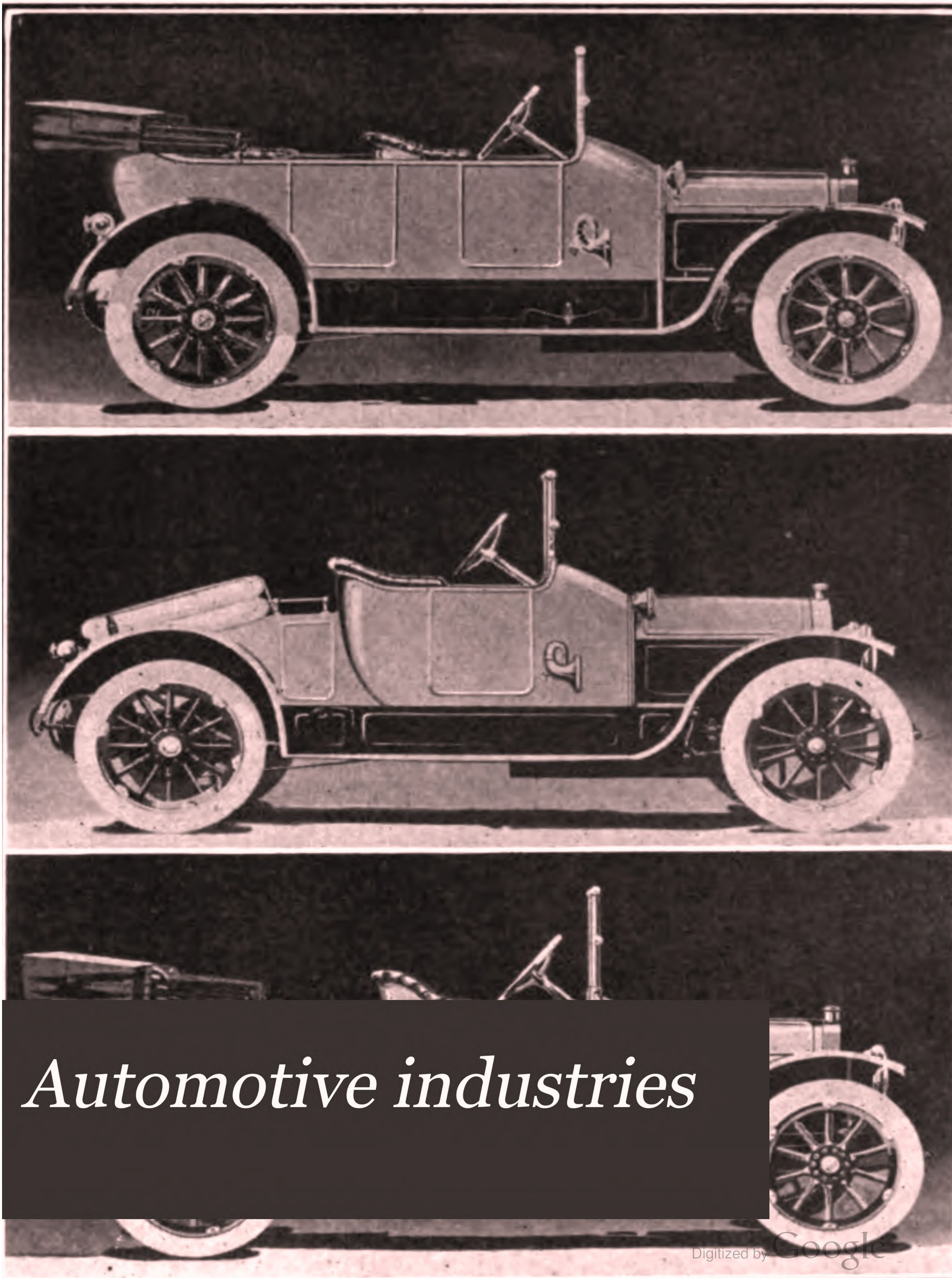

Automotive industries

The AUTOMOBILE

A Journal of Automobile Progress and Construction

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THE CLASS JOURNAL COMPANY

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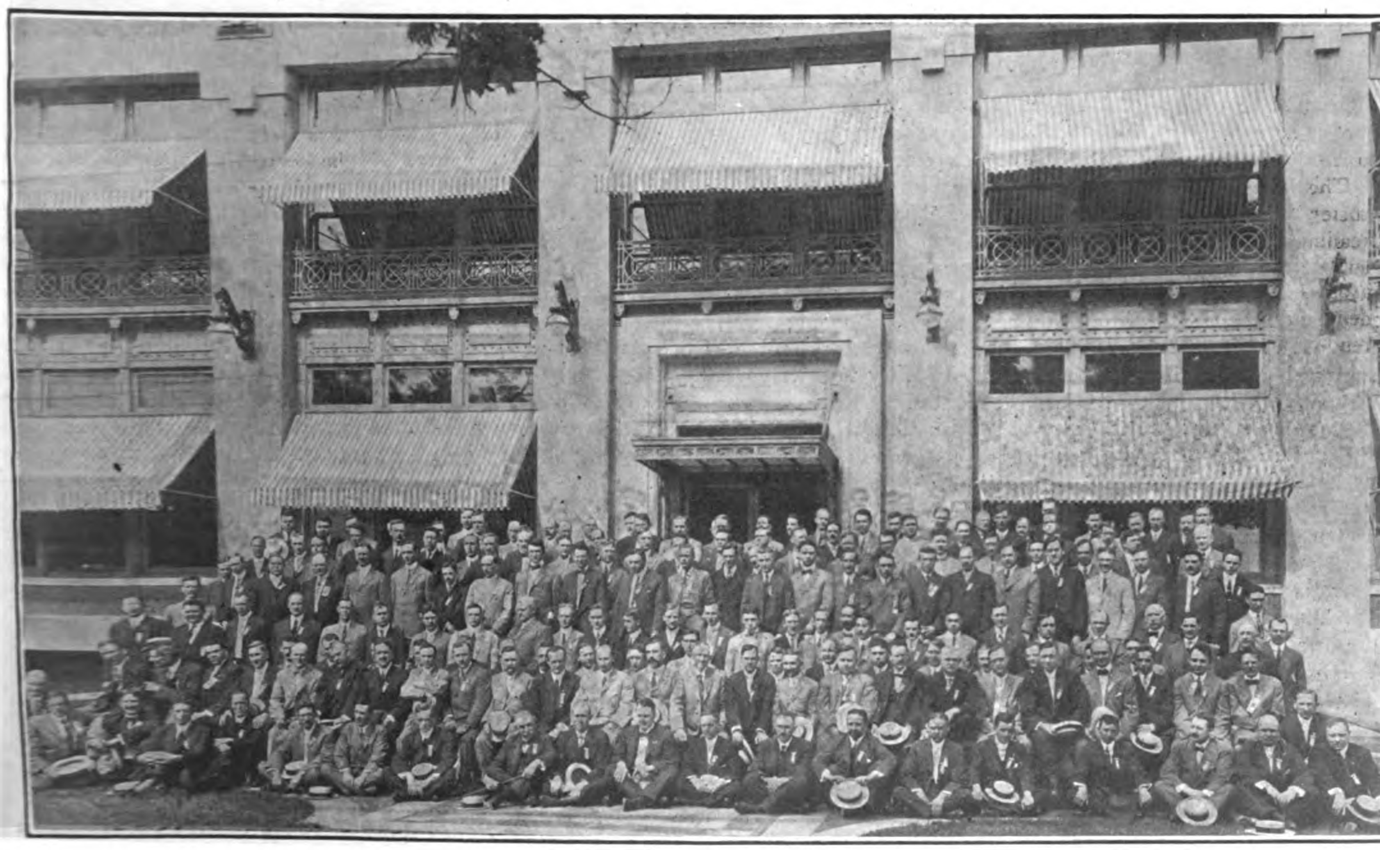
VOL. XXVII NEW YORK—THURSDAY, JULY 4, 1912—CHICAGO No. 1

THE AUTOMOBILE

Standardization Is S.A.E. Slogan

Shipboard Convention of the Organization Most Successful in Its History—Four Hundred in Attendance—President Donaldson Outlines the Future Work—Several Valuable Papers Read and Discussed



S. A. E. delegates assembled in front of the Ford office building, Detroit, previous to an inspection of the plant

DETROIT, MICH., June 29—The regular midsummer meeting of the Society of Automobile Engineers ended one of the most useful sessions in its career when the steamboat City of Detroit landed at the dock at 9 o'clock this evening, after a two-day cruise to Mackinac Island and return, during which time the regular sessions of the society were held on ship. Never before in the history of automobile associations in America has there been such a unique meeting, namely, discussing automobile topics on board a ship on the high seas. Happily the one-half day's experience two years ago on shipboard with its cooling breeze and quietness suggested the possibilities of an entire convention on water rather than land, and when the hustling Detroit entertainment committee was assured of the meeting being held in the city, it did not take long to suggest the chartering of a ship for the society and their wives, sisters and daughters.

On Thursday morning, when the convention was called to order by President Donaldson in Convention Hall in Hotel Pontchartrain, it was found that a record breaking attendance was to be on hand and that with the ladies the number attend-

Convention hall in the Hotel Pontchartrain, Detroit, where the open meeting of the society was held

ing would be over the 400 mark. Undoubtedly the thought of combining a holiday with a business trip appealed very strongly to many in the society, and hosts of new faces were present.

The three-day session was one of the best in the life of the society from the viewpoint of work done. The work consisted of reading and discussing professional papers presented by members of the society; presenting of various reports by the standards committees, and acting on them; the reading of the president's address, and general routine business, including society reports on membership, finance, etc. The treasurer's report showed a balance of over $3,000 in the treasury in spite of the many heavy expenses of the last six months.

President Donaldson in his presidential address outlined the varied activities of the society during his period of tenureship, beginning with last January. He drew attention to the growth in membership, 209 members having been enrolled since the first of the year, this representing an increase of 60 per cent. over a similar period a year ago. He drew attention to the new headquarters in the Rubber building on Broadway, New York, near Columbus Circle, where open reading rooms are provided for the use of the members when in the metropolis. Since his installation in office the society has begun the publication of *The Bulletin,* a monthly organ, in which the official announcements are printed, as well as professional papers read before the society or its sub-sections in Detroit, Indianapolis, New York, etc. A feature of *The Bulletin* is the employment bureau, in which appear notices of vacant positions as well as notices of those in search of positions. The issuance of handbook data sheets continues from time to time as conditions demand. The society has secured the co-operation of the Automobile Club of America, which has placed its laboratory at the disposal of the society, and from which much valuable data is expected to come. The society during the past six months has been working hand in hand with the National Association of Automobile Manufacturers in the matter of standardizing truck features. The two complement each other, the National Association limiting its activities to merchandising the truck, covering warranties, loads and speeds, whereas the S. A. E. is working along technical lines with the hope of standardizing wheel sizes, tire sizes, and investigating generally the truck field. President Donaldson closed by drawing attention to the collection of historical data by the society and also touching at length on the work of the standardization committee of the society, which is thoroughly reviewed in this issue.

Undoubtedly the biggest factor in the convention was the lucid and emphatic exposition of the works of the standards committee of 100 and the various sub-committees. During the past six months there have been many caustic criticisms circulated on the work of the various standards committees, some engineers imagining that the society was going too far in the work and that some of the new standards set up were going to prove an injury to the industry. Chairman Henry Souther read an exhaustive paper on the subject, in which he clearly defined what is meant by standards, showed exactly what each sub-committee has been doing and pointed out tersely that the standardizing work is not the ideas of a few men, but of the entire industry. There are not any star-chamber proceedings in the matter; it is general discussion with the collection of data from all manufacturers. This matter is treated in detail in the opening pages of this issue.

Montagu on Standardization

AT the morning session, Lord Montagu, a British pioneer in motoring, who has been traveling in this country for several weeks, was present and addressed the society on the matter of standardization. He said in part:

"I esteem it a great honor to say a few words as I represent to a certain extent English automobilism. I listened to your president's address with great interest, as I saw in it reasonable standardization the same as is being aimed at today in England. But as in England, so here, you will have some difficulty if you try to raise standardization too high. There are several difficulties that will arise if you try to go too far in this work. In the first place your trade is very international, as can be seen on the main roads of England and France, where you see American-built cars in great numbers, and in considering standardization and replacement of parts you must take into consideration the standardization of the industry as it is carried on in England and France.

"Second: When people talk standardization they forget that all

invention must come as a spur of dissatisfaction. Some engineer has become dissatisfied with some part of the car and sets about to correct it; and in this great automobile movement it would be a disastrous error to place a limit on inventive genius, or, in a word, to say how the coat should be cut or how the hair should be trimmed, as it is only in certain directions that standardization must be carried on.

"Standardization has many advantages to the car maker, and the car buyer; but do not press it too far if you want to continue healthy rivalry and research work. Standardization pressed too far is bad.

"In England and France we are all endeavoring to standardize where possible. To be specific, we might have two, three or four sizes of wheels, but standardization work would simplify the work of wheel and tire makers. You can standardize on nuts, bolts, rivets, tubes, steering wheels, but if you go into carbureters and gearsets, both are today in their infancy, and you would make a mistake if you limited the activities of the engineers in any way in relation to these parts.

"Frequently outsiders see more than engineers in a problem of this nature; taking a survey of this great world-wide revolution of transportation—the automobile—you are talking on something that cannot come for a number of years.

"Take a parallel in locomotive engineering: Not until the last few years in England and France did they have any standardization, while here I see a difference, as a locomotive for hauling freight from Buffalo to Cleveland must be entirely different from one needed to haul from Kansas City to California over the mountains. The different loads and road conditions call for differences in locomotives.

"On behalf of the English engineers, we desire to co-operate in this great work, and we are glad to welcome you and your cars in our country, as it spurs our makers to higher efforts and we appreciate your cars on our shores."

List of the Papers Presented

NEW records were established at the different sessions by the discussion that followed the reading of professional papers and the presenting of reports. A year ago it was difficult to get members into discussion at former meetings, but during the present one the discussion was so great that the program was not half completed, and the reading of many papers was postponed to the midwinter meeting, which will be held in New York in January. The papers presented were:

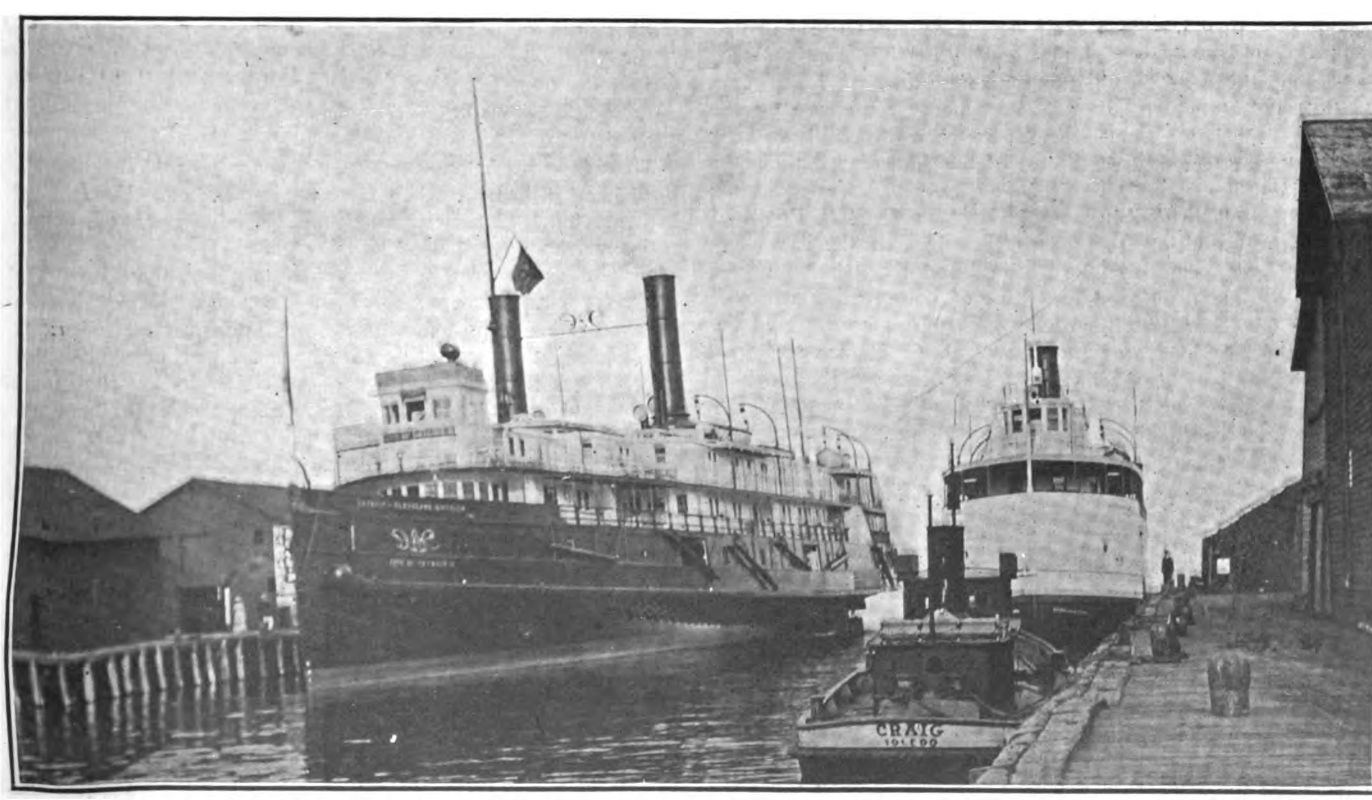
"Motor Sizes and Drive Ratios for Commercial Vehicles," by Eugene P. Batzell; "A Comprehensive Motor Test," by Herbert Chase; "Standardization and Co-operation in Motor Testing," by Herbert L. Connell, and "Worm Gears," by Frank Burgess.

Among the papers that were laid over until the midwinter session were: "The Effect of Relation of Bore and Stroke in Automobile Engines," by John Wilkinson; "Stability of Automobile Propeller Shafts," by J. M. Thomas; "Methods of Brake Capacity Determination," by S. I. Fekte, and "Leaf Springs," by L. J. Lane. Some of these articles will be considered next week.

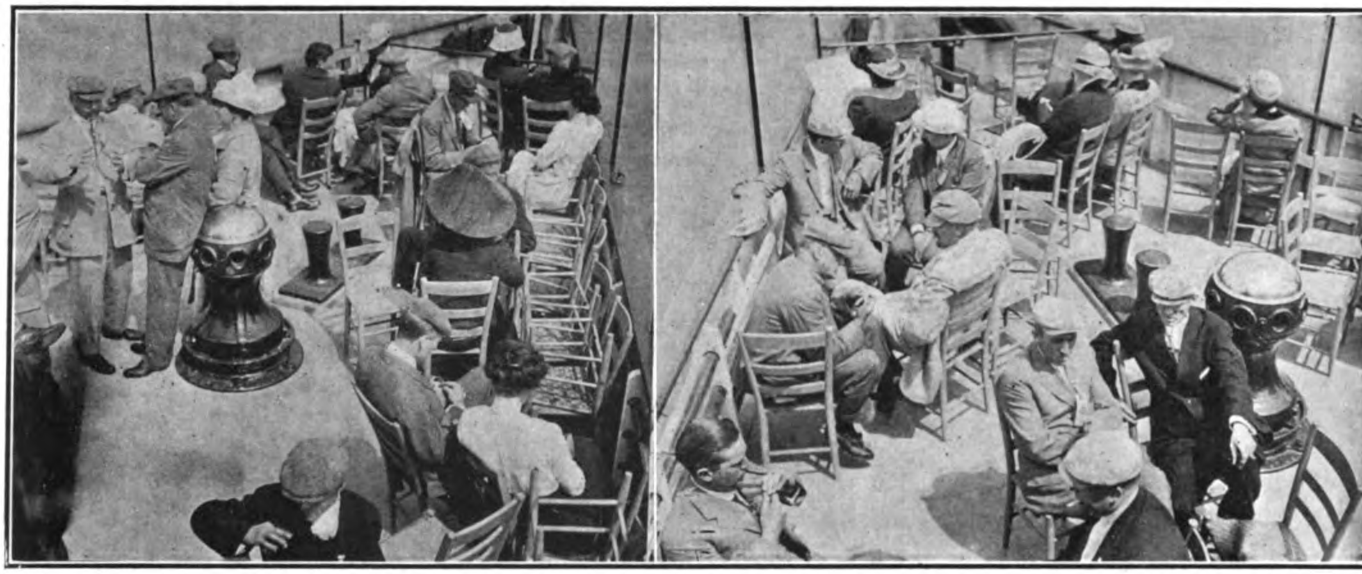
The presentation of reports of the various standard committees is always an important factor in regular sessions, but time did not permit to have all of the reports presented, several of these having to go over to January. Of paramount importance in the standard report field was the accepting by the society of the fourth report on carbureter fittings. This report has had a stormy career. It pertains to standardizing the size of flanges on carbureters for attachment to intake manifolds, so that the same intake manifold can be used for different makes of carbureters. At present it is generally necessary to make a new manifold when a carbureter is changed. The report also covers the matter of uniformity in connection for the gasoline pipe to the carbureter, and also the water connections with the carbureter jackets. After brief discussion the report was adopted.

The report on broaches was read by C. W. Spicer, and discussion postponed to a later session, but lack of time prevented a return to the matter, which will come up again at the midwinter session.

W. P. Kennedy, chairman of the committee on truck standards and also on wheel dimensions and fastenings for tire division, offered an oral report, stating that his committees had not any new recommendations to make, as there are minor details to settle in the present matter of standardized wheel sizes. The committee is making haste slowly, being sure of its ground in truck work before advancing. The committee wrote to wheel makers for trucks, asking them if they considered the work the



The good ship City of Detroit II which carried the engineers safely over the unsalted seas



The bow was a favorite gathering place for the engineers and the ladies. On the left Albert Champion is seen talking with his hands

committee was aiming to standardize as practical; if it required modifications; if it had been an advantage to them, and if it had caused any complications in their work. The correspondence asked if the new standards were resulting in a saving of time and money, and also what percentage of their product was being manufactured according to S. A. E. standards. The replies showed that 90 per cent. of the makers are working to the S. A. E. standards and all new work is being laid out according to such.

In reporting on the truck-standard division, Chairman Kennedy said that the committee was collecting data on truck specifications from all sources. The class papers had published many data sheets on trucks at show time, but there is need for much more. It is necessary to have complete and accurate information before certain steps can be taken toward standardization of parts, as has been accomplished in the touring car field. Several makers have objected to furnishing all of the data on the ground that they imagined their details of construction would be given country-wide circulation and so get into the hands of their competitors. The chairman assured them that any data obtained would be treated with the utmost confidence by the committee, much the same as stock-car specifications have been handled by the technical committee of the American Automobile Association.

E. T. Birdsall, in the absence of Chairman Cecil P. Poole, of the data-sheet division, told of the activities of the committee in collection of data for the society, and the tabulation and filing of it. He mentioned the work of co-operating with the United States Standard Bureau by the Detroit section and the benefits that would accrue therefrom. J. C. Heinze spoke on the advisability of establishing a society testing laboratory in Detroit, for the general use of the members. He suggested Detroit in preference to New York because of the large number of motor companies in the city, and also the proximity of Cleveland and Indianapolis. The matter was by motion referred to the council of the society for action.

Visit to Ford Company's Plant

The society accepted as recommended practice the Ediswan socket for electric automobile lights. Chairman Churchward stated before the general meeting of the standard committee that a full report could not be made as the sizes of sockets fixed upon by the division would sooner or later have to be made larger to meet the demand for stronger lights. Mr. Churchward stated that the 16-candlepower, 6-volt lamp, as suggested by members of the committee, will give two and one-half times the light of a three-quarter-inch acetylene-gas burner. He therefore believes the now generally used 16-candlepower lamp to be sufficiently large, and that as soon as larger lamps are used there will be legislation against them on account of their blinding other drivers.

President Donaldson

Ex-President Souther

Thursday afternoon was spent in an official visit to the Ford plant in Detroit, where open house was held. Henry Ford had previously intimated to Chairman Coffin of the entertainment committee that all locks had been thrown away for the afternoon and everything was wide open but the safe. The engineers spent over 2 hours in the plant. Much interest centered in the almost endless rows of automatic machines that continuously turn out parts for the Ford machines. Next of interest was the great number of multiple-spindle drills, those in some cases drilling holes into the four sides of a motor casting simultaneously. The assembly plant had its stores of interest in the quick dropping of the motor in position by three men; positioning the dash by a single man; mounting the front axle unit; a few minutes later attaching the rear axle unit, and finally bringing the body on and running the car away not long afterward. Many large additions are being made in providing for the extra output of next season.

The Indianapolis section of the S.A.E had a surprise in store for General Manager Coker F. Clarkson when through spokesman Wall it presented the general manager with an automobile as an indication of the appreciation the section bears for him. As the car had not been selected a tin toy one was presented. Mr. Clarkson was in complete ignorance of the plan to present him with an automobile, but it had been formed several months ago by the members.

President Donaldson's Address to the S.A.E. Convention

IN welcoming the members of the S. A. E. on the occasion of the semi-annual meeting of the society, your president is able to report that the affairs and activities of the Society are in a very satisfactory condition. The growth in influence of the society is reflected in the steady increase in membership, which now exceeds 1,300, a gain of about 60 per cent. over the total membership at the time of the 1911 midsummer meeting.

As you are aware, the Membership Committee has taken hold of the work vigorously and, with the active co-operation of the members, the results have been very gratifying. The work of the committee and the supervision of the council in passing upon the membership applications have been conducted in accordance with the provisions of the S. A. E. constitution.

Since the last meeting of the society in January, the headquarters in New York have been removed from 1451 Broadway, at Forty-first street, to the new twenty-story building, 1786 Broadway, corner of Fifty-eighth street, in the center of the metropolitan automobile district. A serious effort had been made to secure suitable quarters in the Engineering Societies Building, on Thirty-ninth street, but there was no unoccupied space that could be adapted to the uses of our society.

The present quarters are close to all means of transportation on Manhattan Island and provide a practical home for the society on an economical basis. The members' room on the twelfth floor, about 30 feet square, commands a magnificent view of Central Park, Columbus Circle, upper Broadway and the Hudson River. This room has been comfortably furnished for the exclusive use of the members and contains files of the automobile publications, writing desks, stationery, telephone, etc. The management urges all members to make frequent use of the quarters, especially those who live outside of New York and who have need of office facilities during their stay in the city. Secretary Coker F. Clarkson is prepared to give a hearty welcome to all visiting members.

Band of engineering redskins who entertained visitors

During the past three months the regular monthly publication styled the *S. A. E. Bulletin* has been undertaken and will be continued regularly hereafter. This provides a convenient means for periodical communication to the members of information about the activities of the society. It is in convenient, readable form, so that it can be preserved for constant reference and already has been found to be an effective substitute for the mimeographic sheets which are now used only when it is necessary to send out important notices between the dates of publication of the *S. A. E. Bulletin.*

A feature of the *S. A. E. Bulletin* is the listing of "Men Available" and "Positions Available" for the information of the members. This is the outward sign of an employment bureau maintained by the society for the service of which no fees are charged. The bureau has been very successful in filling vacancies for employers and finding positions for members suited to their capabilities.

Standards Development Has Been Great

In no other direction has the society so effectively contributed to engineering progress and the good of the automobile industry as in the development of the so-called standards. Of all the activities of the S. A. E., the standards work has been the most discussed—the most praised and the most abused. The society is fortunate in having for chairman of the Standards Committee a member who combines brawn with brain—although up to the present time his combats have been confined to intellectual encounter. An old proverb says that "The proof of the pudding is the chewing of the string," and so while the mastication of the string has occupied the exclusive attention of some, others have already digested the standardization plums and appear to be well fed and happy.

Talking it over between times—although all the conversation was not devoted to technical matters

Looking down upon Mackinac landing and harbor from the old fort on the heights

The angles of approach are a delightfully Euclidean study. Some even assert that the term "standard" is a misnomer, which assertion recalls to mind the Shakespearean reference to a rose. What is a standard? Astronomers tell us that some of the celestial bodies get askew when the notion seizes them so that even such fixed and irrevocable things as stars become unstandardized.

Coming down to earth, we have the case of monetary standards which are not really standard—witness the proposal to coin one-half-cent and three-cent pieces in America, and the abandonment of the guinea, the three-penny and four-penny pieces in England. And so with the standards of weights and measures—witness the sustained effort in England to substitute metric for imperial measures.

Recommended Practice Still Standard

Others suggest the abandonment of standards, foreseeing the impossibility of getting nation-wide acceptance. For such there is encouragement in the history of the metric system. About forty years after its adoption by France, the government was obliged to pass laws providing severe penalties for the use of any other system of weights and measures. The S. A. E. standards have had a more speedy acceptance, even if they have been only "accepted" by the society and not "adopted," a fine distinction that gives comfort to many able minds.

As a result of familiarity already gained in standards work, and having in mind the long continued and highly successful standards experience of the Master Car Builders' Association, the council of this society has decided that in future the conclusions reached by standards committees will be designated "Recommended Practice." When such practice is confirmed by general usage, the term "standard" may be applied. To suggest standards applicable in perpetuity is to assume a lack of information and capability on the part of those who will take up the work of construction and research when we are only a memory.

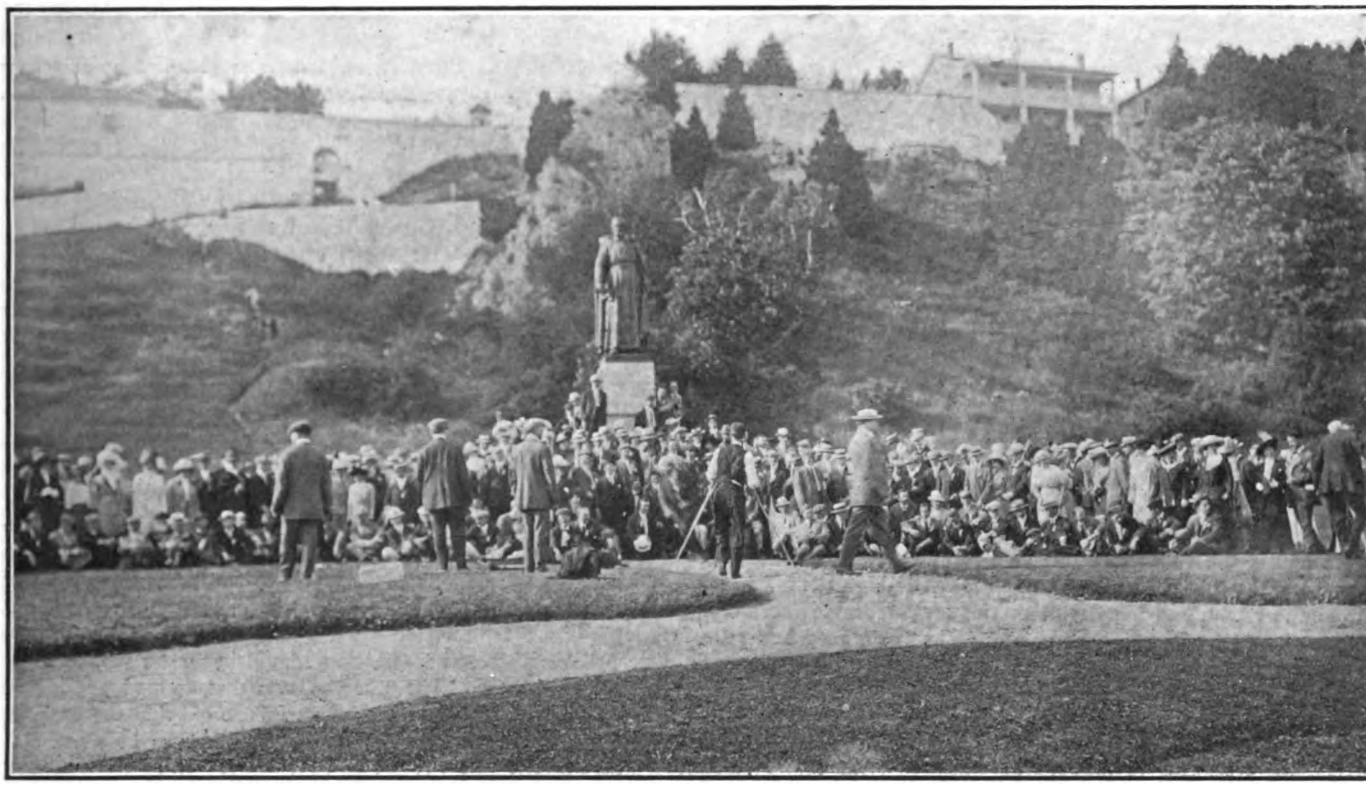
It will be the pleasure of the members to listen to a complete exposition of the scope and purpose of the Standards Committee's work by Chairman Henry Souther at the first professional session of this meeting.

The important work of revising and adding to the S. A. E. handbook has been entrusted to a new professional committee styled the Handbook and Data Sheet Committee. This committee has been selected with a view to the special experience of its members in such work and has now in its possession a large amount of engineering data which will be critically examined and edited for publication. As the work of this committee is one of the most important undertakings of the society—of direct benefit to a large majority of the members—the active co-operation of every member is invited. Contributions of data, whether in tabular or graphic form, or as memoranda, will be thankfully received by the committee. The data sheets already issued are of great value to automobile engineers and are really an indispensable part of the designers' and drafting room equipment.

Every member of this society recognizes that there are many obscure problems connected with the design and construction of motor vehicles that are still unsolved. The habit of mind which is best fitted to cope with problems of production is not the most efficient when applied to the consideration of abstractions. Much good work has been done in the service of motor car manufacturers, but there is always present, even unconsciously, the limiting effect of a salable product, which indeed is the ultimate purpose of the so-called experimental department of the automobile factory. It will, therefore, be of much interest to the members of the industry to know that the society is now in correspondence with the United States Bureau of Standards, in Washington, for the purpose of reaching a basis of agreement whereby the bureau can conduct scientific investigations of problems in carburetion, ignition and the like. It is unnecessary to lay an emphasis upon the value to the industry of determinations reached by the U. S. Bureau of Standards which is pre-eminently the scientific authority in its field in America.

Co-operation upon somewhat similar lines has also been promised by the laboratory of the Automobile Club of America, and the laboratory of the University of Michigan, both of which are well equipped in personnel and material to assure the most valuable results.

Another gratifying development of the standards work of the society is the approval of the S. A. E. motor truck wheel standards by the National Association of Automobile Manu-



The entire party assembled around Marquette's monument on the slope in front of Fort Mackinac

facturers. Also, at a recent conference between members of the S. A. E. Truck Standards Committee and the N. A. A. M. Commercial Vehicle Committee, an agreement was reached whereby the work of the two committees will be co-ordinated, the N. A. A. M. committee confining its investigations and recommendations to standards of a commercial character, and the S. A. E. committee to those of a more technical character, relating particularly to chassis construction. At this conference the cordial relations existing between the two great organizations in the automobile industry—the one commercial in character and the other technical—were strengthened and a united effort for the good of the industry agreed upon.

Your president recommends that a serious effort be made by the society to accumulate historical engineering data for preservation in our library. There are, doubtless, many drawings and photographs of early models now available which will have a constantly increasing historical value and which, owing to their obsolete character and the usual limitations of storage space in a manufacturer's office may be destroyed. It ought to be one of the functions of this society to collect and preserve such material and the co-operation of all members is invited.

In conclusion, your president believes that the society can view with satisfaction the technical work it has already accomplished and use this as an incentive to further and greater effort. As the representative of the technical branch of one of the greatest engineering industries in the United States it has a broad field for usefulness and achievement. And keeping step with its engineering progress the society can fulfill a high purpose in bringing into intimate association the technical men of the industry upon whom its very foundations now repose.

Reports on Standardization Committee Work

DETROIT, MICH., June 29—A standard is that which best endures the test of time; that which changes when demand necessitates, but otherwise stands towering aloft amid the maelstrom, an enduring beacon by which the masses shape their course.

Standardization is the last word in mental satisfaction: The mind craves completeness; it will endure the imperfect, the makeshift, the temporary, all of which become stepping stones to the eventual, only until it can go further towards the goal.

In mechanics standards are accepted practices in design. A score of automobile makers decide on a uniform size of magneto base, they vote their approval, and that size becomes a standard. It may be a standard for a year, for 5 years, or, perchance, for a century—it remains standard practice until those interested declare that it no longer possesses that completeness that conditions demand; then it may be altered into a new standard.

The automobile industry in America has done more to develop standardization in the last 2 years than any other existing industry. Here has been an infant industry, everybody rushing into it and everybody doing everything in a different way. Pedantic engineers refused to imitate established practices and went off at tangents; dark clouds arose. Everything became at sixes and sevens. Makers became laws unto themselves; engineering and manufacturing anarchy was invited.

One automobile engineer would make a water tubing 1-64 inch larger than another simply to be whimsical and different; another insisted upon a special spark-plug size; a third had 100 different sizes of lockwashers in his automobile, when 10 would have been better; to a fourth it was a different size of carbureter flange; a fifth demanded a wheel felloe 1-32 inch wider than his rival; and from Alpha to Omega multitudinous sizes and multitudinous shapes produced confusion and cost of manufacture that worked destruction to treasury reports wherever such prolific extravagances of engineering hallucinations were permitted.

At the crucial moment a solution presented itself. The Society of Automobile Engineers recognized the gravity of the situation, saw the needless cost to the manufacturer of such a promiscuous medley of shapes and sizes, saw the drain on the pocketbook of the owner for hard-to-obtain replacements, and, surveying the troubled waters, appointed an arbiter.

Frank Burgess faces camera

C. E. Duryea disagrees

It was a committee on standardization, 100 men selected from the automobile industry, men representing the manufacturer, men representing the consumer, and men representing both the producer and the consumer. This committee of 100 selected a leader, an engineer who had lived with the industry from its inception, Henry Souther. Once a head was selected, it organized for the fray, dividing into committees and sub-committees until the entire field was covered. Then began the campaign. Before standardization could come, present methods must be known. Huge data sheets were provided, sheets on which makers could give all of their sizes for parts, permissible variances in sizes, etc. These reached every factory from the least to the greatest. Some were filled out, some were not. Not until they got these sheets did many makers realize the hopeless situation they had unconsciously drifted into. The data collected were segregated and tabulated, and for the first time the gross irregularity of manufacture and design became apparent. The tabulations were distributed widespread over the industry, and so discussions and conferences eliminated hosts of constructions.

A new dawn was breaking. The light of standardization was breaking across the firmament. Instead of the hundred sizes, makers by vote agreed to accept two or three; the rest went into discard. Soon makers of tubing found it possible to fill orders from stock by return delivery, instead of having to put a special order through the mill, at big expense and long loss of time. Soon the car owner found standard parts creeping into his machine, parts that could be purchased in Galveston or Portland just as well as at the factory. Soon standardization became a boon to car owners as well as to manufacturers.

But there are conservatives and anarchists in every movement, and the standardization conservatives and anarchists soon exhibited themselves. Some engineers imagined that soon their positions would be eliminated, standardization would eliminate them. They imagined the end of their usefulness at hand. It looked to them that all was standardized, even inventive genius. Then opened a guerrilla warfare. There was some fighting in the open, but many preferred the bush tactics.

Souther on Standardization

Once more came a satisfying solution. It came only this week, and the war zone was the Mecca of the industry—Detroit. Chairman Souther, of the committee of 100, led the attack. From start to finish he reviewed the work of standardization by the Society of Automobile Engineers, showed the thousands of dollars it had saved the makers, showed the thousands of dollars it had saved the car dealers and showed the thousands of dollars it had saved the car owners in outlay and in time.

The occasion selected was the annual midsummer session of the society held on board ship between Detroit and Mackinac Island and return on Thursday, Friday and Saturday of this week. Nearly 200 members mustered for the attack, and when led into the fray the advocates of standardization presented so irresistible a battle line that the attacking force was routed.

Chairman Souther opened the engagement in mid-sea, the bosom of Lake Huron being the zone and the aft main cabin on board steamship City of Detroit II the immediate scene of activities. The opening shot was fired at 10 o'clock Friday morning, from which time for over 2 hours he outlined the work from its inception up to the present moment; and where conviction was then wanting, it was secured by a score or more of reinforcements who for a year or more have been making dollars for their factories by utilizing the advantages of standardization.

President Souther presented the work as follows:

The subject of standards and the work of the standards committee of the society seem to be so misunderstood to those not in close touch with the work that a paper of some length, which shall take up the matter in detail, seems desirable. There is a great variety of viewpoints taken by those who comment and criticise.

It is safe to say that all approve of some standardizing work and freely admit that some standards are possible. There is the class which believes that a standard, in order to be worth anything at all, must not be adopted or recommended until everything is known about the subject. In contrast, there is the class which seems to believe almost anything can be standardized and which would go to very great extremes in the matter. There is apparently a sharp division of opinion between these two groups. One believes that standardization should begin early in the history of an industry. The other believes that no standard is possible in an industry until such industry is so old that the probable changes in the proposed standard are few and far between.

Standardization Where Possible

The opinion that standardization should start early in the history of an industry has many arguments back of it. Perhaps the best one is that there are no partial standards that must be undone. The opposite view is that sufficient knowledge does not exist in a young industry to enable a standard to be adopted that will possess any enduring value. It is argued that frequent changes will be necessary and therefore no standard is possible.

In this last phase of the situation, the policy of the Society of Automobile Engineers seems to solve the question. It is believed by the council and those in charge of the society's work that standardization must be started as soon as possible. With this in view, committees having to do with the most recent things in the art are settling upon a few points that all can agree upon at the moment. Then there are a number of other items or points in construction or detail that are questionable as standards. Portions of the sub-committee considering the subject may believe that certain details ought to be standard and other portions of the committee may believe they should not. These

SOME STANDARDISMS

The adoption of a standard is not compulsory; it is voluntary.

Standards should be accepted as readily as possible and kept up-to-date by following the art closely and making such changes as time deems necessary.

To some men the word standardization means the same as the red flag to a bull.

Standardization is not intended to usurp the engineer's position but to facilitate his work.

A standard should represent the collective knowledge of all concerned, rather than the narrow viewpoint of one man or a small group of men.

Affirmative action and approval on the part of the S. A. E. as a whole carries with it the recommendation of the matter as standard.

Standardizing is not hampering inventive genius; it is helping it.

Sufficient knowledge does not exist in a young industry to enable a standard to be adopted that possesses an enduring value.

The records show that all standards have been changed; some of them very seldom and others frequently.

disputed points are fully discussed and the discussions put into the records of the society, so that all members may know what is being considered at the time.

Then there is a third class of information that it is clear to all cannot be used as a standard or as part of a standard. Nevertheless, much of it is excellent material from an engineering standpoint and may even some day come to the quality necessary to form a standard. Such material is put on record and forms part of the engineering knowledge of the society.

The springs division of the standards committee is at this time confronted in a marked degree by the foregoing conditions. There is apparently little that can be even suggested to the society as the basis for a standard; and yet a large amount of engineering data is being gathered by this sub-committee and placed before the members of the society for their information.

The life of a standard is the cause of much discussion. Some believe that if a standard is not everlasting it should not be designated standard, others that a standard is subject to change at any time. Those of the first school would probably adopt but very few standards, for the simple reason that in this age and industry evolution is so rapid that there would never be a time when it would appear that changes were not possible. Consequently, it is the belief of your standards committee that standards should be accepted as rapidly as possible and should be kept up to date by following the art closely and making such changes as may be necessary from time to time.

To me it seems that portions of a construction may be standardized at a given time and that other details must wait further developments. It is most desirable to have the few agreed points standardized rather than do nothing at all.

Makers Demand Standardization

Perhaps the word standard interferes with the understanding of this subject. For instance, a standard pound or kilogram remains the same forever; also the standard foot or meter. There can be no such thing as this in any industry that progresses. It would seem, therefore, that the word standard should be understood as applying not only to those objects which are never to be changed, but also to those that are standard for the time being.

Your committee realizes perfectly well that too many standards, or ill-considered standards, are worse than none at all, and that it must not go too fast. But it also realizes that there are certain things that must be standardized to save untold confusion. It is in receipt of occasional demands from members and from corporations that certain things be standardized. Just at present there is the sharpest possible demand from a large producer of truck axles that the society shall standardize the tread of trucks and a few other items related to the axle. The statement is made by this corporation that if some standard is not forthcoming at a very early date it will create its own.

The whole question of standardization is interesting to the engineering world. It is viewed with the most favor by those who have gone deepest into the subject.

A view of a standard apparently taken by some contemplates the fact that a standard once adopted by the Society of Automobile Engineers must be used by all its members or else they shall forfeit their rights to membership or citizenship or something else not expressed. This is certainly not the case. A standard, in order to be accepted, must have so much merit that engineers or producers or executives will see good reason for its acceptance. Good engineering design may be the reason why it is worthy of universal adoption; easy manufacture may be another reason why it should be adopted and become standard practice; and low cost is a reason why the business organization would say to the others involved that it must be adopted. As a matter of fact all three of these qualities will usually be found in any good standard. The adoption of a standard is not compulsory; it is voluntary.

There are many details that should not be standardized and many that cannot. For example, to set forth a detail standard design for an I-beam front axle or a front axle of any design or shape would be manifestly impossible. The shape and weight of an axle for any given car depend upon so many details connected with that particular car that it might be absolutely wrong for all others. Similarly, a set of transmission gears suitable for one car could never become the standard for all. A set of springs suitable for a given type of car is rarely right for any other; therefore, it is out of the question to attempt to standardize springs as a whole or sets of springs as a whole. A standard engine design would be equally absurd and ridiculous. Such a standard would presuppose absolute perfection in every detail.

Carl G. Fisher and William G. Wall D. F. Graham

SOME STANDARDISMS

It is out of the question to standardize springs as a whole or sets of springs as a whole.

Some think that because bearing dimensions are standardized that the materials are; nothing of the kind is possible.

All agree that there are altogether too many sizes of broaches and that standardizing should progress.

There is not any attempt to standardize carbureters, but simply carbureter flanges and gasoline and water connections.

It is a grave question as to how much of an automobile frame is susceptible of standardization.

When the lock washer standardization was started there were 700 different sizes and shapes of lock washers, and now after standardization there are twenty-eight.

Before standardization started there were over 1600 different sizes of tubing; now with standardization of sizes there are 161.

A construction or design that is good becomes standard rapidly.

After a period of probation, extending over an indefinite length of time, recommended practise may be promoted to a standard.

Discriminating Is Essential

There are many more details of a car that should not be standardized. To draw the line in a practical way between that which is fit material for standardization and that which is not is the work of your standards committee and of the whole society. A standard should certainly represent the collective knowledge of all concerned, rather than the narrow viewpoint of some one man or small group of men. Various interests must be involved. There are always at least two—the producer and the consumer. There may be several; for example, the producer of the raw material, the manufacturer who shapes it and, finally, the consumer of the finished article. There is usually the sales interest between the other interests.

The standards committee as a whole consists of 100 members. The membership is made up of men possessing every variety of


J. G. Perrin wore his smile


Howard Coffin looking for the right door


Kennedy is a trifle skeptical

knowledge in the automobile art; at least such is the intention. The standards committee as a whole is too large to consider originally each and every possible standard as a committee of the whole, and for this reason it has been divided into sub-committees or divisions, consisting of a relatively small number of men, all of whom are interested in and qualified on the particular topic being considered. These divisions are made up as far as possible, and where necessary, of consumers and producers of the object or part under consideration. The chairman of the division, as a rule, suggests certain standards or possible standards. These suggestions are considered at meetings and through correspondence. The consumer expresses his objections to any proposed standard and the producer also states his. Providing they do not get together unanimously, there can be no fully effective standard.

Once a report is made by one of these divisions or sub-committees it is submitted to the standards committee as a whole. The subject matter is put before them in writing and also in open meeting. If the standards committee as a whole approves of the work of the division committee, then the matter goes to the council of the society, carrying the standards committee's recommendation for acceptance. The council decides whether or not it shall be put before the whole society in open meeting for discussion. If so, a printed report is prepared and laid before the whole membership of the society, so that all may be familiar with the substance of the proposed standard. Discussion is invited in every possible manner and adverse criticism usually causes the report to be returned to its division for reconsideration or alteration.

Standards Are Not Unalterable

Affirmative action and approval on the part of the society as a whole, by those present, carries with it the recommendation of the matter as standard. It is then put on record in the Transactions of the society and placed before the membership, for ready reference, in data sheet form in the handbook. This, as already stated, does not mean that the standard can never be changed. The sub-committee are not discharged, but continue their work whenever there is a need for any further change or advance. Every change must receive the same careful scrutiny of sub-committee, full committee, council and society before being recommended.

It seems advisable to summarize the work of the various divisions of the standards committee at this time. Some progress has been made and some standards have been accepted, but there are many more in process of consideration.

As stated, these sub-committees or divisions do not go out of existence because their work has apparently been completed. They are continued in case any new developments in their line arise. There is no better illustration of this than the Aluminum and Copper Alloys Division. Bearing in mind that this division is considering and recommending aluminum and copper alloys, it is made up of four producers and five consumers. In meetings and by correspondence the questions pertaining to this line of work were thoroughly discussed and the conclusion reached that the alloys which they have recommended are suitable ones for the purposes intended. The producing element of the division agrees that it is able to furnish, commercially, alloys containing no more impurities than permitted by the *Society of Automobile Engineers'* specifications. The consuming element has testified, by its acquiescence to these recommendations, that it is satisfied these alloys can be purchased at a right price and that they can be manufactured into the articles for which they are intended without undue cost.

Standardization Helps Buyers

This is very valuable information for the members of the *Society of Automobile Engineers*, whether the results be called a standard or not. It means that a purchasing agent buying for any of the engineers present will be safe in calling for bids for alloys of aluminum or copper in accordance with the specifications as printed. The purchasing department is perfectly sure that it will not be laughed at by the producer because in its ignorance of the technicalities involved it is asking for something that is impossible. It is certain that no fancy price can be justly asked for alloys in accordance with the compositions specified. The production manager knows that he is not going to have any undue difficulty in machining these alloys, because they are made in accordance with the consensus of opinion of those who are experts in the matter. In other words, they are tried alloys, alloys that have been found to be reliable, strong, easy-machining and reasonable in price. The work of this division is finished for the present, but its members are still waiting for any developments in the art.

The ball and roller bearing division has made several reports and has recommended several standards, some of which have been accepted. The work is by no means complete. There are many difficult problems before the division; problems that are delicate and that require careful, conservative scrutiny before any action can be recommended. This division has been able to decide and recommend a nomenclature for bearings of the annular ball type. Any one desiring to order a bearing of a certain size knows in detail just what he will get. The matter is much simplified in this respect.

The diameter of the bore, diameter of exterior, and axial length of the bearing are clearly defined. Any designer or any draftsman is able to incorporate in his design and drawings definite details with the assurance that what he has pictured may be purchased without extra cost. Many hundreds of measurements are being taken by consumers of ball bearings, to learn what is reasonable and to ascertain what tolerances are permissible and yet will not interfere with the interchangeability of the co-operating parts used by the consumer.

The producer of the ball bearing is equally interested. He wants as great a tolerance as is permissible in order that his manufacturing costs and his rejections, because of inaccuracies, may not be too great.

These two interests are coming together and it is fairly well established at this time that they can agree and that the tolerance under which it will be commercially possible for the producer to work is not too great for the manufacturing accuracy of the consumer. It should be borne in mind that no attempt is being made by producers or consumers to recommend how large a bearing an engineer shall use for any given purpose. That is engineering knowledge; and engineering knowledge cannot be standardized in that sense. One engineer may consider that a factor of safety of ten is necessary under his peculiar conditions. Another may consider that a factor of safety of two is safe under his conditions. Both are equally anxious to know just what a given bearing is like as to shape and dimensions.

To Help Broach Manufacturer

The broaches division is endeavoring to simplify the situation in such a manner that any purchaser may have hope of finding in stock at a reasonable price the broaches necessary for his work. As it is to-day, the broach manufacturer does not dare to carry a stock supply, as does, for example, the manufacturer of twist drills. He has learned by experience that the designer of broached holes will probably call for some peculiarity of detail that will demand a special broach. If a designer has laid down a hole showing corners cut off considerably, the broach must be made accordingly or the gears, for example, will not fit the shaft.

The number of splines and the shape of the splines are being considered; whether three, six or some other number is desirable. It is developing that this is a matter of engineering knowledge, and it may be that this division will decide not to recommend any particular number of splines, but will recommend some definite proportion of depth or width for the spline. All of this can only be possible by entire agreement among all those interested in the subject.

The carbureter fittings division has not completed its work. The definite object of the division is to minimize complication in connection with carbureter fittings. It is a fact well known to automobile engineers, repairmen, and to every one else who has anything to do with carbureters that there are nearly as many designs of carbureter flanges as there are carbureters, and that to substitute one carbureter for another, on any given engine, means some special machine work or fitting. This complication must be done away with; complication means trouble and expense.

This division is not attempting to design or standardize carbureters. It is attempting to standardize carbureter flanges, and gasoline and water connections, so that all these connections may be readily obtained and readily interchanged.

Carbureter Standards Endure

A draftsman may safely incorporate in the design of an engine such flanges and connections as the standards or recommended practice will show. He will be taking no chances and there will be no experiments involved. And the designer need not fear that his engine will be defective because of inferior carbureter connections. Such standards as these ought to endure for many years or until there is a radical departure from our present system of carburetion.

The work undertaken by the frame sections division is a very difficult one. It is a grave question as to how much about an automobile frame is susceptible of standardization. It was learned that there was a good opportunity for standardizing work; that there was an immense number of shapes differing one from another only very slightly. For example, there were some 700 different curves at the front and rear ends of frames, many of them very much alike. This necessitated a tremendous number of dies and all the attendant expense. Nevertheless, the division has found that the degree of curve depends upon several other items in the design of the automobile; the distance above the ground, the desired flexibility of the springs, including their length and curvature, the method of attaching to axles, method of attaching to the frame, and numerous other details. It has not yet been found possible to arrive at any acceptable standards in these respects, although they would seem very desirable on the face of it.

From year to year the shape of the body changes and necessitates a change in the shape of the frame side bars, perhaps even the weight, thickness and width of the side bars. New methods of construction are discovered, such as spot welding and various other means of joining members. More daring engineering is

Howard Marmon ready to object — R. H. Rosenberg incredulous — E. T. Birdsall waits for a reply undertaken and the cross members are incorporated with the side members. All of these details mean change of shape and design. This is one of the best illustrations of the fact that the engineer and his knowledge cannot be standardized. Year after year the engineer must devote his time and energy to the design of a frame which will suit his own particular job, and the draftsman must be carefully guided in every detail in order that the proper frame may be produced. This is not one of the cases where the draftsman can be sent to a data book for standard detail.

The gear tooth shapes division has made no recommendations as yet. It has before it a study of pure engineering, particularly relating to the shape of gear teeth. The automobile engineer knows perhaps better than any other engineer the great importance of exactness as to the shape of the teeth of gears, spur, bevel and spiral. Noise must be eliminated from an automobile, and poor gears are productive of most disagreeable noises.

The work of the iron and steel division is a continuation of that undertaken by the mechanical representatives of the companies that formed the Association of Licensed Automobile Manufacturers. Seven years ago the subject of materials suitable for automobile construction came up for discussion. Their own experience and practices were discussed, and metallurgists and representatives of the steel companies were heard. These men came before the meetings and gave to the members up-to-date information as to the progress of the steelmaking art, and upon this foundation and its yearly development the iron and steel division has built its reports.

Standard Steel Specifications

Specifications for all steels likely to be used by the automobile manufacturer are now before the membership, having been accepted by the society. Engineers may now turn to these specifications and learn what is commercially available and what is safe and reasonable to be incorporated in automobiles. Purchasing agents may safely take these specifications and order materials accordingly. They may feel assured that the materials are not difficult to get and should not carry a fancy price.

It must be borne in mind that these specifications have been closely scrutinized by producers who have been furnishing steel to the automobile industry since its beginning. Equally close scrutiny has been given them by the purchasers who have been buying similar steels for a long time. Both parties have agreed that they are willing to do business with each other on the basis of these specifications, which is very valuable information for our members.

Apart from these specifications, the division has also thought it wise to recommend the printing of certain information as to the proper treatment and handling of the steels specified. What may be expected under certain conditions of treatment and handling has been pointed out.

The reason for the existence of the lock washers division is a very practical one. The lock washer manufacturers found themselves in a very trying position. Every design that came into their office for quotation proved to be a little bit different from any other design previously received. One manufacturer stated that at the time this division was proposed there were some 700 sizes and shapes of lock washers on his books and that, from his standpoint, the situation was absurd. At the same time he did not dare suggest the use of stock lock washers to any of the engineers calling for particular shapes or sizes, for fear of offending the engineer and for fear the engineer had some very good reason for demanding certain very specific details or shapes. There are now 28 sizes of standard S. A. E. lock washers, 16 of the heavy type and 12 of the light type, and these will satisfy all the demands of the automobile industry with the exception of a few special cases.

The benefit of the work of this division permits of no discussion. The engineer, the draftsman, the purchasing agent and the manufacturer are all relieved of much detail work. The engineer instructs his draftsmen to use S. A. E. standard lock washers as far as possible; the draftsman looks in his handbook or in the society transactions and finds the design of the washer and incorporates it in his drawing; the purchasing agent orders a certain number of S. A. E. standard lock washers for a given bolt or screw; the lock washer manufacturer buys his steel of suitable shape from the rolling mill to produce standard washers, and when the order reaches him is able to furnish the standard article promptly.

The nomenclature division is one that is endeavoring to simplify the nomenclature applying to the various parts of an automobile. There is no end of confusion between engineering department and production department, between producers and others, and, in fact, throughout the industry as the result of lack of calling the same things by a uniform name.

The work of the seamless steel tubes division is also the completion of the solution of a problem undertaken by the Association of Licensed Automobile Manufacturers. There is no question about the extreme value of the work of the division and its predecessor. The number of tubing sizes has been reduced enormously—from over 1,600 down to the present number, 161. There is no reason why a designer or draftsman cannot work out any design incorporating one of the S. A. E. standard sizes. This is being done almost universally, and the sheet showing the stock sizes may be found in nearly all the drafting rooms of the industry.

There was a time when the tubing manufacturers received orders for tubing differing in wall thickness or diameter only by thousandths and they were obliged to draw special sizes for these special orders. That day has gone by and it is fair to say that the work of this division is nearly finished.

The sheet metals division has made considerable progress in its work, which has been that of collecting into one document or set of documents data never theretofore appearing together and distributed in any general way. There is a sharp demand from purchasers of sheet metal for more information from this division. It appears that purchasers supposedly well informed as to the purchasing of sheet metals are sometimes confronted with a new demand or a new use. A purchaser knows in a way what he wants, but suddenly finds that he does not know how to ask for it to get just what is desired. The customs and trade names and practices of the men in the sheet metal industry are obscure and confusing. They do not seem to use uniform practices in their industry.

The task before the springs division is an exceedingly difficult one. It will never be possible to standardize a full set of springs, for very obvious reasons. Every engineer has his own idea of flexibility and as to the many details of the length, shape and number of leaves in a spring. Nevertheless, it seems to be possible to standardize certain features of spring construction.

Much of the work of the division is sure to take the form of notes on good spring practice. As stated earlier in this paper, the division has done considerable work in connection with nomenclature, the width of springs, the sizes and proportions of center bolts, nibs, rebound clips, threads, specifications for ordering leaf springs, etc.

Truck Committee Collecting Data

The truck standards division will attempt to recommend standards for a new industry as fast as it can arrive at definite conclusions. At any rate, it is accumulating all the data possible relating to trucks, and these data will be immediately available and result in sufficient knowledge to enable us to recommend any reasonable standards that may be called for.

How much can be standardized and how rapidly the work can be done remains to be seen. The division is on duty with the purpose of advancing as rapidly as seems safe. It would seem that if axle builders can attempt to standardize their output at this time, the engineers who will purchase and use the axles ought certainly to have a hand in the effort. The axle manufacturers express their willingness at this time to modify their designs in deference to the ideas of the engineers. But if the matter is delayed too long they will not be so willing, and the inevitable result will be friction between consumers and producers.

The work of the wheel dimensions and fastenings for tires division has been startling in its success. The situation was apparently an impossible one when the division took up its labors. There were a dozen or more makes of tires and styles of tires, and for every nominal size there was a different actual size. The differences were small but important in the mind of each of the manufacturers of the tires. The conditions existing in the truck factories were intolerable. It was common for a truck manufacturer to have from five to fifteen trucks standing ready for delivery with the exception of wheels and tires. Special wheels had to be ordered and the order depended absolutely upon the tire specification. There was no possibility of stocking with either the wood wheels or the tires.

Demands reached the division from all sides—particularly from the manufacturers of trucks—asking that something be done. The work has been done and the result is already perceptible. The tire people are satisfied, the wood wheel people are satisfied, and the manufacturers and producers of trucks particularly are satisfied. Certain small details are still under consideration, but so many of the important details have been handled successfully that the former now seem small and insignificant to all concerned.

The spark plug shell is a standard which also came from the A. L. A. M. The miscellaneous division was called upon to specify a tolerance for the thread, so that the plugs would be interchangeable in threaded holes. This demand came from the consumer of the spark plugs, and definite knowledge and a definite practice must be established. The division felt that the thread should measure zero plus and .003 inch minus. As soon as this was tried, it was found that a standard method of measuring would have to be decided upon.

All of this sounds like small work—too much a matter of detail—but, as a matter of fact, once these details are taken proper care of, an amount of friction out of proportion to the size of the detail will disappear. The spark plug manufacturers are just as keen for this accurate knowledge as the users of the plugs. Some body of men must establish a standard practice, and there is no better body of men to do it than the miscellaneous division of the standards committee.

Some years ago a demand for a fine screw thread was felt. A committee of the A. L. A. M. answered this demand and established a standard. The screw companies took it up with some reservation. Consequently, the producers of screws and the consumers of screws did not get together fully at the time in question. The differences were slight and have since been reconciled, and the standard as it is now accepted by the society is one that has been adopted by both producer and consumer without reservation.

To Standardize Gearshift Gates

Standardization of gear shift gates was proposed to the miscellaneous division insistently by several designers. The division did not believe it possible to standardize any such detail, but after full discussion the matter was handled by a recommendation of the division as to preferred practice. Sketches indicate the several possible choices and the preferred practice may be followed by all who want to get as near as possible to standard construction. Should this preferred practice prove, by general and constant use, to be a decided advantage, it is not unlikely that it might become standard in fact if not by recommendation of the division. A construction or design that is good becomes standard rapidly.

Magneto Dimensions—Here is a subject that has been an annual target for criticism. Motor builders and car builders cannot understand why the magneto people cannot get together and make their instruments in such a way that they may be interchanged easily on an engine or in any car. The miscellaneous division has brought about the acceptance of two extensive tables of dimensions of magnetos, one for 4 and one for 6-cylinder engines, which tables differ as to two items only. At present a designer is able to so arrange his motor as to accommodate the largest magneto found in the tabulated information given. By so doing it is possible to locate all the smaller instruments in the same space. There is no difference except as to taper of shaft, in the case of the 4 and the 6-cylinder instruments, and a slight difference in the distance from the center of the two front base-plate holes to the large end of the taper shaft. The latter difference is but a millimeter, and may be reconciled by elongating the hole.

General discussion on the merits of standardization followed:

Charles E. Duryea, C. E. Duryea Company, said: I have nothing to say but appreciation of the work the standards committees have been doing. I have seen but one word that I wish to criticize in the entire report and that is "tread." We should use gauge to designate the distance between the right-hand wheel and the left-hand wheel, as used in railroad practise. The word tread really refers to the width of the individual wheel or tire.

H. W. Alden, Timken-Detroit Axle Company—Two years ago at the midsummer session of the society in Detroit there was criticism on the undue activity of the S. A. E. in its standardization work, which criticism was felt keenly by the council and the old members of the society. We brought matters to a head and had a vote. In the last six months the standardization work has called forth much criticism, some good and some caustic. I think that right now we should get the general view of the members of the society on the work, whether they are in favor of or against the work.

Coffin Points Out Some Difficulties

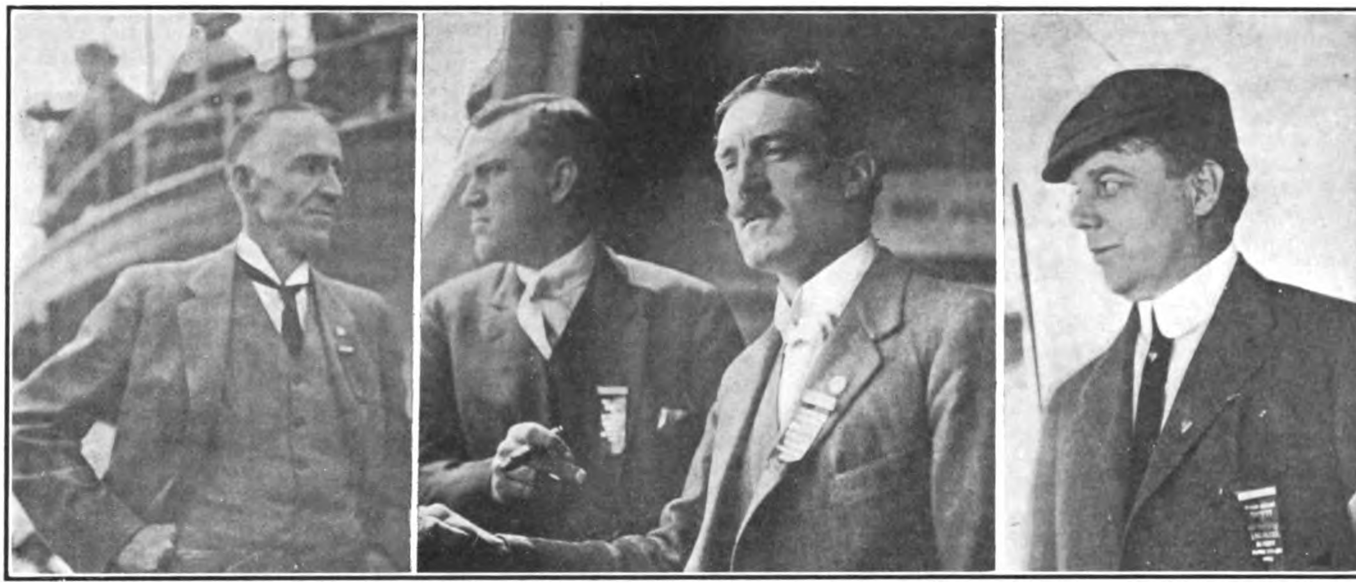
Howard Marmon, Nordyke & Marmon—I have nothing of moment to add. The thought has been broadcast in many minds that the standardization work of the society has been designed to usurp the work of the factory engineer whereas it has solely been intended to facilitate it.

L. J. Flint, Grip-Nut Company—I should like to know what has been done in the matter of bolts and nuts. The Society of Mechanical Engineers has never been able to decide the question of standard weight of bolts and nuts, and I think it would be well if the miscellaneous sub-committee of the standard committee would take this matter up; it would greatly facilitate much work to have these weights standardized.

Clarence E. Whitney, Whitney Manufacturing Company—I am in full appreciation of all the work that the standards committee has done. The company I represent has already saved many dollars by working toward the standardized sizes set by the society.

Howard Coffin, Hudson Motor Car Company—I would like to add one thought: In all activities we must have conservatives and anarchists. We will have suggestions sent in for standardization work which are absolutely foolish, as an example, the standardization of threads for hub caps has been suggested and it was immediately decided that such was too much a matter of detail and the subject was dismissed. The real energies of the standards committee will be exercised along sane lines and for the general good. Often the various standard sub-committee will send out letters containing foolish suggestions for standardization work. The committee knows them to be foolish, but it feels called upon to leave the disposition of them to the entire committee.

H. W. A. Brewer, London, Eng.—One of the points which has interested me most is the business way in which the affairs of your society are conducted. For many years our engineering associations in England have been attempting to standardize work, but to date I have not received any information as to what they are actually accomplishing. I have shown the data sheets issued by your society to English engineers and they are absolutely surprised at the amazing progress you have made here. I think that for a go-ahead nation and a society of such that you mix up dimensions a little; for example, I



F. H. Floyd defiant H. L. Pope annoyed E. W. A. Brewer perplexed Clarence E. Whiting amused

note on some of your sheets some of the dimensions are given in decimals expressed in thousandths of an inch and in another place you express dimensions in sixty-fourths of an inch. This is bad. Further, in going through your standard reports there are certain search-light paragraphs which it would be well to print on small cards for general distribution to the industry. For example:

"Standardization is the last word in a practice.

"Standardization has no regard to materials used but only to shapes and sizes."

I am particularly interested in the standardization of fittings for carbureter attachments and connections. We in England import many American cars and our motorists are very particular in the matter of cost of gasoline and also tire cost. We often want to change carbureters, and as it now is, it costs as much to install the new carbureter as the carbureter costs. This is due to the new manifolds and new gasoline and water-pipe attachments needed. In addition the car owner loses a week's use of his car while the work is being done.

David Fergusson, Pierce-Arrow Motor Company—There is absolutely not any criticism to make on the work of standardization as outlined by Chairman Souther. There is a little criticism on certain points that certain sub-committees of the standards committee may take up with the object of standardizing. One thing of this nature is the absurdity of trying to standardize truck speed. Placing a maximum speed of 8.5 miles on a 5-ton truck is absurd, as the Pierce truck is made for 13 miles per hour. I think that there are many lines in which a speed of 8.5 miles per hour will not pay. In the matter of tire sizes and wheel dimensions the committee has done good work, but there seems to be something wrong in the way the work has been carried out. On our truck we have adopted the Goodrich tire and we have to put a metal band over the wheel in order to accommodate the tire, which is not an S.A.E. standard tire size.

President Donaldson informed Mr. Fergusson that the truck speeds referred to were not S.A.E. recommendations, but merely the desires of makers as taken by a straw vote, and, further, that the National Association of Automobile Manufacturers had adopted a schedule of truck speeds which were lower than these mentioned.

Kennedy Discusses Truck Work

W. P. Kennedy, New York—Regarding standard sizes of truck wheels and tires, I want to corroborate President Donaldson as to proper truck speeds, as the truck committee has not made any recommendations on this question. The committee on wheel dimensions and tire fastenings for trucks has nothing to do on tire sizes. Our work was to standardize wheels and our recommendations ended with a definite idea on felloe bands as recommended by wheel makers. Before our recommendations wheel makers had to carry in stock months before they got their orders vast quantities of materials amounting to many thousands of dollars, but with the standardizing of sizes this money was put into other uses. Today nearly all of the tire makers for commercial motor vehicles are working to S. A. E. standards.

D. F. Graham, Bower Roller Bearing Company—Regarding the bearing division of the standards work much can be said. The work of this committee has benefited the makers of bearings and also the makers of cars in that it is very much easier for the bearing makers to get together in regard to tolerances allowed as to just how much the bearing shall vary from the standard one way or the other. The amount of variance permissible in housings for containing bearings has certainly been simplified.

J. G. Perrin, Lozier Motor Company—We are all impressed with the possibilities and impossibilities of standardization. The change of name from Standard to Recommended Practice will aid in the movement and broaden the scope of the work. I think a great deal of good has been accomplished. In many fields the standardization work has quickened competition. An example: A popular maker of magneto or carbureter uses many unstandard sizes and so it is almost impossible for the maker to attach another make because of these sizes, but when all parts are made to standard sizes it will not be much of a task to substitute any make for any other make of part.

Wall Ventures a Suggestion

William G. Wall, National Motor Vehicle Company—We use many standard parts. I have always been a believer in the standardization work of the S.A.E. I have one suggestion, namely, in the matter of standardized yokes and rod ends. This work was taken over bodily from the Association of Licensed Automobile Manufacturers and these standards were set four or five years ago. Our ideas of wearing surfaces have changed since then and it may be these should be changed.

Regarding Mr. Wall's communication concerning yokes and rod ends, President Donaldson explained that the society had taken over the work of the A.L.A.M. and that the A.L.A.M. had issued one set of standards years ago which were revised before being handed over to the S.A.E. and that since taking them over, the standards committee has revised them twice.

C. T. Meyers, General Motors Company.—I have had to do only with truck construction and in nearly every case we have adopted or arranged to adopt S.A.E. standards and in all new designs we are laying down we are working to S.A.E. standards. It is very important in truck manufacture to use standard parts as spare parts must be carried in stock in the branch houses and agencies all over the country.

H. L. Pope Manufacturing Company—The work of the standardization committee should be highly complimented. In our legal courts we fight for years on matters in litigation and often previous decisions are reversed and so we should not be surprised at sharp contests in this work. If I have troubles with working any standard part into a car I generally find two or three ways out of the difficulty, and where any engineer cannot follow the work he can write to the committee.

C. R. Watson, Cadillac Motor Car Company—My views of the questions of standardization are different from many others. I work for a concern that gets vast benefits from standardization work. The internal standardization work of a car building concern is important, where all parts of the motor must fit perfectly, the piston, the cylinder, etc. In such a car there is a benefit to every owner. How does the world-wide garage man receive such standardization? He wants to carry the smallest stock of spare parts possible and when a car comes in for repairs he wants to make the quickest possible repair. He wants to do that work without needless expert repairmen. If the parts are all of standard size this can be done, if not he needs expert help, which costs much, the car owner paying the bill.

Steinmetz Favors Standardization

J. A. Steinmetz, Janney, Steinmetz & Company—We make seamless steel gasoline tanks and standardization aids very much. We make standard diameter tanks and a change of 1-16 inch in diameter from these standards costs the automobile maker perhaps $1,500 to $2,000 a year. We require dies for our work and the more dies the more cost. Within the last two years we have changed 50 car makers over to standard sizes and saved each over $3,000 per year. We have also come to use the standard iron pipe size of tank fillers and caps, caps for you which you can purchase at a small price all over the country instead of using the high-priced heavy brass caps of non-standard size and which are so difficult to secure.

L. S. Bowers, Schwarz Wheel Company—I speak as a wheel maker. We are vitally concerned in the development of these standards. Before the adoption of standard wheel dimensions for trucks it was impossible to make up any stock for customers as nothing could be done until the customer's specifications were in. Since the adoption of the wheel standards we can make up felloes long in advance and can also carry truck wheel bands and so are in a position to give quick delivery. The standards mean economy to maker and owner. It was my understanding the tire makers would all come to making standard sized truck tires and we should all get after them.

Chairman F. E Moscovics, of a special advisory committee on magneto standardization, read the report of a meeting held in Indianapolis May 31, 1912, in which 95 per cent. of the magneto manufacturing interests were represented. The report showed that the magneto makers agreed that standardizing the following named magneto parts should be taken up and considered by the standardization committee: Shafts; base height; location of studs, or holes, in relation to the key point on shaft; overall dimensions; length of advance lever and the standardization of holes in the advance mechanism, and the relation of keyway setting in armature shaft to the moment of break in the breaker mechanism.

Recommendations of the Committee

The committee recommended adoption of a standard taper shaft for four and six-cylinder magnetos. The length of the taper was put at .5905 inch; the large diameter of the shaft at .5905 inch; the angle of taper 5 degrees and 45 minutes, and the small diameter of the shaft .472 inch. To be furnished with No. 3 Woodruff key.

Further recommendations of the committee were: First—The adoption of a thread for the end of the magneto shaft of 3.8, 16 threads U.S.F., the length of the thread to be .5905 inch. Second—That in the base height the distance from the center of the armature shaft to the base be 1.771 inch or 45 millimeters. Third—That for two-magnet machines there be used from the center of the first bolt hole to the large end of the taper a dimension of 2.086 inches. Fourth—That the size of the hole on a two-magnet machine be 3-8, 16 threads U.S.F. Fifth—That owing to the declining business in three-magnet machines no cognizance be taken of standardizing those parts and that manufacturers requiring those instruments for special purposes or on exceptionally large motors can very handily obtain the information by writing to the different magneto manufacturers. Sixth—That engineers allow a sheer clearance of 8 inches from base height to top of magneto space, a width of 5 inches and an overall length of 10 inches. Seventh—That magneto advance-levers have a radius of 2 1-8 inches from the center of the armature shaft and that this hole be drilled to take a tapping hole for 1-4, 28 x pitch thread. Eighth—That the committee recommend that the keyway of the armature shaft should bear a definite relation to the moment of break in the breaker box, when the breaker box is in the full retard position.

C. M. Hall ponders E. P. Batzell meditates David Fergusson reflects

Legal News of the Week

Michigan Supreme Court Reverses Finding of Lower Tribunal in Case Involving Handling an Agency

Wants a Receiver for Motor Starting Company—Court Upholds Gordon Trademark

DETROIT, MICH., July 1—Reversing the Wayne County Circuit Court, the Supreme Court recently held that the verdict rendered below in favor of William G. Isbell, former representative of the Anderson Electric Car Company, for $23,000 for damages by reason of the cancellation of the agency is null and void.

An original contract between the litigants called for the maintenance of a suitable garage for handling automobiles, together with such appurtenances as are usually required in such a business. An auxiliary agreement made soon after the original contract provided for allowing Isbell to place gasoline cars in the garage, as well as those of the electric type, until such time as the business in the latter should have developed to a point where the caring for them offered a sufficient business to warrant their care exclusively.

The Anderson Company later notified Isbell that he was not caring for the business properly; did not advertise sufficiently; did not provide proper labor for caring for the business, and was not carrying any of the cars in stock. The result was the cancellation of the agreement.

Isbell brought suit and was awarded $23,000 damages in the lower court. The appeal to the higher tribunal, however, brought a reversal.

Marking Out the Scope of Agency

That an action by a principal for money had and received is appropriate to recover profits from an agent who, contrary to his agreement to sell certain goods of the plaintiff company exclusively, broke his agreement and sold a similar line of goods in competition with that of his principal, was held recently in the case of Robert Reis & Company against John E. Volck by the Appellate Division of the New York Supreme Court.

While no patent rights were involved in this dispute, the general rule laid down by the court proves interesting and important to the automobile trade.

In lay terms the court holds that where an agent contracts to sell a certain line of goods exclusively and violates his agreement, becoming a competitor of his principal, a suit by the principal will lie to recover the profits made by the agent through the unfair competition inaugurated by him.

Ask Receiver for Starter Company

INDIANAPOLIS, IND., June 29—Suit has been brought in the superior court at Indianapolis by the Indianapolis Light and Heat Company asking that a receiver be appointed for the Motor Starting Company. The suit was brought on an account of $116 for electric current, and it is charged the concern, which has been manufacturing a motor-starting device, is insolvent. Lew W. Cooper, formerly president of the board of public safety, is president of the company.

Cut-Out Law in Effect July 16

July 16 is the date upon which the new muffler cut-out ordinance goes into effect in New York. The investigation of the subject of cut-outs and their relation to lost power, upon which the metropolitan lawmakers relied for some of the data presented before that body, was undertaken by the Touring Club of America and showed that the cut-out added only a small fraction to the power of the motor, while the noise resulting from running without the muffler proved sufficiently annoying to a large number of citizens to raise a prejudice in their minds as to automobiling in general.

The movement culminated in the following ordinance, which was duly endorsed by the aldermen:

Section 1. Every motor vehicle propelled by an internal combustion engine, when such vehicle is on any street, road, avenue, alley, park, parkway or public place within the city limits shall, when such engine is running, be equipped with a muffler or silencer, through which all of the exhaust gases from the engine will escape into the atmosphere.

Section 2. It shall be unlawful for the operator or driver of any motor vehicle to use any cut-out, fitting or other apparatus, or a device which will allow the exhaust gases to escape into the atmosphere without passing through a suitable muffler or silencer as described in Section 1.

Section 3. Any person violating the provision of this ordinance may, upon the conviction thereof by any city magistrate, be fined a sum not exceeding $10, and in default of payment of such fine may be committed to prison by such city magistrate until the same be paid, but such imprisonment shall not exceed 10 days.

Gordon Trademark Is Upheld

CHICAGO, ILL., July 1—Suit of the Vehicle Apron & Hood Company against the American Tire & Rubber Company, based upon alleged unfair competition of the defendant company in substituting other tire covers when the Gordon tire cover of the complainant was named by purchasers, has been decided in favor of the complainant.

Judge Kohlsaat of the United States District Court has signed a decree perpetually enjoining the defendant from such practices and from the use of the trademark name, Gordon, in connection with any other than such tire covers. The defendant is ordered to pay the costs of action.

Makes Car "Borrowing" a Felony

The assistant United States attorney says the Government is planning to co-operate with the police and court in stamping out if possible the practice, now almost of daily occurrence, of taking motor cars and, after using them for joy rides, abandoning them. A special law to cover cases in which the grand larceny charge would not hold, where motor cars are taken without right, will be asked of Congress. A bill framed with the co-operation of the United States attorney's office will be presented to Congress at an early date.

Enjoins Individuals, but Not Union

BUFFALO N. Y., July 2—Judge Hazel in United States District Court has fined Charles Stemp, Andy Smith and William Hopkins, $100 each for violating a federal injunction restraining them from interfering with the strike breakers in the plant of the Aluminum Castings Company, Elmwood Avenue, which concern makes aluminum castings for automobiles. Judge Hazel denied the motion of the Aluminum Castings Company to make permanent the injunction against the molders' union, but the injunction against the individual striking molders, however, is continued. The penalized men are being held until the fines have been paid.

Defends Quebec's License Law

MONTREAL, June 25—"The province is licensing chauffeurs and not engineers," said Wallace Dawson, collector of provincial revenue, who has charge of the issuing of licenses, when questioned regarding the comments on the government's method of examination made by a local association of chauffeurs. "The province requires that a man be competent to conduct a machine, and not to manufacture. The question as to hair, eyes, etc., serves a twofold purpose—in case of an accident to identify the chauffeur and to prevent a transfer of licenses. Every chauffeur must carry his license with him, and the description must tally with the person who holds the same. Have you served in a penitentiary? is a query as to whether the applicant has been convicted under traffic law in any country. The query as to occupation is to establish whether or not the applicant is to act in capacity of operator or chauffeur.

"The mechanical end is taken care of," said Mr. Dawson, "in that an applicant must have three witnesses over 25 years old who swear under oath that they are personally acquainted with him; how long they have known him; that they believe his statements as to knowledge of the machine to be true; that the applicant is not in any way, physically or mentally, incapable of handling a motor vehicle, and that they believe him to be competent, and the applicant is required to state under oath the power of vehicle previously operated and the number of miles run."

Western Transferred to Rutenber

CHICAGO, July 2—The incorporation of the Rutenber Motor Company for $1,350,000 in Delaware last week was the forerunner of an important change in the Western Motor Company, of Marion, Ind., which long has manufactured Rutenber motors, in that it marks the transfer of the business of the Western Motor Company to the newly organized Rutenber Motor Company and the infusion of new financial blood in the shape of George W. Bowen, of Auburn, N. Y., president of the Bowen Manufacturing Company, of that city, maker of grease cups and other oiling devices.

Confirmation of this fact was secured today from J. W. Stephenson, general manager of the Western Motor Company at Marion. While the deal has not been finally completed, it is as good as made, Mr. Stephenson says, and Mr. Bowen will be heavily interested from a financial standpoint. The name of the company will be changed to the Rutenber Motor Company and Mr. Stephenson will remain as general manager and a large stockholder. With the new capital interested it is planned to double and probably triple the capacity of the engine plant at Marion.

Innocent Driver Fined for Fake Tag

ALBANY, N. Y., July 2—Because he used a license plate on the rear of his automobile which had not been issued by the Secretary of State, Charles A. Wetmore, representative of a local automobile agency, was arrested Saturday on complaint of Gustave Semmig, inspector in the automobile bureau of Secretary Lazansky's office. It is claimed that the license plate on Wetmore's car was of cardboard, and that the size and also the color of the figures was similar to that of the official license plates. Wetmore pleaded that he knew nothing of the plate being a fake, as he had simply driven the car from the garage on a test trip, and although Justice Brady accepted the explanation, he fined the violator $5 as a matter of principle.

Atlas Engine in Receiver's Hands

INDIANAPOLIS, IND., July 2—Fred C. Gardner has been appointed receiver for the Atlas Engine Works, American manufacturing licensee under the patents of Charles Y. Knight covering the Knight sleeve valve automobile motor. This action was precipitated by the filing of suit against the Atlas company involving the payment of a claim for $2,387. Judge Weir, of the Superior Court, entertained an application for a receiver made by F. H. Wheeler and George M. Schebler. Bond in the sum of $50,000 was filed and the business will be continued.

Officers of the Atlas company have announced that the cause of difficulty lies in the fact that the largest customer of the company has suspended payment temporarily, owing the company about $100,000. At the same time, according to the announcement, a request has been made by this customer to suspend indefinitely all deliveries under the contracts existing between the Atlas company and the customer.

Covers Moving Cars Only

Milwaukee's Universal Light Law Applies To Cars Which Are in Actual Operation

New York State Examiner Would Confine Licenses to Those Only Who Show Ability

MILWAUKEE, WIS., July 1—The universal light ordinance proposed for the city by the Milwaukee Automobile Club, and recommended for adoption by the committee on judiciary, has been amended to apply only to moving vehicles, as there is at present an ordinance in Milwaukee which provides that any vehicle left standing on a street or in an alley must be marked by at least one light visible in both directions. The club endeavored to have its ordinance passed, and the old ordinance abolished, to avoid superfluity and make the ordinances relating to the subject more compact. However, there was danger of losing both ordinances, so the club decided to let well enough alone and have two ordinances to cover the ground which one good statute would cover. The M. A. C., acting with the Wisconsin State A. A., will endeavor to push a universal light law through the next session of the Wisconsin Legislature, convening in January, 1913.

Body Company Suspends Operations

FLINT, MICH., July 1—Following an order made in the United States Court in Bay City, the Flint Body Company has closed its doors. Action in the court was taken by creditors of the concern. An inventory will be taken and the future of the company decided. Robert H. Cook, who was vice-president and secretary of the company, has been chosen by the creditors as receiver. The company was incorporated January 1, 1909, and capitalized at $50,000. William E. Stewart, president and treasurer of the company, was principal stockholder.

No License Unless Competent

ROCHESTER, N. Y., July 2—That every man or woman who drives an automobile in New York State eventually will have to pass a road examination and show a certificate to the effect that the bearer is competent to operate a machine, is the belief of R. H. Strickland, Rochester, state examiner of chauffeurs, who is examining applications for licenses in various cities. He declares that automobiles are being driven by incompetent people without the slightest regard for existing laws concerning the running of these machines. Mr. Strickland, whose headquarters is in Buffalo, declares new owners ought to be required to give demonstrations of their competency in driving automobiles before being provided with a license.

Grossman to Appeal Decision

Formal order has been issued by Judge Hand of the United States District Court, allowing Emil Grossman, nominal defendant in the recent suit of J. H. Sager, involving patent rights on automobile bumper manufacture, to perfect an appeal from the decision of Judge Hough which sustained the Sager patent.

The opinion of Judge Hough was couched in doubtful terms, but the decree granted provided for a permanent injunction and it is from that order that the Grossman party takes appeal. The case in due course will be presented before the United States Circuit Court of Appeals. The actual defendant in the case is the United States Bumper Company of Chicago.

Willys Acquires Garford

Overland Company Purchases Common Stock of Elyria Concern, Which Will Be Operated at Full Capacity

General Vehicle Company Contracts to Build Daimler Trucks in This Country

TOLEDO, O., June 28—Announcement has been made that President John N. Willys, of the Willys-Overland Company, today consummated a deal by which he purchased the common stock of the Garford Automobile Company, of Elyria, O. There is $2,000,000 worth of the stock and the product will be handled through the Toledo sales department of the Willys-Overland Company. The Garford plant in Elyria is capable of employing 3,000 men and the concern makes a high-class six-cylinder passenger car and 2, 3, 4, 5 and 6-ton automobile trucks. With this plant the Willys-Overland Company will make all classes of cars from a low-priced $900 car to the high-priced touring car and automobile trucks. The Elyria plant will in the future be operated at its full capacity. Mr. Willys now controls not only the Overland business in Toledo, but the Gramm Motor Truck Company at Lima, O., the Auto-Parts Company, at Elyria, N. Y., and the Garford Company. They will all become part of the proposed $15,000,000 corporation which will be organized as soon as the secretary of state authorizes the increase in capital stock, application for which will be filed within a few days.

Enormous improvements are planned for the local plant of the Willys-Overland Company, and of the Kinsey Manufacturing Company, both of which concerns will be doubled in capacity. It is expected to turn out 40,000 cars from the local factory during 1913. According to a statement made by a member of the Overland Company, orders for from 2,000 to 3,000 cars have been turned down within the past 6 weeks because of inability to turn them out.

Crude Rubber Market Is Firm

A firmer tone was apparent in the crude rubber markets of the world during the past week. Trade in New York has been of small proportions and most of it was for prompt delivery. A slight hardening of prices was felt and the current level is on a basis of $1.12 1-2 for up-river fine. At the London fortnightly auction, which is scheduled for the first and third Tuesdays of each month, the offerings include 580 tons of plantations.

Barnes Resigns from M. & A. M.

Claire L. Barnes, third vice-president and member of the board of directors of the Motor and Accessory Manufacturers, has resigned owing to a series of shifts in the membership in the association. William H. Crosby of Buffalo was chosen to fill out the unexpired term of Mr. Barnes as director until January 1, 1914.

The following concerns were elected to membership in the organization: Hood Rubber Company, Boston, Mass.; The Lefever Arms Company, transmissions and jackshafts, Syracuse, N. Y., and The American Hardware Corporation, Corbin Screw Corporation, speedometers, New Britain, Conn.

G. V. to Make Daimler Trucks

James M. Carples, general manager of the Daimler Import Company, has made the following announcement:

"Contracts have been signed between the Daimler Manufacturing Company, the General Vehicle Company and the Daimler Motoren Gesellschaft, Germany, for the future manufacture in America by the General Vehicle Company of all the types of commercial vehicles made by our factories in Germany.

"Representatives of the General Vehicle Company have been abroad for the last three months negotiating and carefully looking into this matter.

"As far as the Daimler Import Company is concerned, we shall continue to import both the Mercedes pleasure and commercial vehicles the same as before. Our manufacturing rights for the pleasure vehicle in America have not yet been definitely concluded but negotiations are well under way and I believe that upon the arrival next month of our directors I shall be able to inform you that this has been accomplished and that the Mercedes pleasure car will hereafter be manufactured in America by a syndicate as well known and as well equipped for this purpose as the General Vehicle Company is to make a success of the Mercedes commercial vehicle."

Combine Business with Pleasure

Instead of holding regular meetings in July and August, the National Association of Automobile Manufacturers will combine the two meetings and hold the joint session at Christmas Cove, Me., the summer home of Samuel A. Miles, general manager of the organization. The meeting is scheduled for July 30.

Overland Stocks on 'Change

Application has been made by the Willys-Overland Company to list its stock issues on the New York Stock Exchange and it is understood that such action will be taken. The tradable total includes at least $15,000,000 of securities under the recently authorized increase in capitalization.

Market Changes of the Week

The rise in steel, which began last week, continued, so that now most of the leading makers charge the prices given in the tabulation below. Beams and channels, following the trend of other products, advanced $1 a ton. The activity in steel which has been witnessed by the past few months, continued during the week. Copper presented a restrained situation, so far as dealings in the metal were concerned, while copper securities were subject to considerable changes in the stock market. The air of speculation which has surrounded this commodity, has not as yet been dispersed. Tin and lead experienced a week of moderate activity with insignificant changes.

Gasoline advanced to 20 cents a gallon in 200-gallon lots, which gives a total rise of 6 cents for this fuel since the beginning of the year. At the same time Pennsylvania and Kansas crude remained unchanged. The range of prices follows:

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Week's Change
Antimony, per lb.	.07	.07	.07	.07	.07	....
Beams and Channels, 100 lb.	1.41½	1.41½	1.41½	1.41½	1.41½	....
Bessemer Steels, Pittsburgh, ton	21.50	21.50	21.50	21.50	21.50	....
Copper, Elec., lb.	.17½	.17½	.17½	.17½	.17½	....
Copper, Lake, lb.	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	....
Cottonseed Oil, July, bbl.	6.71	6.71	6.71	6.78	6.84	+ .13
Cyanide, Potash, lb.	.20	.20	.20	.20	.20	....
Fish Oil, Menhaden	.38	.38	.38	.38	.38	....
Gasoline, Auto., 200 gals. @	.20	.20	.20	.20	.20	....
Lard Oil, prime	.85	.85	.85	.85	.85	....
Lead, 100 lbs.	4.50	4.50	4.47½	4.47½	4.47½	+ .02½
Linseed Oil	.79	.79	.79	.79	.79	....
Open-Hearth Steel, ton	22.50	22.50	22.50	22.50	22.50	....
Petroleum, bbl., Kansas Crude	.68	.68	.68	.68	.68	....
Petroleum, bbl., Pa., Crude	.68	1.60	1.60	1.60	1.60	....
Rapeseed Oil, Refined	.68	.68	.68	.68	.68	....
Rubber, Fine Upriver Para	1.10	1.10	1.10	1.10	1.12	+ .02
Silk, Raw Ital	....	4.15	....	....	4.15	....
Silk, Raw Japan	....	3.65	....	....	3.65	....
Sulphuric Acid, 60 Beaumé	.99	.99	.99	.99	.99	....
Tin, 100 lbs.	47.50	47.50	47.00	47.00	47.00	— .50
Tire Scrap	.08½	.08½	.08½	.08½	.08½	....

Big Increase in Exports

As Compared With May, 1911, Value of Automobiles and Parts Shipped Abroad Almost Doubled

Slight Increase in Imports—Ascribe Slump in Millinery Trade to Automobiles

WASHINGTON, D. C., July 1—The value of automobiles and parts exported from tne United States during May, 1912, was almost double that exported during May, 1911. Canada, as usual, bought almost half of the exports sent abroad by this country, the total for May, 1912, having been $1,352,856. This was an increase of $245,751 over the corresponding month of last year. The exports to the United Kingdom, it is noted, were more than double those of May, 1911.

Probably the most remarkable increase of all, though, was in the exports to British Oceania, which were but $109,813 in May of last year, and jumped to $412,565 in May of this year. Asia and Oceania also showed a big increase, the exports growing from $61,765 in May last year to $149,309 in May this year.

The most interesting figures, however, are in comparison of the totals for the 11 months ending May, 1910, 1911 and 1912 respectively. These show that the 1912 figures are approximately two and one-half times those of 1910, and more than $9,000,000 in excess of those of 1911. The proportion of increase of 1912 over 1911 is about twice that of 1911 over 1910.

The imports for the same period covered by the report of exports show a slight increase as between May, 1911, and May, 1912. The imports from France and Italy show an increase, by comparison, but those from the other countries show a falling off. The tables follow:

COMPARATIVE EXPORTS OF AUTOMOBILES AND PARTS FOR MAY, 1911 AND 1912

	1911		1912	
	Number	Value	Number	Value
Automobiles, and parts of—Automobiles	1,466	$1,513,547	3,009	$2,963,818
Exported to—				
United Kingdom	....	203,539	673	465,722
France	....	71,922	63	48,980
Germany	....	19,972	49	36,719
Italy	....	22,125	30	35,605
Other Europe	....	89,554	204	155,125
Canada	....	1,107,105	1,109	1,352,856
Mexico	....	11,990	8	15,370
West Indies and Bermuda	....	27,436	29	36,237
South America	....	104,172	162	183,292
British Oceania	....	109,813	445	412,565
Asia and other Oceania	....	61,756	152	149,309
Other countries	....	28,042	85	72,038
Parts of (except tires)	....	343,879	....	448,972
Total	....	$1,857,426	....	$3,412,790

COMPARATIVE IMPORTS OF AUTOMOBILES AND PARTS FOR MAY, 1911 AND 1912

	1911		1912	
	Number	Value	Number	Value
Automobiles, and parts of—Automobiles	75	$158,046	76	$165,759
Imported from—				
United Kingdom	19	36,941	11	28,324
France	26	62,442	41	95,965
Germany	13	26,460	5	10,114
Italy	7	12,709	11	17,424
Other countries	10	19,404	8	13,932
Parts of (except tires)	..	47,846	..	21,493
Total Automobiles and parts of	..	$205,892	..	$187,252

Automobile Securities Quotations

In the list of automobile securities the stock changes for the past week did not develop anything startling. The waiting attitude noted during the week previous was if anything more pronounced than ever. This condition kept the investment issues extremely solid but naturally developed a slight drop in the speculative shares, with, however, a few exceptions where a 1-2 point rise was noted. The asking price in the gilt-edged issues still shows no tendency in falling off, indicating a substantial condition in these shares and an encouraging condition of the industry. The following table shows the comparison of this year's prices with those of 1911 at the corresponding time:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., common	...	...	110	...
Ajax-Grieb Rubber Co., pfd	...	...	93	100
Aluminum Castings, preferred	...	...	100	...
American Locomotive, common	41	42	43¼	43½
American Locomotive- preferred	109	110	109	110⅝
Chalmers Motor Company	...	...	140	155
Consolidated R. T. Co., common	5	11	14	16
Consolidated R. T. Co., pfd	10	20	55	59
Firestone Tire & Rubber Co., com	163	168	276	282
Firestone Tire & Rubber Co., pfd	102½	105	106	108
Garford Company, preferred	...	...	90	100
General Motors Company, common	53	54	32	33
General Motors Company, preferred	88	89½	74	75
B. F. Goodrich Company, common	238	241	79¼	80¼
B. F. Goodrich Company, pfd	115	116	108¼	108¼
Goodyear Tire & Rubber Co., com	210	215	265	275
Goodyear Tire & Rubber Co., pfd	104	105	100	102
Hays Manufacturing Company	...	...	...	104
International Motor Co., com	...	...	23	25
International Motor Co., pfd	...	...	86½	88
Lozier Motor Company	...	...	45	55
Miller Rubber Company	...	...	160	165
Packard Motor Co., preferred	...	...	104½	106
Peerless Motor Company	...	...	...	...
Pope Manufacturing Company, com	51	53	30	32
Pope Manufacturing Company, pfd	77½	79	73½	75
Reo Motor Truck Company	8½	10	9	10
Reo Motor Car Company	23	25	22½	33½
Studebaker Company, common	...	...	34½	35½
Studebaker Company, preferred	...	...	90	92
Swinehart Tire Company	...	...	104	106
Rubber Goods Company, common	88	92	100	...
Rubber Goods Company, pfd	100	104	108	...
U. S. Motor Co., common	40	42	3	3¼
U. S. Motor Co., preferred	82	83	13	14
White Company, preferred	...	...	107½	109

Big Addition to Morrow Plant

ELMIRA, N. Y., July 2—A mammoth addition to the already large plant of the Morrow Manufacturing Company, South Main and Scott streets, was opened today with the employment of 300 additional skilled mechanics. This company manufactures transmissions and small parts for Overland automobiles for the Willys-Overland Companies at Indianapolis and Toledo, O. Before the new addition was opened for business the concern turned out an average of 130 transmissions daily, and with the additional workmen and the annex to the large factory it is proposed to manufacture at least 200 transmissions every day solely for Overland cars. At least 70,000 pieces for automobiles are made daily, totaling 16,998 pounds of finished material. The work is mostly done with automatic screw machinery and each separate piece must be carefully inspected before shipment is made. Besides spending $1,000 weekly for materials as lumber, hardware, etc., for use in the plant, the weekly payroll of this concern totals $10,000 without including foremen, office men or officials.

Company to Make Martin Tractor

INDIANAPOLIS, IND., July 2—The Martin Tractor Company has been organized and incorporated with an authorized capital stock of $50,000 to manufacture the Martin Tractor in this city. The incorporators include: Charles H. Martin, Hugh R. Richards, F. B. Davenport, Edward D. Moon and George D. Thornton.

Automobile Hurts Millinery Trade

LOUISVILLE, KY., June 29—The modern motor car, with its attendant veil, donned by women autoists, because of damage the wind does to hats, is responsible for the falling off of trade in the millinery line, according to A. O. Niedlander, of Indianapolis, president of the Millinery Traveling Men's Association. The statement was incorporated in the annual report of the president of the association, which was read at the opening session of the convention at the Hotel Henry Watterson this week.

Detroit's Building Boom

Many Companies Putting Up New Structure and Additions to Present Ones —Tire Exports Increase

Horace DeLisser With Ajax Rubber Company—Carter Corporation Plant Sold

DETROIT, MICH., July 1—After a comparative lull in factory expansion locally, building operations seem to have been resumed this summer on a comparatively large scale. The largest addition of which formal announcement has yet been made, is that of the Chalmers Motor Company, which has authorized and will immediately begin construction of a new factory building, adjoining its present plant. The building will be four stories in height, conforming in materials and general design to the buildings already in use by the company. The length will be 191 and the width 71 feet. In the neighborhood of 55,000 square feet of floor space will be added to the plant. Arrangement is also being made by the Chalmers Company to still further increase its facilities by the erection of another building, also four stories high, and 400 by 60 feet. This will be practically a duplicate of the two main buildings of the present plant, each of which conforms to this size. The Chalmers Company has more than 30 acres of room and has ample chance for expansion.

Building operations will, it is understood, soon be begun by the Cadillac Company, which has been severely cramped for room during the past two seasons and is at present using an immense tent near its plant. No definite announcement has yet been forthcoming, however.

The Briggs-Detroiter Company has authorized a large addition to its plant north of Detroit, on the line of the Grand Trunk & Michigan Central, Bay City division. This company is one of the most prosperous of the smaller local factories and has been absolutely unable to fill its orders during the season, which is its first. The new addition will almost double the capacity of the plant.

Building operations are also in progress at the Studebaker, Ford and Packard plants. This, however, is a normal condition, as the occasions have been rare in the history of these three companies when expansion of some sort was not in progress.

Another firm which is adding materially to its facilities is the Poss Motor Truck Company. This is by means of a change of base, however. Up to date the Poss has been manufacturing in the old Anhut plant on Abbott street. The company has now purchased the plant formerly known as Brush Runabout No. 2, at Euclid avenue and the Grank Trunk tracks, in the northern part of the city. Considerably more room is thus placed at the command of the company, which is understood to be very well backed financially and has been manufacturing on an increased scale of late.

La France Aerial Truck Tested

ELMIRA, N. Y., July 2—Fire Chief E. H. Price of the Flint, Mich., fire department, accompanied by B. Brumph, C. R. Matt, L. D. Lane, George Norwood, Charles Willis, and Thomas R. Johnson, of Chicago, district sales manager of the American-LaFrance Fire Engine Company of this city, witnessed here last Friday a demonstration of the first motorized aerial fire truck made by the local concern. This truck was made for Elizabeth, N. J., fire department and has attracted widespread attention. Flint, Mich., wants one, and the test given the truck proved highly successful. The aerial truck has a wheelbase of 340 inches and the driving apparatus is applied to every wheel of the machine. The gasoline motor is connected with a generator which in turn generates power which is applied through flexible cables to each wheel, which is steerable. This enables the apparatus to carry a huge extension ladder raised by its own power.

The Elmira motorized fire department, including an American-LaFrance Company's motor driven service cart and combination service truck, motor driven, with an extension, spring raised ladder, gave an exhibition run last week, when the Knights Templar convened here, which was highly satisfactory. An alarm of fire was turned in and the motor apparatus responded speedily.

Los Angeles Christens New Car

LOS ANGELES, June 29—"I christen thee 'Perfex' and welcome thee and thy builders into the fold of the many industrial institutions that now grace our fair southland." With these words, H. B. Gurley, assistant secretary of the Los Angeles Chamber of Commerce, broke a bottle of Owens River water over the radiator of the newest automobile to make its advent into Southern California.

The new car is built in Los Angeles and therefore the welcoming ceremonies. The machine was designed and built by James Fouch in his new plant in Los Angeles. Several wealthy Easterners are interested in the Perfex Company, among them Paul Brown, a broker and member of the New York Stock Exchange.

Tire Exports Increase $500,000

WASHINGTON, D. C., June 29—The exports of motor car tires in May last were valued at $272,346, as against a value of $310,346 in June a year ago. However, during the 11 months' period ended May the exports increased in value from $1,838,482 in 1911 to $2,335,920 in 1912.

The imports of India rubber in May last amounted to 9,802,830 pounds, valued at $8,918,506, as against 6,399,946 pounds, valued at $6,340,948 imported in May a year ago. The imports for the 11 months' period increased from 65,723,492 pounds, valued at $70,736,522 in 1911 to 103,395,020 pounds, valued at $87,570,396 in 1912.

De Lisser Goes Back to Tires

Announcement was made Friday that Horace De Lisser has resigned as vice-president of the United States Motor Company, to take up the chairmanship of the board of directors of the Ajax-Grieb Rubber Company, makers of Ajax tires. Mr. De Lisser had been with the United States Motor Company since its organization, leaving the tire business to join with Benjamin Briscoe in that enterprise.

The Ajax company now plans the establishment of a tire factory abroad which will produce tires for Europe and parts of the world not easily served from the factory at Trenton, N. J.

Mr. De Lisser will leave for Europe on the Kaiser Wilhelm der Grosse, on July 30, to be gone six or eight weeks.

Carter Corporation Plant Sold

WASHINGTON, D. C., June 29—The plant of the Carter Motor Car Corporation, at Hyattsville, Md., was sold at auction this week and was bid in for $12,000 by P. M. Galvin, acting for the Independence Motor Company. It is understood this action was taken to protect the stockholders of the defunct corporation. It is planned to organize a new directorate of the Independence Company and resume operations.

June's Big Motor Incorporations

Automobile incorporations formed during June and having a capitalization of $1,000,000 or more are as follows: Delaware—Amplex Motor Car Company, $1,000,000; Rutenber Motor Company, $1,350,000. Maine: Edwards Motor Car Company, $2,000,000. Total, $4,350,000.

Among the manufacturers of automobiles and accessories and sales organizations connected with the trade the following incorporations of $100,000 or more have been filed during the month: New York: Brooks Motor Car Company, $100,000; Knickerbocker Commercial Vehicle Company, $300,000; Robert Stock Auto Spring Tire Company, $300,000; Resilient Punctureless Tire Company, $100,000, and the Weitch Motor Manufacturing Company, $200,000. New Jersey: National Automobile Sales Company, $300,000; Newark Auto Truck Manufacturing Company, $500,000. Massachusetts: V-C Motor Truck Company, $100,000, and Westfield Motor Truck Company, $100,000. Illinois: Cotta Gear Manufacturing Company, $100,000. Ohio: Ideal Commercial Car Company, $200,000. Indiana: Nelson Motors Company, $200,000. West Virginia: Pitt Motor Truck Company, $200,000. Making a total of $2,700,000, or a grand total for the month of $7,050,000.

Denniston Plant Sold for $9,050

BUFFALO, N. Y., July 2—The hearing in the Denniston Company bankruptcy proceedings held here last week resulted in the sale of the company's property to Dr. Edward J. Meyer, 1312 Main Street, for $9,050. The bankruptcy petition indicates that liabilities amounted to $85,745.94, of which $60,385.38 were unsecured. Its assets were $99,636.27, stock being $5,089.43, machinery, $19,219.42, and open accounts $13,727.17. A final hearing in the company's affairs has been set for Wednesday, July 10.

Citizens Want Gift Plant Returned

SHELBYVILLE, IND., July 1—An effort to take back the land and factory occupied by the Clark Motor Car Company has been started by the Citizens' Industrial Association, which about 2 years ago turned the land and plant over to the company. The association has brought suit to foreclose a mortgage and for liquidated damages, asking $26,000 on the ground that the company has not complied with an agreement to employ 150 persons for a period of 5 years, beginning 90 days after the company began operations. Involuntary bankruptcy proceedings were brought against the company some time ago and the plant was recently reopened after having been closed since February. The involuntary bankruptcy proceedings were settled.

Cole Selling Organization Complete

INDIANAPOLIS, IND., July 1—The Cole Motor Car Company starts today to handle its own sales. According to previous announcement, the Henderson Motor Sales Company, which has handled the marketing of the Cole and allied lines, was absorbed by the manufacturing company. The move is progressive, indicating that the time has now been reached when the factory management believe the line is sufficiently developed to allow it to combine the sales with the manufacturing departments.

Kissel Starts on Its 1913 Cars

HARTFORD, WIS., July 1—The Kissel Motor Car Company has started on its 1913 production after a shut-down of 10 days, during which period inventory was taken, the big plant overhauled and new equipment placed. Work will be started during the next month on a new factory building to supplement two large structures erected during the spring of the year. The average number of employees during the 1911-12 season was in excess of 1,100 and with new buildings and facilities, the pay roll for next season will exceed 1,500. Announcement of the new models will be made within a few weeks. It is stated that no radical changes from the existing Kissel practice will be made in the 1913 cars.

Republic's Capital Boost

Will Increase Stock from $6,000,000 to $10,000,000—Speedwell Planning a New Six-Cylinder Car

Corbin Screw Corporation to Make Speedometers—Lion Company Will Accept Adrian's Offer

YOUNGSTOWN, O., June 30—The directors of Republic Rubber Company on Thursday authorized the calling of a stockholders' meeting to be held early in August for the purpose of increasing the authorized capital of the company from $4,000,000 to $10,000,000. The capital will consist, after the increase, of $6,000,000 common and $4,000,000 preferred stock.

No definite announcement has been made as to amount of the additional capital to be issued this year. It is understood, however, that the steady growth of the company's business will require new capital before another season.

The directors have also authorized the construction of a large modern reclaiming plant, which with the completion of the five-story building now under construction will give considerably greater capacity.

It has been reported that there will be a common stock dividend of some size after the increase of capital has been provided for; but when interviewed President Thomas L. Robinson said no action had been taken in regard to the stock dividend.

Speedwell Planning New Six

Numerous changes and improvements will mark the 1913 line of Speedwell pleasure cars. While no detailed announcement has been made by the Speedwell Motor Car Company, it is pretty definitely understood that the models will include both fours and sixes and that the wheelbase will be materially lengthened.

The working force at the plant is to be increased, according to official word from the factory.

Corbin Enters Speedometer Field

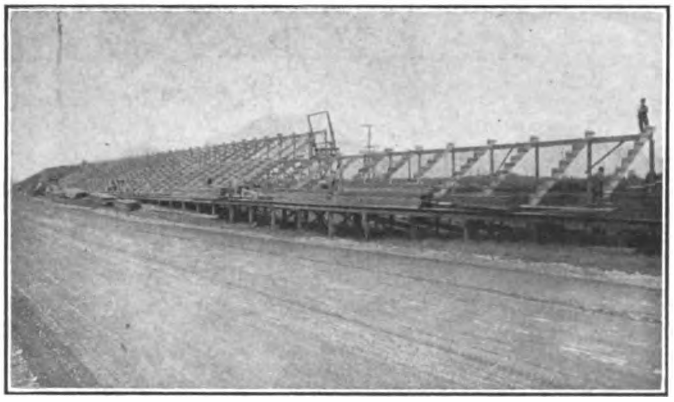
NEW BRITAIN, CONN., July 1—The Corbin Screw Corporation, division of the American Hardware Company of New Britain, Conn., announces that it will manufacture and market the Corbin-Brown Speedometer. The device has heretofore been known as the Brown Speedometer, but under the new name will embody a number of improvements. The Corbin-Brown Speedometer is the invention of Col. W. C. Brown of New York.

Estep Resigns from Packard

DETROIT, MICH., July 1—E. Ralph Estep, advertising manager of the Packard Motor Car Company, has resigned his position and is no longer connected with that company. Mr. Estep has had charge of the Packard advertising, except for two brief intervals, since the early years of the company. He is widely known as an editor and speaker. Mr. Estep's future plans are not announced. As yet there has been no successor appointed at the Packard plant.

Lion Company to Resume at Adrian

ADRIAN, MICH., July 1—Directors of the Lion Motor Car Company, which recently lost its plant here by fire, have decided at a meeting, held in Detroit, to accept the offer of this city of a complete factory building and will equip it as a motor car plant immediately. This plan will enable the Lion people to fulfil their contracts for orders of parts and supplies, already purchased for their 1913 line.



Grand stand at start and finish of Tacoma 5-mile course

Straightaway on Tacoma course before it was ironed out

Ready for Tacoma Races

Seventeen Entries for Two Big Events at 200 and 250 Miles Over 5-Mile Course

Corners Are Well Banked, and Prospects Are Excellent for Fast Time

TACOMA, WASH., June 28—Less than 2 months ago work was commenced on the 5-mile circuit just outside this city upon which the Montamara road races will be run next week. Something like $6,000 has been expended and a marvel has been wrought considering the small amount of time and money that have been available for the purpose. The course is in fine shape today practically throughout its entire length and several of the drivers who will take part in the races have made exceedingly fast time over parts of it.

Part of the course has been laid out over ordinary country highways but quite a material part of the circuit had to be constructed from the grass-roots down. Of course the existing roads that have been included in the course have been revolutionized and the result is to be seen in the broad, safe speedway that has been brought into being by the energy of the road builders.

Right up to the post call the engineers will continue to improve the course. The last of the oiling will be done on Monday but work will continue on the surface until Thursday night. Packers and steam-rollers will not be withdrawn, save for the time allowed for practice work, until sundown on Thursday.

It will take a year before such a course can reach its perfection, but there are many among the automobile enthusiasts here who predict that an average speed of over 70 miles an hour will be attained for the whole of the free-for-all contest. Tetzlaff has said that on the straightaways it is not unlikely that a maximum of 110 miles an hour will be reached by some of the cars.

The course is about 2 miles shorter than the Los Angeles Santa Monica circuit and the straightaways are correspondingly shorter. The turns have all been banked so that there is not one on the course which can not be taken with a fairly wide throttle. It is predicted that 60 miles an hour around any of them will be possible without untoward results.

Work on the grand stands is progressing to completion and accommodations for a vast army of spectators will be provided. The location of the course is just south of the city and can be reached by street car or via the Northern Pacific, which will inaugurate a special service from the center of the town to the grand stand on the race days.

The street car schedule has been extended 1 hour earlier than usual and frequent service will be provided after 5 o'clock in the morning.

Martial law will prevail on the course during both days of racing and the local companies of the National Guard will be on duty to prevent spectators from getting in the way of the racers and to maintain a careful patrol of the whole circuit.

The latest indications are that there will be about twenty entries in the races.

The field now lines up as follows for the two big road races of 200 and 250 miles each, run respectively on Friday and Saturday: 3 Fiats, 1 Benz, 3 Nationals, 2 Coles, 2 Stutz, 2 Mercers, 2 Simplex, 1 Pope, 1 Knox.

Two of the Fiats are 120 horsepower; the third is 70 horsepower; the Benz is 110 horsepower; the Stutz are 50 horsepower, and the others range from 30 to 90 horsepower.

There are still a number of soft and rough spots on the course that are centering the attention of the road makers and so far any supreme speed has not been essayed over it in its entirety. On the straightaways all the contestants have opened wide and several of them have made the whole round in fast time. However, the best mark set in practive to date is a little less than 4:56, which is slightly more than 60 miles an hour on the longest stretch of the circuit. Numerous rounds have been made in 5 minutes and thereabouts.

The fastest spurt indulged in by any of the entries was 1 mile in 41 seconds by the Cooper Stutz.

One reason why rounds have not been made at the 70-mile-an-hour rate is that there is a rough spot across the course 3-4 mile from the end of the best straightaway, necessitating much care and low speed. On this spot a steam-roller and a gang of tampers have been busy for 2 days past and during the practice today the drivers began to shoot their cars across at full speed. Just beyond the last turn before reaching the main stands there are two more bad spots which will be rolled out and resurfaced tomorrow.

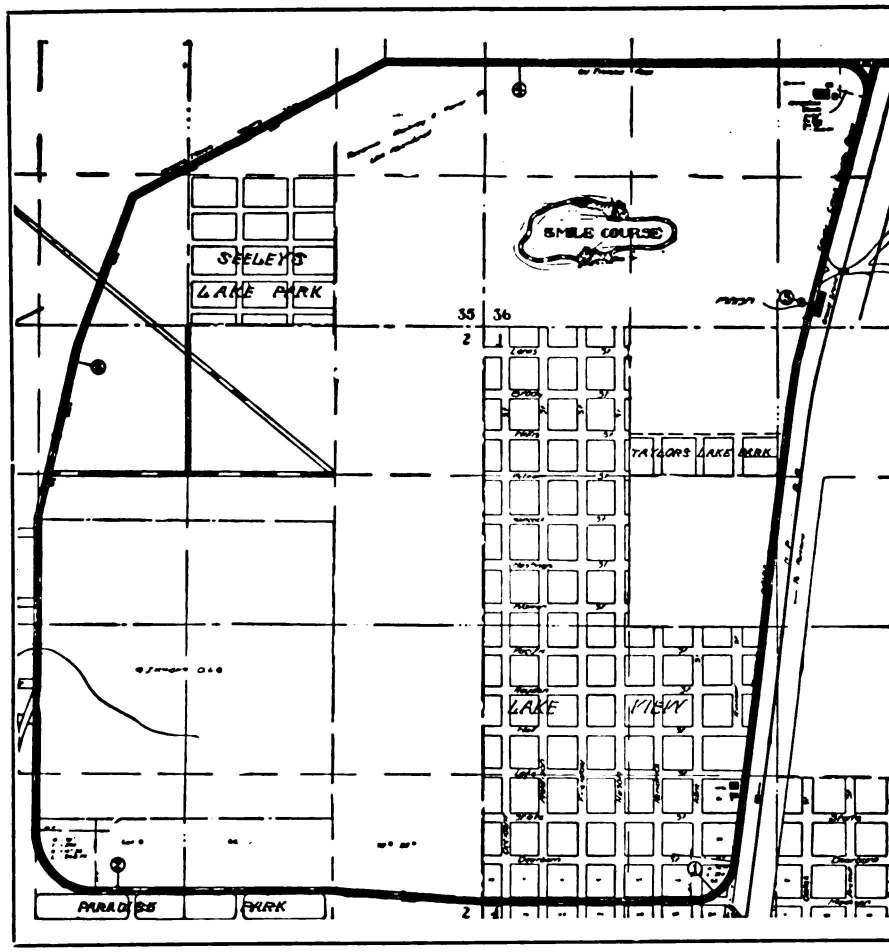
Broad banked turn, near Lakeview, before completion

The three chief corners on the course have turns constructed on a radius of 1,000 feet, which ought to be sufficiently gentle and safe to make the race comparatively free from mishaps. They have been banked according to the most approved formula, and if there should be any spills the management predicts that they will not occur on the turns.

The pits are located above the finishing line and within easy view of all but one of the stands. The seating capacity of the grandstands is well above 20,000, and the parking spaces are sufficiently commodious to take care of 2,500 automobiles.

The prizes offered to the winners are satisfactorily large. In the big free-for-all the money purse amounts to $5,000 and the total amount of prize money hung up is $10,000. These purses with the challenge trophies that they carry make the prize list formidable.

Special arrangements have been made at all the local hotels to take care of the crowds and low excursion rates to this city have been granted by the railroads. While the population within a radius of 50 miles is not up to metropolitan standards and ideas, the territory included is rich from every material viewpoint and its residents are prosperous. In one of the small valleys near Olympia, which is devoted to fruit culture, it is claimed that there are more automobiles owned per capita of population than in any similar sized locality in the world.



Map of the Montamara 5-mile course, near Tacoma, Wash.

Small Crowds at Washington's 2-Day Meet

WASHINGTON, D. C., June 29—Designed to afford some amusement for the big crowds attending the Democratic Convention in Baltimore this week, a 2 days' race meet began on the mile dirt track at Laurel yesterday. The convention was too attractive, however, and less than three hundred people attended the first day. Burman won back the Remy brassard in his Blitzen Benz, covering 3 miles in 3:20. He had little competition, as only Elmer MacDonald, in the Benz 110, and I. C. Barber, a local driver, in a Warren-Detroit, opposed him. They finished in the order namer. Burman won the 21-mile race in 27:32, with Raimey's Ohio 99 second and French's Lozier third. The summaries:

Non-stock, 161 to 230 cubic inches, 5 miles

No.	Car	Driver	Time
1.	Warren-Detroit	I. C. Barber	6:15
2.	Reo	Frank Stewart	

Non-stock, 231 to 300 cubic inches, 5 miles

1.	Ohio	John Raimey	5:37
2.	Kline	C. C. Fairman	
3.	Mercer	Frank Blair	

First heat for Remy Brassard, 3 miles

1.	Blitzen Benz	R. Burman	3:20
2.	Benz 110	E. MacDonald	
3.	Warren-Detroit	I. C. Barber	

Non-stock, 600 cubic inches and less, 5 miles

1.	Cutting	R. Burman	5:22
2.	Kline	J. W. Minker	
3.	Lozier	H. W. French	

Exhibition Mile

Blitzen-Benz	R. Burman	:58 3-4

Non-stock, 600 cubic inches and less, 25 miles

1.	Cutting	R. Burman	27:32
2.	Ohio	J. Raimey	
3.	Lozier	H. W. French	

Free-for-all, 5 miles

1.	Benz	E. MacDonald	4:12 1-2
2.	Kline	C. C. Fairman	
3.	Lozier	H. W. French	

The second day's racing brought out the same fields as the day before. The crowd was very small and the promoters will lose a great deal of money on the venture. The results:

5-mile race

Car	Driver	Time
Mercer	Frank Blair	6:04
Warren	I. C. Barber	
Reo	F. Stewart	

Second heat for Remy Brassard, 3 miles

Benz	E. MacDonald	5:11 1-4
Benz	R. Burman	

Third heat for Remy Brassard, 3 miles

Benz	R. Burman	3:06 1-2
Benz	E. MacDonald	

5-mile race

Cutting	R. Burman	5:34
Ohio	J. Raimey	
Warren	I. C. Barber	

5-mile race

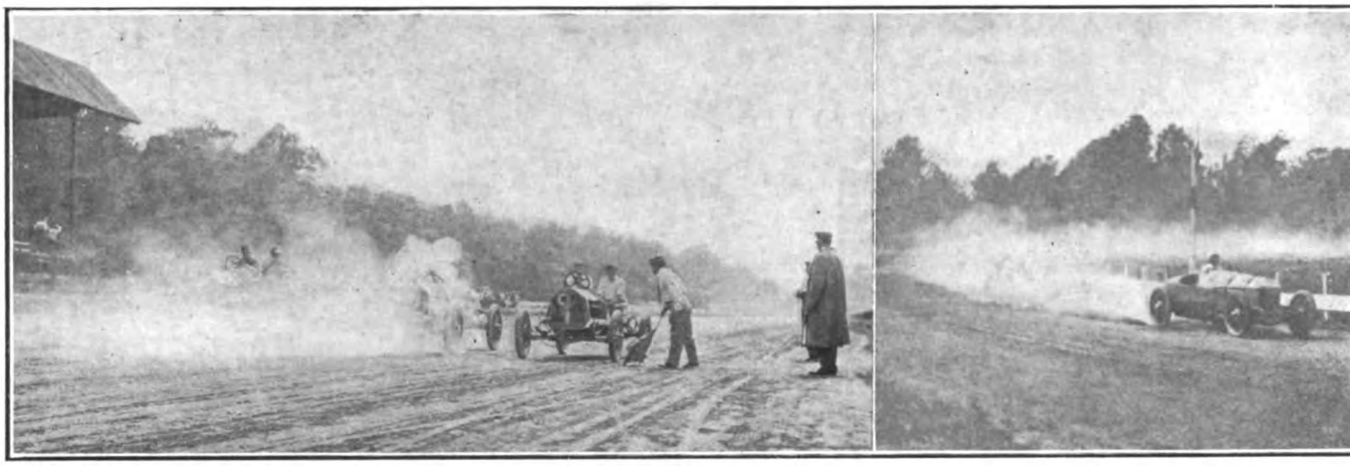
Ohio	J. Raimey	5:55
Warren	I. C. Barber	
Mercer	Frank Blair	

Free-for-all handicap, 5 miles

Benz	E. McDonald (Scratch)	6:05 1-2
Warren	I. C. Barber	
National	C. Campbell	

Australian pursuit race

Benz	R. Burman (8 1-2 miles)	8:19 1-4
National	C. Campbell	



Start of Event 1, won by Buick. Menker in Klinekar passing Blocksom in Stutz in 10-mile race

Klinekar Stars at Belmont

Wins Free-for-All and 10-Mile Events —Morton's Mercer Overturned; Nobody Hurt

Three Unsuccessful Attempts to Lower Burman's Mile Track Record of 54.26

PHILADELPHIA, June 29—All things considered, the initial race meet of the Belmont Motor Club held this afternoon at the Belmont Driving Park, Narberth, was an ambitious attempt, and the disappointingly small crowd that attended was amply repaid for any discomfort due to the sweltering heat of the hottest day so far this summer by the exciting finishes in several of the events. To further add to the excitement an accident occurred which at first was thought to have had a serious termination. The accident occurred during the running of the sixth event, a 50-mile free-for-all race with an entry list of ten, only four of which, however, faced the starter. These were a Stutz, driven by S. R. Blocksom; a Mercer, driven by W. D. Morton; a Fiat, piloted by William Frietag, and a Klinekar, John Menker, driver. Early in the contest the Fiat was forced to drop out, and the three survivors put up the prettiest contest of the day. On the seventeenth lap the Mercer entry crashed into the fence on the far side of the track, throwing both driver and mechanician out. The spectators crowded on the track and threatened further danger, as the Stutz and the Klinekar were still tearing around the oval. The race was immediately stopped. The Mercer car was put out of commission but neither W. D. Morton nor his mechanician was seriously injured. The contest was resumed between the Stutz and Klinekar on the eighteenth lap, at which point the former car held a commanding lead. A succession of tire troubles toward the conclusion of the race, however, caused the Stutz to lose much valuable time, which the Klinekar was not slow to take advantage of, and when two flat tires, one in the forty-seventh and the other in the forty-ninth lap occurred, the Klinekar breezed in a winner by a comfortable margin. The latter car was not without its tire troubles either, but they occurred less frequently.

In the 1-mile exhibition for the track record, although three attempts were made, Burman's 54.26 seconds still stands, the nearest approach to it being made by John Menken in a Klinekar, who negotiated the mile in 58 seconds flat, which, by the way, was the fastest lap of the afternoon.

The program was marred somewhat by the withdrawal of several of the entries, so that with one exception the fields were small. By the application of liberal quantities of calcium chloride, assisted by an autocar sprinkling wagon that made trips around the track during intermissions between events, the raising of dust was reduced to a minimum.

Event No. 7, a 10-mile handicap race, furnished plenty of thrills, William Frietag in his Fiat, starting from scratch, wearing down his six opponents one by one, winning in 10 minutes 50 seconds, the Empire car, driven by R. D. Smith, Jr., finishing second.

Event No. 3, 10 miles, was featured by the establishment of a record for cars of 301 to 450 cubic inches piston displacement. the Klinekar driven by John Menker covering the ten laps in 9 minutes 55 seconds, although the record will not be official owing to there being no timing device to record it, as required by the A. A. A. The summaries:

Non-stock; 5 miles; 161 to 230 cubic inches

No.	Car	Driver	Time
9	Buick	Eddie Bauer	6:02 2/5
18	Cartercar	H. Baker	6:03 4/5
12	Empire	R. D. Smith	....

Non-stock; 5 miles; 231 to 300 cubic inches

No.	Car	Driver	Time
14	Bergdoll	E. Homan	6:00 4/5
3	Mercer	W. D. Morton	....
4	Mercer	Harvey Ringler	....
1	Klinekar	C. C. Farman	....
7	Schacht	Jas. M. Gray	....

Non-stock; 10 miles; 301 to 450 cubic inches

No.	Car	Driver	Time
2	Klinekar	John Menker	9:55
28	Stutz	S. R. Blocksom	5;56 4/5
17	G. J. G.	Al Millichap	....

1-mile exhibition to lower track record of 54.26 seconds

Car	Driver	Time
Fiat	William Frietag	1:01
Klinekar	John Menker	:58
Chadwick	Willie Haupt	1:02

Free-for-all; 50 miles

No.	Car	Driver	Time
1	Klinekar	John Menker	53:39
28	Stutz	S. R. Blocksom	....

10-mile handicap

No.	Car	Driver	Time
12	Empire	Wm. Frietag	10:50
15	Fiat	R. D. Smith, Jr.	....
7	Schacht	Jas. M. Gray	....

Handicap for non-winners of previous events; 5 miles

No.	Car	Driver	Time
12	Empire	R. D. Smith, Jr.	5:39
7	Schacht	Jas. M. Gray	....
4	Mercer	Harvey Ringler	....

Hoosiers to Honor Speedway Builders

INDIANAPOLIS, IND., July 1—The business interests of the city will pay a pleasing tribute to Carl G. Fisher, A. C. Newby, F. H. Wheeler and James A. Allison, owners of the Indianapolis Motor Speedway, when they give a dinner at the German House to-morrow evening. The dinner is to be in recognition of the services of the owners of the speedway to their home city and will be one of the first honors of the kind ever paid to an Indianapolis citizen.

There will be about 100 guests, representing the substantial business interests of the community.

Mr. Fisher and Mr. Allison have recently begun the construction of Speedway, the first horseless city in the world. They are also owners of the Prest-O-Lite Company, and Mr. Fisher is the Indiana agent for the Packard and Stutz. Arthur C. Newby is secretary and treasurer of the National Motor Vehicle Company, while Mr. Wheeler is a member of Wheeler & Schebler, carbureter manufacturers, and of the Langenshamp-Wheeler Brass Works.

Unclaimed Prizes Distributed

INDIANAPOLIS, IND., July 1—The Indianapolis Motor Speedway Company has divided $2,100, representing the eleventh and twelfth prizes in the 500-mile race Memorial Day, among the drivers who were unable to finish on account of accidents. As only ten cars finished, the two last prizes were not claimed. The $2,100 has been distributed on a basis of the number of laps covered by each driver. It was found that the fourteen cars failing to finish covered 1,093 laps, which gave a basis of $1.9213 a lap for each of the fourteen drivers.

Distribution of the $2,100 has been as follows: Stutz, Anderson, 80 laps, $153.70; Mercedes, De Palma, 199 laps, $382.34; Case, Disbrow, 67 laps, $128.73; Case, Herrick 54 laps, $103.75; Mercedes, Wishart, 92 laps, $176.76; Lexington, Knight, 7 laps, $13.46; Simplex, Dingley, 116 laps, $222.87; Cutting, Burman, 157 laps, $301.54; Firestone-Columbus, Rickenbacher, 43 laps, $82.62; Marquette-Buick, Liesaw, 72 laps, $138.34; McFarlan, Marquette, 63 laps, $121.04; Opel, Ormsby, 7 laps, $13.46; Lozier, Matson, 110 laps, $211.34, and National, Bruce-Brown, 26 laps. $49.95.

Davenport's Gala Motor Fourth

DAVENPORT, IA., July 1—Davenport automobilists are to have a special gala day July 4, the annual hill climb of the Davenport Automobile Club and the speed demonstrations of Bob Burman at the mile track in the afternoon to be the features. The hill climb will be held on Rock Island street, from Third to Tenth street. Two blocks are to be allowed for a flying start, the machines to be timed on five blocks. The record for the distance is 17 4-5 seconds, made by Pete Petersen of the P. C. Petersen Auto Company in a Pope-Hartford last year.

Ford Enjoins Price Cutters

DAYTON, O., July 2—The United States District Court at Cincinnati has decided in favor of the Ford Motor Company in its suit against the Union Motor Sales Company, of this city, in which unfair competition and violation of certain patent rights belonging to the complainant company were involved. The ruling of the court orders a temporary injunction. In the suit it was charged that the Union Sales Company advertised Ford automobiles at less than list price and the manufacturing company proceeded against the Dayton concern.

Run to Wildwood Races

Many Quaker City Motorists Will Tour To Seaside Resort to See Straightaway Contests

Thirteen Prizes Will Be Hung Up for the Roadability Event—Good Fields for the Races

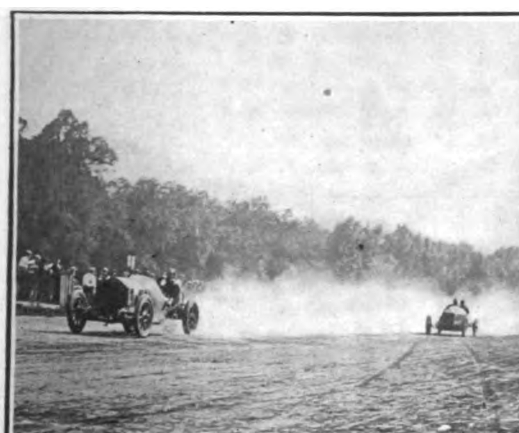
PHILADELPHIA, June 29—The roadability run under the auspices of the combined Boards of Trade of Wildwood, North Wildwood and Wildwood Crest from Philadelphia to Wildwood, N. J., next Wednesday morning, culminating in a race meet in the latter resort on Independence Day, promises to be one of the largest and most successful of its kind yet attempted. Taking part in the run down as non-contestants will be a score or more of racing cars that will take part in the contests to be waged on Thursday.

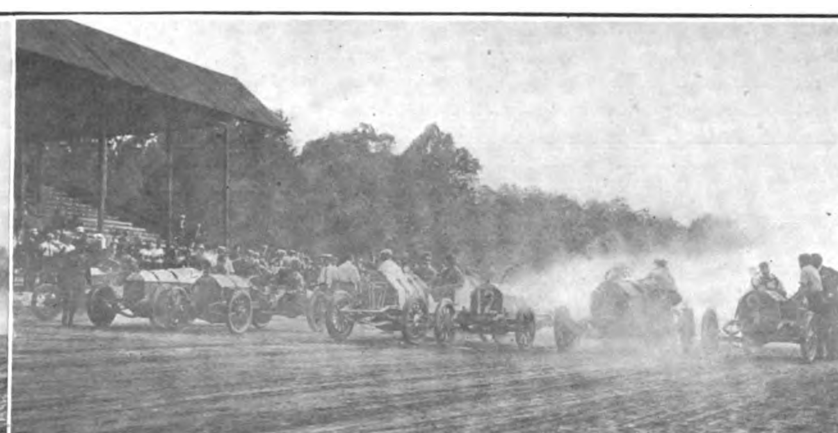
The itinerary as mapped out by the pathfinding Stoddard-Dayton Saybrooke car includes Gloucester, Westville, Woodbury, Swedesboro. At the latter town the tourists will be joined by a contingent of local machines, to whom two cups, the Ford Hotel Cup and the Clark Hotel Cup, will be awarded the cars running nearest the legal speed limit from Swedesboro to Wildwood, N. J. From Swedesboro the tourists will touch Alloway, Salem, Bridgeton, Millville, Port Elizabeth, Dorchester, Leesburg, Cape May Court House, thence into Wildwood.

In addition to the two special cups for Swedesboro contestants only, eleven others will be awarded, including two for the women's division, four main prizes and five supplementary ones. To the car finishing nearest the secret time for the full distance, which will be set by J. Thompson Baker, mayor of Wildwood, the prize is $50 in gold; second nearest, the Hotel Ridgway Cup, Camden, N. J.; third, Colonial Hotel Cup, Wildwood, N. J.; fourth, Hutchison Motor Company Cup, Woodbury, N. J.

For the secret intermediate control feature of the run, to the car nearest the legal speed limit at the first control (Alloway, N. J.) will be presented the Alloway Hotel Cup; second control (Salem, N. J.), the Nelson House Cup; third control (Bridgeton, N. J.), the Bridgeton Cup; fourth control (Wildwood, N. J.), the Ruric Hotel Cup.

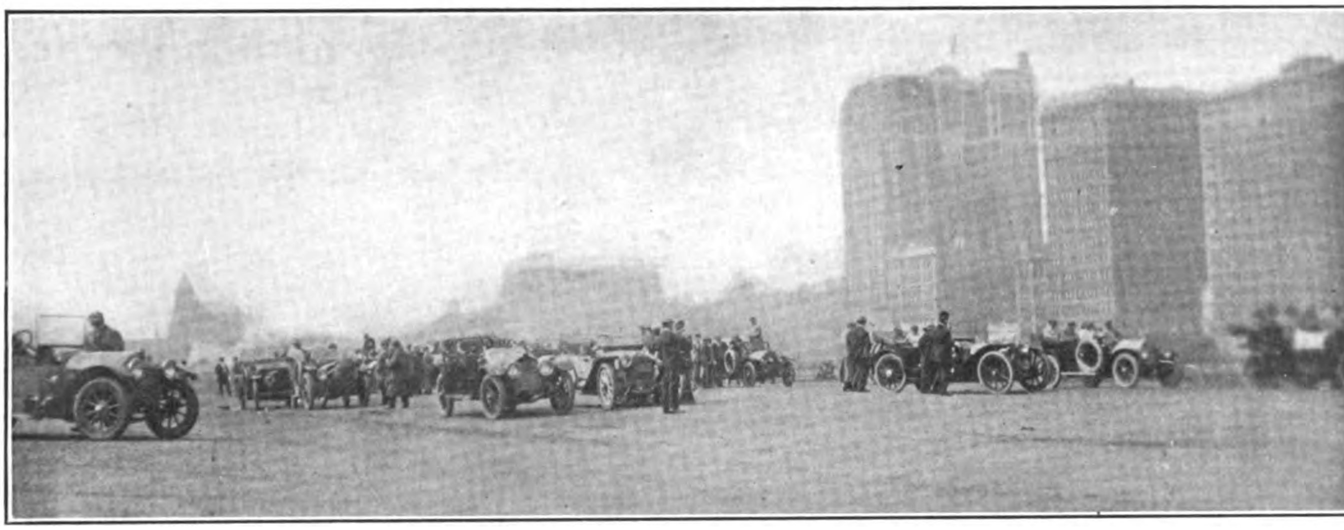
A majority prize of $50 in gold is also hung up for the greatest number of cars of any one make entered in the run by a Philadelphia agent and, finally, two special prizes, one a sterling silver chatelaine bag and the other a sterling silver chatelaine wrist watch, will go to women contestants. The automobile races on July 4th will all be one-mile straightaway.





Stutz passing Klinekar in 50-mile race.

Start of 10-mile handicap, won by Fiat



Start of the fifth annual reliability team match between the Chicago Athletic Association and the Chicago Automobile Club

Athletes Beat Motorists

Chicago Athletic Association Team Wins from Automobile Club in Annual Roadability Event

Heavy Penalties for Two of the Latter Team Upset Good Work of Their Mates

CHICAGO, June 29—The fifth annual interclub reliability team match between the Chicago Athletic Association and the Chicago Automobile Club, which was run Thursday and Friday of this week to Milwaukee and return, was won by the former club by the closest margin that ever has marked a match between the two organizations, the Cherry Circle having 46.7 points against it and the Chicago Automobile Club 58.

This is the great amateur event of the year, no one identified with the trade being permitted to participate as contestants. Because of the political conventions the entry list was not as large as was expected, there being at least a dozen scratches because of this. Still, the C. A. A. had twelve cars in line and the C. A. C. eleven.

The contest was run under grade 3 of the A. A. A. rules, penalizations being only for work done on the road and for being late at controls. This produced an interesting contest and the result is a demonstration of the skill of the amateur drivers, for of the twenty-three contesting fifteen made perfect scores. It was hard luck for the Chicago Automobile Club to lose, for only two of its drivers were penalized, while the second day the entire team went clean. At the end of the first day's run the Cherry Circle looked an easy winner with only 2 points against it, but yesterday, coming back from Milwaukee, S. F. Weatherly, in a Pathfinder ran into a ditch near Libertyville, sinking to the hubs. He had a couple of motor stops charged against him and also had to clean out his carbureter feed line with an air bottle,

A fine stretch of road near Lake Geneva

the line having become clogged because of the mud. All this work gave him 43 points which brought the C. A. A. near defeat.

The other five cars penalized on the C. A. A. side got their black marks for trifling causes. Frank Wentworth in a Rambler drew 4 points because his lighting system shortcircuited his ignition. The other four were charged with motor stops.

The first day's run was to Milwaukee, the mileage being 137, while the route back yesterday was but 120 miles. While at the night stop the Chicagoans were entertained by the Milwaukee Automobile Club at its country home.

TABLE SHOWING PENALIZATIONS IN THE INTERCLUB-RELIABILITY MATCH RUN BETWEEN THE CHICAGO ATHLETIC AND AUTOMOBILE CLUBS

CHICAGO ATHLETIC ASSOCIATION

No.	Driver	Car	Penalty 1st day	Penalty 2nd day
1.	C. T. Knisely	Diamond T	0	0
3.	Frank Wentworth	Rambler	0	4
5.	W. F. Grower	Diamond T	1	0
7.	W. C. Thorne	American Traveler	0	1
11.	A. H. Gunther	Cadillac	1	0
13.	C. A. Briggs	Chalmers	0	0
15.	W. Chamberlan	Rambler	0	0
21.	S. F. Weatherly	Pathfinder	0	43
23.	Harry Boulter	Locomobile	0	0
25.	W. Simpson	Winton	0	1
27.	L. Jacques	Peerless	0	0
29.	S. E. Hibben	Packard	0	0
			2	49

CHICAGO AUTOMOBILE CLUB

No.	Driver	Car	Penalty 1st day	Penalty 2nd day
2.	Allen S. Ray	Stearns	0	0
4.	C. F. Ballou	Apperson	0	0
6.	Charles Bosch	Stearns	25	0
8.	J. T. Brown	Velie	0	0
14.	R. O. Evans	Apperson	0	0
16.	H. A. Ford	Premier	0	0
18.	E. T. Franklin	Abbott-Detroit	33	0
20.	G. F. Griffin	Peerless	0	0
22.	W. M. Jones	Winton	0	0
24.	F. E. Mann	Locomobile	0	0
28.	R. B. Wilson	Knox	0	0
			58	0

Advertised Cars as Stock

Agencies Suspended for Misleading Statements Regarding Victories at Indianapolis and Elsewhere

Referee and Promoter Disciplined for Disregarding Contest Board Ruling—Records Granted

FOR breaking the rule about advertising the performances of contestants in non-stock events as being those of stock cars, three automobile agencies fell under the ban of the American Automobile Association at its meeting last week. The disciplined agencies are as follows: The Wisconsin Auto Sales Company of Milwaukee and the Howard Automobile Company of San Francisco were suspended until January 1, 1913, for advertising the performance of the winning National in the recent 500-mile race at Indianapolis as a stock car victory. The Empire Motor Car Agency of Boston was given a similar sentence for claiming that a Stutz car that competed in a race at Salem, N. H., was a stock car running under non-stock conditions.

On a dusty piece of road near Mucknowago

E. G. Kuster, official representative of the A. A. A.; R. P. Hillman, referee of recent California contests, and A. M. Young, promoter of the Santa Monica road races and other events, were disciplined. Mr. Kuster's resignation was accepted and Mr. Hillman was declared ineligible as an official until January 1, 1913, and Mr. Young was barred for a similar period.

The matter in question was the disregarding of a telegraphed ruling of the Contest Board defining the status of the E-M-F—Flanders entries.

In order to cover the point more definitely than it is in the present rules the following amendment, effective August 1, has been adopted;

"No car with a bore, stroke and piston displacement of a different size from the regularly catalogued product of a manufacturer shall be entered in any sanctioned event until its manufacturer shall have filed with the Contest Board, on official blanks provided for the purpose by the Contest Board, sworn certificates giving the bore, stroke, number of cylinders, total piston displacement, horsepower and year and model name of the cars, and such cars must be officially entered, programmed and advertised in strict accordance with such registration.

"All other cars must be entered, programmed and advertised in strict accordance with catalogued specifications.

"Rule 113 (on Road Racing). REPAIR PITS. There shall be located at the start and finish line one repair pit for each car started, not less than 15 feet long and 8 feet wide. The pits must be located on the right of the course in the direction in which cars are traveling. If located on the same side and in front of the grandstand, there must be an intervening distance of not less than 15 feet between the pits and the stand."

The following official records made at the recent Indianapolis race were allowed:

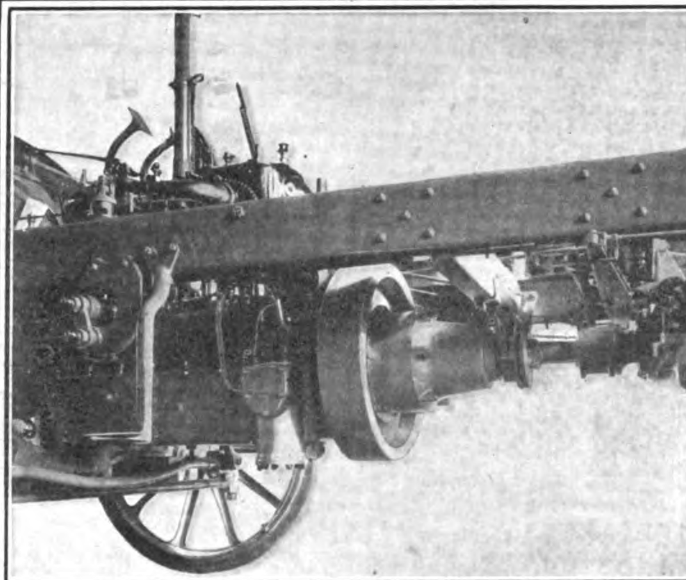
Distance, Miles	Car	Driver	Time
100	Fiat	Tetzlaff	1:13:37.25
150	Fiat	Tetzlaff	1:49:52.84
200	Fiat	Tetzlaff	2:25:59.52
250	Fiat	Tetzlaff	3:07:13.94
300	National	Dawson	3:48:49.30
350	National	Dawson	4:25:15.27
400	National	Dawson	5:04:14.23
450	National	Dawson	5:44:04.54
500	National	Dawson	6:21:06.03

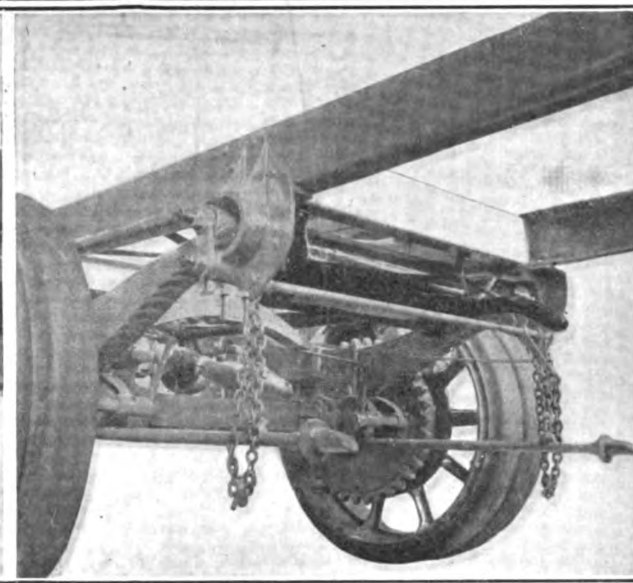
(NOTE.—The time of the No. 4 Mercedes, driven by DePalma, bettered all of the above times, with the exception of the 500-mile mark, but under Rule 79 of the 1912 Contest Rules no record at an intermediate distance is allowable unless the car finishes the event. The No. 4 Mercedes discontinued the race in the 199th lap.)

Alco Truck Is Nearing Omaha

MARSHALLTOWN, IA., July 2—The transcontinental trip of the Alco 3-ton has proved successful so far and the car is now approaching the mid-way point, having averaged 12 miles an hour during its running time to date. The car is delivering 3 tons of freight to a Pacific coast consignee. The first half of the trip was routed over good roads and the car still has to face the rough going of the Rocky Mountains and the desert country.

Start from Milwaukee of the team match reliability run between the Chicago Athletic Association and the Chicago Automobile Club





Partial view of chassis, showing arrangement of clutch and motor. Rear view of chassis, showing construction features

Locomobile 5-Ton Truck

Motor Develops 45 Horsepower and All Parts of the Machine Are Especially Designed for Commercial Work

Increased Factors of Safety, Increased Bearing Areas and Decreased Pressures and Strains Important Features

AFTER investigating conditions in the commercial vehicle field for a number of years, studying the design, materials and construction most suitable for such work and testing out an experimental machine, the Locomobile Company, Bridgeport, Conn., has brought out a 5-ton truck. The main features of the experimental machine have been retained but improvements have been made wherever the tests demonstrated their feasibility.

The design of the truck shows a very compact arrangement, affording a very large platform space, and at the same time making the vehicle one which is easily managed, only a 27 1-2-foot radius being needed to make a complete turn.

The driver's seat is located over the motor, thus affording the maximum platform space and carrying capacity for the wheelbase, and enabling the operator to handle the truck more easily.

Parts Built for Hard Service

In the production of this truck no parts have been used which were designed for any of the types of pleasure cars that the company has constructed. Every part has been designed for the truck, so that it will be able to withstand the more severe duty to which trucks are subjected.

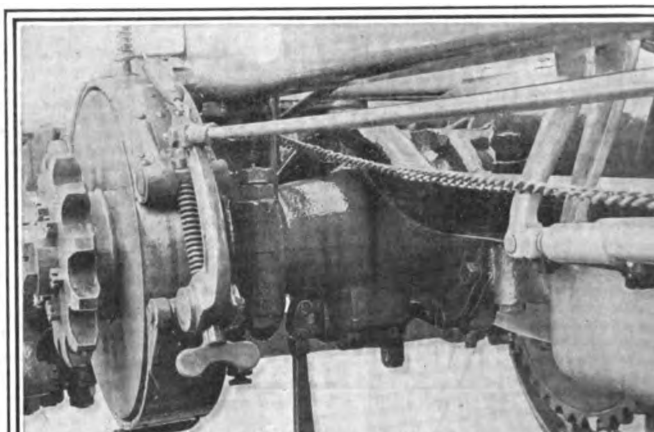
The general dimensions of the truck are as follows: Wheelbase, 140 inches; tread, front, 65 inches; rear, 70 inches. Height above ground, loaded: frame, 39 1-2 inches; platform, 46 inches; driver's seat, 72 inches. Platform length, 14 feet; width, 6 feet (or wider). Width over hub caps, 85 3-4 inches. Length over all, 226 1-4 inches.

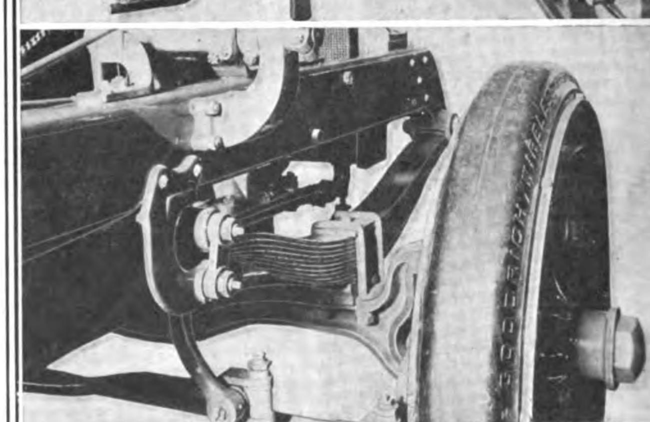
A self-contained, continuous-flow lubricating system, which has proven very economical, has the added advantage that its regulation cannot be altered by the operator, and a specially designed ring governor, which prevents the motor speed from exceeding 900 r.p.m., has been added.

The water outlet pipes, instead of being made separately, are cast integral with the cylinder waterjacket caps, to eliminate the danger of leaky joints.

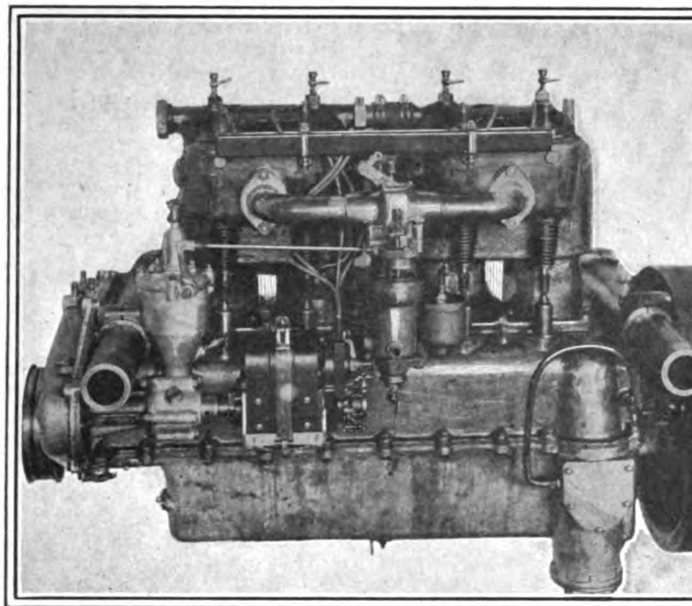
The double chain drive gives great strength, flexibility and the maximum tractive effort. The motor is of the four-cylinder, water-cooled type, having a bore of 5 inches and a stroke of 6 inches, and developing 45 horsepower at 900 R.P.M., and was made especially for truck service.

The diameters of the valves have been increased, as well as those of the admission and exhaust pipes, thus reducing gas velocities; and the valve stem guides, instead of being cast integral with the cylinders, as is the usual practice, are cast separately and forced into place so they can be easily replaced.

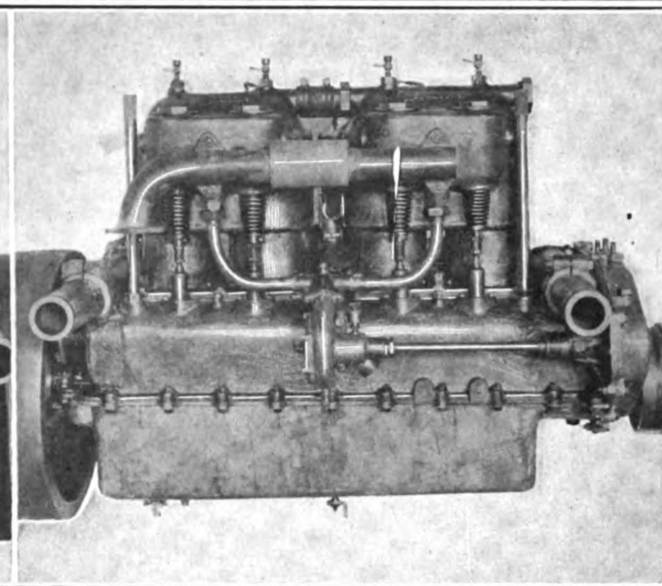




Arrangement of brake and drive sprocket on the jackshaft
Front suspension, one shackle bolted on, the other welded



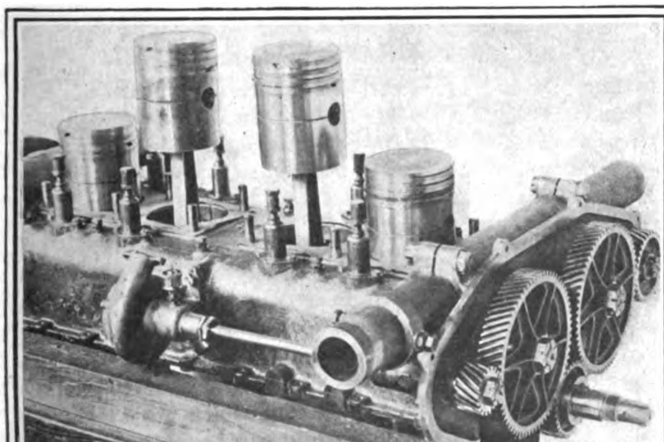
Intake side of Locomobile 5-ton truck motor, showing governor.



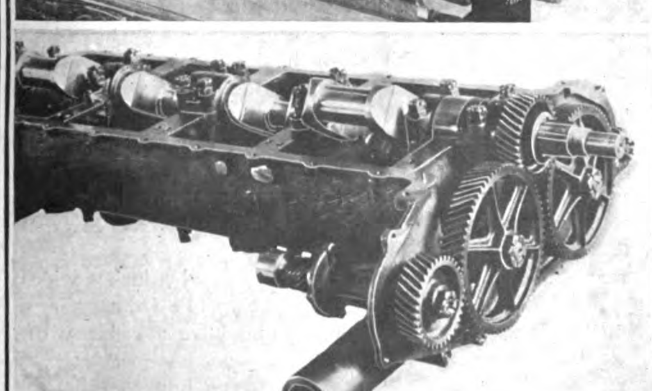
Exhaust side of motor, showing independent water pump shaft

The exhaust manifold is made in two parts, one of which telescopes inside the other, thus obviating any stresses between the two pair of cylinders due to the longitudinal expansion of a solid manifold when heated, which would tend to throw the wristpin and crankpin bearings out of proper alignment.

Radical changes have been made in the method of supporting the crankshaft, and in the size of the crank and connecting-rod bearings, so that the pressures per square inch of projected bearing area could be cut down to the minimum. Instead of a three-bearing crankshaft with bearings 1¾ inches in diameter, such as was used in the pleasure and public service cars, a five-bearing crankshaft, with bearings 2¼ inches in diameter, is used on the truck. In consequence, the crankshaft bearings in the truck have a projected area of 41.34 square inches, as against the projected bearing area of 21.54 square inches on the pleasure and public service cars. This tends to increase the life of the bearings and to minimize motor troubles. The crankpin and wristpin bearings also show a marked advance in size over previous practice.



Cylinders removed, showing engine pistons and connecting rods



Top of crankcase removed, showing crankshaft and timing gears

The connecting-rods are of I-beam section, drop forged from a steel strong enough to give the rods a factor of safety of 25.

The crankpin bearing caps are held in place by four studs to which they are fastened by means of a lock washer, plain nut, castellated lock nut and cotter pin.

The cast-iron cylinders are cast in pairs and have very large waterjackets. Each cylinder pair is fastened to the crankcase by means of six ⅝-inch studs, nuts and castellated lock nuts.

The cylinders, after being bored and reamed, are ground to a finish, as are also the pistons. The pistons are each fitted with four ¼-inch rings above the wristpin, each of which has been annealed to relieve it of all internal strain, and has been carefully ground and finished to an exact fit.

In the crankcase the makers have followed their standard practice by using bronze, thus insuring alignment of the crank bearings and eliminating any danger of crystallization under the road shocks to which a truck is subjected.

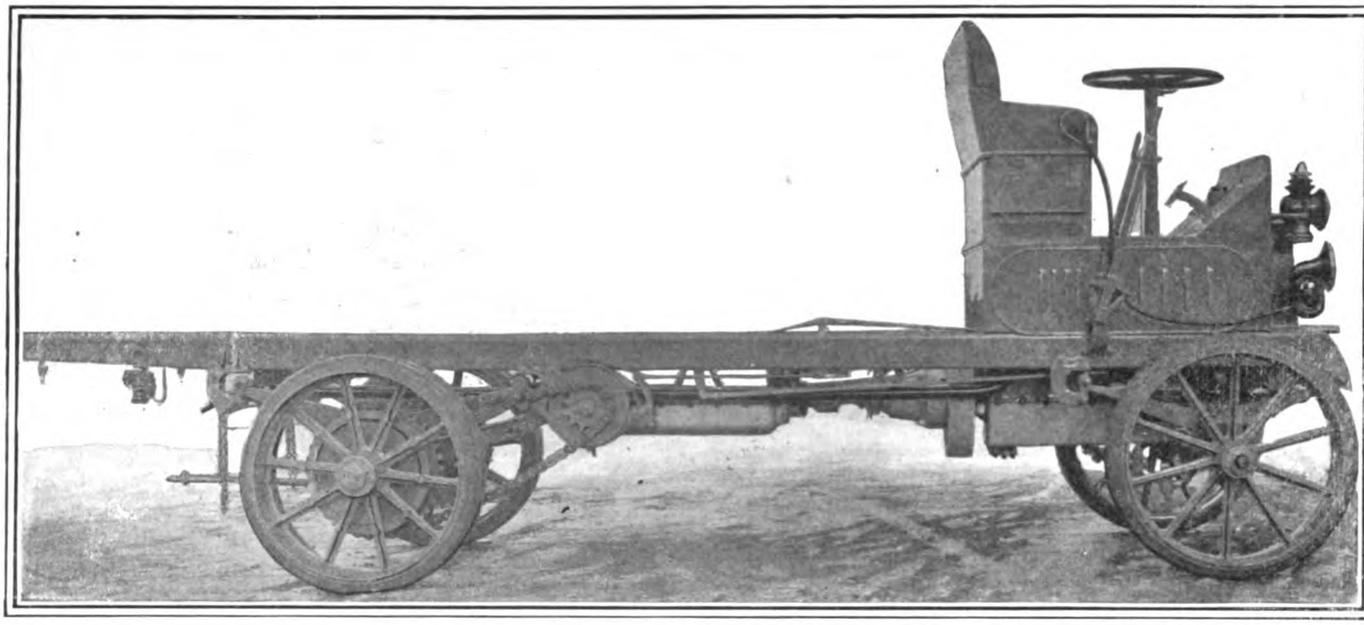
The crankcase is supported front and back from the channel side member of the frame in a manner which makes the motor easy to remove and insures alignment upon replacement.

Steel Tubes Support Motor

Two 3-inch steel tubes pass through holes bored in suitable lugs in the front and rear of the crankcase and are held firmly in position by means of clamp bolts, which draw together the slotted ends of the two bearings. Cast steel bearing brackets, bolted rigidly to the frame after the motor has been properly aligned, support the tubes and keep them in place by means of caps bolted down.

The governor, which is located on the left-hand side of the motor in front of the magneto, is of the vertical ring type, and is driven from the magneto driving shaft by spiral gears. The ring is hung from the shaft at a normal inclination to the horizontal plane of 53 degrees and carried by two cams. It is held in this position by a spring, but as the motor speed increases the tension of this spring is overcome, and the ring seeks to assume a horizontal position. The governor is connected by linkage to a butterfly valve in the carbureter, which remains wide open at all speeds below 900 r.p.m., at which speed the governor cuts off.

The carbureter is of standard Locomobile design. It is of the float-feed type and is fitted with both a hot air regulator and



Locomobile 5-ton truck with platform body; 70 per cent. of the load capacity is carried on the rear wheels

a hot water jacket. Only a single jet is used, which insures easy starting; but this single jet, owing to its design, performs the functions of both the single and multiple type jets. This is accomplished by elongating the jet so that the customary hole in the top is some distance above the level of the gasoline in the float chamber. Supplementary holes are drilled in the jet just above the gasoline level. Gasoline for low motor speeds is supplied through the supplementary openings, the necessary excess for high speed being furnished by the hole on top, the gasoline being drawn through it by the increased suction due to the higher velocity of the mixture through the vaporizing chamber. An air adjustment is arranged on the dash.

The water-cooling system contains 8 gallons of water. Instead of having a rigid return water connection on top of the cylinders, the cylinder water jacket caps have return pipes cast into them. The connection with each other and with the radiator is made with rubber hose connections, eliminating any danger of breakage due to vibration, and relieving the water jacket caps of all strain.

The radiator is protected by being set behind a large channel cross-member, and is hung in a novel manner.

A large aluminum fan, cast in one piece and driven by a 1¾-inch flat belt, is provided, the driving pulley being on the crankshaft. This fan is mounted on two ball bearings contained in an eccentric case, which, by loosening a nut, can be turned, thus adjusting the tension of the belt and facilitating any necessary belt replacements.

Clutch Alignment Is Assured

The dry disk clutch installed in this truck is self-contained and is carried on the flywheel alone, preventing any possibility of the plates getting out of alignment. Its connection with the transmission is through a drive shaft which has a universal action. The seven driving disks, which engage with six hardened and ground driving bolts attached to the clutch drum bolted to the flywheel, are made of ⅛-inch sheet steel. The seven driven disks, which are mounted on the clutch disk retainer, are made of ⅛-inch sheet steel and are lined on both sides with a non-burn material 5-32 inch thick. The driven members are provided with a clutch brake.

The transmission is of the electric type, with four speeds forward and a reverse. The transmission case proper, which is a manganese bronze casting having a tensile strength of 68,000 pounds per square inch, comprises the top, instead of the bottom, half of the transmission case, contrary to usual practice. The bronze top half is supported from the frame, and the clutch pinion, countershaft and mainshaft are attached to it by collars. The aluminum oil pan bolts on from the bottom, and, in consequence, can be dropped to inspect the gears. The clutch pinion, countershaft or main shaft can be individually removed without dropping the transmission or disturbing any other part.

The transmission case is hinged in front to a channel section cross member and is supported behind by the jack shaft housings, which are bolted to it so as to form an integral part. These housings are held by spherical bearings in cast steel brackets bolted to the chassis side channel members. This arrangement prevents any temporary deflections or distortions in the chassis from straining any part of the transmission or from throwing it out of alignment, as the transmission case will adjust itself in the spherical bearings..

Features of the Transmission

The gears, which have a 1½-inch face, are made of an especially tough alloy steel heat-treated and very accurately machined. The teeth are generated on a gear shaper instead of being milled in the usual manner, so that friction losses are reduced as much as possible.

The main shaft, instead of being square, has feather keys cut from the solid material, this design giving a greater cross-section and consequently greater strength.

The contracting type foot brakes are each 13½ inches in diameter and 3 inches wide, giving the foot brakes an effective braking area of 225 square inches. Owing to the chain reduction, these brakes have as much braking effect on the rear wheels as the internal expanding emergency brakes, which are 18 inches in diameter, with a 4½-inch face, and a total effective braking area of 355 square inches.

The truck is equipped with a 2-inch pitch chain with rollers 1⅛ inches in diameter and 1¼ inches wide, whose strength is 44,000 pounds.

The rear axle is made of alloy steel and is rectangular in shape, being 3½ inches high by 2½ inches wide.

The wheels are carried on roller bearings guaranteed to carry 17,500 pounds per axle, a figure which would not be reached even under the maximum overload conditions.

The rear springs, which are 50 inches long and 3 inches wide, have a normal capacity of 6,000 pounds each. The front springs are 42 inches long and 3 inches wide, and have a capacity of 2,000 pounds.

The truck is fitted with a 3-inch jack spring hung parallel to and above the rear axle from a spring chair supported by diagonal frame members heavily reinforced by gusset plates, top and bottom. This jack spring was installed to absorb severe road shocks and also to take care of any overloading of the rear springs.

One important feature in the spring arrangement is the device used in connection with the spring link bolts and shackles. In order to prevent wear, the hardened steel link pins which pass through the bronze spring bushings are welded to one shackle by an oxy-hydrogen process, making them a solid unit and preventing any relative movement between them. The other shackle is bolted on.

Heavy sprags, which can be dropped from the driver's seat by a chain on the steering post, are mounted on the rear axle.

Cast Steel Wheels Employed

The frame is strong and well designed. It is made throughout of pressed alloy channel steel, the side members of the frame being 6 inches high by 2½ inches wide by 5-16 inch thick, and held together by six channel section cross-members, heavily reinforced by large steel gusset plates.

The truck is equipped with 40-inch cast steel wheels, which are stronger than wooden wheels, and are not affected by road jars and vibration. The cast steel rear wheels weigh over 50 pounds less than similar wooden wheels. The front wheels are fitted with a single 6-inch solid tire, while the rear wheels each carry two 6-inch interchangeable solid tires.

The steering gear is of the screw and nut type, a triple thread screw of large pitch being used to lessen the wear. The horizontal steering wheel gives the operator greater leverage in steering, and subjects him to less fatigue.

The superstructure carrying the driver's seat is so arranged that it can be easily removed, in case it is wanted to grind the valves in the motor, without disturbing the control.

The gasoline tank, holding 25 gallons, is located under the driver's seat, and is connected with the carbureter by means of a flexible metallic tubing.

About 70 per cent. of the capacity load is carried on the rear wheels. This distribution gives maximum traction without loading the wheels beyond their effective adhesive weight, lightens the load on the front wheels, and offers the minimum load resistance, making steering easy and equalizing the tire wear between the front and rear wheels.

Standardization in the Drafting Room

H. Allen Suggests that Conservation of Time, Energy and Money Is Possible Through the Use of Standard Tables of Sizes in Properly Laying Out the Work Before It Reaches the Shop

STANDARDIZING the drafting room is one of the biggest factors in this department of the factory today. This standardization work can be carried on in many different ways. Each act of standardization calls for a tabulation which should be given to each draftsman. One example of this occurs in drilling holes for cotter-pins. Draftsman No. 1 might use a certain size drill and draftsman No. 2, working in the same drafting room, would indicate a different size drill for this work. As a solution of this difficulty, my suggestion is adopting the standards for cotter-pin drill sizes of Table No. 1. Give each draftsman a copy of this table and insist that all holes for certain size cotter-pins be of the same size, irrespective of the person doing the work.

TABLE NO. 1—STANDARD SIZE DRILLS FOR SPRING COTTER-PINS

Size of Pin	Size of Drill
1/16-inch	No. 48, .076 inch
3/32 "	" 38, .101 "
1/8 "	" 28, .140 "
5/32 "	" 21, .159 "
3/16 "	" 12, .189 "
7/32 "	" 2, .221 "
1/4 "	" F, .257 "
5/16 "	" O, .316 "

As 1/16, 3/32 and 1/8-inch pins are used more than any other, it is very easy to remember for 1/16 pin to use No. 48 drill; for 3/32 use No. 38 drill, and for 1/8-inch pin use No. 28 drill.

The adoption of standard sizes for drills and standard sizes for bosses is an excellent idea. Such a tabulation is shown in Table No. 2, of which each draftsman is given a copy. This table is divided into three divisions:

First, pipe tap bosses; second, S. A. E. bolt bosses; and third, U. S. S. cap screw and coupling bolt bosses.

The first column in each division gives the size drill to use for each given tap; the second column gives the size of tap and the third column gives the size of boss. The benefit of the last column can be readily seen, as it stops a draftsman from having to figure out each time what size to make each boss for a given size tap. For instance, one man might make a boss for a 1-8-inch pipe top 5-8-inch in diameter; another man would make it 7-8, and so on; another would lay it out and when he thought it was big enough he would then dimension it. This makes the bosses of all different sizes by different draftsmen. With this table, a draftsman has it right before him and knows right away what size to make the boss. For example: He is using a 1-4-inch pipe tap. Glancing at the table, he finds the size of boss to be 1 inch and also the tap drill size 29-64, which he puts on the drawing. Thus he uses drill 29-64 and tap 1-8-inch pipe. It will thus be seen that all information is given, even to the drilling department. The last division is divided off into different shapes of the screw heads. For instance: The third column in the third division calls for the size of boss for a flat, hexagon and square head bolt.

TABLE NO. 2.—STANDARD SIZE DRILLS AND STANDARD SIZES OF BOSSES

Pipe Tap Bosses			S.A.E. Bolt Bosses			U.S.S. Cap Screws and Coupling Bolt Bosses				
Size Drill	Size Tap	Size Boss	Size Drill	Size Tap	Size Boss	Size Drill	Size Tap	Size Boss Flat, Hex., Square	Size Boss Ad. Fill. Button	Size Boss Coupling Bolt
In.	In.	In.	In	In.	In.	In.	In.	In.	In.	In.
27/64	1/8-27	11/16	No. 4 (.209)	1/4-28	3/4	No. 9 (.196)	1/4-20	13/16	7/8	13/16
29/64	1/4-18	1	17/64	5/16-24	13/16	1/4	5/16-18	1	1 1/16	1
19/32	3/8-18	1 1/4	21/64	3/8-24	1 1/16	5/16	3/8-16	1 1/8	1 3/16	1 1/8
23/32	1/2-14	1 7/16	25/64	7/16-20	1 3/16	23/64	7/16-14	1 3/16	1 5/16	1 3/16
15/16	3/4-14	1 3/4	29/64	1/2-20	1 1/4	27/64	1/2-13	1 5/16	1 3/8	1 5/16
1 3/16	1 -11½	2 1/8	1/2	9/16-18	1 3/8	31/64	9/16-12	1 1/2	1 1/2	1 1/2
1 [illegible]	1¼-11½	2 9/16	9/16	5/8-18	1 1/2	17/32	5/8-11	1 5/8	1 3/4	1 5/8
1 [illegible]	1½-11½	2 7/8	5/8	11/16-16	1 [illegible]	41/64	3/4-10	1 7/8	2 1/16	1 7/8
2 3/16	2 -11½	3 3/8	11/16	3/4-16	1 [illegible]	3/4	7/8-9	2 3/16	......	2 3/16
2 11/16	2½-8	4	51/64	7/8-14	1 7/8	53/64	1 -8	2 3/8	......	2 3/8
3 5/16	3 - 8	4 3/4	59/64	1 -14	2 1/8	63/64	1 1/8- 7	2 7/16	......	2 7/16

The third way in which drafting room practice can be standardized is in the use of certain drill sizes with any taper-pin. It was customary to take the small end of the taper-pin and use a corresponding size of drill, but with the method outlined in Table No. 3 it does not leave so much to ream. For example: For a No. 4 pin 3-4-inch long, use a No. 1 drill, .228 inch; for a No. 4 pin 2 inches long, use a No. 4 drill, .209 inch; and the same way all through the table. It is best to mark pieces for a taper-pin thus: "Drill No. 4 (.209 inch) and rear at assembly for No. 4 taper-pin." Thus the drilling can be done ahead of time and by jigs, and the reaming can be done at assembly.

TABLE NO. 3—SHOWING POSSIBLE STANDARDIZATION IN DRILLS FOR TAPER-PINS

No. of Pin	Diam. at Large End A	Diam. at Small End B	Length of Pin C	Size of Drill to Use	Corresponding No. of T.P. Reamer	Diam. at Small End T.P. Reamer
0	.156	.140	3/4	29 (.136)	0	.135
0	.156	.135	1	29 (.136)	0	.135
1	.172	.156	3/4	25 (.1495)	1	.146
1	.172	.151	1	26 (.147)	1	.146
1	.172	.146	1 1/4	26 (.147)	1	.146
2	.193	.177	3/4	17 (.173)	2	.162
2	.193	.172	1	18 (.1695)	2	.162
2	.193	.167	1 1/4	19 (.166)	2	.162
2	.193	.162	1 1/2	19 (.166)	2	.162
3	.219	.203	3/4	7 (.201)	3	.183
3	.219	.198	1	9 (.196)	3	.183
3	.219	.193	1 1/4	12 (.189)	3	.183
3	.219	.188	1 1/2	13 (.185)	3	.183
3	.219	.183	1 3/4	13 (.185)	3	.183
4	.250	.234	3/4	1 (.228)	4	.208
4	.250	.229	1	1 (.228)	4	.208
4	.250	.224	1 1/4	2 (.221)	4	.208
4	.250	.219	1 1/2	7/32 (.218)	4	.208
4	.250	.214	1 3/4	3 (.213)	4	.208
4	.250	.209	2	4 (.209)	4	.208
5	.289	.273	3/4	I (.272)	5	.242
5	.289	.268	1	H (.266)	5	.242
5	.289	.263	1 1/4	G (.2661)	5	.242
5	.289	.258	1 1/2	F (.257)	5	.242
5	.289	.253	1 3/4	1/4 (.25)	5	.242
5	.289	.247	2	D (.246)	5	.242
5	.289	.243	2 1/4	D (.246)	5	.242
6	.341	.325	3/4	P (.323)	6	.273
6	.341	.320	1	0 (.316)	6	.273
6	.341	.315	1 1/4	5/16 (.312)	6	.273
6	.341	.310	1 1/2	N (.302)	6	.273
6	.341	.305	1 3/4	N (.302)	6	.273
6	.341	.299	2	M (.295)	6	.273
6	.341	.294	2 1/4	L (.290)	6	.273
6	.341	.289	2 1/2	9/32 (.281)	6	.273
6	.341	.284	2 3/4	K (.281)	6	.273
6	.341	.279	3	J (.277)	6	.273
6	.341	.273	3 1/4	J (.277)	6	.273
7	.409	.388	1	W (.386)	7	.331
7	.409	.383	1 1/4	V (.377)	7	.331
7	.409	.378	1 1/2	3/8 (.375)	7	.331
7	.409	.373	1 3/4	U (.368)	7	.331
7	.409	.367	2	23/64 (.359)	7	.331
7	.409	.362	2 1/4	T (.358)	7	.331
7	.409	.357	2 1/2	T (.358)	7	.331
7	.409	.352	2 3/4	S (.348)	7	.331
7	.409	.347	3	11/32 (.343)	7	.331
7	.409	.341	3 1/4	R (.339)	7	.331
7	.409	.336	3 1/2	Q (.332)	7	.331
7	.409	.331	3 3/4	Q (.332)	7	.331
8	.492	.466	1 1/4	29/64 (.453)	8	.398
8	.492	.461	1 1/2	29/64 (.453)	8	.398
8	.492	.456	1 3/4	29/64 (.453)	8	.398
8	.492	.450	2	7/16 (.437)	8	.398
8	.492	.445	2 1/4	7/16 (.437)	8	.398
8	.492	.440	2 1/2	7/16 (.437)	8	.398
8	.492	.435	2 3/4	7/16 (.437)	8	.398
8	.492	.430	3	27/64 (.422)	8	.398
8	.492	.424	3 1/4	27/64 (.422)	8	.398
8	.492	.419	3 1/2	7 (.413)	8	.398
8	.492	.414	3 3/4	7 (.413)	8	.398
8	.492	.409	4	Y (.404)	8	.398
8	.492	.404	4 1/4	Y (.404)	8	.398
8	.492	.398	4 1/2	Y (.404)	8	.398
9	.591	.560	1 1/2	35/64 (.547)	9	.482
9	.591	.555	1 3/4	35/64 (.547)	9	.483
9	.591	.549	2	(35/64 (.547)	9	.482
9	.591	.544	2 1/4	17/32 (.531)	9	.482
9	.591	.539	2 1/2	17/32 (.531)	9	.482
9	.591	.534	2 3/4	17/32 (.531)	9	.482
9	.591	.529	3	33/64 (.516)	9	.482
9	.591	.523	3 1/4	33/64 (.516)	9	.482
9	.591	.518	3 1/2	33/64 (.516)	9	.482
9	.591	.513	3 3/4	1/2 (.500)	9	.482
9	.591	.508	4	1/2 (.500)	9	.482
9	.591	.503	4 1/4	1/2 (.500)	9	.482
9	.591	.497	4 1/2	31/64 (.484)	9	.482
9	.591	.492	4 3/4	31/64 (.484)	9	.482
9	.591	.487	5	31/64 (.484)	9	.482
9	.591	.481	5 1/4	31/64 (.484)	9	.482
10	.706	.675	1 1/2	43/64 (.672)	10	.581
10	.706	.670	1 3/4	21/32 (.656)	10	.581
10	.706	.664	2	21/32 (.656)	10	.581
10	.706	.659	2 1/4	21/32 (.656)	10	.581
10	.706	.654	2 1/2	41/64 (.641)	10	.581
10	.706	.649	2 3/4	41/64 (.641)	10	.581
10	.706	.644	3	41/64 (.641)	10	.581
10	.706	.638	3 1/4	5/8 (.625)	10	.581
10	.706	.633	3 1/2	5/8 (.625)	10	.581
10	.706	.628	3 3/4	5/8 (.625)	10	.581
10	.706	.623	4	39/64 (.6094)	10	.581
10	.706	.618	4 1/4	39/64 (.6094)	10	.581
10	.706	.612	4 1/2	39/64 (.6094)	10	.581
10	.706	.607	4 3/4	19/32 (.594)	10	.581
10	.706	.602	5	19/32 (.594)	10	.581
10	.706	.597	5 1/4	19/32 (.594)	10	.581
10	.706	.591	5 1/2	19/32 (.594)	10	.581
10	.706	.586	5 3/4	19/32 (.594)	10	.581
10	.706	.581	6	19/32 (.594)	10	.581

Another table that is very useful in laying out work for clearance in close quarters is for the size of machine screw nuts. I do not recall ever seeing it in any of the handbooks. Table No. 4 shows this.

TABLE NO. 4—FLATS OF HEXAGONAL NUTS SAME AS FLATS OF SQUARE NUTS

Nut Size	Across Flats	Thickness
4–36	9/32-inch	3/32 inch
6–32	5/16 "	1/8 "
8–32	11/32 "	1/8 "
10–24	3/8 "	9/64 "
12–24	7/16 "	5/32 "
14–20	1/2 "	3/16 "
16–18	17/32 "	13/64 "
18–18	9/16 "	1/4 "
20–16	5/8 "	9/32 "
24–16	21/32 "	5/16

When drawings are made and go to the pattern shop with just the ordinary "f" marks on, the pattern maker has to ask his foreman how much finish to put on each place. By using a stamp, Table No. 5, and marked drawings f^1 it shows the pattern maker to put 1-32 finish in that place, f^2 means 1-16 finish, etc., and it also keeps pattern maker from putting on too much finish and making heavy castings.

TABLE NO. 5—PATTERN SHOP STAMP

NOTE

F—FINISH

$F_1 = \frac{1}{32}$" FINISH
$F_2 = \frac{1}{16}$" "
$F_3 = \frac{3}{32}$" "

$F_4 = \frac{1}{8}$" FINISH
$F_5 = \frac{5}{32}$" "
$F_6 = \frac{3}{16}$" "

CAUTION

READ ALL NOTES BEFORE STARTING WORK.
WORK MUST BE TO DECIMAL LIMITS.
ALLOWANCE OF .010 INCH EACH WAY ON FRACTIONAL DIMENSIONS. DO NOT SCALE DRAWINGS.

Among the New Books

THE MOTORIST'S GUIDE, published by the Berry Company, Kansas City, Mo., under the direction of the Automobile Club of Kansas City. 117 pages, paper cover, $2.

Comprising several tours out of Kansas City to points of interest throughout the state. The guide is fully illustrated by maps but lacks the descriptive matter generally given in a tour book. This might be said to rob the work of a certain charm, although it may be forgiven in view of the fact that the directions are complete and thorough.

BRAZING AND SOLDERING, by James F. Hobart, fifth edition, published by the Norman W. Henley Publishing Company, New York City. 51 pages, illustrated. Price 25 cents.

A manual on the art of brazing or soldering which of such size and binding that it can be conveniently slipped in the pocket. Formulas for the making of different solders and the flux to be used with each are given in a summary at the end of the book where they can be readily found when wanted. It should prove a useful book for apprentices or helpers not having the experience necessary to remember all the required formulas.

THE POLYTECHNIC ENGINEER, for 1912. Published annually by the undergraduates of the Polytechnic Institute of Brooklyn, under the auspices of the Polytechnic Institute Section of the American Society of Mechanical Engineers. 132 pages, 6 by 9 inches, illustrated. Cloth, $1.

Containing papers which are always of intense interest, owing to their timeliness, this annual work is always welcomed. Among the more interesting papers are: Testing and Manufacture of Smokeless Powders at the United States Naval Proving Ground, by John C. Olsen; Deflection Due to Shear, by Edward J. Squire; The Selection of Material for Machine Parts, by C. W. Gremple, and Problems in the Manufacture of Chemically Pure Acids, by C. W. Gremple. An outline of the course pursued at the Polytechnic Institute is also given, along with some interesting editorial notes and reports of the various students' technical societies.

Harking Back a Decade

What the Automobile Journals of 10 Years Ago Had to Say Concerning the Happenings of the Day

FROM *The Automobile and Motor Review*, June 28, 1902:

Some of the American automobile factories produce vehicles of various patterns, just as the large carriage factories turn out numerous styles. However, it is true that at present the different patterns of automobiles represent more nearly the work of different factories than do the different styles of carriages.

The muffler is one of the prominent features of the Oldsmobile, being the cause of the frequent comments passed concerning the quietness of running of the machine by a number of parties.

The recent stand of the Automobile Club of America against all road races threatens a cessation of these important events on this side of the ocean and similar efforts are being made in France, Switzerland and Germany, so that the road race may be considered as on trial for its life.—Editorial.

Recent transfers of farm properties in Nassau County on Long Island give to a group of wealthy automobile enthusiasts a continuous strip of land from Long Island City to the country home districts of Nassau and Suffolk counties. Talk of the building of a motor parkway is again in circulation.

W. K. Vanderbilt, Jr., David Wolfe Bishop, Foxhall Keene and Albert C. Bostwick will be the American representatives in the Paris-Vienna race scheduled for next week. There are 177 entries.

Impounding automobiles for various periods after their owners have been found guilty of speed law infractions has been suggested in New York. This might work out all right except that where a wealthy speedster owned several cars, one or more of them might be in the pound, but there would be nothing to prevent him from using others.

Suit for $25,000 damages has been filed by Everson Stout, of Indianapolis, Ind., in the Superior Court as the result of the accident that befell Mr. Stout last winter while a passenger in an electric car which tumbled from the incline at the automobile show and thereby smashed several exhibits besides injuring Mr. Stout.

The Steamobile Company of America has sold out to the Standard Roller Bearing Company and will retire permanently from the automobile manufacturing field.

Winton's Bullet to the Fore

ALEXANDER Winton expects to test his new racing machine, which he has named "Winton's Bullet," next week. He expects to get 80 miles an hour out of the new racer.

After a most successful period, both from a financial and non-financial point of view, the National Exhibition of Berlin, the forerunner of a much larger international show during the coming year, has closed its doors. Racing automobiles and two-seated voiturettes were scarce, the main lines being represented by comfortably sized cars almost exclusively.

The recent escape of the Humbert family of swindlers has resulted in much annoyance to automobile tourists in France. Ever since the disappearance of the much-sought family it has been the custom to halt every likely-looking automobile party and make the members prove their identity. Among the notables who have been searched so far are Prince Egon of Furstenberg, and three American parties.

Philadelphia is making a bid for space in the spotlight of publicity by considering the enactment of an ordinance to limit the speed of automobiles in the central part of the city to 5 miles an hour.

There are now more than 600 automobiles in California, of which 400 are operated in San Francisco. Gasoline and steam cars are made at the Golden Gate, but so far no electric automobiles.

A free school to familiarize horses with automobiles is about to be started at Kenosha, Wis. The feature of the curriculum will be a training track around which automobiles will be run for the instruction of the horses.

Arrangements are being made for a 1,000-mile race against time on Long Island. A French car equipped with water and gasoline tanks large enough to carry supplies for the whole distance, so that the wheels need never stop turning, will be used. No provision for replacing tires under the same conditions have been made.

A tax of 1 franc, or 19.3 cents, per quintal of 220.46 pounds on crude petroleum has been adopted by the French Chamber of Deputies. Heretofore the tax on petroleum has been $1.74 per quintal.

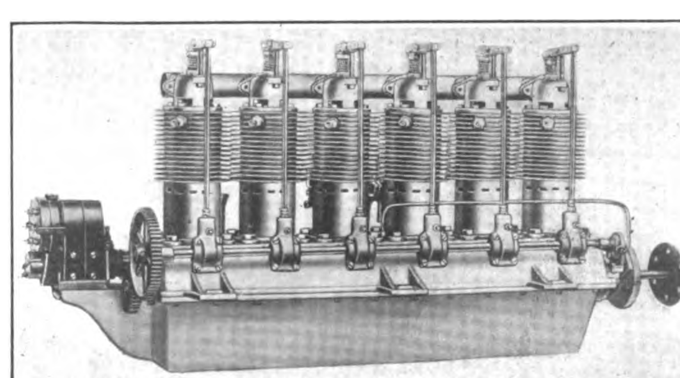
A Duryea three-wheeler made 3 miles from a flying start on a half-mile dirt track at Reading in 5:08, which is the best time on record in the United States for a gasoline vehicle on a circular track.

Cooling Water in Alcohol Motors—The consumption of cooling water is about the same for most of the small alcohol and benzine motors in the German market—namely, about a quart per horsepower hour. This consumption is about the same whether cooling is effected by evaporation or by water circulation, the former being the more simple of the two.

Decreasing Motor Compression—It is easy to decrease the compression of a motor. Place gaskets between the crankcase and the cylinder until the required decrease has been made. Fiber is the best material to use for these gaskets. It is not advisable to attempt to shave material off the tops of the pistons in an effort to reduce compression as the pistons are generally as thin as is compatible with safety, and to further reduce the thickness of the material is dangerous. It is not safe to shorten the connecting-rod either, for, when this is done, the angularity is increased so that there is danger of the connecting-rod striking the crankcase.

Light Motor with Concentric Valves

A new light motor which is especially adapted for aviation work has been brought out by R. O. Rubel, Jr., and Company, of Louisville, Ky. It is illustrated herewith. The most prominent features of the motor are its large concentric valves, situated in the head of the cylinder. Everything has been done to make the motor as light as possible, semi-steel cylinders being used and a solid vanadium steel crankshaft. As a special inducement the makers maintain an aviation field which the users of the motors may occupy while trying out their motors.



New type of light concentric valve motor

Synopsis of European Efforts for Reconciling Rapid and Automatic Mass-Production of Automobiles with Improvements in Accuracy of Dimensions and Durability —A Move Toward Larger Payloads for Omnibuses—Vibrating Shafts

MANUFACTURING METHODS.—The international struggle for supremacy in the economical fitness of manufacturing methods is working itself toward a keener edge than ever before. Realizing at last that the future in automobile manufacture belongs exclusively to those who learn to combine high quality with low cost of production, the leaders among European engineers are now turning their attention to the most fundamental requirements for reconciling rapid mass-production, which is necessary for economy, with a new standard of excellence in which the early adoption of advanced design is relegated to second or third place, while the durability and reliability of the finished product are safeguarded far better than they ever could be under the old system of depending mainly for accuracy in dimensions and the properties of the materials, upon the individual skill of specially trained workmen. The salient feature in the new movement, as it is cropping out in Europe, lies less in the adoption of the practice of designing and building new machinery specially for the production of the parts wanted for any new model of automobile which has been decided upon, than in the devising of special measuring instruments so nearly automatic in their action that they will secure accuracy in dimensions of parts and secure it cheaply, even when placed in the hands of the most ordinary workman and, furthermore, in highly simplified machinery for testing raw materials and finished parts for the physical properties required of them.

To Measure or to Compare—Which?

Just to what extent the American practice is gaining headway which consists in supplying each workman with inalterable samples of the one or two measurements which it is incumbent upon him to duplicate—these samples being produced in advance of all other manufacturing processes and with extraordinary care—does not appear from the articles on the subject which are published with some frequency of late in the technical periodicals of Europe. Perhaps this practice is looked upon as a self-evident extension of the jig-and-templet system which is known all over the industrial world as indispensable in the assembling departments, and the economic importance of its application to the primary production of parts on the machine tools, in the foundry and in the drop forge shop, has possibly not yet been fully recognized abroad. The mere fact that great stress is laid upon the perfecting of instruments, such as the "minimeter" partially described in THE AUTOMOBILE of May 2, by means of which the workman can make any one of a number of different measurements with great accuracy and speed, seems to indicate that specialization in the producing system is not yet being forced to the last notch and that the Europeans still prefer to keep open the chance of switching a machine tool from one job to another or shrink from the expense of providing new measurement-"normals" for every variation in design and dimensions. The limited home markets of Europe may account for the difference in policy, and a close analysis might also find a temperamental desire to keep ahead of America by a greater mobility in design and adoption of improvements.

With regard to the simpler methods introduced for the testing of materials, before and after machining and heat-treatment, mention was made in THE AUTOMOBILE of March 14 of the great favor now accorded the Brinell method for testing hardness and at the same time determining the tensile strength and the elastic limit by simple reference to a table based on certain fixed or nearly fixed relations between the figures expressing these properties and the hardness number (or rather density number, since the Brinell method does not give the mineralogical hardness but a property in which hardness and toughness both enter as factors). In the issues of Dec. 21, 1911, and Feb. 29, this year, brief descriptions were given of new machines for locating errors in the cut of gear teeth and of a rotary ram designed for shock-tests of materials and admitting of very quick decisions. On April 4 a machine for polishing test pieces was described.

In all of these innovations there is noticed a desire to emancipate the attainment of extreme accuracy—which is a paramount requirement if cheap and efficacious replacements shall take the place of expensive and yet unsatisfactory repairs in the long-time use of an automobile—as well as the safeguarding of the strength of materials from all question of individual skill among workmen, and this desire is coupled with a strong effort for saving time and risky reasoning in the departments of supervision and testing. Academic considerations are very plainly thrown to the winds, when, for example, in the Brinell test, the matter of the composition and hardness of the steel ball with which the imprints are made is left to the manufacturer supplying the machine and the balls, on the principle that wherever this testing machine is used for practical purposes the main object should be to establish comparative figures for the different materials under consideration rather than absolute figures which would hold good in comparison with other tests made in other places and with other machines. This inferiority of the Brinell method from a scientific standpoint—in not giving figures of the same universal validity as those obtained by the old laborious method of pulling standard test specimens—is disregarded in consideration of its practical advantages and its rapidity, as is also its acknowledged inapplicability to cast iron and case-hardened articles. A large number of uses remain for which it is industrially superior.

Brinell Conversion Formulas.

As in other similar cases, the movement for simplified testing apparatus owes its impetus largely to the initiative of a few individuals and concerns. Brinell designed his apparatus in 1900, submitting it to the Swedish Technological Society, and the Copenhagen engineering congress held in 1910 finally brought it

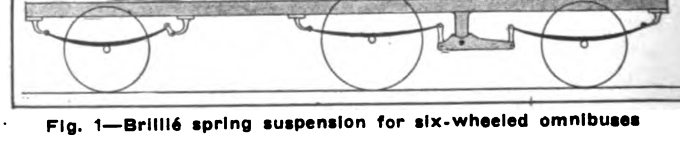


Fig. 1—Brillié spring suspension for six-wheeled omnibuses

prominently before the technical public. It is now manufactured not only by the Alpha company of Stockholm, but also by two German concerns, and the renowned automobile parts maker, the G. Derihon company of Loucin, Belgium, and Jeumont, France, manufactures a simplified model especially intended for automobile manufacturers, as well as for the company's own use. The tables compiled for facilitating the use of these machines are calculated on the basis of the formula:

$$H = \frac{P}{\frac{\pi \cdot D}{2}\left(D - \sqrt{D^2 - d^2}\right)}$$

in which H is the density number, D the diameter of the steel ball used for making the imprint in the test piece, in millimeters; d the diameter of the imprint, also in millimeters and fractions thereof, and P the pressure applied to D, in kilograms. By comparison with tensile tests it has been found that the tensile strength in kilograms per square millimeter is obtained from the density number by multiplying the latter with either 0.354 or 0.362 when the density number lies below 175, giving a working average of 0.358; but when the density number is higher it should be multiplied by a slightly lower coefficient, averaging 0.334.

Measuring Wearing Qualities

Among testing machines developed by the Derihon company there is also one for deciding quickly the wearing qualities of a material. (This also seems to be designed to give valuable pointers rather than absolute figures, inasmuch as neither the material of the pressure-disk employed in it nor the area of the rubbing-surface seems to be susceptible of ready variation.) A side view of this machine is shown in Fig. 2. The waterjacketed housing R is one-third filled with lubricating oil, and in it is mounted the disk O, which is made of an especially hard alloy and the circumference of which is exactly 1 meter, giving a circumferential velocity of 8 to 50 meters per second at 500 to 3,000 revolutions of the disk per minute. The test material is fitted into a prismatic guide piece V which holds it against the top of the disk, passing snugly through an opening in the top of the housing. The pressure is applied through the knife-edge lugs B on a lever fulcrumed at A and loaded at C by means of the weight P. Compensation for the weight of the lever itself—which otherwise would be a disturbing constant in all comparisons—is provided through another lever E whose fulcrum is at M, while the weight Q, suspended at F, applies the required lift by means of lugs D to the yoke G which receives the downward pressure of the other lever ABC by means of lugs B. The ratio of the lever arms AB and AC is as 1 to 12, and at L there is a knife-edge lug whose distance from B gives exactly a 10 times greater movement to this point of the lever than that to which the point B is subject when the test piece wears down under the abrasive action of the disk O. By means of the micrometer screw K, at the fixed point N of the machine, which admits of readings down to a 1/100 part of a millimeter, it is therefore possible to determine wear of the test piece within limits of 1/1,000 part of 1 millimeter. At the beginning of a test, the lever ABC is first placed horizontally, for which purpose the point A may be adjusted by the screw H. And the micrometer screw K is turned until an electric circuit, which is closed when L touches K, moves the hand of a galvanometer. After the end of the test the micrometer screw is turned down till the contact is again closed and the hand of the galvanometer again moves. By this arrangement the reading is made independent of the sensibilities of the operator. Thermometers admit of reading the temperature of the cooling water, and of the test-piece itself, while an odometer and a cyclometer measure the speed and the total number of revolutions involved in a test. The apparatus is driven by an electric motor and a voltammeter serves to check possible irregularities in the power, so that these may be taken into account if necessary.

Tests with this apparatus have demonstrated surprising variations in the wearing properties of steels whose chemical compositions were very similar and have, in the practice of the Derihon company, led, for example, to the adoption of a certain air-hardening method in the treatment of large bevel-gear crowns for automobiles, the method giving a minimum of deformation and wearing qualities almost equal to those obtained by casehardening of another chrome-nickel steel of lower carbon content, although its mineral hardness is considerably lower. —From *Der Motorwagen*, May 20.

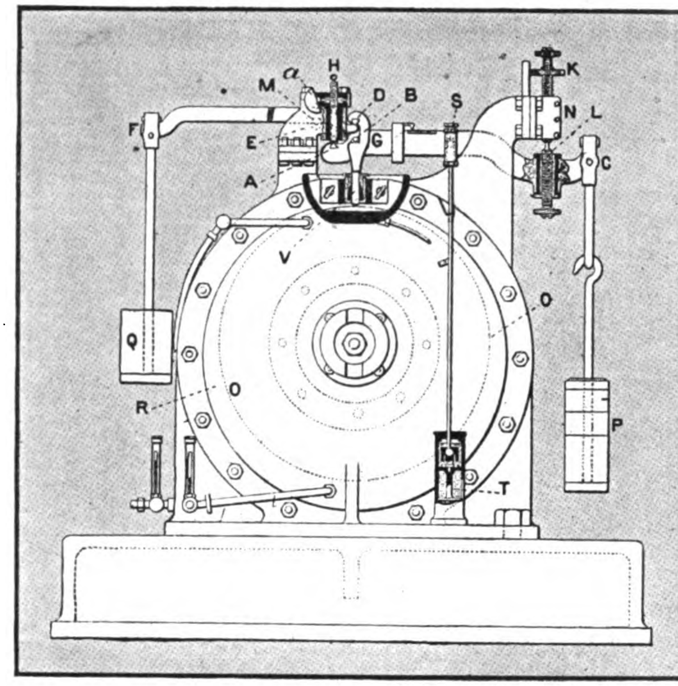


Fig. 2—Derihon machine for measuring wear of materials

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Six-Wheel Omnibuses—The General Omnibus Company of Paris intends to place in circulation before long a small number of vehicles with three pairs of wheels of which the middle pair are to be drivers, while the steering will be done with both the front and rear pairs. The objects to be attained are increased carrying capacity, ability to turn in a small circle, and the avoidance of skidding, but the spring suspension of the three axles presents a problem which has not heretofore been satisfactorily solved. The system which will be tried out first is that which has been devised by Brillié for Schneider omnibuses. In this, it is only the two rear pairs of wheels whose spring suspensions are connected, while the front axle is independent. The front ends of the driving-wheel springs and the rear ends of the rear wheel springs are attached directly to the frame reaches, but the intermediate ends of these springs are shackled to the ends of a balancing lever which is secured horizontally under the frame reach free to oscillate around a fixed pivot. The two arms of this lever are of unequal length, however, the arm nearest the driving-wheel axle being about one-third the length of the other with the purpose of making the driving-wheels continue to carry the bulk of the load when they pass over an obstacle, or when the vehicle load is too far to the rear, as may easily happen with an omnibus. The accompanying side view, Fig. 1, shows the general plan of this system of suspension, which is considered the simplest yet devised. To facilitate the compensating action between the two axles, it is necessary to allow the wheel axles to turn in the spring clips or fastenings.—From *Omnia*, May 25.

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Critical Speeds—Renewed experiments by German engineers show great irregularity in the periods of excessive vibration observed in connection with rotary shafts, indicating that the phenomenon, which is ascribed to rhythmic coincidence in periods of oscillation, must be obviated experimentally in each instance.

R-C-H 1913 Models

While No Radical Changes Have or the Body Design, Special Provide Highest Class of

Electric Lighting, Non-Skid Tires, Special Curtains, Auto- Cars Are Standard in This

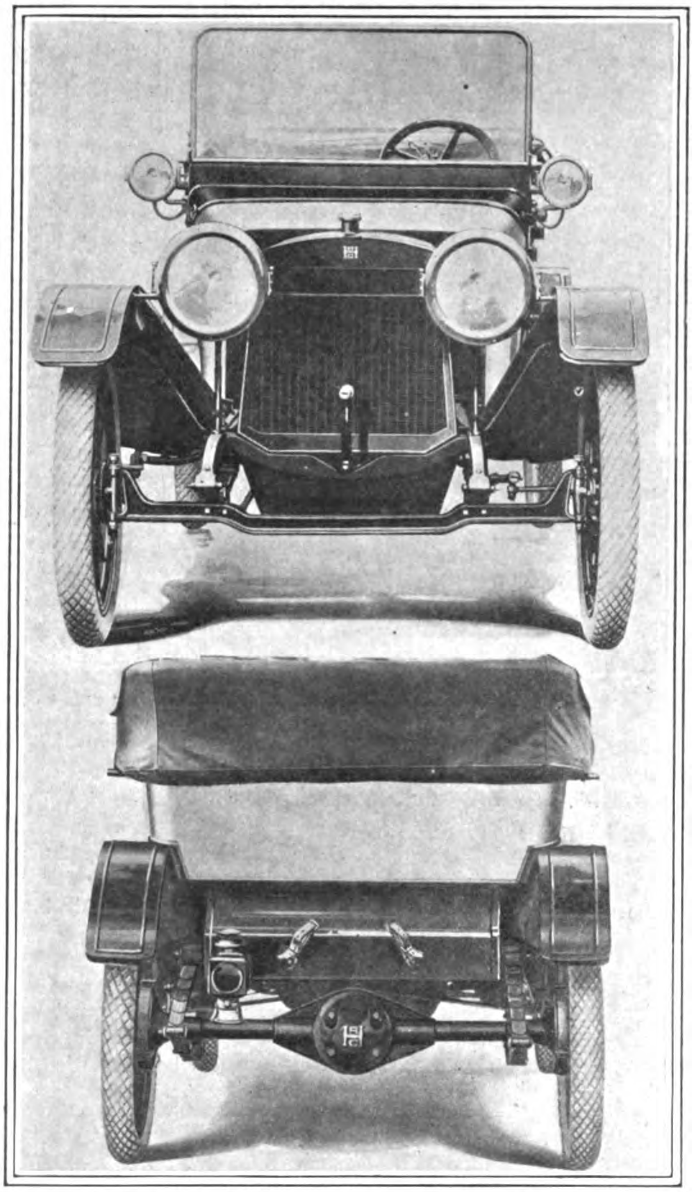

Fig. 1—Front and rear views of new R-C-H product

BELIEVING that full equipment will be the keynote for the coming year, the R-C-H Corporation has announced its models for 1913 with this as the talking point. Practically no changes have been made in motor, transmission or in body design, the car presenting the same general lines that characterized it when it first made its appearance in the motoring world less than a year ago.

The equipment of the new models will be most complete, consisting of non-skid tires on all four wheels, size 32 by 3 1-2 inches, electric lighting, Bosch magneto, Warner Auto-Meter, demountable rims, extra rim holders, Tally-ho horn, Jiffy side curtains, top and top-cover, windshield, rear-view mirror, robe-rail, tool-kit, tire-repair kit, jack, and pump. In so equipping this machine, R. C. Hupp is of the opinion that 1913 will be a season in which the convenience and comfort of the passenger and driver will be demanded. The fitting of electric lighting, non-skid tires, special curtains and Warner Auto-Meter to cars in the $900 class is an innovation for which the R-C-H is responsible.

The lamps on the new R-C-H cars are all of the bullet type, the headlights being 12 inches in diameter and fitted with parabolic lenses and 16-candlepower bulbs. The two side lamps are 6 inches in diameter, have the parabolic lenses also, and 4-candlepower incandescent globes, while the rear light measures 4 inches and carries a 2-candlepower bulb. On the headlights the parabola is set into the lamp body, permitting of easy access to the focusing device and facilitating the cleaning of the reflectors while they remain in place. The sockets for all the lamps are of Edison make. Current for the illumination is furnished by a

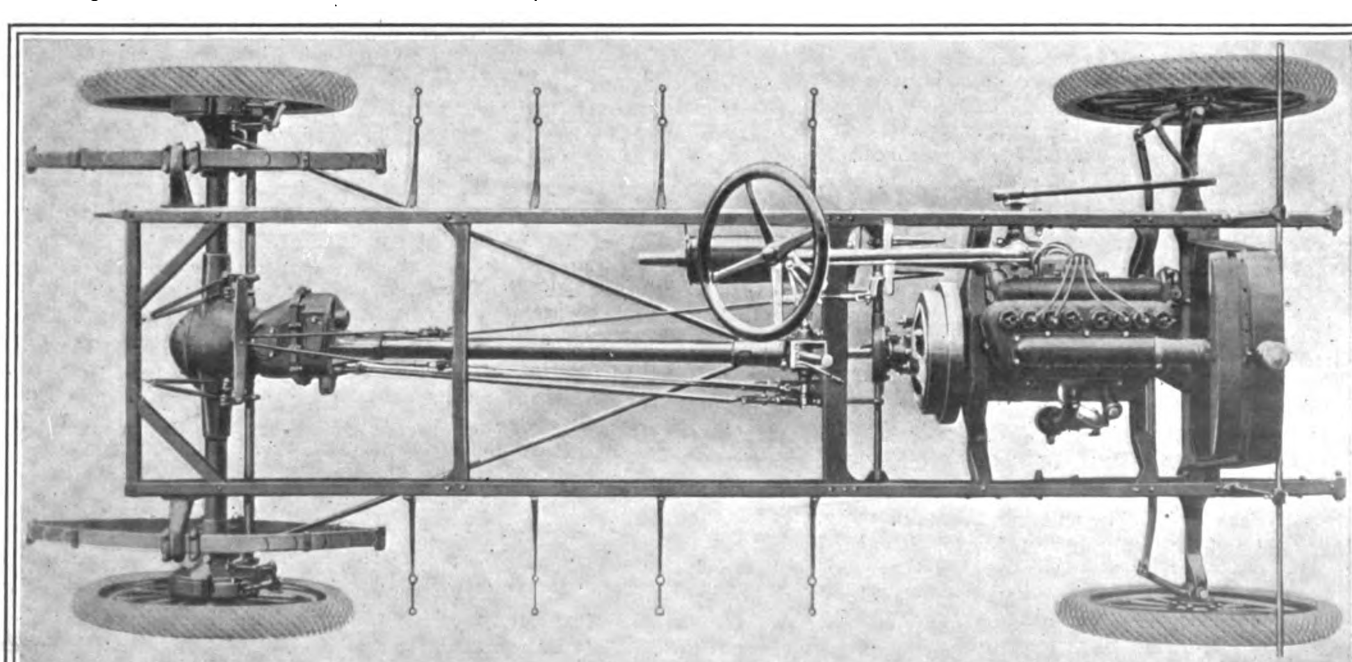

Fig. 2—Plan view of chassis, showing motor suspension, torque arrangements and principal control features

Now on the Market

Been Made in Motor, Transmission Efforts Have Been Made to Equipment Throughout

Meter and Other Adjuncts Peculiar to High-Priced Year's R-C-H Products

100-ampere storage battery which is carried within a case on the running board.

The only mechanical changes which the new car shows are the placing of a hand-throttle lever and spark lever on the steering column just below the wheel, and the addition of a hand-lever emergency brake in place of the former foot emergency brake. In the previous cars, two foot-brake pedals were used, one being the clutch and service brake combined, while the other operated the rear brake drums. The service brake operates on the transmission, as in the earlier model, but it is now a separate pedal, while the lever replaces the other brake pedal to bring the emergency hub brakes into play.

No change whatever has been made in the four-cylinder, monoblock motor, which has a long stroke of 5 inches and a bore of 3 1-4 inches. The rating is given at 25 horsepower. The crankshaft is mounted on two bearings—one at either end, which is in keeping with the general compact construction of the power plant. The motor is mounted in the frame of the car on the three-point suspension principle, there being a support at either side of the crankcase in front and one in the center in the rear. The valve rods and springs are all inclosed by an easily-removable cover-plate, while the timing gears are housed by plates fastening with cap screws. The Bosch high-tension magneto with single set of spark plugs is used, while the carbureter is of the latest B-D make.

The transmission, which is integral with the rear axle, is of the three-speed selective, sliding-gear type, the power being transmitted to it through a clutch of the dry plate form. The gearbox is mounted amidships of the frame, being supported by a cross member. The rear axle is semi-floating, the power reaching it through the agency of the amply-proportioned propeller shaft, which has one universal joint mounted back of the gearbox and which is inclosed in a torsion tube bolted to the rear axle. Two radius rods pass from the axle to the torsion tube for properly bracing the former, and for maintaining its correct alignment.

The rear springs are elliptic and they are mounted on swivel seats, taking much of the strain from the spring leaves. The front springs fasten directly to the I-beam, drop-forged front axle and they are of semi-elliptic construction.

The frame is of pressed steel, channel section, and it is braced at front, rear and center. The wheels are of artillery-type wooden construction, the designers, in keeping with most of the other American engineers, still adhering to them in place of the much-heralded wire types.

As to body design, this $900 touring car presents a decidedly foreign light-car appearance with its nearly square hood and

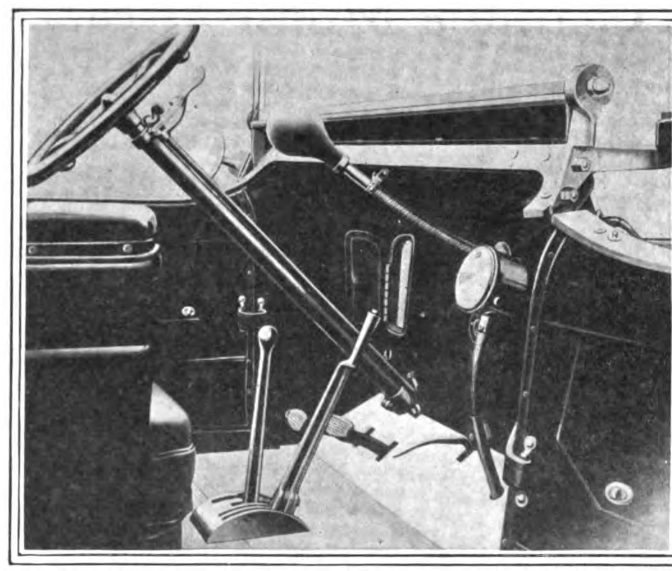

Fig. 3—Showing center control and dash features of new car

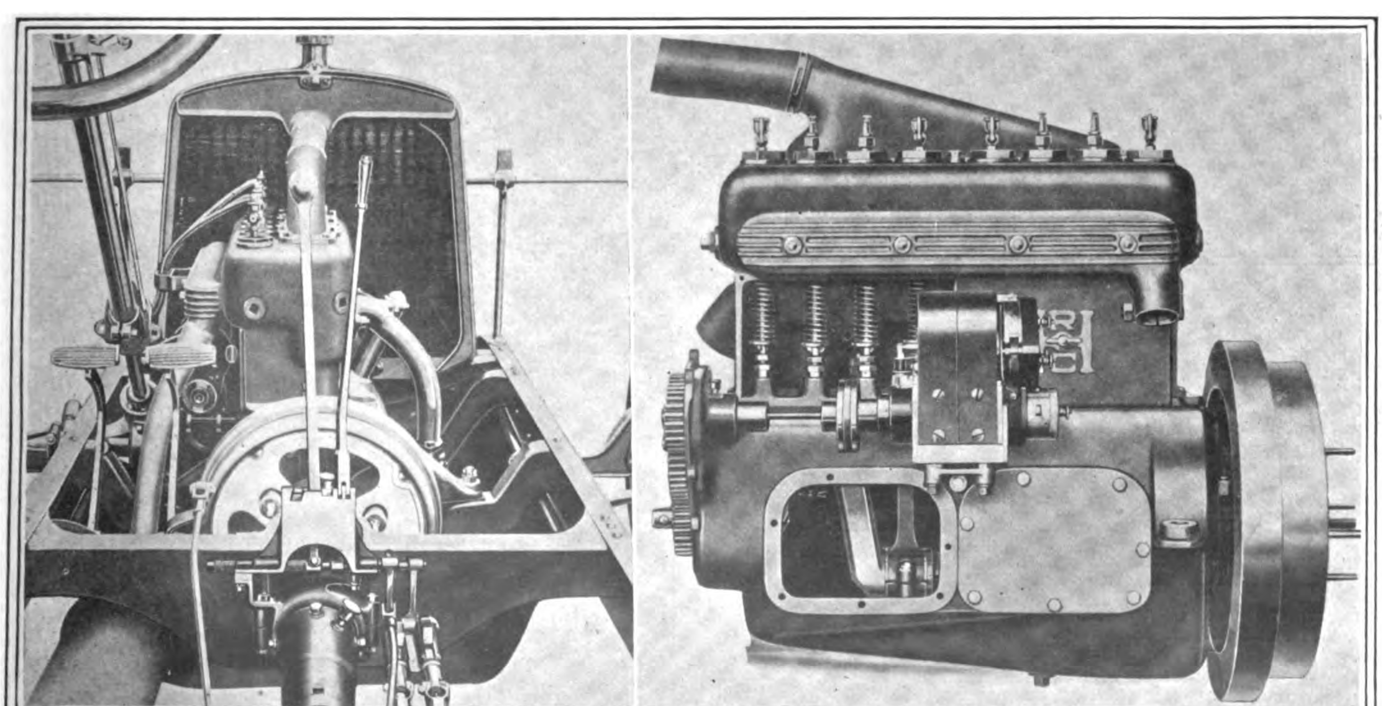

Fig. 4—Mounting of control levers and rigid cross member supporting clutch; view of magneto side of motor

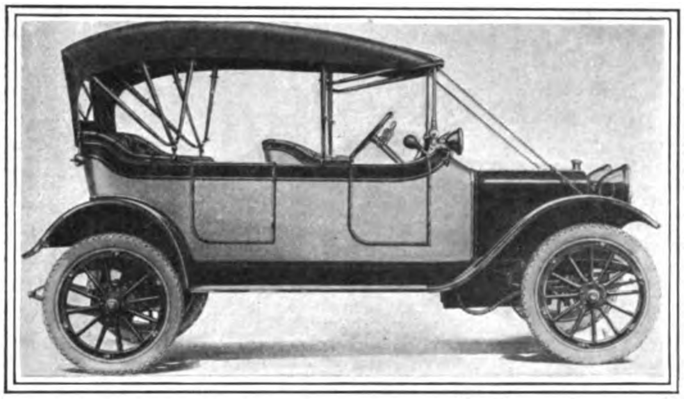

Fig. 5—R-C-H touring car with full equipment

Cost of Work With Gasoline Motor Trucks

Louis Ruprecht, S.A.E., Calls Attention to the Methods of Obtaining Maximum Efficiency With Economy

Proper Routing—Improving the Load-Handling Facilities—Increasing Daily Work—Comparative Illustrations

THE graphic charts of actual costs of operation, and cost per ton-mile of work of motor trucks herewith shown, are merely a tabulation, for convenient reference and study, of trucking economy under varying conditions of loads and mileage.

They are intended more as a comparative study than a discussion of specific costs, but it is nevertheless in order to review the detailed figures used in arriving at the total costs for plotting curves.

Depreciation is figured at from 10 to 15 per cent., varying according to mileage and the size of the units, the tire value being deducted from the cost of the complete vehicles. One of the highest-priced types of truck is assumed in each case. The depreciation figures are based on experience with hundreds of this type of truck in use over a long period of years, in many instances longer than 10 years. It is only fair to say that the depreciation of the newer, more flexible models will be less than that of the older ones.

Drivers' wages on 1000-pound delivery wagons are taken at $2.75 per day, and on trucks, $3 to $4 per day according to size and length of day's work. Helper on trailer $1 per day. These figures in the case of a very large day's work might conservatively be figured a trifle higher.

Garage charges include only washing and storing of the vehicle: $240 to $300 per year according to size.

Tire cost is based on prices to user and 8,000 miles life as guaranteed by makers. The sizes figured are all in accordance with the makers' specifications based on weights of vehicles and loads, and therefore this large item of expense is figured conservatively.

Gasoline cost is taken at 11 cents per gallon. The price at this writing is a little higher, but only 3 to 6 1-2 miles per gallon is assumed as the performance according to size of vehicle.

Oil cost is taken at 30 cents per gallon; 50 to 125 miles per gallon according to size of vehicle.

Insurance: $100 to $250 per year according to size.

Repairs and replacements have been figured up to 3 cents per mile in the case of heavy trucks. This is based on extensive records.

Operating days per year have been taken uniformly at 300. This figure is a trifle high, particularly in cases where large daily mileages are made, although it leaves 65 working days and holidays for the upkeep of the equipment.

Comparing Costs of Hauling

ATTENTION is now called to the set of curves showing actual costs of hauling, expressed in dollars per year, for different sizes of units for varying average daily mileage. The ordinates indicate the average daily mileage from 10 to 100 and the abscissæ the total cost per 300-day year, all charges included. It so happens that on the basis of these figures the plotted costs are straight lines in every case. This indicates that the *total cost increases in constant ratio with the daily mileage.* These straight lines if continued to zero miles should indicate theoretically therefore the fixed and other charges against the equipment when idle, and in fact this is approximately the case; for it will be found that costs thus indicated at zero miles are practically the sum total of Depreciation, Interest, Part-Time Wages, Dead Storage, Insurance, Tire Depreciation, etc., actually chargeable against a vehicle temporarily out of commission.

This situation has suggested to me a convenient thumb-rule for figuring costs of operation, making unnecessary the use of this chart, as follows:

Cost per Day = "Fixed Charges" + (Miles per Day × Daily Increment in Cost).

Size	Fixed Charges	Increment Per Mile
1000-lb.	5.07	.0686
3-ton	5.33	.0860
5-ton	5.60	.1253
6-ton	6.00	.1540
7-ton	6.15	.1718
12½-ton train	7.40	.2070

For example, the cost of operating a 6-ton truck, all charges included, 45 miles per day, will be $6.00 + (.1540 × 45) = $12.93.

Costs per ton-mile can of course be derived similarly without reference to the second set of curves seen in Fig. 2; for

sweeping lines. The cowl has a low slope which is set off by the same design of windshield as marked the car on its début. The door handles are all inclosed, while, except for the battery box, the running boards are clear. The interior of the car has been designed to give the maximum of leg room consistent with the wheelbase of 110 inches. Seats are set at a comfortable angle, which the designers have deemed most restful for all occasions.

The two-passenger roadster is continued in two models, the standard and the EE types. The former, selling at $700, has gas head lamps, oil side and tail lights, 30 by 3-inch tires on clincher rims, gas generator, top and Jiffy curtains and horn as its regular equipment, while the EE model, which is to cost $750, has the same equipment except that a Prest-O-Lite tank takes the place of the generator and 32 by 3 1-2-inch tires on demountable rims are substituted for the 30 by 3-inch tire equipment. In all respects, these roadster models retain the mechanical construction as outlined for the touring car.

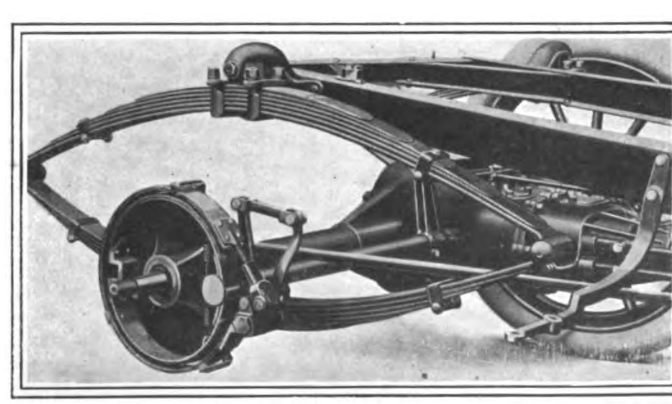

Fig. 6—R-C-H spring suspension and rear axle

these costs have been derived from the first set of curves.

In computing costs per ton-mile it is assumed that vehicles are fully loaded half the total daily distance traveled, or, what is equivalent, that vehicles carry half their rated capacity load the full distance. If they carry more than this the costs per ton-mile would be correspondingly reduced below the figures of the curves. For instance, with full load the entire distance, the cost per unit of work would be reduced almost one-half. I say "almost" because depreciation, repairs and renewals and fuel per loaded mile are somewhat greater than per dead mile.

A study of these curves reveals the large ***reduction in cost per unit of work by increasing daily performance*** as follows:

Increas'g daily mileage		Reduction in cost, per cent.			
From	To	3-ton	5-ton	7-ton	12½-ton train
10	20	44	44	44	44
20	30	25	20	21	20
30	40	17	17	12	11
40	50	14	14	10	10
50	60	10	8	8	9
60	70	7	6	4	5
70	100	12	8	11	10
40	100	38	32	30	30

In other words, increasing the daily work from 10 miles daily average to 20 reduces the cost per ton-mile, or per unit of work, 44 per cent. in all cases. Then increasing the daily work to 30 miles another reduction of 20 to 25 per cent. in cost per unit of work is effected. And increasing from 30 to 40 miles per day 11 to 17 per cent. reduction in cost is effected. Substantial gains in economy are made by further increase in daily mileage; increasing from 40 to 100 miles per day, for instance, effects a reduction of 30 to 38 per cent. in cost per unit of work.

Value of Proper Routing

THESE curves are impressive as indicating the economies to be effected by proper routing of vehicles for maximum daily work. The costs, as above mentioned (being based on loads one way only), can be very materially reduced if merchandise or material can also be carried over some of the "dead-mileage" assumed in these computations.

The approximate parallelism of the curves indicates that

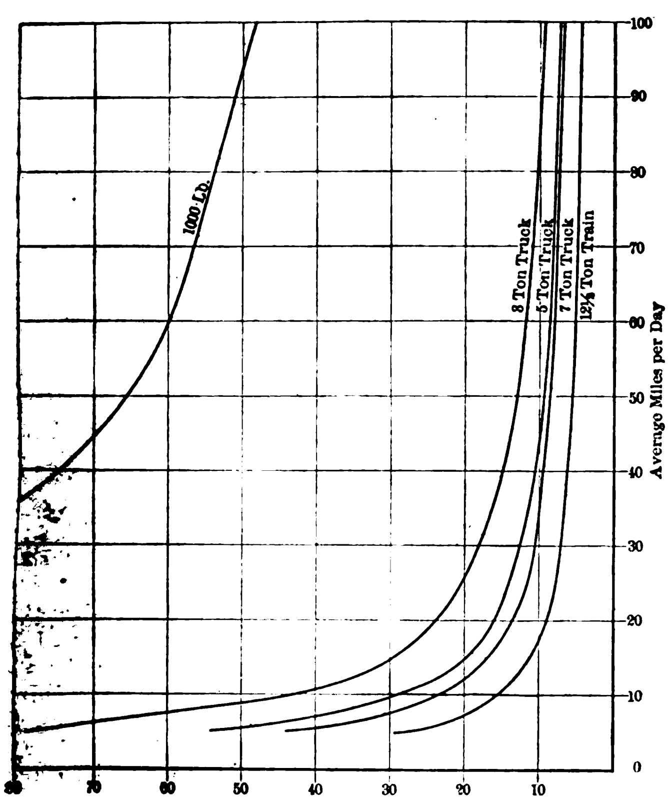

Fig. 2—Illustrating the comparative cost per ton mile for different sizes of units for varying daily mileages

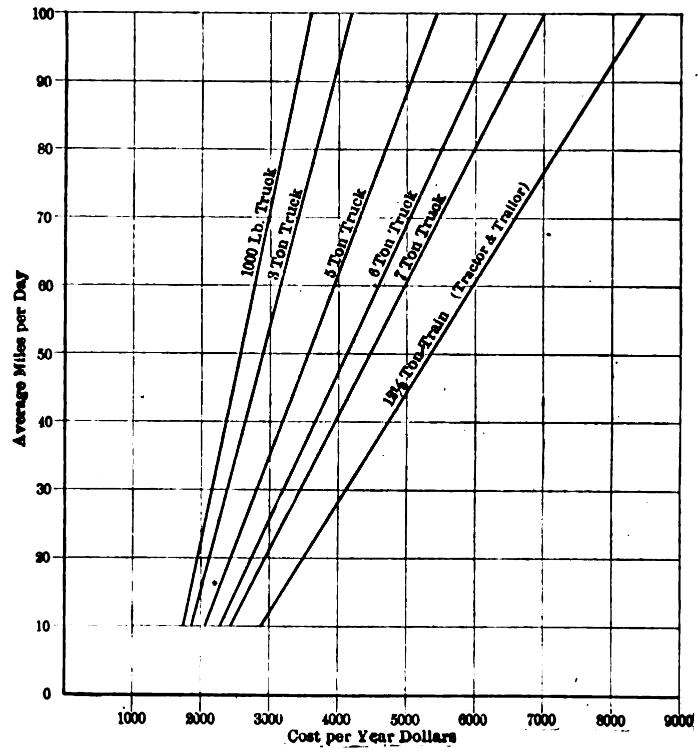

Fig. 1—Illustrating comparative actual hauling costs for different sizes of units for varying daily mileages

whether light trucks, heavy trucks, or trucks and trailers are employed, economy increases with increased daily mileage at about the same rate with all these sizes of units.

These curves are also of interest and assistance in studying the question of sizes of units to be used for any particular class of work. They show, for instance, that a 12 1-2-ton train (7-ton truck with 5 1-2-ton trailer), operating 70 miles per day and loaded only one way, will carry 1 ton of load 1 mile for 5 cents, whereas the same 1 ton carried 1 mile in smaller units operating 70 miles per day would cost 10 3-4 cents on 3-ton, 8 cents on 5-ton and 7 1-2 cents on 7-ton units; thus indicating the tremendous advantage of using large capacity units and trailers.

They show also, for instance, that the same economy, viz., 10 cents per ton-mile, is obtained by operating a 3-ton truck 84 miles, a 5-ton truck 44 miles, a 7-ton truck 35 miles, or a 12 1-2-ton train only 18 miles per day.

The proper routing of heavy transfer units and of lighter distributing units, the adoption of correct sizes of units for such service, or for pure straight haul service, the proper load handling facilities, are all problems which frequently require careful study, always with an eye to the practical conditions of each particular service, to obtain maximum efficiency and economy.

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Carbureters for Kerosene—While designers in England and on the continent of Europe have lately turned out several carbureters intended for use with kerosene as a fuel or to be installed for emergency purposes or economy in cars also equipped with a gasoline carbureter, it is admitted that the fuel consumption with these devices is still so much larger than with the best gasoline carbureters that the economical advantage in using the cheaper fuel is wiped out. The difference in the consumption is due to the greater difficulty in vaporizing the kerosene and is not, as in the case of alcohol, an inherent shortcoming in the fuel; on the contrary kerosene exceeds gasoline in heat value, and correspondingly favorable results may be expected eventually if experiments are continued. This was the gist, for example, of a lecture delivered before the Institution of Automobile Engineers in London by Messrs. W. Morgan and Wood with special reference to a kerosene carbureter designed by G. Constantinesco of Rumania.—From *Auto-Technik*, May 24.

Motor Overheats Badly; Does Not Believe in Water Jackets; Minimum Fuel Consumption Under Different Circumstances; Repairing Oakland Clutch; Care of Locomobile Low-Tension Ignition System; How to Reach the Cadillaqua from Wheeling

Regards His Case as Hopeless

EDITOR THE AUTOMOBILE:—I have a Flanders 20, two-speed gearset. It has been overhauled, the cylinders cleaned and the crankcase has been cleaned out. It has a 4-inch spark advance at most. I have tried all kinds of carbureter adjustments and all kinds of timing. I have polished the combustion chamber; tried all kinds of lubrication and lubricants; put on air valve; ground the eight poppet valves and have done all that I know or ever heard of.

The motor will heat up to boiling point in running 1-2 mile and loses power after it has run about 10 minutes in spite of all my care. At first it works finely and while cold pulls strongly. What should I do?

Chapanoke, N. C. JOSEPH TOWE.

—You have apparently overlooked the very first thing that should have been done. That is to clean out the radiator. A scale gathers on the radiator that will cut down its efficiency to a remarkable degree unless cleaned out. If the water is hard, as it is very likely to be in North Carolina, the deposit of lime would impair the radiator efficiency so much that the trouble you encounter is only to be expected. The cure is as follows: Secure a large wash boiler and put in about 10 gallons of water. Bring the water to a boil and add twenty handfuls of washing soda. Stir this up until it is well dissolved and allow it to drain through the radiator. When there is just enough left in the boiler to fill the radiator, fill it up. Keep the drain cock closed, put on the cap and start the motor. Allow it to run for 2 or 3 minutes; stop it and drain out the water. Flush out, with rain water if possible, or, if not, use the purest water you can get. After this, refill the radiator and there should be an improvement in the running.

You do not mention if the water pump is working satisfactorily. Examine this also. Other causes for your trouble are: bad valve timing, magneto timing, dragging brakes and bad oil feed. In connection with the latter it would be advisable to fill the crankcase until the motor smokes and then see if it runs without heating. If it does you have found your trouble.

Criticises Engineering Practice

Editor THE AUTOMOBILE:—I would like to enter upon a discussion with your readers upon some points which may be quite a matter of course, but which are not clear to me. For what reason are means for cooling gas engine cylinders resorted to? What sound reason is there for their present use when it appears that an engine will work better without them? To be more specific: My engine is conventional, being of the horizontal type designed to run on city gas. It is waterjacketed, but I have run it for 2 months without any water; and, what is more, I intend putting an asbestos jacket around the cylinder since it is not hot enough to suit me.

To come back to the question: Why a waterjacket? Is not the engine a heat engine? Is not the driving power the difference in potential between the heat at the time of the explosion and the surrounding air? Why lower the temperature of the cylinder? There must be a reason for the present use of the waterjacket, since engineers persist in keeping it, but we must admit that fashion dominates engineering as much as women's hats. Still, I believe that running an engine as above stated brings up a question which is worthy of serious consideration from the designers. What is the answer of the technical fraternity?

The present temperature of the motor I cannot state. It is sufficient to melt babbitt and yet I am tempted to believe that I can nearly double it. The oiling is very good, less oil than usual being required. The compression is excellent, being probably about 80 pounds, and what I use for fuel is immaterial. It has been stated by authorities that an increase in efficiency is practically impossible in a gas engine. Does not the above refute this? The losses in the waterjacket have been given as a result of tests not less than 33 per cent; would they be in this case?

I have also noted that the highest compression pressure is obtained at the rear dead center only when running at very low speed and that at all other times the compression maximum wave is considerably behind the piston speed. This would indicate that all our high-speed engines at the present day are radically wrong. What have our designers to say to that? Will some of them be good enough to verify my statement? I think it is a discussion of great value to the industry. One more: Some makers claim that they can inject water into the cylinder for cooling purposes, this water forming steam; I have been unable to duplicate this: it will leave as water. What is the answer?

New York City. P. G. TISMER.

Speed Affects Fuel Consumption

Editor THE AUTOMOBILE:—Will you answer the following questions and clear up a controversy between our local automobile men?

(1) Given a 20-mile stretch of level road, will an automobile consume more gasoline if driven over it in 55 minutes than if driven over it in 30 minutes?

(2) Given a stretch of road of the same length in hilly country, uphill and down being about equally divided, so that it would be possible to coast part of the time, would more gasoline be consumed in 55 minutes than in 30 minutes?

The latter question, you will see, brings in the question whether the open throttle, as would be required for quick work up and down hill, would be offset by the shutting of the throttle when coasting down the hills.

Bridgeton, N. S. W. A. WARREN.

(1) Assuming that the carbureter on the car is adjusted for ordinary touring, its speed of best economy would be about 25 miles an hour, as was explained in THE AUTOMOBILE of June 27, page 1487. If the distance was covered in 55 minutes, the speed would be about 22 miles an hour, which is very close to this; while 30 minutes would mean a speed of 40 miles an hour. The best economy would be obtained in the 55-minute run.

(2) This question resolves itself simply to one of climbing 10 miles of hill. The best economy would be secured when the car

was allowed to coast down the hills with the motor stopped; that is, with the switch turned off and clutch out. You do not state whether the hills can be taken on high gear. If they can by rushing them at the bottom this would be the most economical way. The slope of the hills would affect this, as if they were steep the rushing of the next up-hill could be done by simply allowing the car to coast with the brakes off. In other words, the most economical speed would be that in which the least gear-changing is done, and considering the amount of rushing that would have to be done, the speed would probably be nearer that in which the course is covered in 30 minutes.

Care of a Low-Tension System

Editor THE AUTOMOBILE:—I have an old Locomobile car with a low-tension ignition system. I have just bought this car second-hand and would like to have the ignition system explained to me.

Paducah, Ky. READER.

—The accompanying illustration showns the system so clearly that very little explanation is needed. The upper end of the tappet rod T is hooked onto the end of the hammer lever H. As the tappet rod is given vertical motion by one of the cams on the camshaft C-C, a hammer comes in contact with the anvil A and stays there until the cam has reached such a position that the tappet rod suddenly falls, causing the hammer to separate sharply from the anvil and the spark to occur. This action is assisted by a strong inclosed spring S1 at the bottom of the tappet rod. It will be noticed that there is a spring S at the top of the tappet rod, the purpose of which is to maintain enough pressure on the end of the hammer lever to keep the electrode in contact until it is time for the break to occur.

The hammer, or moving electrode, has a conical bearing through the igniter plate so that the pressure inside the cylinder forces the hammer bearing tightly against its conical seat and prevents any escape of gas at this point. The igniter plug, or anvil, is the fixed electrode and is made a solid unit. It has a taper fit through the igniter plate, being drawn up and held on the outside by a hexagonal nut. The insulation of the anvil consists of mica, compressed and highly polished, knife-blade switches K form electrical contact between an insulated bus-bar B B and the anvils, the copper jaws of the switches being secured to the insulated portion of the anvils outside the cylinders.

The important things to consider in the maintenance of the ignition system are the igniters. If an unnecessary amount of lubricating oil is continually fed to the motor the ignition will eventually become foul and irregular operation, or even a short-circuit, may result. Therefore do not give the motor too much oil and make it a point when the valve covers have been removed to inspect the igniters and clean them if they are foul. If suitable oil is fed to the motor in the proper quantity, not only will the lubrication be thoroughly adequate, but the igniters will be clean and thus will not require much attention.

When the car is inspected, it is well to look over the wiring and see that all terminals are in proper order and that the knife-blade switches K are making proper contact with the copper jaws A. The latter should be kept clean and pinched together. Keep the hard-rubber handles on top of the switches screwed down tightly.

Wants S. A. E. Horsepower Rating

Editor THE AUTOMOBILE:—Can you give me the S. A. E. rating of the new Hupmobile 32 which has a bore of 3 1-4 inches and a stroke of 5 1-2 inches?

Hop Bottom, Pa. S. E. MILLER.

—The S. A. E. rating of this car is 16.9 according to the formula $\frac{D^2N}{2.5}$, in which D is the cylinder bore; N the number of cylinders and 2.5 a constant which approximates the 2.489 evolved by the S. A. E. This constant takes into consideration an average piston speed of 1,000 feet per minute and an engine efficiency of 75 per cent. between indicated and brake horsepower. On a long-stroke motor this rating underestimates the power.

To Cadillaqua by Automobile

Editor THE AUTOMOBILE:—Several of my motoring friends and myself intend to make the tour to Detroit from Wheeling to see the Cadillaqua, which is to be held there in July. I understand that this will be the gathering place for numerous motorists from all parts of the country. In consideration of this I would like a synopsis of the route. Can THE AUTOMOBILE help me in this?

Wheeling, W. Va. G. A. TUCK.

—The first part of the route takes you from Wheeling to Canton; the distance is 85.8 miles, and the roads, which traverse through hilly country and abound in beautiful scenery, are for the most part of good macadam. As far as Steubenville they are of natural dirt and very good in dry weather.

Set your indicator at zero at Twelfth and Market streets, Wheeling. Start on North Market street with trolley and at Tenth street turn to left, crossing the long stone toll bridge, after which proceed to diagonal four-corners, then over the long iron toll bridge into Bridgeport. Follow trolley out Zane street, then turn under trolley and cross railroad tracks at reading of 4.6 miles. At the end of the road turn along railroad tracks, passing beneath them and crossing trolley at 4.9 miles. Taking the right road and leaving the toll gate at the left, and passing again

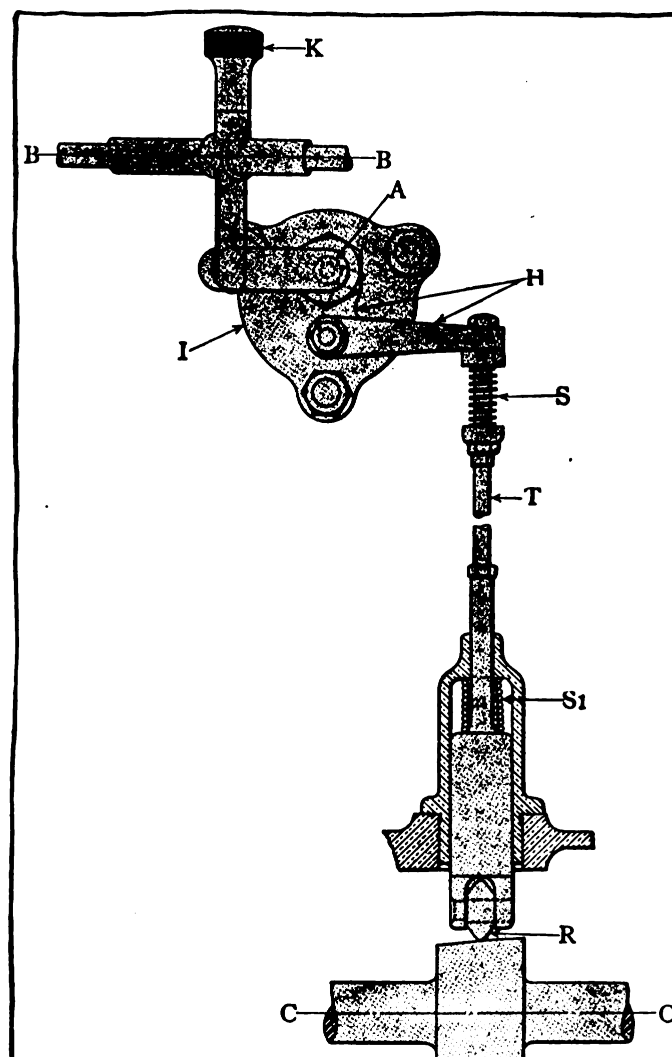


Fig. 1—Illustrating the low-tension ignition system used on Locomobile cars previous to the year 1911

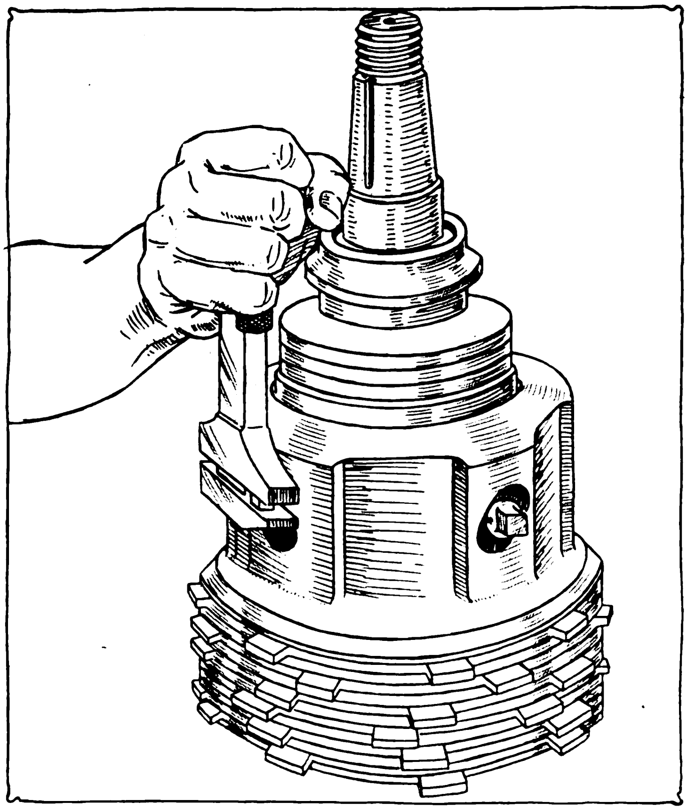


Fig. 2—Taking down the Oakland multiple-disk clutch; first step in operation

under the railroad at 5.5 miles, crossing it 5.6, turn along the river bank and follow it to 8.7 miles, where you turn left with the road. At 8.9 take right road, turning across the tracks at 9.5 and at the end of the road turn left into Rayland. Cross the long iron bridge, taking first right road at 10.4. At 10.9 take the right road just before the upgrade, turning to the right under the railroad and then immediately to the left until you turn to the right again at 11.1, after which cross the railroad, passing through Warrentown.

Follow the left road, turning left at 11.5, passing along the river bank and turning right at 13.2. Turn left with road after crossing one railroad and running under another, then turn sharp right at 13.6 and run along tracks. Follow lines of main travel through Brilliant and then along trolley to Steubenville. Out Market street through Wintersville, Richmond, along line of main travel through East Springfield, Amsterdam, Harlem, Carrolton, New Harrisburg, straight through Morges Corners, Magnolia, Industry and with trolley into Canton.

The road from Akron to Elyria is macadam almost all the way. It is easy to follow and takes in a distance of 41.6 miles. Start west out Market street with trolley, pass through Smith's Corners, Medina, Mallet Creek, Erhart and then straight through to Grafton, picking up the trolley to Elyria. Route is now from Elyria to Toledo on good gravel and stone roads. Pass out Middle avenue passing City Hall running into College avenue, Oberlin. Go straight on through Townsend, following Townsend avenue to Main street and thence to Norwalk. Through on West Main street to Monroeville and out Monroe street to Bellevue, following lines of main travel through Clyde, Fremont and Woodville, being careful not to take Fort Wayne route here. Follow signs and local direction into Toledo. From Toledo to Detroit there are two routes. The shorter road is bad, so the longer is here given. The distance is 76.3 miles over gravel and stone roads. Leave Toledo by going north on Madison avenue, then out Collinswood avenue, through Detroit avenue, keeping straight ahead where trolley leaves to the left, and pass under railroad. After striking Erie pick up trolley and follow through La Salle, Monroe and leaving it for road through Old Port. Pick up trolley again at Trenton and following along brick pavement to Wyandotte and Ford City. Then follow trolley line straight into Detroit.

Trouble with Multiple-Disk

Editor The Automobile:—I am having trouble with the multiple-disk clutch on my Oakland 30 runabout. It slips. Can The Automobile tell me how this can be overcome?

It seems that when I put kerosene in the housing, the clutch will grab severely, if I give it oil it slips and if I do not oil it I am afraid it will wear. Have tried several grades of good oil with the same result. Clutch spring is down to last notch.

Muscatine, Iowa. C. E. Graetner.

—In the first place, it is important that you should know that there is a passage from the gearset housing to the clutch through which the lubricant is free to pass. The grade of oil in the clutch and gearset should therefore be the same. The best lubricant to use is a medium grade of cylinder oil.

To cure the slipping and grabbing troubles, disassemble the clutch by removing the screws shown in Fig. 2. The clutch can then be taken apart by lifting the various units off the shaft. Be careful not to separate the plates. Keep them in one pile in the same order in which they were taken off. The clutch collar is placed in a vise and the face between the jaw is filed down so that the collar fits tightly against the clutch sleeve support. This is the part against which the collar illustrated in Fig. 4 fits. After having filed this down for some distance, slip the collar over the shaft and see how far it goes down. If there is not gap between the collar and the sleeve support it will be right. In order to make this fit tightly, it may be necessary to file down the boss on the shaft. This can be determined after an attempt is made to close the gap between the collar and the sleeve support by filing as indicated in Fig. 4.

This gap may be closed by other methods. The shaft itself can be turned down so that the collar will slip down further. This requires an extensive machine shop to carry it out, as does a third method which consists in counter-boring to a greater depth the center of the clutch collar.

It would probably be advisable for you to also cut off two or three turns in the clutch spring. These should be cut from the front end of the spring and this should then be securely refastened. This puts a greatly added tension on the spring and will stop slipping tendencies to a great degree.

Finally, before reassembling the clutch, take the top plate and the lowest plate. These are both brass. Slot them with a hacksaw as shown in Fig. 3. This will permit the oil to pass

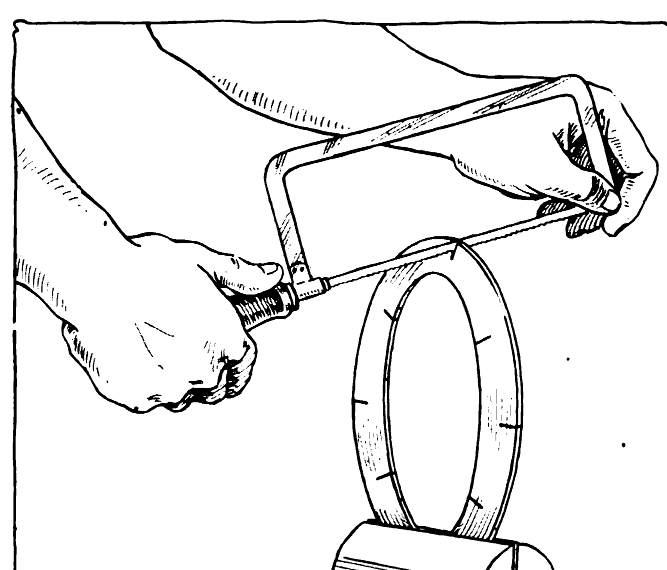


Fig. 3—Cutting the outside brass ring to permit of a flow of oil through clutch

freely through the clutch. If these directions are closely followed out the clutch may be put in prime condition and the repair will be practically permanent.

Constructing a Racing Motor

Editor THE AUTOMOBILE:—I wish to have further information regarding questions answered by you in the issue of May 23.

(1) The four and six-cylinder motors I am constructing have a bore of 4 5-32 inches and a stroke of 5 1-2 inches. Is this a good ratio for racing purposes?

(2) The valves have a diameter of 2 3-16 inches, opening with a lift of 7 1-6 inch. Is this opening large enough or too large, and is the lift high enough or too high?

(3) The cams are made to time the motor with inlet to open 15 degrees past top dead center and close 35 degrees past bottom center. The exhaust opens 52 degrees before bottom dead center and closes 5 degrees past upper dead center. Would you consider this timing right, considering the valve opening and lift? If not, state how many degrees different from any of the above you would recommend, as you say that quite a few motors overlap the valves; that is, have the intake open about center and the exhaust 10 degrees past, therefore having an overlap of 10 degrees. Also note that some motors close their inlets as late as 60 degrees after bottom dead center and open their exhaust before the bottom center. Would there be any advantage in opening the exhaust earlier, closing the inlet later and overlapping the inlet after the exhaust?

(4) Lubrication is by splash. The oil being fed to the trough and then scooped up by the connecting-rod as it passes on each, and under these conditions, would oil holes in the pistons be advantageous? If so, why?

(5) The flywheel with the clutch when finished weighed 113 pounds. It is 18 inches in diameter, and is fitted with aluminum cone, leather faced. Is this too much weight for either the four- or six-cylinder; if so, state what each should be. I am cutting the four-cylinder 5 pounds and the six-cylinder 10 pounds from the 113-pound weight, leaving the diameter the same.

(6) The four-cylinder car will weigh 2,350 pounds and the six-cylinder 2,750 pounds. I figure 32-inch wheels for the four-cylinder with 4-inch tires and 34-inch wheels with 4 1-2-inch tires for the six-cylinder one. Would you consider this right?

(7) The length of the connecting-rods is 10 3-4 inches from center to center. This, I understand, is a little shorter than average practice. But I have not room in the base for a longer one. Is it any disadvantage? The car I built worked satisfactorily on the road with these rods.

(8) The compression is 85 pounds, which I consider high and should be an advantage. If not right, should it be higher or lower?

(9) How fast should these engines turn over to be considered a good, safe speed for racing so that I can determine the gear ratio suited to the speed desired?

(10) Are cast-iron flywheels safe for high speeds, and at how many revolutions do they reach their limit of safety? Should I use a cast-steel flywheel, and how much would this increase the safety limit?

York, Pa. J. PIERCE.

—(1) According to your figures you would have a bore-stroke ratio of 1.132, which would be very satisfactory for racing purposes. The piston speed in this case at 2,000 revolutions per minute would be 1,833 feet per minute, which is common on racing cars.

(2) Your valve dimensions are good, but a lift of 1-2 inch would be better, remembering the short time for gas flow.

(3) The valve timing is largely a matter of cam shape in a racing car. Square cams should be used in order to give the valves a quick opening and closing, and it would be well to increase the strength of the valve springs slightly so as to make the action more positive. That is to obviate any danger of the follower not having speed enough to follow the cam. An increase of 5 pounds to the inch compression would make the springs about right. The timing for a racing car is largely a matter of personal opinion. Expert opinion, however, seems to run along the following lines: In terms of piston travel, inlet should open 1-8 inch after top dead center and close 1-4 inch above bottom dead center. Exhaust open 1-4 inch above bottom dead center and close 1-4 inch after top center, giving the inlet opening a lead of 1-8 inch over exhaust closing.

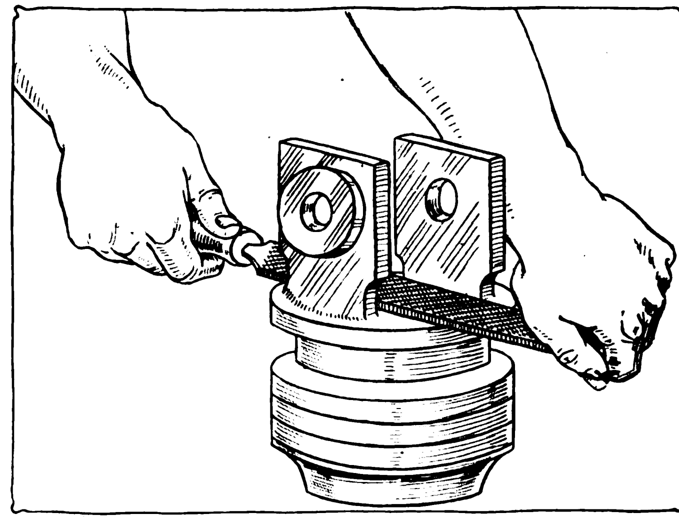


Fig. 4—Filing clutch collar to make it fit tightly against sleeve support

(4) Try motor without oil holes in piston. If it smokes cut them in so that oil will not be sucked into the combustion space, the idea being that only the oil above the holes could be sucked into the combustion space past the piston on the suction stroke, the air being sucked up from the crankcase through these holes instead of around the pistons.

(5) Flywheel can be cut down in weight to 90 pounds on the four-cylinder motor and 110 pounds on the six-cylinder. In each case the diameter would be, with these weights, 22 inches. With the diameter 18 inches, as you have it, the weights you suggest would be all right.

(6) Wheels, weight and tire sizes are correct.

(7) The connecting-rods are too short. This puts too much side thrust on the pistons and cuts down the efficiency of the motor on account of the added friction and angularity. The correct length would be 14 inches with a stroke of 5 1-2 inches.

(8) The compression could be made higher in a racing car, where every ounce of power is needed. From 90 to 95 pounds would be all right with a high-speed motor; 90 would give very satisfactory results all around.

(9) Two thousand revolutions per minute is good; 2,500 is the outside limit; 2,000 revolutions per minute would give you a piston speed of 1,833 feet per minute, which is as high as you will be able to go. To get this, all moving parts must be of the best material, light but strong.

(10) Use a steel flywheel. Cast iron is safe for all ordinary speeds unless there is a blowhole in the casting. A bubble may not be found by inspection, but would evidence itself by allowing the flywheel to burst at high speeds. The speed at which the flywheel will burst is that at which the centrifugal force equals the tensile strength. This depends on the weight, diameter and speed of the flywheel and is easily figured.

[THE AUTOMOBILE is holding a few queries and communications which have been received unsigned. If a correspondent does not wish his name published it is merely necessary to state this fact in the letter and a nom de plume will be substituted. As an evidence of good faith, however, it is required that all communications be signed. Those which have been received up to date will be held until the identity of the sender is known. All communications will be answered strictly in the order in which they are received.—EDITOR.]

New Reciprocating Sleeve Valve Motor

Inventor Brings Out Novel Engine with Exterior Valves Driven by Vertical Shafts and Connecting-Rods

Accessibility, Ease of Lubrication and Low Working Temperature the Chief Claims

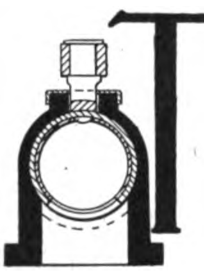


Fig. 1—Cross-section of valve

THAT inventors are still hard at work evolving new and original ideas on the sleeve valve motor is well illustrated by the latest development in this field which has been brought out by Denis P. J. Burguieres, a New Orleans sugar manufacturer, who has made himself known in that field by a number of useful inventions in sugar machinery. The distinguishing feature of this motor is that the sleeve valve is distinct and separate from the rest of the motor, thereby allowing the working parts to be operated at a lower temperature than if they were in closer proximity to the heat of the combustion chamber. In appearance, the valve is a long cylinder. Each cylinder is about the length of a block of two motor cylinders. There are four of these for a four-cylinder motor, two for each pair of cylinders, one on the exhaust side and the other on the intake side. Outside of the valves and their driving mechanism, there are no departures from standard practice in motor construction.

The valve consists of three main parts, a casing, an inner sleeve and an outer sleeve. The casing is attached to the outside of the motor cylinder as shown in the plan view, Fig. 4. The inner and outer sleeves are the two cylinders shown in the same illustration, the slotted sleeve being the inner or stationary sleeve, while the other sleeve, the lower in the illustration, moves with a reciprocating motion between the casing and the inner sleeve. The ports in the casing of the valve register with the ports in the cylinder so that there is always communication between these two. The port on the inner or stationary sleeve also registers with the cylinder and casing openings so that, were not the intermediate, or moving, sleeve between the inner sleeve and the casing there would be a free passage from the motor cylinder into the valve passage. The intermediate or sliding sleeve is also slotted, as may be seen in Fig. 4. It is shorter than the stationary sleeve and is therefore capable of a reciprocating motion. When the port in the center, or moving, sleeve registers with the openings in the casing and inner sleeve, the gas has a free flow from the center out into the valve passage and to the exhaust manifold.

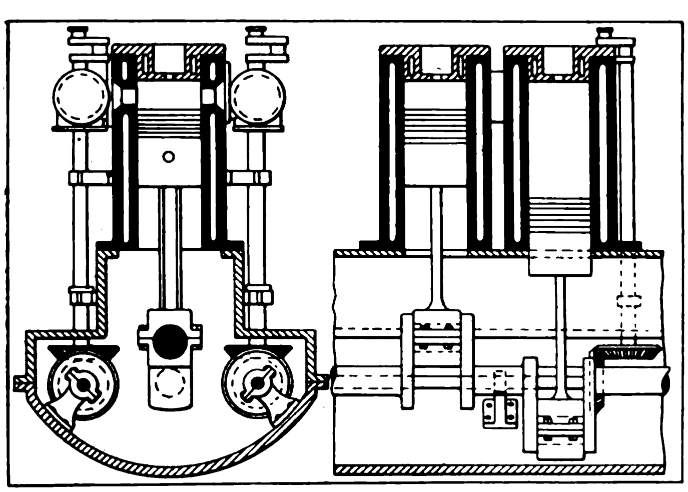


Fig. 2—Transverse and longitudinal section through motor

There is no possibility for leakage of compression past the sleeves for two reasons. In the first place, the gas, in order to escape from the cylinder when the ports are not in line, would have to pass between the sliding or center sleeve and the casing through the port in the center sleeve and then, to get through the opening in the inner sleeve, would have to come back between the inner and center sleeves to the opening in the latter. The natural inclination of the gas is against following a tortuous passage of this description so that there should be no leakage. Balance is secured by an annular fillet which passes around the interior of the casing. This fillet is filled with the gas at the time of exhaust and is intended to maintain an equal pressure all around the sleeves. Balance has been found to be one of the troubles which beset the rotary valve makers who mount their valves in much the same way, but who depend on a rotating motion in place of the reciprocating motion suggested in a motor of this type.

The drive is effected in a manner new to sleeve valve motors. A study of Figs. 2, 3 and 4 will show how this is carried out. Two shafts run the length of the crankcase, as shown in Fig. 2, one on either side. These are driven directly off the crankshaft by spiral gearing or any other method which may be desired by the manufacturer. From the center of this shaft between the two center cylinders a vertical shaft is carried up to the top of the motor terminating in a crank, which may be seen in Figs. 2, 3 and 4. Upon these two cranks are mounted a pair of connecting-rods, one for each valve. A slot is made in the casing so that the drive may be communicated to the center sliding sleeve and, to prevent a leak through the connection of the connecting-rods and the center sleeves, a cover is put over the slots. The cover slides in a guide along the top of the casing, making a neat and compact joint with little frictional loss and having but little weight.

Lubrication and Cooling Systems

Lubrication of the sleeve valve is taken care of by grease cups. In Fig. 1 the method employed in mounting these is shown. The cup is filled with light grease and is of the common compression type. The passage of the lubricant is through the opening in the casing and down on to the reciprocating sleeve. The oil is distributed about this sleeve by the grooves or ducts depicted in Fig. 4. By the action of these ducts and the reciprocating motion of the sleeve itself the oil is spread over the surface of the metal and the required film of lubricant is formed. There is practically no leakage of lubricant as the end caps of the cylindrical casing fit tightly against the ends of the stationary spring sleeve, Fig. 3. This tightness of the ends fills the two purposes of preventing leakage of gas or oil and at the same time prevents any endwise movement of the stationary sleeve. This method renders the lubrication of the sleeve altogether independent of the regular lubricating system of the motor. If desired, however, this could be departed from and it would seem that it would be an advantage in the case of a motor with a force-feed system to run a lead directly to the sleeve valve, making this part of the lubrication positive and independent of the driver's forgetfulness to turn down the grease cup.

Cooling the valve would depend upon its position. Should it be on the side of the motor, as shown in the accompanying illustrations, it would seem that cooling ribs at least on the casing would be an advantage or if brought in closer to the cylinder a waterjacket could be easily run around the casing. Expansion of the cylinders should not destroy the fit as the inner sleeve is sprung into the reciprocating sleeve by compressing it against the slot which runs its entire length. This spring action should com pensate for wear as well as for expansion. The method of cooling, however, would depend entirely on the position of the valves, which are of such construction that they can be placed almost anywhere the designer chooses to put them.

The claims made by the inventor are principally in the form of claiming the superiority of the outside sleeve motor over the inside sleeve type in that greater accessibility is secured, lubrication is simpler, on account of the position of the sleeves, and the fact that they work at a lower temperature than those having inside sleeves. It is also claimed that the moving parts are fewer and hence frictional losses are less. A fact which is of special significance is that the inventor claims fewer parts by half than are used in the construction of a poppet valve motor. This has been the tendency in all the latter designs of sleeve and rotary valve motor. The cutting down of the number of parts is drawing attention after years of insistance on the part of manufacturers for a simpler motor.

High Efficiency and Accessibility

The efficiency of the motor is claimed to be as high as that of any of the motors of the sliding sleeve type and a gain might be expected from the fact that the sleeves are of smaller diameter and hence give less chance for losses of power through the friction caused by the expansion of the sleeves. The advantages which are set forth above, it is claimed, would also tend to reduce power losses and to render the motor more efficient.

Repairs on the sleeves are declared to be more easily made than on the inside sleeve type because all that is necessary to disassemble the sleeves is the removal of the two end covers which are simply screwed in place. The connecting-rods are then detached by removing the bolts which hold them in place. After this is done, the sleeves can be drawn out. This renders cleaning and inspection easy. The reassambling job is also very simple. The inner sleeve is first sprung into the working sleeve and the two are then put together into the casing. When the inner sleeve is placed in the sliding one, the ports are lined up so that they will be in the correct position when they are put back into the housing. It is impossible for the ports to get out of line when the sleeves are once in position owing to the fact that the bolts from the connecting-rods which drive the sleeves pass through slots in the different parts. The slots act as guides and hold the sleeves in the correct relative position to the casing.

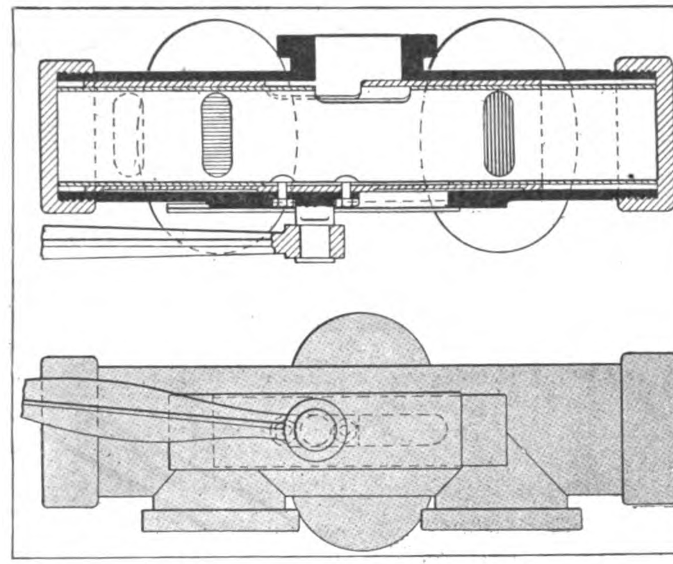


Fig. 3—Sectional and exterior view of assembled valve

An Angel on Ball Bearings

When the famous *Campanile di San Marco* in Venice collapsed about ten years ago it was decided to rebuild it "where it had stood and as it had stood," and this work of restoration has now been concluded, but while the tower stands to all appearances just as it was before, the construction methods which were employed in its reproduction were altogether modern and calculated to make it better able to resist storms, fire and earthquakes. Only a few parts of the old tower were used over again, but among these was the Marcus Angel, which for centuries had adorned the summit of the tower, and in replacing this image whose very large wings used to catch the full force of the wind, making the tower to sway and vibrate, it was decided to make use of ball-bearings for the purpose of obviating this evil. It was in fact a concern closely identified with the automobile industry in whose charge the design of this feature was left. The image is made of hammered copper sheets covered with gold leaf and weighs 1200 kilograms. In securing this considerable weight to the extreme top of the tower by means of an internal scaffolding, it was the object to permit the image to turn like a weathercock, so as to always present the smallest possible surface to the wind, and also to permit it to sway a few degrees in any direction independently of the tower and thereby cushioning the wind stress upon the latter. An end-thrust ball-bearing was secured in the scaffolding at the height of the angel's chest and from the upper one of its disks there was hung a long flexible rod passing down through the pedestal of the figure, with some side play, and supporting at its lower end, inside of the tower, a counterweight of 100 kilograms. Inside of the pedestal, which was bolted to the tower, there was secured a semi-spherical ball race containing a cage with sockets for 64 balls of 1⅜-inch diameter, and with an opening for passing the counterweight rod, and to the bottom of the scaffolding the other semi-spherical member of this bearing was securely fastened. In order to withstand the effects of dust and of the salty air of Venice without any attention whatever the bearings and balls are made of a special bronze in dimensions giving a large factor of safety, are packed in graphite paste, to serve as lubricant for perhaps a thousand years, and the whole mechanism is tightly encased to prevent all ingress of impurities, such as otherwise might be caused by the visits of birds, and also to prevent the wind from gradually blowing the lubricant away.—From *Werkstattstechnik*, June 15.

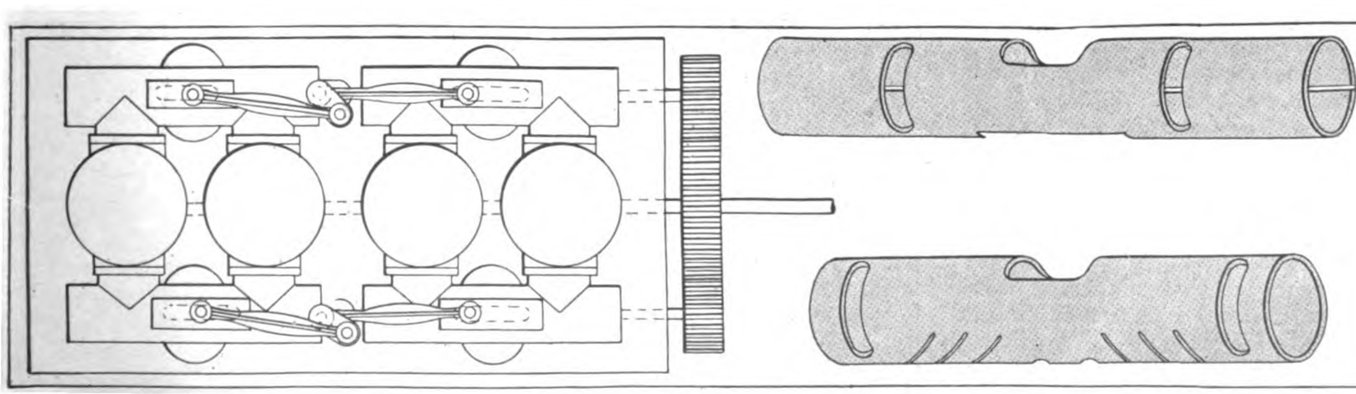
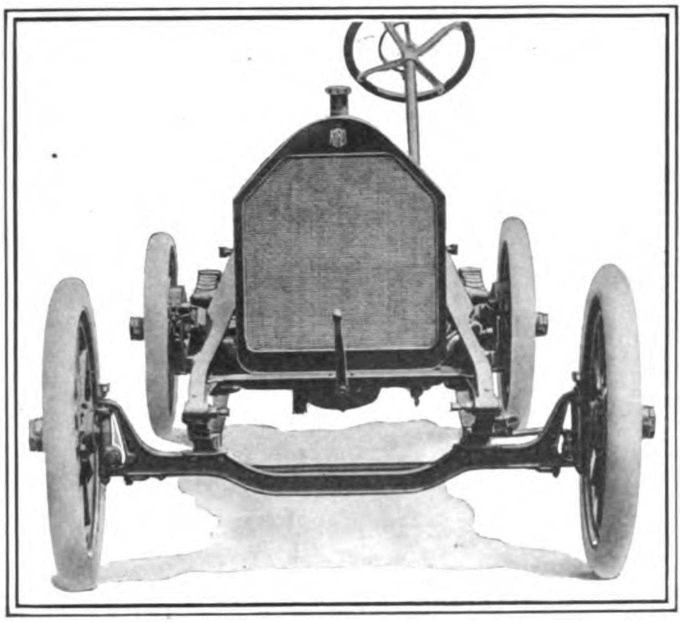


Fig. 4—Plan view of Burguieres sleeve valve motor. The long stationary and the short reciprocating sleeve are also shown



Front view of 1913 King 36 roadster chassis

King 36 Roadster

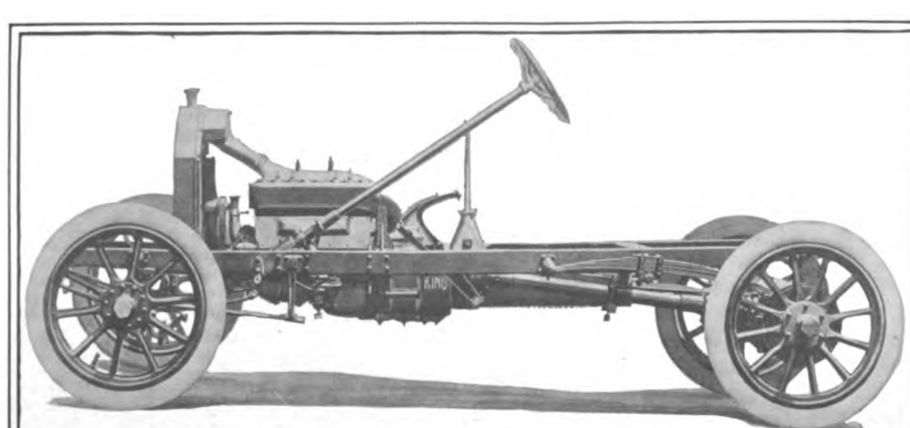
New Type of Body Features This Latest Addition to Company's Line

Rear Deck Compartment for Tires and Baggage—Long-Stroke Motor and King Patent Lubrication System

AMONG the cars which have recently made their initial appearance is the King 36-horsepower roadster, which, while possessing all the mechanical features characterizing the product of the King Motor Car Company, is of an entirely new body type, designed by Charles B. King.

The car, which has a 110-inch wheelbase, has very graceful and pleasing body lines. There is a rear deck compartment which incloses the extra tires and is intended to carry all necessary baggage as well. A glance at the illustration will show how this rear compartment idea has been carried out without causing the back of the machine to present a bulky appearance. The running-boards are free from tanks and boxes, a tendency which is fast becoming law to body designers. The doors latch from the inside, closing flush with the sides of the body. The cowl is on a very low slope and it is surmounted with a windshield which is a part of the standard equipment.

Another feature is the setting of the radiator and power plant 8 inches back of the center line of the front axle. This is done with the idea of giving better load distribution and of adding to the attractiveness of the car's lines.



Side view of 1913 King 36 roadster, showing radiator set back of front axle

The road clearance has been made 10 inches, but at the same time the body is hung low to lend a rakish effect to the whole.

The car in every way conforms to the King construction, the peculiar rear spring design being perhaps the most original and distinctive feature. The front springs are of the ordinary semi-elliptic type, but the rear ones, which are specially long and flat, are mounted in the reverse manner from that in which they are placed on the average car. They are supported at their centers on pivots which are fastened to the frame, and at their front ends they are also fixed to the frame. The rear ends operate in shackles which are mounted on the rear axle. With this construction it is claimed that the shocks received in passing over rough places, instead of being transferred to the occupants of the car, are taken up by the lever action of the springs and thrown back again. The action is very similar to that of the shock-absorber.

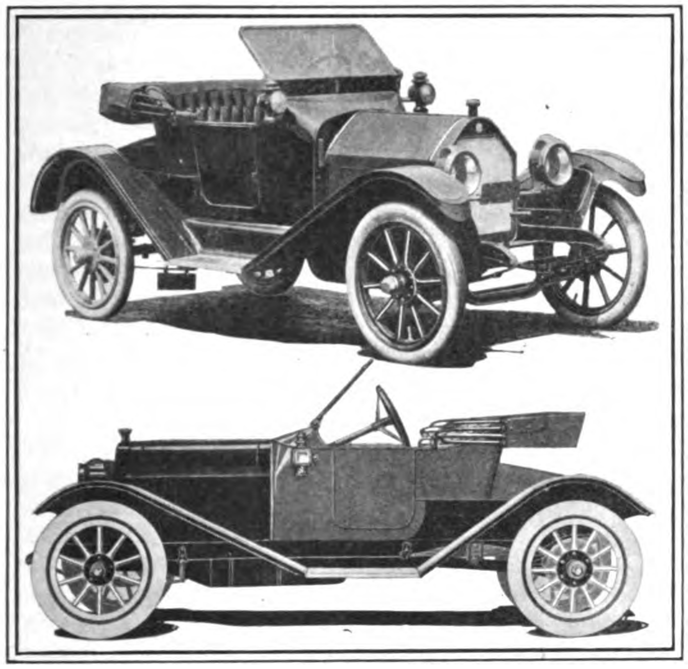
Details of the Long-Stroke Motor

In the new roadster, the long-stroke motor, which is of the four-cylinder, monoblock type, is to be found. The bore is 3 13-16 inches and the stroke is 5 1-8 inches, giving a stroke-bore ratio of 1.34. All the moving parts are inclosed. With the aim of getting the shortest possible line of travel for the gases, the valves are placed at an angle of 8 degrees. This also has a tendency to make the firing quicker, it is claimed. The intake and the exhaust open directly into the cylinders, there being no valve pockets. The crankshaft has two bearings and its diameter is 2 1-8 inches. This mounting of the crankshaft at the front and rear is a construction which is peculiar to the monoblock motor, and greatly economizes the power plant length. The timing gears are spirally cut and completely housed. A single cover plate houses all the valve-rods, tappets and springs. A peculiarly shaped fan, having two blades of aeroplane type is belt-driven. This, in connection with the thermo-syphon system of water circulation, makes up the cooling outfit of the car.

The carbureter is a Stromberg, being mounted on the valve side of the motor. The control is on the left hand side, so that the placing of the carbureter on the same side, together with the monoblock construction, makes for the minimum amount of manifold. The exhaust manifold is cast integral with the cylinders, the connection with the exhaust pipe being made at the rear of the cylinder casting.

The ignition is accomplished through the use of the Bosch magneto and dual system, using one set of spark-plugs. The magneto is mounted on a shelf at the forward end of the motor, and is driven by bevel gearing from the crankshaft, being placed at right angles to it.

Since the unit power plant idea is used, the flywheel, clutch and transmission being integrally housed with the crankshaft and motor, the lubrication of the entire mechanism is much simplified. In the King patented system oil which is put into the engine through the breather pipe serves for the motor, the



Three-quarter and side views of the 1913 King 36 roadster

clutch, the transmission and the universal joint at the front end of the propeller shaft. Each unit has its own oil compartment, and the inclosed flywheel serves the purpose of a pump in carrying the oil to an elevated trough, from whence it is delivered to the gears, bearings and so on. The grades down which the oil flows to the various friction points are made very steep, insuring positive lubrication of each bearing. The lower part of the flywheel housing is made the lowest part of the power plant, and the oil is led from the various lubricated points back into this part, which serves as a trough. In revolving, the flywheel rim runs through this trough and carries oil up into the elevated trough. Drain wells in each oil compartment catch dirt and residue and screens are provided which prevent this sediment from passing from one oil compartment into another. Both the engine base and the transmission case may be drained separately by the removal of pipe plugs.

As inspection of the chassis view will show, the control lever enters directly into the gearbox, which is made possible through the center control feature. By this construction, toggle joints and rocking shafts are done away with.

The clutch is of the multiple disk-type, consisting of thirty-two plates running in oil and contained in the flywheel. Transmission is selective, three speeds forward and reverse. The gears are flooded with oil at all times in the manner already explained.

A substantial torque tube incloses the propeller shaft which effectively maintains the relative positions of the rear axle and the transmission through the aid of two radius rods passing from the front end of the tube back to the rear axle at either side. This construction has long been a European-car characteristic and is also seen in several cars now made in this country of the monoblock-unit-power-plant type.

The torque tube bolts to the rear axle, which is of the floating type of Weston-Mott design. The weight of the car is supported on the rear axle housing, leaving the two halves of the axle shaft which pass from the differential to the rear wheels free to perform their driving function exclusively.

Novel Front Axle Mounting Scheme

The brakes are internal and external expanding, operating on the rear wheels through pedals. The right one of these pedals operates the emergency brakes and is provided with a catch for locking it in position when desired. The other pedal operates the clutch and the service brakes as well.

The front axle may be clearly seen from one of the illustrations. It is mounted at an inclination of 7 degrees, the idea in so placing it being to cause it to meet the road shocks more directly in line with the springs. The result is a caster effect. When the wheels are turned to an extreme left or right position they have an inclination towards the road. For example, if the wheels are turned to the left, they slant to the left, the claim being that tire wear is thereby reduced, and the strain on spindles, bearings and tires lessened.

The frame has a depth of 4 inches at its heaviest point in the center of the car, and it is constructed of pressed steel. It is strengthened by a cross brace at the point where the rear springs are pivoted, in addition to the motor and power plant hangings which also act as reinforcements.

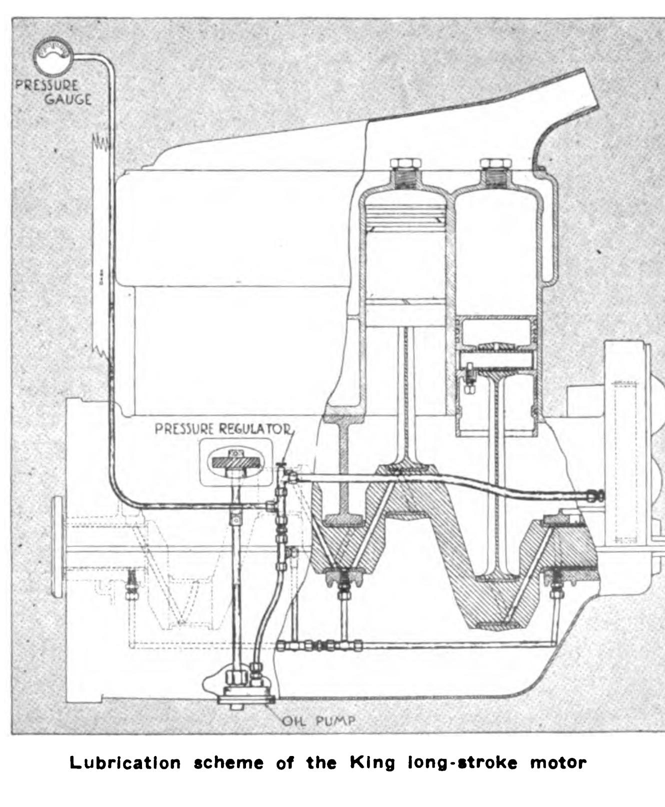
The wheels are of the artillery type, of second growth hickory, and they carry 32 by 3 1-2-inch tires. The tread is the standard 56 inches.

The standard equipment of the new roadster, which, by the way, is to sell for $1,190, includes a mohair top and slip cover, windshield, magneto, acetylene gas tank, gas headlights, oil side and rear lamps, horn and tools. The trimmings on lamps and accessories are black and nickel.

The body design has already been brought out. The front fender unit construction, however, is worthy of mention. The usual type front lamp brackets are done away with, the lamps being mounted directly on a steel tie tube which passes from one fender to the other, with the idea of so effectively bracing the fenders and lamps that there is no vibration of either. The lamps are raised higher than in the usual construction for the purpose of eliminating long road shadows. Gas enters the lamps through these braces, which consequently perform a double function.

Motor Passenger Line for La Guaira

La Guaira, Venezuela, June 20—An extensive concession providing for an automobile passenger and freight service covering a considerable territory in this vicinity has been granted, subject to the approval of the national Congress. The concessionaire will construct the roads necessary to the maintenance of his schedule. The government will protect the enterprise from competition for a period of 30 years, but all tariffs must first be approved by the authorities before being made effective.



Lubrication scheme of the King long-stroke motor

THE AUTOMOBILE

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Standardization—Dollars and Cents

DOES standardization pay?

This question affects the automobile builder, the automobile engineer, the automobile salesmanager, the automobile advertising manager, the dealer, no matter in what city he be located, the garage man, irrespective of location, the repairman, the retail salesman and, lastly, the car owner. All are interested in the work of standardizing those car parts which close study and observation decide should be standardized.

Standardization has been defined in scores of different ways and there have been as many misinterpretations of it as there have been definitions: Standardization has to do with different automobile manufacturers making certain parts of their machines or parts of uniform size, as using standard sizes of bolts or nuts in many places. The use of accepted sizes of cotter pins; accepted sizes of lock washers; accepted threads on spark-plug sockets; accepted sizes of grease cups; accepted sizes and shapes of yoke ends; accepted wheel diameters for certain tire sizes; accepted sizes of base plates for magnetos; accepted sizes of flanges for securing carbureters to intake manifolds; accepted sizes of gasoline and water connections for the gasoline line to the carbureter and the water lines to the carbureter jackets; accepted sizes of pipe diameters for car parts; accepted lengths of control arms or magneto breaker boxes and carbureter throttles; accepted sizes of sockets for electric light bulbs; accepted tolerance in bearings, and a hundred other things.

Such accepted, or recommended, practices mean money to every person connected with the industry. To grasp this, paint two parallel pictures, one of the standardized car, the other the non-standardized product, and let the owner of each become a country-wide tourist. Every tourist meets with little troubles and delays and so will the man with the standardized car and also the one with the non-standardized machine. In each case a new spark-plug is needed. Mr. Standardized Owner can secure the required plug in any garage or repair shop; the plug may not be of the same make as the one it replaces, in fact it may never have been used on his particular make of car, but that is not a factor, as the plug socket is a standard size and will take a plug that can be purchased anywhere at any time.

Parallel with this Mr. Non-standardized Owner. The engineer of his car decided that all spark-plugs were faulty and had his company build their own plugs of a standard size that met his conceptions. A new plug is needed while touring through Mississippi. The local garage men do not carry the non-standard plug, although well stocked with standard articles. The tourists has no recourse but to telegraph to the nearest branch, or dealer in his car, and patiently wait for a shipment. It may be that the dealer is just out and in turn waiting for a factory shipment and so the delay is increased. Such are the misfortunes of non-standardized parts.

As a second parallel consider the car using a non-standard filler cap on the gasoline tank. This is a small detail, but if the thread and diameter are special to that particular car and a cover gets lost it means that a substitute can only be obtained from the factory, or a branch, or dealer. On the other hand, if the car uses a standard iron pipe size, covers for such can be purchased in every town or city in the country, or practically every blacksmith shop is equipped to manufacture such an article.

A third parallel may be found in the use of yoke ends for steering parts, of which the average repairman carries a small stock. Should one call for replacement in Kansas or Oklahoma, the car owner feels that when the standardized article is used it is a speedy repair, but if a non-standard size has been used the question becomes serious.

Should his car be equipped with standard flanges on the intake manifold it is possible to install a different carbureter in Dallas without losing more than an hour or so, if in the forenoon or afternoon, and without any loss of time if the change is made at night. Should the flange be a non-standard it is impossible to install another make of carbureter without having to get a new manifold and the transition extends itself into a week's task.

Should the car have a magneto with a standard base, a change can be made in any emergency and without any loss of time, whereas it is impossible if the car is not a standardized machine.

But there is another phase of standardization rather than that of convenience—it is one of economy in repair. A standardized car is cheaper to repair throughout the country. A repairman or garageman in Denver soon discovers that his help become expert in the repair of standardized parts as they meet them on different makes of machines; whereas when non-standard parts have to be repaired a difficult and special problem is presented. The workmen are not familiar with the case. More time is required. The repair is not so well done and the bill to the car owner is greater. Because of this it soon gets rumored around the country that certain makes of cars are expensive to repair, solely due to the lack of incorporating standard sized parts in it. Thus does the standard car become a vehicle of cheaper maintenance to its owner, a vehicle more readily repaired and a vehicle that soon gets an honest reputation for cheaper maintenance because of these factors. Thus it pays to standardize. It saves money to the owner; it adds skill to the repairman; it builds up reputations for the manufacturer; it frees the engineer of details and leaves him free to carry on research and progressive work, and it makes manufacturing quicker and cheaper to the concern building the standard parts which are sold to all of the different units constituting the industry.

Standardization is needed. It must not be too radical; it must not be the whim of the few but the mature judgment of the many; it must not precede practice but must follow it; it must not place any limitations on the inventive genius of the engineer; it must not hamper the development of the growing industry; and it must change as time demands, always shaping its course by the requirements of the period.

Metropolitan Speedway Planned

Associations to Build and Manage the Project Incorporated With a Capital of $1,500,000—International 500-Mile Race Proposed

FORMAL announcement of the plans for the construction of the Metropolitan Motor Speedway has been made at the offices of the company in New York. The Metropolitan Motor Speedway Association has been incorporated with an authorized capital of $1,500,000.

The association has been formed to take over 300 acres on the Jersey meadows near Newark for the purpose of constructing a motordrome and stadium. Ground will be broken this month and the Speedway is to be completed within a year. On July 4, 1913, the premier event will be staged—an international 500-mile race. Engineering offices have been opened in Newark, and a corps of experts engaged.

It is not merely intended to make the Speedway a stage for automobile speed contests. Long distance motorcycle races and other races will be held on the brick oval, while the infield will be available for aviation meets, baseball, football, field and track athletics, circuses, Wild West shows, etc. The entire plant will be inclosed by a high fence. The Speedway itself is to be 60 feet wide, excepting on the turns, which are to be 75 feet in width and scientifically banked with saucer curves.

Officers of the new company are as follows: H. E. Hoyt, president; A. R. Pardington, vice-president and general manager; Theodore F. Kerr, treasurer; W. H. Osborne, secretary; Fred J. Wagner, director.

Sales Managers' Meeting Put Off

Indefinite postponement has been taken as far as the convention of sales managers is concerned. The convention was originally planned for next week, but owing to the press of late business and preparation for the 1913 season it was found inadvisable to hold the convention until later.

According to announcement made by the Automobile Board of Trade the convention will probably be called for September. The regular monthly meeting of the A. B. of T. will be held July 11.

Motor Carnival Week Postponed

Automobile Carnival week, which was scheduled to be observed week after next, has been postponed until the week of September 9. Lack of interest in the project was the main reason for its postponement at this time. Another reason was the fact that July is normally vacation time on automobile row and as the 1912 business has been cleared up in good shape the row is quieter than it has been in several years. Only four agencies can deliver cars on the spot.

Denver-Chicago Reliability Run

Eleven Contesting Cars, Representing Commercial and Other Organizations of Colorado's Capital Reach the Windy City

CHICAGO, July 1—The Denver-Chicago reliability run reached Chicago to-day. The party comprised eleven cars, representing the commercial and real estate organizations of Denver, Col., the towns of Sterling, Longmont, Canon City, Steamboat Springs and Idaho Springs, in addition to four privately owned Denver machines. Governor J. F. Shafroth and Mayor Henry Arnold took part in the getaway ceremonies.

The tour started at 9 a. m. Tuesday, June 25, from the Denver Chamber of Commerce, and the participants were accompanied out of the city by a gala parade of machines. The party will remain in Chicago July 2, 3 and 4, and returning will leave here the morning of July 5, reaching Denver July 13.

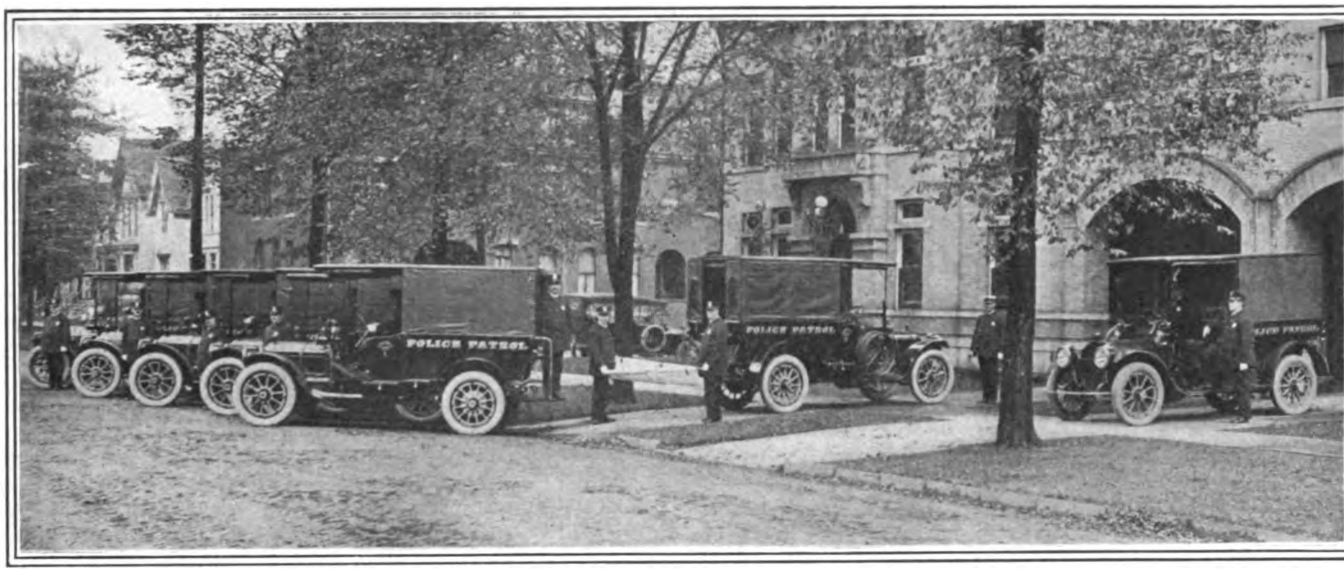
Each car was strung with banners and was well loaded with literature giving one hundred reasons why motorists should visit Colorado.

The cars entered in the run are Denver Real Estate Exchange car, R. R. Gillette; Chamber of Commerce car, Howard Smith; Denver Retail Association car, J. G. North; Sterling car, F. E. Frost; Longmont car, William McCreery; Canon City car, Mrs. Edith Myers; Steamboat Springs and Idaho Springs car, F. A. Craise; Denver privately owned and entered cars, C. L. Newcomb, John Brannan, W. H. Tompkins and Joe Lovan.

Twin Cities-Winnipeg Tour Plans

MINNEAPOLIS, MINN., July 1—With a message to the president of the state automobile association from Mayor R. D. Waugh, of Winnipeg, the Baby Mitchell Six Pathfinder has returned to the Twin Cities, with a scouting trip of 1,195 miles to its credit. The first leg of the return trip from Winnipeg ended at Grand Forks, N. D., 156 miles, passing through Emerson at the Canadian border, 68 miles from the start. The route was Hamilton, Glasston, St. Thomas, Auburn, Grafton, Harriot, Minot, Ardock, Lavant, Manville. At Grand Forks the arrival will be coincident with the opening of the North Dakota state fair. The next day's run was 163.8 miles to Breckenridge, Minn., through Crookston, Beltrami, Ada, Moorhead and Fargo, Comstock, Iverson, McCauleyville and Kent. A 20-minute control was established at Ada. The next leg was to Fergus Falls, Elbow Lake and Alexandria, Glenwood, Annandale, Rockford and Robbinsdale to Minneapolis. All sorts of scenic effects are to be found on the run, especially in the White Earth Indian reservation in Minnesota and in Canada. Returning the route is through lake park district, one of the most beautiful in the Northwest. Within the city limits of Minneapolis are 18 beautiful lakes such as cannot be found anywhere in similar location in the world.

News of the Week Condensed



A portion of Detroit's Packard motor patrol squadron. Officers in center represent first aid to injured

DETROIT Motorizes Police Department—With the addition of two Packard police patrols to the seven already in use, the motorization of the Detroit, Mich., police department is complete. Commissioner Croul declares that one automobile patrol with two men can cover as much ground as three horse-drawn wagons and give much better service. The cars in the department responded to 32,939 calls last year and covered 81,599 miles.

Berndt Assistant Manager for Remy—Arthur H. Berndt will become assistant manager of the Indianapolis branch of the Remy Electric Company September 1.

New Denver Accessory House—The Shaffer Auto Supply Company, 1240 Broadway, Denver, Col., is a new organization which will handle standard accessory and supply accounts.

Remy Appoints Lolly—The Remy Electric Company, Anderson, Ind., maker of the Remy magneto, has appointed W. H. Lolly of London, Eng., an engineer in the service department.

Loomis Resigns from Speedwell—Gilbert J. Loomis, who has been general sales manager of the Speedwell Motor Car Company for the past 5 years, has resigned, to take effect August 1.

Oustendorf Buys Out Partner—George Oustendorf, Franklin dealer in Buffalo, N. Y., has just bought out the interest of H. E. Crosby, formerly associated with him in the Franklin dealership.

Tisdale Buys Control—Glenn A. Tisdale, of the Franklin Motor Car Company, dealer for the Franklin car in the New York City territory, has bought the controlling interest in the firm of the John Kerkin Company.

Packers Branch in New York—The Packers Motor Truck Company, Wheeling, W. Va., has opened a branch office at 1734 Broadway, in the U. S. Rubber building, corner of Fifty-sixth street. Besides the office at that location, the Packers have a service station of 7,500 square feet, on West Forty-second street, with complete equipment and expert mechanics.

Dawson to Go on Stage—Joe Dawson, winner of the second annual 500-mile International Sweepstakes race at the Indianapolis Motor Speedway last Memorial Day, is to embark in the theatrical business. Dawson announces that he is being booked to appear in many of the larger cities during the next few months and will probably be engaged throughout the winter on the vaudeville stage.

To Control Taxicab Drivers—An amendment has been passed by the legislature of the Province of Quebec which will give the cities the right to make by-laws controlling chauffeurs of automobiles and taxicabs kept for hire as cabmen are now controlled, and to inspect the meters in taxicabs. It will also make it possible to establish a fine for passengers in these vehicles who do not pay the regular fare, the standard for which will be set.

Buy Out Broad-Oak Company—R. M. Weaver and W. J. Miller have purchased the entire capital stock of the Broad-Oak Automobile Company, which operates a sales agency and garage at 622 Oak street, Columbus, O. The purchasers take charge of the business July 1. Both men have had considerable experience in the automobile business and they announce improvements and extensions will be made. The concern has the central Ohio agency for the Chalmers and Pierce-Arrow.

R-C-H Branch for Frisco—To handle its constantly increasing business in the Pacific Coast territory, the R-C-H Corporation has completed arrangements for opening a branch and service station at San Francisco on July 1. The building secured for this purpose is a three-story structure on Ellis avenue, just off Van Ness, in the heart of the new automobile district of San Francisco. A floor space of 18,000 square feet is available for display and parts storage. The San Francisco branch will be used as a car and replacement distributing point for the entire West, and a sufficient supply of cars will be kept on hand to take care of rush orders at all times.

City's Street Cleaning Automobile—Mr. Edwards, street cleaning commissioner of New York City, intends to use motor trucks in the disposal of garbage.

Truck Saves $4,200 Annually—A milling company of New Orleans, La., has estimated that it saves $4,200 annually by the use of a 5-ton General Motors truck.

Wagner Sales Manager—Howard E. Wagner of New York City has accepted the position of sales manager with the Buffalo Electric Vehicle Company, Buffalo, N. Y.

Durable Dayton Service Station—The new service station and salesrooms at 1700 Wabash avenue have been opened for Chicago, Ill., users of Durable Dayton motor trucks.

Builds in Columbus—A permit for garage building has been taken out by Viola Horn, Columbus, O., who will erect a public establishment between High and Third streets.

Currier Now in Charge—M. B. Currier, Columbus, O., who has been a mechanical expert with the Interstate Auto Company, has been placed in charge of the Columbus agency.

Wilson Called East—Orin S. Wilson, for 2 years general manager of the Studebaker Colorado Vehicle Company in Denver, Col., has been called East to supervise more extensive territory. He has been succeeded by his assistant, J. C. Beck.

Lozier's New Boston Building—Work has been started on the foundation of the new Lozier building on Commonwealth avenue, Boston, Mass., and it is expected that the new structure will be completed and ready for occupancy about September 1.

Lansden Electric in Boston—The Lansden Electric Vehicle Company has been formed in Boston, Mass., with Albert B. Freeman, president; Gardner Freeman, treasurer, and William H. Britton, secretary. The company recently took the agency for the Lansden electric truck for Boston.

Automobile Affects Horse-Breeding—The great popularity of the automobile, according to army officers, is having the effect of causing a marked diminution in the breeding of middle and inferior grades of horses, thus rendering it difficult to secure animals for the cavalry and artillery service.

Locomobile Branch in New Quarters—The Los Angeles branch of the Locomobile Company, which was temporarily located at 942 South Grand avenue, is now occupying new permanent headquarters at Pico and Grand avenues. The new building was secured, as it is larger and offers more facilities for giving customers prompt and efficient service.

New Home for Motor Company—Negotiations are under way for a new home for the Longstreth Motor Car Company, Philadelphia, which handles the Alco. The plans provide for a modern concrete building approximately 66 by 125 feet at 2126-28-30 Market street. It is expected to have the building ready for occupancy about September 1.

Will Enrich Automobile Gasoline—The Acetol Company has been formed by P. C. Avery, of Milwaukee, Wis., and other interests to market an invention by Mr. Avery of a chemical compound to enrich gasoline. Mr. Avery is chief owner of the Avery Portable Lighting Company, which formerly produced the Auto-Gas tank and later the Electrobola motor lamps.

Denver Club Suggests Improvements—Mayor-elect Henry Arnold of Denver has asked the co-operation of the Denver Motor Club in the way of suggestions for the improvement of existing traffic ordinances and in the stationing of the traffic police squad. The club responded with suggestions for fifty-six ordinances, some of which are certain of adoption.

Keeton Company Secures Good Man—The Keeton Motor Company, Detroit, Mich., builder of the Keeton French type, has announced another addition to its office force in the person of H. D. W. MacKaye. He is now to be connected permanently with the Keeton Motor Company as assistant to the president, and will also take charge of the purchasing.

Government Department Buys Trucks—The Bureau of Engraving and Printing, like many other Federal departments, is gradually doing away with the horse-drawn vehicle in favor of the automobile. The purchasing agent of the department has just received bids for one 8,000-pound truck, one 5,000-pound truck, one coupé and one delivery wagon. The number of bids submitted was so great that announcement of the awards will not be made for several days.

Young Severs Lozier Connection—C. S. Young, engineer and designer with the Lozier Company, has severed his relations with that organization to become assistant general manager with the Regal Motor Car Company, Detroit, Mich.

Everett in Louisville—The Everett Motor Car Company, Detroit, Mich., has established a branch office in the Coleman building, Louisville, Ky. E. L. Jacoby, formerly manager of the Studebaker branch at Memphis, Tenn., is in charge.

District Managers Meet—Enthusiasm, good fellowship, business and pleasure were the predominating features which marked the 3 days' convention of the district managers, allied with the Willys-Overland Company, held at Toledo, O., recently. Each state in the Union was represented, as well as Canada. Among the pleasure features were the smoker at the Overland Club on Maumee Bay, banquet at the Toledo Yacht Club, launch rides on Lake Erie and a theatre party. The company intends to build 40,000 cars this year.

Outing of Overland district managers at Overland Club House, Maumee Bay, during annual convention

Kelly Branch in Indianapolis—The Kelly Truck Company has opened a factory sales branch and service station at 9 East Pratt street, Indianapolis, Ind. The company has a number of its trucks in operation in the city.

Richmond to Have Truck—Charles F. Taylor, of the Richmond, Va., tire commission, announces that the board is now considering the motorizing of the entire fire department. President Taylor says that if the fire department is motorized, the city will save at least 50 per cent. in operating expenses, making a total saving of $60,000 to $90,000 annually.

To Start Truck Line—An automobile truck service between Hamilton, Ont., and Toronto for the transportation of perishable and household goods between the two cities is being planned by the Grant Cartage and Forwarding Company which will place in operation ten machines as soon as the service is opened.

City Cars Need Not Register—Cars owned by the city of New Orleans, La., if plainly lettered, showing the department to which they belong, will not be required to carry license tags. This decision was rendered recently when an effort had been made to force the registration of the city's machines.

Shreveport Collects Car Tax—Taxes are being collected by the city of Shreveport, La., on approximately $1,000,000 worth of motor cars. The taxation, however, is not based on the valuation, but is graded as follows: 2 passenger cars, $2; 4 passenger cars, $3; 5 passenger cars, $4; 7 passenger cars, $5. Trucks pay $1 and public transfer wagon $10. The tax is assessed annually.

More Cars in Michigan—Secretary of State Martindale believes that the sale of automobile licenses this year will bring the State of Michigan $150,000. More than $119,000 already has been received. During 1911 the fees amounted to $102,913.

Scranton Repair Shop Burns Down—The repair shop of Robert Lance, Scranton, Pa., was burned recently.

Shay Leaves Ozburn Company—W. J. Shay has sold his interest in the Ozburn Automobile Supply Company, Memphis, Tenn., to N. F. Ozburn. Mr. Shay now will devote his time to the organization of the United States Sales Corporation, which will deal in accessories.

Big Convention of Haynes Men—About 300 salesmen and agents of the Haynes Automobile Company were entertained recently at the factory in Kokomo, Ind. The city was decorated for the occasion, every business house displaying Haynes pennants, while in many windows were shown parts of the Haynes car. The guests were forbidden to spend their own money, each man being given fifty certificates which were accepted as money by Kokomo merchants.

New Automobile Agencies

PLEASURE CARS

Place	Car	Agent
Alexis, Ill.	Henderson	W. K. McKnight.
Anderson, S. C.	R-C-H	Fowler's Garage.
Atlanta, Ga.	Henderson	Dan Walraven.
Belvidere, Ill.	R-C-H	H. H. Collier.
Boston, Mass.	Havers Six	Fred O. Hoyt.
Boston, Mass.	Henderson	James A. Binney.
Champaign, Ill.	R-C-H	A. L. Percival.
Cleveland, O.	Little	Co-Operative Garage.
Croswell, Mich.	R-C-H	Fred A. Moore.
Des Moines, Ia.	Paige-Detroit	Interstate Auto Co.
E. Liverpool, O.	R-C-H	G. W. McNichol.
Erie, Pa.	R-C-H	Murphy Brothers.
Fergus Falls, Minn.	R-C-H	Martin Johnson Auto Co.
Iowa City, Ia.	Franklin	F. C. Carson.
Kansas City, Mo.	Franklin	W. F. Kneip and E. F. Williams.
Laurens, S. C.	R-C-H	Rounds Auto Co.
Mankato, Minn.	R-C-H	Mankato Automobile Co.
Mansfield, O.	R-C-H	Myers & Morris.
Matoon, Ill.	Henderson	Mattoon Refrigerating Co.
Middletown, O.	E-M-F, Flanders, Oakland, R-C-H and Oldsmobile	F. Van Sickle and W. F. Nichols.
Milwaukee, Wis.	Cartercar	D. Wittenberg.
Milwaukee, Wis.	R-C-H	Smith-Hoppe Auto Co.
Morris, Ill.	R-C-H	O. T. Wilson.
Niles, O.	R-C-H	Park Auto Sales Co.
Oak Grove, Mo.	R-C-H	W. T. McLaurins.
Omaha, Neb.	Firestone-Columbus	W. H. Hellen Motor Car Co.
Painesville, O.	R-C-H	Star Garage.
Philadelphia, Pa.	Henderson	Johnson Motor Car Co.
Plainfield, N. J.	Henderson	Service Garage.
Princeton, Ill.	R-C-H	Evans & Coopins.
Roanoke, Ala.	R-C-H	R. L. Allen.
Rochester, N. Y.	Henderson	Fred E. Wilson.

Increase of Franklin Business—According to the Franklin Automobile Company, distributing agent for the Franklin, the average increase of business done so far this year by 41 per cent. of the Franklin dealers in various states is 122 per cent. over that done during the first half of last year.

Albany Forbids Use of Cut-Out—The common council of Albany, N. Y., has adopted an ordinance prohibiting the use of a cut-out for a motor vehicle.

Saxon Company Moves—The Saxon Manufacturing Company, Toledo, O., maker of automobile lamps, horns and accessories has removed from its original building on South Ontario street to larger quarters on Cherry street. The new building has been remodeled, refinished and refurnished.

Nichols Goes to Detroit—Fred C. Nichols, for the past 2 years connected with the Whitten-Gilmore Company in Boston, agent for the Chalmers, has resigned to accept a position as assistant to Percy Owen, sales manager of the Chal-

Annual house party of the Haynes Automobile Company, at Kokomo, Ind. Included in the picture are

Pleasure and Commercial

PLEASURE CARS

Place	Car	Agent
St. Michael, Minn.	R-C-H	H. W. Dick & Son.
Salt Lake City, Utah	Columbia, Maxwell	Salt Lake Automobile Exchange.
San Francisco, Cal.	Marathon	Samuel Hables.
Seattle, Wash.	Franklin	W. A. Wicks.
Toledo, O.	Little	American Motor Sales Co.
Washington, D. C.	Henderson	Matheson Motor Car Co.
Wheeling, W. Va.	R-C-H	R-C-H Motor Co.
Winston, Mo.	R-C-H	W. H. Dice.

ELECTRICS

Philadelphia, Pa.	Babcock	John Wanamaker.
Washington, D. C.	Hupp-Yeats	Storm Motor Car Co.
Washington, D. C.	Standard	W. P. Barnhart Co.

COMMERCIAL VEHICLES

Allentown, Pa.	R-C-H	Queen City Motor Co.
Battle Creek, Mich.	R-C-H	F. E. Riley.
Boston, Mass.	Veerac	W. L. Russell & Co.
Coldwater, Mich.	R-C-H	Coffman & Boucher.
Harrisburg, Pa.	B. O. E.	J. M. Mack.
Kansas City, Mo.	Regal	E. P. Moriarty & Co.
Louisville, Ky.	Baurer, Mack and Hewitt	Leyman Motor Co.
Middletown, O.	Chase	F. Van Sickle and W. F. Nichols.
Milwaukee, Wis.	G. M. C.	Skuol & Schauer.
Montreal, Que.	Foden (steam)	Jones & Glascco.
Philadelphia, Pa.	Chase	Chase Motor Sales Co.
San Francisco, Cal.	Lippard-Stewart	A. E. Hunter Motor Car Co.
Scranton, Pa.	R-C-H	Edward and Harold Conrad.
Woodstown, N. J.	R-C-H	Newton & Reeves.
Washington, D. C.	Kelly	Peerless Motor Transfer Co.

mers at the factory in Detroit. R. A. Dobyns, secretary of the Bay State A. A. for the past 2 years has taken Mr. Nichols' place with the Whitten-Gilmore Company.

Phelps Gets Promotion—George H. Phelps, who, during his year's service as manager of the retail branch of the Boston salesrooms of the Studebaker Corporation, placed it in second place in the number of sales, has been promoted to be manager of the New York branch of the company to succeed Charles F. Redden. Frank X. Coveney has been made manager of the Boston retail branch succeeding Mr. Phelps, while Phil Hawley is manager of the wholesale department in charge of the New England district.

Richards With Michigan—F. W. Richards, who was formerly connected with the Boston, Mass., branch of the Premier car, is now sales manager of the Boston agency recently opened for the Michigan.

Day Baker Lectures in Canada—President Day Baker of the Electric Vehicle Club of Boston, Mass., and agent for the General Vehicle Company, had the honor of being the first person chosen to deliver an address before the newly formed Montreal Electrical Society. His topic was the Electric Vehicle, Its Source and Its Future. He illustrated it with many lantern slides, among them ones showing the recent parade of electric vehicles in Boston.

Mercer Kansas City Branch—The Mercer Company, Trenton, N. J., has opened a branch in Kansas City, Mo., in charge of Roy O. Kendall.

Reorganizing Austin Company—With George H. Davidson and W. R. Shelby interested with James E. and Walter S. Austin, the Austin Automobile Company, Grand Rapids, Mich., is being reorganized with a capitalization of $500,000. Of this, $300,000 will be common stock and $200,000, six per cent. preferred. Stock will be open for popular subscription and a 50 per cent. bonus of common may go with the preferred. An advertising campaign will be inaugurated and it is planned to build a new factory.

Habersham Succeeds Villet—E. H. Habersham has been appointed manager of the wholesale branch of the Studebaker corporation in Washington, D. C., succeeding E. M. Villet, who has been transferred to the Fargo, N. D., branch.

Lowell Traffic Regulations—Street traffic rules have been adopted by the Lowell, Mass., city officials similar to the regulations in use in Boston and other cities designed to improve conditions. The new regulations provide that owners of vehicles must not allow them to stand for any great length of time unattended, and on some of the busier thoroughfares the vehicles must not stand only long enough for persons to enter or alight. All vehicles must at all times stand parallel to, and near the right hand curb. Vehicles are not allowed to stand within 75 feet of the corner of some of the intersecting streets on the main thoroughfares.

Halliday Traveling for Thomas—Norman N. Halliday, manager of the Boston branch of the E. R. Thomas Motor Car Company, has been despatched on a tour through the West by the factory to call on dealers and branch managers and also to establish agencies for the Thomas where needed.

Wants Better Regulations—Through its board of governors, the Bridgeport, Conn., Automobile Club is endeavoring to provide important changes in traffic regulations. Many complaints have been made that little attention is paid to the rules of the road in the city. The club officials want to have the rule of keeping to the right enforced, some of the busy streets made one way thoroughfares, and to prohibit vehicles standing on the streets for long periods where there is much traffic.

Haynes agents, branch managers, and representatives, parts factory experts and magazine and newspaper men

New Home of the George C. Brinkman Motor Company, which represents the Nyberg and National in St. Louis

News of the Garages

KOLB Builds in Erie—William Kolb has built a large garage on Spring street, Erie, Pa.

New Garage for Adams.—W. C. Garrison, Adams, Neb., has bought a lot, where he will erect a cement block building to be used as a garage.

To Give Out Contracts—The Ellis Motor Car Company, New York City, will soon give out contracts for the work of building a $12,000 garage.

Romare Enters Garage Business—O. E. Romare, formerly designer and maker of astronomical instruments, has decided to build a garage at Lake Geneva, Wis.

Municipal Garage in Columbus—Ordinances have been adopted by the city of Columbus, O., for an appropriation of $2,800 for the erection of a garage to house the motor patrol wagons of the police department.

Columbus to Have City Garage—The city government of Columbus, O., has voted for the erecton of a city garage which is to house the vehicles used by city officials. The city is now taking bids for the work.

Sturgeon Bay Garage Expands—The J. C. Dana Company, Sturgeon Bay, Wis., is building a 32 by 100 foot addition to its garage. A part of the addition will be equipped as a large repair shop. Elevators will be installed in the structure.

Toronto Will Get Another—A new garage will be added to Toronto's directory as soon as Death & Watson, Ltd., electrical engineers, complete the erection of their plans regarding an establishment for housing gasoline and electric cars.

Fireproof Garage Opened—A concrete garage has been opened in Rockford, Ill., by Lee Stewart. The garage is two stories high, but requires no elevator, as the lower floor is at the street level and the upper floor slightly above that of the alley.

Hayes Lays Out Plans—Edward Hayes, of Los Angeles, Cal., has laid out his plans for a one-story brick garage and repair shop. The building will be erected on a lot 55 by 75 feet, and will have a pressed-brick front, cement floors and composition roof.

Dorley Builds Addition—A large addition has been built to the garage owned by J. N. Dorley, Gloucester, Mass., giving a floor space of about twice the size of the old structure. A new office addition has been added to the front and a repair shop in the rear also.

Owatona to Have Garage—R. W. Sander and Paul J. Sander have leased a garage which is being erected at Owatona, Minn., and will have it equipped by July 20. The building is 50 by 114 feet and will accommodate fifty cars. P. J. Sander will have charge of the repair department.

Toledo Garage Issues Guide—The United Garage, Toledo, O., has issued an interesting guide showing several newly completed roads of northern Ohio and giving the best routes out of Toledo to distant points. A number of shorter routes and week-end journeys for pleasure jaunts are also given.

Janesville Establishment Enlarged—J. A. Strimple, Janesville, Wis., agent for Mitchell products, has purchased the garage and agency business of S. B. Echlin, 219 Milwaukee street, and will move there at once. He thereby becomes Reo and Chalmers agent, and plans to enlarge the building as well as his stock.

Bentley to Have New Building—B. Court Bentley, proprietor of the garage on Main street, Westerly, R. I., is to erect a new building on the site of the old structure which was partly destroyed by fire some time ago. The new building will be 30 by 100 feet with an addition in the rear 20 by 40 which will be used as a machine shop.

St. Paul Garage Changes Hands—Merrit J. Osborn, St. Paul distributor for White cars, has taken over the Western Automobile Company Garage and will operate it together with the establishment now conducted at 15 East Ninth street. At the second place the main office will be located and there trucks will be stored. A driver's school will also be conducted.

Ground Broken in Northampton—Ground has been broken on Maple street, Northampton, Mass., for a garage capable of housing thirty-five cars on the lower floor, and the walls will be built strong enough to carry an additional story whenever the business warrants the building being enlarged. It will have modern equipment and will be conducted by Frank S. Parsons.

Automobile Incorporations

AUTOMOBILES AND PARTS

AKRON, O.—Akron Gear & Engineering Company; capital, $20,000; to manufacture gears for the transmission of power and to do general machine work. Incorporators: J. R. Triplett, Otis E. Prier, T. A. Seacrist, E. T. Dwyer, John E. Blower.

BARBERTON, O.—Todd & Courtney Company; capital, $10,000; to deal in automobiles, wagons and other vehicles. Incorporators: John H. Todd, O. I. Courtney, Laura E. Courtney, C. C. Courtney.

BROOKLYN, N. Y.—Saratoga Auto Company; capital, $5,000; to engage in the automobile business. Incorporators: George D. Smith, Harry A. Bogart, Emily J. Bogart.

BUFFALO, N. Y.—Automobile Vehicle Corporation; capital, $20,000; to manufacture automobiles and other vehicles. Incorporators: A. L. Kenyon, Frank O'Neill, Otto A. Hegelm, James C. Fox.

CLEVELAND, O.—Automobile Owners Company; capital, $25,000; to deal in automobiles and accessories and to operate a vulcanizing plant. Incorporators: P. L. A. Leighley, H. N. Pettibone, W. K. Stanley, Frank H. Forrest, John E. Griesheimer.

COLUMBUS, O.—Everitt Auto Sales Company; capital, $30,000; to carry on the sale of automobiles. Incorporators: Horace K. Dobson, Amos F. White, Elmer F. McConaha, H. H. Kallenberger, A. W. Daving.

FLATONIA, TEX.—Flatonia Automobile Company; capital, $5,000; to engage in the automobile business. Incorporators: C. P. Johnson, D. McKay, F. F. Wotpka, H. Nolle, J. W. Snell.

LIMA, O.—Gramm-Bernstein Company; capital, $500,000; to manufacture and deal in pleasure and freight automobiles and other vehicles. Incorporators: B. A. Gramm, Max Bernstein, Fred Biesantz, Dudley Bernstein, H. O. Bentley.

NEW YORK CITY—American Society of Automobile Owners; capital, $10,000; to protect the interests of automobile owners. Incorporators: Robert J. Kennedy, Joseph C. Murray, Alexander Woods.

PORTLAND, ME.—Edwards Motor Car Company; capital, $1,250,000; to engage in the automobile business. Incorporator: Clarence E. Eaton.

SOUTH BEND, IND.—Otis Motor Car Company; capital, $10,000; to manufacture automobiles. Incorporators: N. L. Otis, J. B. Beattie, Gilbert Squires.

WILMINGTON, DEL.—Rutenber Motor Company; capital, $1,350,000, to manufacture and deal in gas, gasoline explosive, steam and all other kinds of motors and power generators.

GARAGES AND ACCESSORIES

BABYLON, N. Y.—Babylon Garage Company; capital, $500; to conduct a garage. Incorporators: Charles H. Duryea, William E. Sprague, Annie M. Sprague.

BROOKLYN, N. Y.—Saratoga Garage, Inc.; capital, $1,000; to engage in the garage business. Incorporators: John S. Klinger, Martin Stoehr, George D. Rockenbach.

CHICAGO, ILL.—Washington Motor Livery Company; capital, $75,000; to conduct a garage and repair business. Incorporators: C. Leviton, J. Lowenhaupt, S. E. Loeb.

Motor Fire Apparatus

ALBANY Installs Motor Apparatus—Albany was added to the list of cities having motor fire apparatus recently by the installation of a motor-driven fire engine.

Milwaukee Department to Be Modernized—Milwaukee, Wis., is in the market for three combination chemical and hose trucks which should not cost more than $6,000 each.

Cambridge in the Market—A committee of the Cambridge, Mass., board of aldermen has been appointed to consider the advisability of buying some motor fire apparatus for the city.

Motor Equipped Fire Apparatus—The Springfield, O., councilmen have decided to equip the present apparatus with motors instead of buying new ones. They will cost from $5,000 to $6,000 each.

Milwaukee's Cartercar Roadsters—The Chicago branch of the Cartercar Company recently received an order from the city of Milwaukee, Wis., for seven roadsters. The cars will be used in the fire department.

Arlington Wants More—The town fathers of Arlington, Mass., are so well pleased with the motor apparatus attached to the fire department that they are after more, and now they want a combination hose and engine that will pump a good stream.

La Crosse Safest City—The Wisconsin Fire Prevention Bureau, after inspection, has declared that LaCrosse has the least gasoline hazards in the state, in that both public and private garages have ideal facilities for storing and handling gasoline and oil.

Philadelphia Fire Department Motorizing—The city of Philadelphia will soon be in the possession of motor fire apparatus costing $35,000. This sum has been granted out of the recently floated city loan of $4,225,000. Seven automobiles are to be bought and bids will be taken on and after July 8.

A portion of the White contingent which took part in the motor vehicle trials of the Russian War Department

Washington Automobile Pump Satisfactory—Chief Wagner of Washington, D. C., has expressed his satisfaction with a new automobile fire engine which was tested here a few days ago. The engine and pump lifted more than 800 gallons a minute which is 100 gallons in excess of the required quantity.

Gotham's New Fire Apparatus—The International Motor Company has been awarded the New York City contract for five 2-ton chassis, mounted with combination hose and pumping bodies which are to be used for suburban service. These two pieces will make ten pieces of fire apparatus delivered by the company to the city of New York.

Watertown Orders Motor Fire-Wagon—The Selectmen of Watertown, Mass., have placed an order with the Locomobile Company, Bridgeport, Pa., for a new motor combination chemical that will cost $5,800 and which is to be delivered August 1. It will be housed in the new fire station recently built on Mt. Auburn street in anticipation of such a purchase.

Eight Columbus Fire Automobiles—The Seagrave Company, Columbus, O., has been given an order by the city of Columbus, for six automobile tractors, four combination horse and chemical wagons and one supply truck, to be delivered and paid for by $49,850. The Columbus Buggy Company has been awarded a contract for a squad wagon which is to cost $2,050.

White Leads in Russian Army Test—The White Company, Cleveland, O., has received news that the White team in the Russian War Office motor vehicle trials still had a perfect score after covering 1540 miles of the difficult test route. At the time the report was sent only 420 miles remained to be covered. The White cars also surpassed the European cars in the trial in economy of gasoline and oil.

Motor Fire Apparatus for Taunton—A Pope-Hartford combination motor chemical and hose truck that was built from designs submitted by Chief Leonard of the Taunton, Mass., fire department, has been delivered. This is the first step toward motorizing the Taunton fire department. The new vehicle combines some new features not embodied in regular motor trucks. The hose body is built in two box-shaped compartments which have a capacity for 500 feet of hydrant hose each, while these boxes are so arranged that they afford seats for the firemen, and the ladders being carried on the sides make a back rest for the men. This vehicle will take the place of two hose wagons and one chemical which means the passing of six horses. So well pleased are the builders of the truck that they have decided to build others along these same lines.

Automobile Incorporations

Columbus, O.—Federal Auto Accessories Company; capital, $2,000; to deal in all kinds of automobile accessories and supplies. Incorporators: J. R. Loofburrow, H. M. McDonald, W. C. Wetherhold, N. J. Mace, M. L. Mace.

Louisville, Ky.—Punctureless Tire Company; capital, $5,000; to manufacture a punctureless tire. Incorporators: Andrew T. Murphy, John H. O'Neill, John S. Hobson.

Muncie, Ind.—Feeney-Hurd Company; capital, $20,000; to manufacture automobile accessories and supplies. Incorporators: Edmund J. Feeney, James H. Leffler, Carl E. Hurd, J. D. Miltenberger.

Los Angeles, Cal.—Essenkay Sales Company; to sell a resilient filler for automobile tires. Incorporator: L. N. Brunswig.

Lynn, Mass.—Seymour Avenue Garage; capital, $25,000; to engage in the garage business. Incorporators: Charles R. Sibley, John E. Moulton, Ellery Jefts.

New York City.—American Motor Freight Company; capital, $25,000; to conduct a freight transfer business. Incorporators: Harry G. Waring, Harvey W. Bell, Howard G. Philipps.

New York City—Amherst Auto Renting Company; capital, –5,000; to rent automobiles. Incorporators: Peter V. Hoyt, Daniel J. McAndrews, George Schippereit.

New York City—Universal Auto Supply Company; capital, $10,000; to manufacture automobile supplies and accessories. Incorporators: John J. Tracy, George F. Connelly, John R. Hunt.

New York City—Goldfinger Auto Renting Company; capital, $2,000; to conduct an automobile-renting business. Incorporators: Benedict Goldfinger, Walter E. Fisher, Isaac Wolf.

New York City—Long Acre Garage. Incorporated; capital, $1,500; to conduct a garage business. Incorporators: Lewis M. Borden, George Gulbransen, Joseph F. Taylor.

Scituate, Mass.—Egyt Garage & Machine Company; capital, $6,500; to conduct a garage and repair business. Incorporators: William E. Chaffin, Charles M. Litchfield, Charles W. Pears.

Syracuse, N. Y.—Mohawk Tire Company; capital, $6,000; to engage in the manufacture of automobile tires. Incorporators: Henry J. Moses, Winifred G. Rice, Clarence E. Rice.

Toledo, O.—Peerless Rubber & Tire Company; capital, $10,000; to manufacture tires and other accessories. Incorporators: R. G. Wierman, Jno. T. Hickman, Edward Umbstraedter, J. R. Humphrey, William B. Woods.

Toledo, O.—Walker Tire Chain Company; capital, $15,000; to manufacture tire chains and deal in accessories of all kinds. Incorporators: Henry R. Rohrman, Charles A. Newman, Charles P. Eger, A. M. Edwards, George C. Bryce.

CHANGES OF CAPITAL

Detroit, Mich.—Keeton Motor Company; capital increased from $10,000 to $300,000.

Lexington, Ky.—Bayless Motor Car Company, name changed to Central Motor Car Company.

Toledo, O.—Rassel Motor Car Company; capital decreased from $125,000 to $95,000.

Factory Miscellany

BIG Pennsylvania Tire Plant—The new factory of the Pennsylvania Rubber Company, Jeanette, Pa., consists of shops, stockrooms, storerooms and other departments aggregating a floor-space of 117,000 square feet. The main building is 300 by 50 feet and three stories high, in addition to which it has a basement 150 by 48 feet. The mechanical goods department is a single-story building, 216 by 230 feet, with a basement 116 by 90 feet, and an annex, 43 by 24 feet. Among the products of the factory are Vacuum Cup tires and other soft and hard rubber goods.

Florida Factory Crystallizing—C. W. Birchwood, Chicago, Ill., plans to establish an automobile factory at Jacksonville, Fla.

Buffalo Pump Maker Builds—The Manzel Brothers Company, Buffalo, N. Y., is building addition to its factory. The company makes automobile pumps.

New Tire Factory Building—Indianapolis, Ind., will soon have another large factory building, this being the new $100,000 plant which will be built by the G. & J. Tire Company.

Dayton Body Factory Building—The Dayton Body Company, Dayton, O., has acquired a site upon which it will erect a new factory building in which to carry on its manufacturing operations.

Carbureter Company to Expand—The Star Carbureter Company, 685 East Atwater street, Detroit, Mich., is considering the erection of a factory annex to increase its output of carbureters and other automobile parts.

Bizzants Is Chief Engineer—Fred Bizzants has taken the position of chief engineer and factory manager for the Gramm & Bernstein Company, Lima, O., which will soon open a factory for the manufacture of motor trucks. The plant of the American Strawboard Company is being remodeled into a factory for the making of motor trucks.

Locomobile's Truck Plant—The Locomobile Company, Bridgeport, Conn., has commenced work on the new building which is to be used for the construction of its commercial vehicles. The new building should be completed within the next 60 days and until that time trucks will be constructed in the regular departments of the factory.

Students Visit Goodyear Plant—Accompanied by Dr. F. H. Thorp, one of the professors in charge of the chemical engineering course at the Massachusetts Institute of Technology, seventeen or eighteen M. I. T. students visited the plant of the Goodyear Tire and Rubber Company, Akron, O., recently.

Another Plant for Canadian Company—D. Lorne McGibbon, president of the Canadian Consolidated Rubber Company, has announced that the company has decided to enlarge the scope of its business by erecting an additional factory for the exclusive manufacture of automobile tires, the demand for which has become very great in Canada. The president stated that the present plant turned out a certain quantity of tires, but business was so rapidly increasing that a daily output of five hundred tires was necessary and will be provided for when the projected factory is completed. The production will be increased from time to time. Mr. McGibbon said that the new plant would involve an expenditure of a million dollars, as it is the wish of the directors that it be the most up-to-date factory of the kind in the world. The exact location, Mr. McGibbon stated, had not yet been decided upon, but the company will decide this matter in the near future.

Showing the immense new plant of the Pennsylvania Rubber Company at Jeanette, Pa.,

Another Factory for Sandusky—General contractor Alfred Schnurr, Sandusky, O., will erect a plant for the Suspension Roller Company in the near future.

Adding to Plant Facilities—The Hayes-Ionia Company, Ionia, Mich., has closed a contract with Theophil F. Banhagel for the construction of four kilns and a machine room addition to its factory.

New Searchlight Plant—The Searchlight Company has bought property at 2416 Fourth street, S. E., Minneapolis, Minn., for a branch factory. It will erect a one-story building of brick and concrete to cost $3,000.

Baker Builds Canadian Factory—The Baker Motor Vehicle Company, Cleveland, O., has incorporated in Canada under the name of Baker Motor Vehicle Company, Ltd., of Canada, A factory will soon be erected in Toronto, Ont.

Truck Plant in Toledo Building—Operations have been started in Toledo, O., to erect a three-story factory building, 75 by 125 feet, for the Shop of Siebert, originally wagon and carriage builders, but now manufacturers of a motor truck.

Iowa Ford Assembling Plant—Work began this week on a $70,000 five-story brick building to be used as the home of the C. L. Hering Motor Company, Des Moines, Ia. On the completion of the building all Ford cars sold in Iowa will be assembled here.

New Michigan Truck—The Wenonah Motor Car Company, Bay City, Mich., has entered the field with a light truck. The designing and manufacturing have been in charge of G. Earl Porter, formerly with the Detroit Motor Wagon. Bay City business men are backing the project.

Ford Plant for Frisco—A $300.000 automobile assembling plant for San Francisco in the immediate future was the interesting announcement from the Ford Motor Company at Detroit recently. The plant will be capable of handling 5000 cars during a season and will employ 300 skilled workmen.

Ford Buys in Canada—The Ford Motor Company has bought a large tract of river front property in Walkerville, Ont., adjoining the site of the firm's present Canadian plant, and announces its intention of erecting a large addition to its factory. When completed, the Ford plant will give work to 2,000 men.

To Enlarge Kentucky Plant—H. B. Hewitt, of the electric vehicle department of the Kentucky Wagon Works, Louisville, has established an agency in Chicago. He says the electric vehicle department of the Kentucky plant will gradually be enlarged until it becomes probably the most important branch of the business.

Kenton Adds Repair Department—The Kenton Gas Engine Company, of Kenton, O., has added an automobile repair department to its plant. The company will also handle a full line of motor car accessories as well as the Kenton agency for the Knight tires. T. A. Taylor is general manager of the concern.

Avoiding Canadian Duty—American automobile manufacturers get by the heavy duty on motor cars in Canada by shipping the parts across the border and assembling the car on Canadian soil. The Canadian duty on American-made automobiles completely assembled is about 35 per cent., while the duty on parts imported is about one-half that sum.

To Enter Automobile Business—The firm of John Immel & Sons, Columbus, O., has taken the first step towards entering the automobile business. The concern has completed the erection of a large plant where all kinds of automobile repairing is now being done in addition to body painting. J. E. Jolly, formerly connected with the Packard factory, is foreman of the department.

Lima May Have Tire Plant—E. Jefferson, Pittsburgh, Pa., visited Lima, O., recently with a proposition to establish a $500,000 tire manufacturing plant in that city in case the local people offer the proper inducement. It is announced that the promoters will furnish 52 per cent. of the proposed capital of $500,000 if Lima people subscribe the remainder. It is proposed to give employment to 275 men.

To Make Automobile Axles—A company capitalized at $175,000 has been organized at Kalamazoo, Mich., to manufacture automobile axles. A site for a plant has been purchased and work will be begun soon. O. K. Burkhart and M. H. Lane of Kalamazoo, and Fred Lee of Dowagiac are interested. M. H. Clary of Buchanan, manager of an automobile axle plant there, will take charge of the Kalamazoo plant. The factory at Buchanan will continue to manufacture buggy axles, and this part of the business will be enlarged. The auto axle manufacturing department probably will be brought here.

floor space of 117,000 square feet. Over 900 persons are employed, some of whom are here shown

Can-Holding Bracket; Electric Tail-Light; Baby Klaxon Coming Out; Unique Motion Writer; Electric Hand Drill; Priming Cup and Spark-Plug; Dashboard Switch for Electric Lighting Systems

Oilzum Can Holder Brackets

ECONOMIC arrangement of baggage on a touring car is a problem which puzzles many automobilists. As a consequence, running-boards are frequently packed in a most uncomfortable manner. To reduce this nuisance as far as possible the White & Bagley Company, 100 Foster street, Worcester, Mass., have designed oil-can brackets, Fig. 1, which have the purpose of holding the oil-cans to the running-board at a suitable point of the same. Each bracket is a bronze T, the leg of which is bent to fit under the running-board. The bent portion has two holes, through which screws are passed for fastening the bracket to the board. The upper portion of the leg has a bored extension through which is laid a strap which serves to secure the oil-can to the running-board.

Edelmann Electric Reer-Lite

E. Edelmann & Company, Chicago, Ill., are the manufacturers of an electric lamp which serves to illuminate the rear number plate, while some of its light passes through a red jewel. The lamp is stationed in a box to which a frame is attached, which is capable of holding a license plate of any size. The whole arrangement is secured to the number plate bracket.

New Smaller Klaxon Signal

A new horn, unchristened as yet, is being brought out by the Lovell-McConnell Manufacturing Company, Newark, N. J., maker of Klaxon and Klaxonet signals. The new horn, Fig. 2, closely resembles the Klaxonet in shape and is constructed on the same general principles, the sound being produced by the ratchet teeth rotated by the motor throwing the stirrup on the diaphragm into vibration. In this way the small horn produces the well-known Klaxon signal.

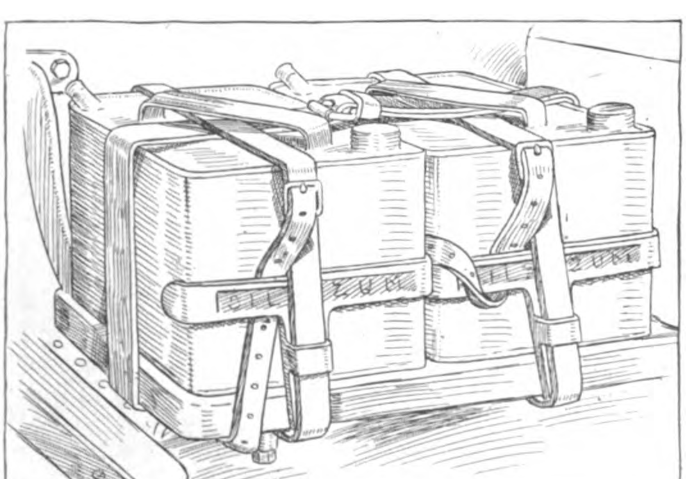


Fig. 1—Oilzum brackets in place on a running-board with cans strapped thereto

Unique Detective Recorder

The instrument shown in Figs. 5 and 6 is the Unique Recorder, made by the Unique Recorder Company, Hazleton, Pa. Its purpose is to prepare a record for the owner's information, giving the length of time during which a car has been operated each day of the week. At the same time the Unique Detective acts as an 8-day clock which is attached permanently to the

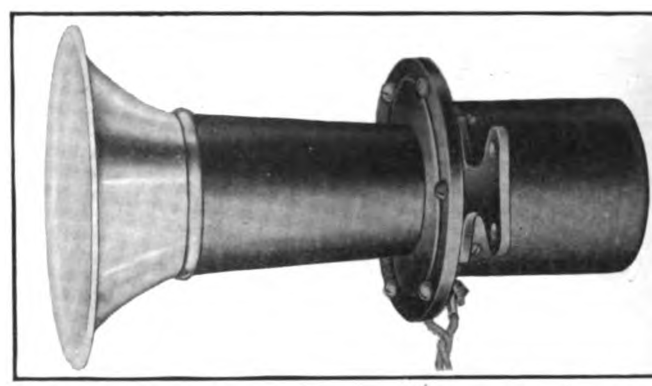


Fig. 2—New unnamed type of Klaxon horn which will be out in September

dash. The appearance of the device is seen in Fig. 5, where it is shown attached to a brass plate in place of the dash. The clock is wound by means of the key at the bottom and set by a stem which is not visible in the illustration. The entire clock mechanism is enclosed in a dust and waterproof casing which is hinged onto the hind casing containing the recorder mechanism, shown in Fig. 6. As this illustration shows, the recorder apparatus is very simple and foolproof. It consists of a pencil Pl steadily raised by the action of the clockwork, which at the same time rotates the recorder sheet which is marked with twice 12 hours once in 24 hours, the point of the pencil bearing against the surface of the sheet. The gear G makes one revolution a day. It is in mesh with the gear Gl, the shaft of which carries another gear meshing with the rack R, so that the rotation of the gear Gl lifts the rack which carries the pencil Pl. The gear Gl rotates on a fork, the end F of which is pivoted on an extension of the stationary post which guides the rack R, while the end Fl is drawn upward by the spring S, which thereby holds it in engagement with the Gear G. To prevent the gear Gl being turned back by the weight of the rack, the pawl P is provided. After one week, when the pencil has traveled from its lowest to its highest position, the owner opens the recorder casing by means of a cam key seen on the right-hand side of the device and disengages the pawl, so that the rack returns to its lowest position. Needless to say, the resultant between the rotary movement of the sheet and the radial one of the pencil is a spiral as shown in Fig. 4. Now the process by means of which periods of rest and motion are distinguished on the recording sheet is as follows: The pendulum P moves whenever the car is in motion, and its movement results in a series of oscillations on the record which appear in the form of heavy lines. The manner in which these oscillations coincide with the spiral-bow sections indicates the time at which the car was running.

Buckeye Electric Breast Drill

The American Foundry Company, Leipsic, O., manufactures the Buckeye electric breast drill. This portable tool is made in a convenient size and shape and may be operated by means of either direct or alternating current. On the drill is mounted a switch which may be moved to neutral or to either side to make the drill rotate in either direction or keep it at rest. The drill spindle sleeve is fitted with a breakover movement which permits of bringing the spindle into a locking position in which it is held from turning by jaws fixed to the drill frame.

Champion Starter Spark-Plug

A combined priming cup and spark-plug has been brought out by the Champion Spark-Plug Company, Toledo, O. This plug has part of its shell bored in an annular chamber open at the bottom of the plug. Into this chamber opens a priming tube which is attached to the side of the shell and consists of a priming hole, a passageway leading therefrom to the annular

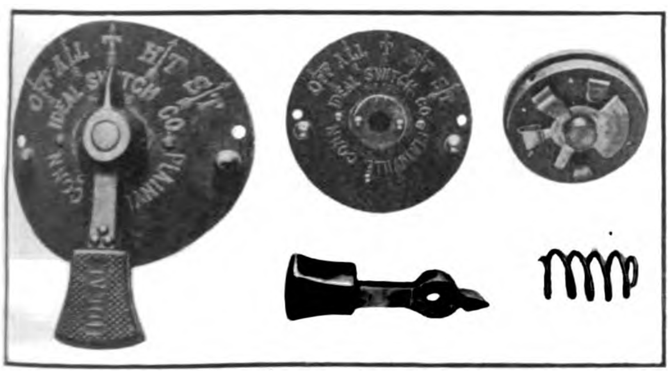


Fig. 3—Ideal lighting dashboard switch and component parts of same

bore of the shell and a needle valve which may be closed so as to shut off the interior of the annular bore against the outside. Gasoline may be introduced by unseating the needle and squirting in the fuel by means of an oil-can, after which the needle is tightened again on its seat.

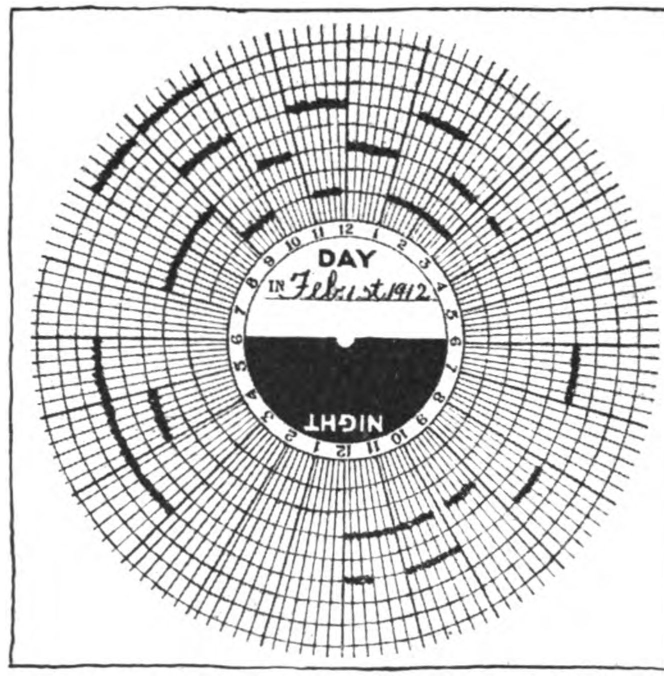


Fig. 4—Record chart for one week, made by the Unique Detective Recorder

Ideal Lighting Dash Switch

One of the latest types of switches is shown in Fig. 3, this being the product of the Ideal Switch Company, Inc., Plainville, Conn. The model shown here is attached to the dashboard, which is bored with four holes for the wires leading from dynamo or battery to the head, side and tail lights and back to the source of current, according to whether it is desired to shut off the light, use any one set, two or three sets of lamps. Seven possible positions of the contact maker have been provided and are marked on the dial or face of the switch. The outside of the switch casing is etched, as shown in Fig. 3, and the hard-rubber handle is designed in a pleasing shape. The view of the inside of the switch shows its simple construction. The leads from the current course to the three sets of lights are connected to the three bent contact pieces, while the return wire is connected to the rotary contact piece.

The spring illustrated serves to space the rotary contact piece from the switch base carrying the other three contact pieces.

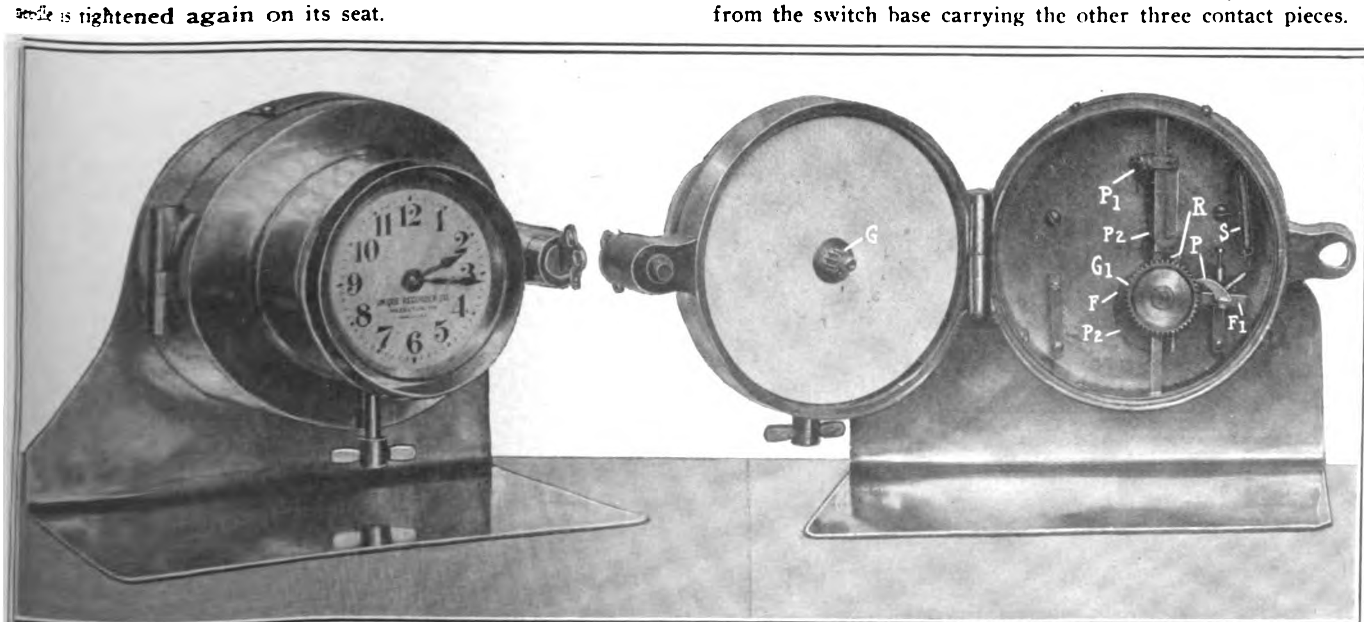


Fig. 5—Front view of Unique recorder. Fig. 6—Mechanism of the Unique motion recorder, comprising gears and rack actuating chart and pencil, and spring insuring engagement

NUMBER Plate Arrangement—In which number plate and tail light are arranged at the two sides of the rear end of the car.

This patent refers to the use of guards at the sides of the automobile body, Fig. 1. These guards gave rearward extensions E and E_1, and a license plate L is mounted on the extension E, while a lamp L_1 is on the extension E_1. The plane of the number plate is mounted at a slight angle to the transverse axis of the vehicle, so that the numbers appearing on the plate may be plainly read from behind the car, while the light radiated by the tail lamp L_1 strikes the face of the plate and illuminates it. The tail lamp may be fitted with a lens which concentrates part of its light rays upon the number plate.

No. 1,029,063—to Russell Huff, assignor to Packard Motor Car Company, Detroit, Mich. Granted June 11, 1912; filed October 28, 1910.

Valveless Motor—In which a bored piston and a rotary valve serve to regulate the flow of fresh and dead gases.

Fig. 2 illustrates the four-cycle motor described in this patent, consisting of a cylinder C which is provided with orifices O and O_1. These orifices are capable of communicating with the exterior, either for the purpose of admitting fresh gases into the combustion chamber or of scavenging burned gases. In the cylinder reciprocates a rotary piston P which has channels for establishing communication between the interior of the cylinder and the orifices mentioned. A rotary distributer R is provided, which is adapted to admit gas into the cylinder through one of the piston channels and one of the orifices. A prolongation P_1 of the piston has a groove G, in which rides a finger E, controlled by the rotary distributer so as to rotate the piston. The relation between piston and distributer is such that the piston, during compression and explosion strokes, covers the orifice leading to the distributer, while at the same time the latter interrupts the current of mixture from the carbureter to the cylinder, all communication between these two parts being cut off during the two strokes named.

No. 1,029,192—to Charles Edouard Henriod, assignor to Société Ribeyrolles & Cie., Puteaux, Seine, France. Granted June 11, 1912; filed November 23, 1909.

Axle-Drive Mechanism—Being of the worm-and-gear type with a thrust-taking member interposed between worm and axle proper.

This construction, Fig. 3, has a stationary axle A on which wheels are journaled and which is connected by a double chain drive to a differential shaft D. A worm gear is provided on the differential shaft, being engaged by a worm W which is carried on the motor shaft S, the latter being in thrust line with the axle. A thrust member T is interposed between the shaft S and the front side of the axle so that all thrust is absorbed between axle and shaft D.

No. 1,029,736—to James H. App, Detroit, Mich. Granted June 18, 1912; filed July 5, 1911.

Method of Cooling Motor—Which consists in casting the inactive face of the engine pistons with radiating studs for air cooling.

This patent refers to a two-cycle engine construction which includes a cylinder, cylinder head and crankcase. A hollow piston is closed at its upper end; it has a smooth working face, while the inactive face of the closed end is cast with heat-radiating studs. Diametrically disposed within the piston is a wristpin which is engaged by the pounded head of a connecting-rod. A deflector plate extends from a portion of the wall of the piston close to the connecting-rod head, and the deflector and head co-operate in deflecting the gases toward one side portion of the piston where an outlet is provided for the gases traveling to the combustion chamber.

No. 1,028,359—to Chester Charles Jones, Beatrice, Neb. Granted June 4, 1912; filed March 5, 1909.

Tire—In which two coiled springs, one arranged within the coils of the other, take the place of inflated inner tubes in the casing.

This patent refers to a tire construction comprising two coiled springs, one of which is situated within the other. On the outer spring a shoe is arranged. This spring carries pins which engage the shoe thereby holding spring and shoe in fixed relation.

No. 1,030,263—to Stephen A. Matarazzo, Wilmerding, Pa. Granted June 18, 1912; filed September 18, 1911.

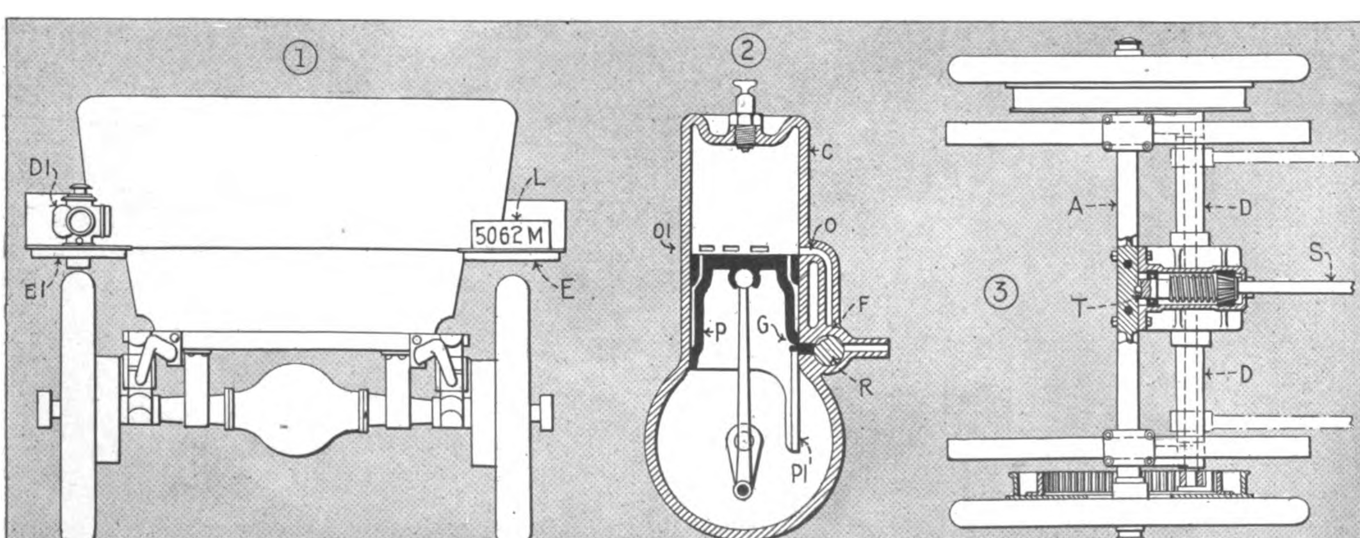


Fig. 1—Huff number plate scheme. Fig. 2—Henriod valveless motor. Fig. 3—Axle-drive mechanism

VOL. XXVII NEW YORK—THURSDAY, JULY 11, 1912—CHICAGO NO. 2

THE AUTOMOBILE

Records Go at Old Orchard Beach

Disbrow, in Case, Lowers Mile Figures to 35.1 Seconds, Clipping 3.9 Seconds from Former Mark—Simplex Covers 5 Miles in 4:04.50 and 10 Miles in 8:53—Lewis, Stutz, Captures 100-Mile Event in 1:32:43.60

General view of the old Orchard Beach course, looking south, during the 100-mile race on the second day

OLD ORCHARD BEACH, ME., July 6—Once more Old Orchard has had an automobile meet, and once more the famous beach has made good as a race course. On July 4, 5 and 6 some of the best drivers of the country appeared here and many new marks were set up for the course.

Louis Disbrow in his famous Jay-Eye-See, Harry Grant, Joe Nikrent, Jack Rutherford, Jack Le Cain, Joe Matson and other noted drivers were all on hand to do their little stunt to show the Maine devotees of automobiling just what real racing is. And everyone of them made good, to a greater or lesser degree.

While at the races last September there were some marks set up for the Old Orchard Beach course that were questioned, most of those were beaten at the meet just concluded today. Louis Disbrow set out to establish a beach record in his Jay-Eye-See. He did it. On Thursday, July 4, he took a long flying start and covered the mile in 35.1 seconds. Last year L. F. Baldwin in his big Stanley steamer did the distance in 39 second's flat.

Today, the last of the meet, Disbrow in the Simplex Zip covered 5 miles in exhibition in 4:04.50 and did the 10 miles in 8:53. These are not as good as the marks given for last fall's races, but as the course in 1911 was questioned, it is thought the new figures set by Disbrow will be taken as the standard for the beach.

On Friday "Bill" Endicott in his Schacht did the 100 miles in 1:36:41, which bettered the time of 1:39:50 made the year before. But even this mark did not stand long, for today Dave Lewis in a Stutz covered the distance in 1:32:43.60.

Line-up of contesting cars for the 100-mile race on July 4, won by Stutz, No. 4

Perhaps the most thrilling event of the 3 days was the 100-mile race on Friday. Jack Rutherford, winner of the century the year before, was out to repeat the performance. On Thursday he burned out a clutch, but his machine was in fine fettle for this event on Friday, or at least seemed to be.

For 99 miles he held the lead as the cars raced around the course and as some were left by the wayside. As he entered his one-hundredth mile the oil supply failed and Bill Endicott, who had been running second, passed the National and won out. It developed that the oil tank had begun to work loose in the fortieth mile. Rutherford kept on, however, occasionally easing up his machine. The continual jar had its effect and at last the oil gave out altogether. He burned out a bearing at the finish, but still was able to cross the line 9 seconds behind Endicott.

On the glorious Fourth there were fully 50,000 people at the beach to see the sport. The next 2 days, however, for all they developed better sport, proved to be disappointing from the attendance point of view.

The officials were: Referee, Daniel W. Hoegg, Jr.; Starter, John C. Herrison; Assistant Starter, W. A. Creighton; Judges, Wesley G. Smith, William Whittier, W. J. Milliken; Representative of the A. A. A., Daniel W. Hoegg, Jr.; Timer, George E. Barbour, Jr.; Assistant Timers, J. C. Estes, W. F. Coffey, W. H. Swett, George H. Sears; Scorer, L. M. Hart.

The following is a summary of the 3 days:

FIRST DAY

One-mile time trials, flying start

No.	Car	Driver	Time
	Jay-Eye-See	Louis Disbrow	35:10
3	National	John Rutherford	47:00
7	National	Neil Whalen	47:50
21	Chadwick	L. C. Hersey	55:10
1	Berkshire	Harry Grant	58:00

Class C, non-stock; 161 to 230 cubic inches; 5 miles

14	E-M-F	Billy Burke	No time taken

Class C, non-stock; 231 to 300 cubic inches; 10 miles

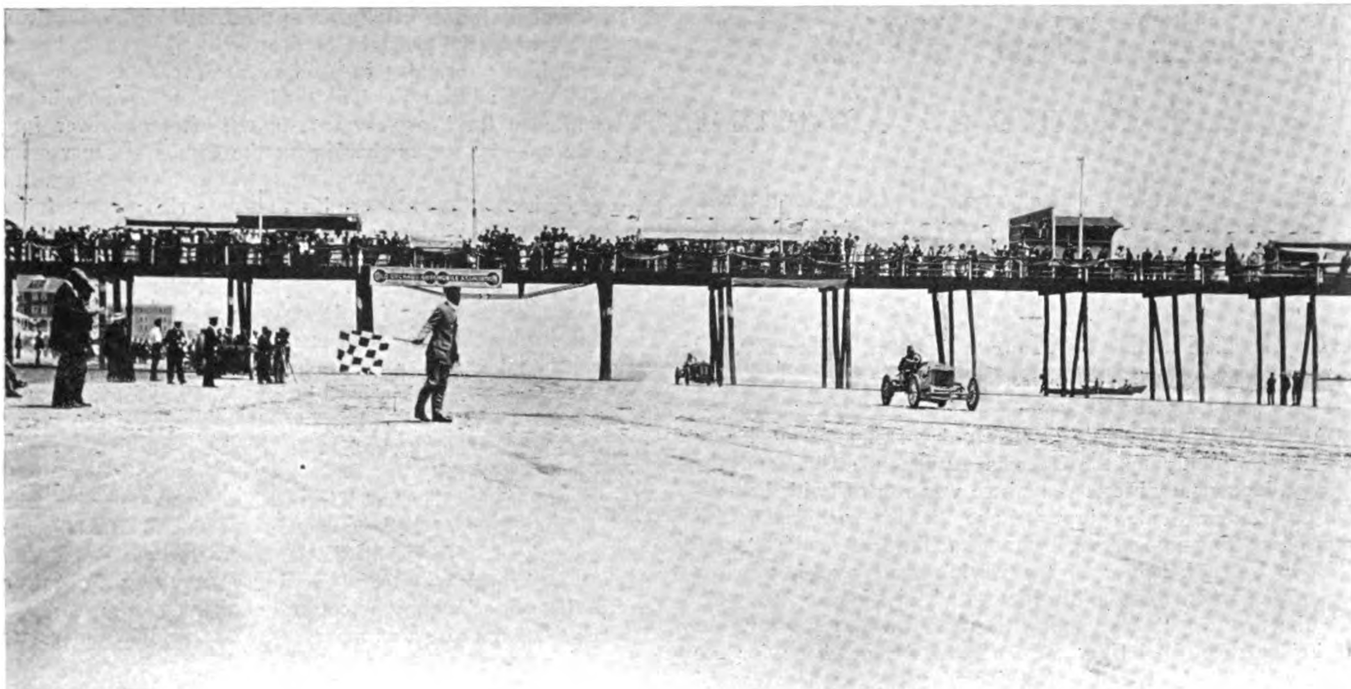
5	Case	Joe Nikrent	10:28.75
11	Mercer	John De Palma	10:30.75
9	Lexington	James Esleeck	No time taken
10	Case	Louis Disbrow	Did not finish

Class C, non-stock; 301 to 450 cubic inches; 5 miles

3	National	John Rutherford	4:25.80
4	Stutz	Dave Lewis	4:42.10
6	Schacht	Bill Endicott	4:45.00
7	National	Neil Whalen	4:46.50
1	Berkshire	Harry Grant	No time taken

Start of 231-300 cubic inch race on July 4

Hummel's Mercer skidding at outer mark in 50-mile race



Case Bullet leading Hummel's Mercer in the 50-mile race on July 5. The Mercer won the race

Class E, non-stock, under 600 cubic inches; 10 miles

2	Simplex Zip	Louis Disbrow	8:36.75
12	Fiat	Joe Matson	8:50.10
4	Stutz	Dave Lewis	9:00.00
18	Bianchi	Charles Basle	10:10.14
7	National	Neil Whalen	Withdrawn
3	National	John Rutherford	Withdrawn

Class E, non-stock, special event (three races running simultaneously); 100 miles. Race A, 301 to 450 cubic inches; Race B, 451 to 600 cubic inches; Race C, over 600 cubic inches. Race stopped at end of 75th mile

4	Stutz	Jack LeCain (75 miles)	1:17.48.75
1	Berkshire	Harry Grant (75 miles)	1:21.06.00
7	National	Neil Whalen (65 miles)	1:21.12.00
3	National	John Rutherford	Did not finish
6	Schacht	Bill Endicott	Did not finish
12	Fiat	Joe Matson	Did not finish
16	Fiat	Robert Stuart	Did not finish
18	Bianchi	Charles Basle	Did not finish
21	Chadwick	L. C. Hersey	Did not finish

SECOND DAY

Class E, handicap, non-stock, under 301 cubic inches; 10 miles

14	E-M-F.	Billy Burke (22 sec.)	5:49.50
11	Mercer	John De Palma (scratch)	5:57.10
17	S. P. O	Howard Plimpton (36 sec.)	6:16.50

Class D, non-stock, free-for-all; 5 miles

2	Simplex Zip	Louis Disbrow	4:39.10
4	Stutz	Dave Lewis	4:40.00
12	Fiat	Joe Matson	4:42.00
7	National	Neil Whalen	4:50.00
21	Chadwick	L. C. Hersey	No time taken
3	National	John Rutherford	Withdrawn

Class E, non-stock, under 301 cubic inches; 50 miles

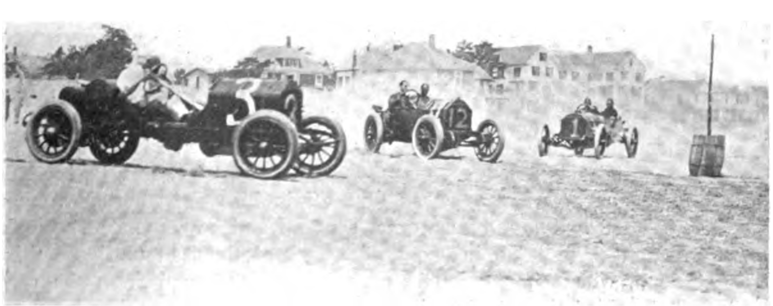
11	Mercer	Alfred Hummel	54:10.50
5	Case	Joe Nikrent	55:45.00
17	S. P. O.	Howard Plimpton	1:07.10.75
10	Case	Louis Disbrow	Did not finish

Class C, non-stock, 301 to 450 cubic inches; 5 miles

3	National	John Rutherford	4:32.30
4	Stutz	Dave Lewis	4:43.10
7	National	Neil Whalen	4:47.10
6	Schacht	Bill Endicott	5:02.50
1	Berkshire	Harry Grant	Did not finish

Class E, non-stock, 301 and over cubic inches; 100 miles

6	Schacht	Bill Endicott	1:36.41.00
3	National	John Rutherford	1:36.50.10
7	National	Neil Whalen	1:40.05.10
1	Berkshire	Harry Grant	Did not finish
12	Fiat	Joe Matson	Did not finish
21	Chadwick	L. C. Hersey	Did not finish
4	Stutz	Jack LeCain	Withdrawn
15	Jackson	Harry Cobe	Did not finish



Three cars strike turn at once—National, Fiat and Berkshire

Endicott's Schacht going at 70-mile clip in the hundred

Tetzlaff's Fiat Wins Big Races at Tacoma

Takes 250-mile Free-for-All and Captures 200-mile Heavy Car Race Previous Day

Averages 68.66 Miles an Hour in Latter Race—70,000 Spectators Witness the Five Events

TACOMA, WASH., July 7—The 2-day racing carnival promoted jointly by the Tacoma Automobile Club and the Tacoma Montamara Fiesta committee was run off without accident on the new 5-mile course at Lake View, near this city, with from 60,000 to 70,000 persons witnessing the five road races.

Teddy Tetzlaff, holder of the world's road record, was the star of the meet, driving his Fiat to victory in the heavy-car race the first day and annexing the free-for-all yesterday. In the Friday race Tetzlaff averaged 68.66 miles per hour for 200 miles, while in the 250-mile free-for-all yesterday he averaged 65.8 miles per hour. The medium-heavy car race Friday at 150 miles went to Cooper in a Stutz with an average of 66.6 miles per hour; Pollem in a Mercer took the 150-mile medium-car race at 61.9 miles per hour, while the light-car race at 100 miles was taken by Evans in a Flanders special at 61.1 miles per hour.

Tetzlaff won first place and $3,500 in addition to the Montmarathon perpetual challenge trophy. Bergdoll won second place and $1,000. Devore won third place and $500.

Friday morning's races, although sensational, did not equal the afternoon contests. A series of mechanical troubles resulted in all the cars in the medium-light car class being withdrawn with the exception of the Mercer driven by Pollem. In the light-car class, which was run in connection with the medium-weight car event, there was an especially pretty and thrilling race. Evans in a Flanders special took the lead early in the race and never was headed. Tower, also in a Flanders special, second. The Maxwell, Oakland and Ford finished in the order named.

Tetzlaff won the heavy-car race in the afternoon over forty laps. He won by steady driving on the dangerous curves and bursts of speed on the straightaway stretches. Mulford took the turns at high speed, which tore his tires into ribbons and forced him to go to the pits four times. Finally he came in with a bleeding head caused by a flying stone and relinquished the wheel to his mechanician, Chandler, who finished the race. Tetzlaff went to the pits but once for tire trouble and once for gasoline. The Fiat pit men had excellent team work, while the Knox men were considerably slower.

Hughie Hughes played in hard luck in both days' races, having considerable engine trouble, burning out a clutch on the Mercer in the medium-car event and in the free-for-all he suffered a broken connecting rod.

Great enthusiasm developed in the big event yesterday when Tetzlaff and Mulford held a duel of speed and Tetzlaff won. Mulford's car was fast, but Tetzlaff's tire luck was with him, which was helped by careful driving at the turns. Mulford took these with scarcely a perceptible slackening of speed. Earl Devore's National also was a victim of tire trouble and he was forced to go to the pits three times.

Two Races Run Simultaneously

The two races in the afternoon were run simultaneously. The Mercer, Stutz, National and Pope were in the heavy-car event and all except the Pope kept on after 150 miles were run off and continued in the heavy-car race.

The free-for-all started at 1:30 Saturday with six cars facing Starter Wagner. The Stutz with Earl Cooper at the wheel got away first and the Pope 30 seconds after. Then with ½-minute intervals followed Devore, National; Mulford, Knox; Tetzlaff, Fiat, and Hughes, Mercer. Cooper made the first 5 miles in 4:30. Tetzlaff made a wonderful start and finished the first 5 miles in 4:11.

With a phenomenal burst of speed the Knox took the lead in the sixth lap, when it passed the National in the back stretch, which was made in 4:00. Then followed another 5 miles but 2 seconds slower, and in the seventh Mulford made it in 3:55, a new record over a 5-mile course like that at Lake View.

The Flanders special No. 2, driven by Bob Evans, was first away from the wire in the light-car event and was first to finish, although Evans ran 150 miles instead of 100 and in the loss of the count on one lap he was put into third place by mistake. This was eventually straightened out and Evans given first place. Tower in a Flanders was second and Joermann, Maxwell, third.

Somewhat of surprise was the showing made by the little Ford owned and entered by W. C. Baldwin, of Tacoma. Frank Bennett driving made a good run, but twice tire trouble spoiled his chances.

After the heavy grind the course was subjected to in the first day's events a large crew worked all night and had it in excellent shape for the race on Saturday. The weather warmed up and brought out double the attendance of the first day.

The free-for-all resolved itself into a magnificent contest and a royal one between Tetzlaff in the Fiat, Bergdoll in the Benz and Devore in the National. After having reached a leading position in the nineteenth lap Tetzlaff never again dropped into second place, but all three cars were in the same lap for the last 50 miles and there always was a chance that positions would be altered. Hughes was first off in his wire-wheeled Mercer. The crowd gave him a great send-off and he responded by making the first lap in 4:09. He retained the lead until the third lap, when clutch trouble caused his withdrawal from the race, the third time during the contests.

As Hughes pulled up at the pits he was passed by Cooper in the Stutz, making a 4:19 lap. Cooper held his car there until the eighth, when Bergdoll in the blue Benz rushed by into first place. Cooper succumbed to Tetzlaff in the ninth and held third

OLD ORCHARD BEACH SUMMARIES (Continued)

Special event for mile record

	Jay-Eye-See	Louis Disbrow	39:10

THIRD DAY

Class C, non-stock, 231 to 300 cubic inches; 10 miles

5	Case	Joe Nikrent	9:54.00
11	Mercer	John De Palma	9:59.90
9	Lexington	James Esleck	12:13.00
10	Case	Louis Disbrow	Did not finish

Five miles against time, flying start

2	Simplex Zip	Louis Disbrow	4:04.50

Class E, non-stock, 231 to 300 cubic inches (two races run simultaneously); 25 miles

Class 2-C, 161 to 230 cubic inches

14	E-M-F.	Billy Burke	27:10.80

Class 3-C, 231 to 300 cubic inches

5	Case	Joe Nikrent	25:29.10
11	Mercer	Alfred Hummel	25:37.10
9	Lexington	James Esleck	27:10.80

Class D, non-stock, free-for-all; 10 miles

2	Simplex Zip	Louis Disbrow (new rec.)	8:53.00
18	Bianchi	Charles Vasle	9:32.10
7	National	Neil Whalen	9:40.10
11	Mercer	John De Palma	10:22.00

One mile, flying start, for beach record

	Jay-Eye-See	Louis Disbrow	.36.50.

Class E, non-stock (three races run simultaneously); 100 miles. Race A, 301 to 450 cubic inches; Race B, 451 to 600 cubic inches; Class C, over 600 cubic inches

4	Stutz	Dave Lewis, Race A	1:32.43.60
6	Schacht	Bill Endicott, Race A	1:36.09.00
15	Jackson	Harry Cobe, Race A	1:50.11.50
1	Berkshire	Harry Grant, Race A (90 miles)	1:54.30.00
7	National	Neil Whalen, Race A	Did not finish
16	Fiat	Joe Matson, Race C	Did not finish
18	Bianchi	Charles Basle, Race B	Did not finish

until engine trouble in the twelfth. A series of various delays placed the Stutz fourth and finally fifth in 20 seconds. From that time on the Stutz ran with consistent smoothness. Cooper had finished his forty-fifth lap when the National crossed the wire in third.

Ralph Mulford shared with Hughes and the Cole the bad luck of the day. The Knox driver received an ovation when he started out and when he made the second lap in 4:05 the crowd was frantic. He never passed the grandstand again, magneto trouble putting his car out.

Tetzlaff won his race on his merits. It is not fair to say he outgeneraled the field, but Bergdoll and Devore both drove magnificent races. Tetzlaff made his first lap in 4:26 and his was the fifth car to leave in the eighth. He caught the National in the stretch and jumped in fourth. After Hughes' retirement he ran third, making his best time, 3:59, in the eighth lap.

Bergdoll caught the Stutz on the back stretch in the eighth in view of the crowd, with Teddy's Fiat singing loud behind him. The next lap the Fiat swept past the Cole in front of the grandstand and at the end of the eighth was hard after the Benz, then running in first place and making a pretty race. For 50 miles these positions were retained, with the crowd growing wild as it was perceived Tetzlaff was cutting down the seconds.

In the nineteenth lap the excitement grew to fever heat. The Fiat swept past the Benz, which had traveled a slow lap in 5:49, due to tire trouble, and when Bergdoll spent 7:15 on his lap and tire change Tetzlaff lapped him. At this time Tetzlaff pulled in the pit for gasoline and, as fate would have it, had some trouble in getting the car started. Meanwhile the Benz was speeding along, cutting off the lost lap, with the result that the end of the twenty-second lap found the Fiat just 48 seconds in the lead. Tetzlaff never again fell behind.

When the Benz passed the Verbeck Fiat on the back stretch at 125 miles Tetzlaff's time for that distance was 109 minutes 4 seconds and he was leading by 4 seconds. In the twenty-eighth lap it was noticed the Benz was missing. Chain trouble had delayed him at the bridge for 12 minutes and when he finally passed the grandstand the crowd rose to its feet and gave him a mighty cheer. In the twenty-ninth Tetzlaff came into the pit for tires while the Benz made a 4:17 lap. The Benz after a stop for a broken chain made two good laps in 4:17 and 4:19, but dropped to fourth. In the thirtieth Verbeck was in the pit with engine trouble and Maggio was taken on as mechanician.

Battle Between Tetzlaff and Bergdoll

The thirty-first lap saw Devore second and the second Fiat third until its engine trouble when it went again to fourth. In the next two laps Verbeck made 4:18 and 4:05. The thirty-ninth saw a thrilling lap when Tetzlaff pulled up for gasoline. While the fuel was being taken on the red National rushed by with Devore grinning happily. The raw gas in the exhaust pipe of the Fiat caught on fire and before the car was ready to start the Benz rushed past, thus putting all three cars into the same lap.

Bergdoll was now driving his best and for five laps he and the National had it touch and go. In the forty-fourth Bergdoll made the lap in 4:05 and in the lap following was firmly in second place, which he retained until the finish. He made the best time he could, but Tetzlaff was well away, blazing his trail to the tune of 4:07, 4:06, 4:08 and 4:10, and as the crowd was advised of his progress it rose to its feet and gave the race hero a demonstration as Wagner held the checkered flag for him.

In the forty-fourth Verbeck entered the homestretch just behind the National, swung around it in a wide sweep, followed by the Benz. When he reached the front of the stand Verbeck endeavored to regain the course, but was carried over into the soft dirt near the pits. Just as the crowd held its breath to hear him crash into the pit bars he skillfully brought his car back into the road and was gone.

After this the spectators were frantic and after they had risen and applauded Tetzlaff, the Benz came in for its share. If Tetzlaff was a popular winner Bergdoll also was a great favorite.

All the drivers handled the curves very cautiously in the big event and this pronounced caution explains the very moderate rate of speed averaged even by the winner. Even the fact that it was anybody's race in the last 50 miles did not produce recklessness. This consistency of judgment is what made the Tacoma races remarkable for the lack of catastrophes.

"The Tacoma races were very fast in comparison with many of the records made on famous road courses of the country," said Starter Wagner at the conclusion of the races. "No records were broken, but good time was made throughout, and considering the green condition of the course, the showing was excellent. I will say without any exaggeration, Tacoma has one of the fastest road courses in the world."

The success of the meet is due in no small measure to the following officials: Fred. J. Wagner, starter; Robert E. Magner, who handled the Warner timing device; F. E. Edwards, chairman of the technical committee of the A. A. A.; and Walter Chanslor of Los Angeles, H. C. Mason of Seattle and Harry C. Miller of San Francisco, judges.

With 400 special guards patrolling the entire course outsiders were prevented from approaching within several hundred feet of the track. As a result there was not a single accident.

SUMMARIES OF MONTAMARA FIESTA RACES

FRIDAY, JULY 5

Light cars, purse $1,000, 100 miles

Pos.	Car	Driver	Time
1	Flanders Special	Evans	1:38:20.00
2	Flanders Special	Tower	1:39:04.35
3	Maxwell	Joermann	1:42:19.50

Medium cars, purse $1,500, 150 miles

Pos.	Car	Driver	Time
1	Mercer	Pollem	2:25:13.00
2	Mercer	Bergdoll	

Failed to finish—Mercer, Hughes; Cole, Blizzard.
Sebastian injured in practice and could not take part in race.

Medium-heavy, purse $1,000, 150 miles

Pos.	Car	Driver	Time
1	Stutz	Cooper	2:15:00.00
2	National	Devore	*
3	Pope	Rossi	*

*Not announced.

Heavy cars, purse $2,500, 200 miles

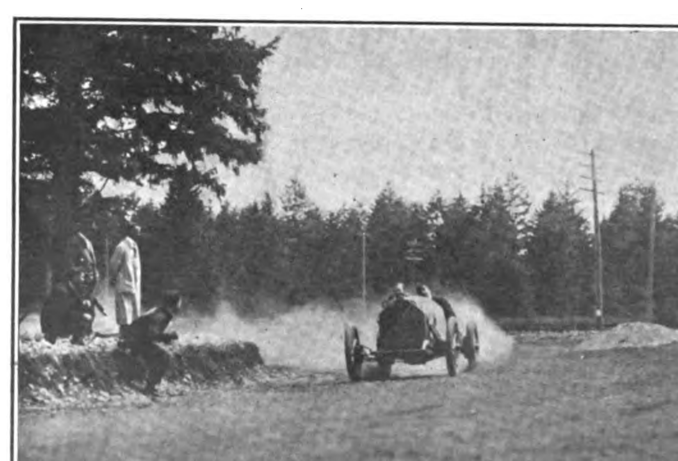
Pos.	Car	Driver	Time
1	Fiat	Tetzlaff	2:54:31.65
2	Knox	Mulford-Chandler	2:58:10.15
3	National	Devore	3:05:42.00

Failed to finish—Stutz, Cooper; Mercer, Hughes.

SATURDAY, JULY 6

Free-for-all, 250 miles

No.	Car	Driver	Time
44	Fiat	Tetzlaff	3:47:00.45
43	Benz	Bergdoll	3:50:49.85
22	National	Devore	3:52:28.25
47	Fiat	Verbeck	3:52:56.15
20	Stutz	Cooper	Did not finish
45	Cole	Blizzard	Out 12th lap
40	Mercer	Hughes	Out 3d lap
31	Knox	Mulford	Out 2d lap



Tetzlaff taking one of the turns on the Tacoma course

American Wins Road Run

Driven by Ralph D. Earle, Captures Honors in Wildwood Test—Prizes of all Descriptions

Several Ladies Compete—Sixty-three Cars Start—Builders of Indianapolis Speedway Honored

WILDWOOD-BY-THE-SEA, N. J., July 3—Ralph D. Earle, of Philadelphia, driving an American car, captured first prize today in the roadability run from Camden to this resort held under the auspices of the combined Boards of Trade of Wildwood, North Wildwood and Wildwoo Crest. Earle's time for the 108 miles was 6 hours 22 minutes 40 seconds, which was within 35 seconds of the secret time set by Mayor J. Thompson Baker, of Wildwood—6 hours 23 minutes 15 seconds. The prize was $50 in gold.

Second prize, the Hotel Ridgway cup was won by F. P. Keeley, Case car, who finished 1 minute 13 seconds out of the way, his corrected time being 6 hours 22 minutes 2 seconds. M. R. Faulkner, Michigan car, captured third prize, the Colonial Hotel cup, Wildwood, in 6 hours 24 minutes 29 seconds, 1 minute 14 seconds slower than the secret schedule, and fourth prize, the Hutchinson Motor Company cup, Woodbury, was carried off by a woman driver, Mrs. C. V. R. Caldwell, in a Premier, time 6 hours 20 minutes 30 seconds.

In addition to the main prizes awarded to winners for the full distance there were supplementary running premiums for the drivers finishing nearest the schedule set for the intermediate controls, of which there were four. The Alloway Hotel cup, Alloway, N. J., offered as the first control trophy, was captured by N. A. Koch, driving an Interstate car, who checked in 51 seconds ahead of the scheduled time. Car No. 35, a Case, driven by Henry Fallows, won second prize, the Nelson House cup, Salem, N. J., he arriving at the latter town within 1 minute 18 seconds of the allotted time. Third control prize, the Bridgeton cup, also went to the Interstate car, but 2 seconds out of the way. The Ruric Hotel cup, fourth control prize, was won by W. Eldredge, driving a Garford.

Half a Dozen Ladies Take Part

In the special division for women only, of whom about half a dozen competed, two prizes were hung up, a sterling silver chatelaine bag for first and a sterling silver chatelaine wrist watch for second. The former was taken by the winner of the fourth prize in the main division, Mrs. C. V. R. Caldwell, time 24 minutes slower than schedule, the second prize by Miss Anna E. Verga, Kisselkar, 34 minutes 50 seconds slow. Mrs. Sarah Hoffman, Ford car, was third, 50 minutes 47 seconds slow.

In addition to the above prizes and trophies a special purse of $50 was set aside for the Philadelphia dealer having the greatest number of cars of any one make entered in the run. This was awarded to the Case with 10 cars in line.

Of a total list of 84 entries, 63 cars left the new Hotel Ridgway, Camden, this morning at irregular intervals between 9 and 11 o'clock. Of this number nearly a score were racing cars which figured in the roadability run as non-contestants for prizes, being entered in the Independence Day races on the Wildwood speedway. A baggage truck carried participants' luggage and a tire car followed in the wake of the train to provide first aid to the injured, the help of which was frequently sought.

Especial interest attached to the women's division of the run, supervised by Mrs. D. Walter Harper, and at every control the fair contestants were given an ovation. Mrs. C. V. R. Caldwell, driving a Premier car, monopolized the glory in this section, for she not only won first ladies' price but also captured fourth prize in the main division. The list of participants follows:

Car	Driver
American	Ralph D. Earle
American	William Thiellens
American	W. L. Jones
American	George M. Rubelli
E-M-F	Adolph E. Beldner
Stoddard-Dayton	Charles Veith
Franklin	George Karlavaghn
American Scout	Frank O'Keefe
Cartercar	H. Baker
Mercer	Harvey Ringler
Mercer	John R. Wood
Klinekar	C. C. Fairman
Klinekar	John Menker
Schacht	James M. Gray
Jackson	Charles E. Biddle
Stutz	S. R. Blocksom
American	James Stark
Fiat	William Freitag
Empire	R. S. Smith, Jr.
Regal	Sid Briscoe
Buick	Eddie Bauer
Paige-Detroit	Ray Flick
Bergdoll	E. Homan
Apperson	George Davis
Interstate	N. A. Koch
Case	Henry Fallows
Case	W. B. Tait
Case	J. B. Bragass
Maxwell	A. J. Malin
Case	V. Faford
Case	Charles W. Karst
Kisselkar	Miss Anna E. Verga
Case	Mrs. Theodore Zirbes
Ford	Mrs. Sarah Hoffman
Premier	Mrs. C. V. R. Caldwell
Case	Mrs. D. Walter Harper
Overland	T. H. Gallagher
Apperson	W. C. Mullen
Benz	Sylvan Woods
Thomas	J. T. Sweeney
G. J. G.	Paul Theobald
Fiat	William M. David
Service	Carl Eldredge
Reo	W. J. Hayes
Bergdoll	H. Sharp
Bergdoll	L. Woodward
Pope-Hartford	G. B. Murtha
Chadwick	Charles Stretch
Flanders	Dr. E. Kelchner
American	Nelson Shaw
Garford	W. Eldredge
Garford	C. P. Sharpless
Cutting	B. H. Kirkbride
Cutting	Charles Walton, Jr.
Case	H. K. Keeley
Case	G. P. Dechant
Lenox	Charles Howard
Overland	William Bonham
Autocar	G. B. Headley
Michigan	Dr. M. R. Faulkner
Overland	W. A. Craig
Pope-Hartford	E. Heintzleman
Oldsmobile	George G. Meeley

Speedway Builders Honored

INDIANAPOLIS, IND., July 8—The people of Indianapolis last Tuesday night paid tribute to the living for what they have accomplished for their home city, when they gave a complimentary dinner at the German House for Carl C. Fisher, James A. Allison, Arthur C. Newby and Frank H. Wheeler, owners of the Indianapolis Motor Speedway.

There were about 150 guests present, including many prominent in the business and professional life of the city. Each of the guests of honor was presented with a copy of the following resolution, signed by each guest present:

"We, the undersigned, citizens of Indianapolis, very much desire to express to our fellow townsman and friend, our sincere appreciation of his magnificent work in furthering the best interests of our city. In thus acknowledging his worth, we congratulate him on his great accomplishments, wish him further unbounded success and promise him our hearty support and co-operation.

"We consider it a distinct privilege to publicly express, at least in part, those sentiments of high regard and esteem which, individually, have always been entertained by the people of our city, who have watched with close attention the magnificent growth of his unparalleled enterprise."

Grand Prix Distance Shortened

MILWAUKEE, WIS., July 7—A campaign to secure a really representative field of foreign-built cars and foreign-born drivers for the grand prix race in Milwaukee on September 17 is now being made by a special committee of the Automobile Club of America through its European representatives, the Automobile Clubs of France, Italy, Belgium, Switzerland, Canada, Austria, and R. A. C. of Great Britain and Kaiserlicher of Germany.

There are excellent chances that George Boillot, winner of the French Grand Prix, June 25 and 26, will bring his Peugot to America to compete at Milwaukee. Likewise hopes are given that Victor Hemery will come over with a Lorraine-Dietrich, while it is sure that Louis Wagner will drive one of the three Italian Fiats which will be entered, the team which worked together in the Dieppe race to be kept intact for Milwaukee.

There has been a slight change made in the conditions for the running of the Grand Prix, the distance being cut from 50 laps to 47 laps of the 8.725-mile course, making the mileage of the feature event 409.075 instead of 436.25 as originally announced.

The road work is progressing satisfactorily and the course already shows much improvement. The placing of the start and finish line will not be done until the various straightaways are in a completed condition.

Fast Time at Wildwood

Freitag's Fiat Covers the Mile Straightaway in :43 2-5, Closely Followed by Menker's Klinekar

Buick Wins Handicap and 161-230 Event, Klinekar the 301-450 and Mercer the 231-300

WILDWOOD-BY-THE-SEA, N. J., July 4—The success of yesterday's roadability run to this resort was second only to that which attended the speed trials held this afternoon over the 1-mile straightaway course, which brought the 2-day carnival to a close.

A long time before the scheduled hour of starting an immense throng gathered along the speedway. The fact that it was an unusually hot day and that a majority of the spectators were compelled to stand in the sun did not act as a deterent. Both sides of the course for a distance of over a mile were lined with a perspiring crowd and the temporary grandstand erected, affording practically the only protection from the sun's rays, was taxed to capacity.

The contestants were for the most part Philadelphians who came down yesterday on the roadability run as non-contestants in that event. The program was a well-balanced one and the finishes were so close in a majority of cases as to keep interest keyed up till the finish. The large crowd was well taken care of, not an easy matter in the case of a course like the one here, where the temptation is to break out into the roadway in order to catch a glimpse of the cars coming, subjecting the over-enthusiasts to danger from the speeding machines; but the guardians of the course were on the alert and not a single accident occurred.

A feature of the meet was the dispatch with which the events were run off. Clarence W. Cranmer, secretary of the Quaker City Motor Club, starting judge of yesterday's run, acted in the capacity of starter and the races were completed without the irksome delays between heats that marred some of the races held here two years ago.

Fiat and Klinekar Divide Honors

Speed honors of the day were divided between William Freitag, in the Fiat, who in the trials for the one-mile record, flying start, negotiated the distance in 43 2-5 seconds, and John Menker, Klinekar, who made the fastest mile of the afternoon in a race, 55 seconds, in event No. 3. The record established two years ago by the Chadwick car remains unbroken, however, as at that time a mark of 41 seconds was hung up by the Chadwick.

Eddie Bauer, driving a Buick, proved the most consistent winner of the meet, capturing first place in event No. 1, the first heat and race in the final time trials. In the initial event Bauer was given a close rub by H. Baker, driving a Cartercar, the latter being only a car's length behind at the finish.

Harvey Ringler had a walkover in the second event, winning from C. C. Fairman, Klinekar, by the safe margin of 21 seconds. John Menker, Klinecar, cut loose in the third race and made the fastest mile of the day outside of the record trials. Menker finished in 55 seconds, his nearest competitor being Philander C. Knox, Jr., 9 4-5 seconds behind.

Preceding the races this morning was a "happy-go-lucky" run for ladies conducted by Mrs. D. Walter Harper. All cars were driven by women over a specially marked route through Wildwood and Wildwood Crest, with women passengers and officiated over by women.

Over at the sister resort of Cape May today 32 pleasure cars and 7 commercial vehicles paraded through the resort, prizes being awarded for the best decorated cars.

Summaries of the races here today:

Division 2-C, non-stock, 161 to 230 cubic inches

No.	Car	Driver	Time
1	Buick	Eddie Bauer	1:15 3/5
2	Cartercar	H. Baker	1:16 4/5
3	Empire	R. S. Smith, Jr	1:19 1/5

Division 3-C, non-stock, 231 to 300 cubic inches

1	Mercer	Harvey Ringler	1:08
2	Klinekar	C. C. Fairman	1:29

Division 4-C, non-stock, 301 to 450 cubic inches

1	Klinekar	John Menker	:55
2	National	P. C. Knox, Jr.	1:04 4/5
3	G. J. G.	W. C. Thiebaud	1:08

Time trials, free-for-all

1	Fiat	Wm. Freitag	:43 2/5
2	Klinekar	J. Menker	:46 2/5
3	Chadwick	C. F. Stretch	:50
4	Apperson	Geo. Davis	:53 4/5
5	National	P. C. Knox, Jr.	:56 1/5
6	Benz	S. Wood	1:00 3/5
7	Marion	E. G. Harris	1:04 2/5

Free-for-all handicap, first heat

First heat

1	Buick	Eddie Bauer	1:19
2	Cartercar	P. Baker	1:19 4/5
3	Empire	R. S. Smith	1:21 3/5

Second heat

1	Mercer	Harvey Ringler	1:06 4/5
2	Marion	E. G. Harris	1:12 1/5
3	Chadwick	C. F. Stretch	1:19 1/5

Third heat

1	Apperson	Geo. Davis	1:06 1/5
2	Fiat	Wm. Freitag	1:06 4/5

Final heat

1	Buick	Eddie Bauer	1:15
2	Apperson	Geo. Davis	1:15 2/5
3	Mercer	Harvey Ringler	1:16 2/5

Special event

1	Marion	E. G. Harris	1:08
2	American	Ralph D. Earle	1:17

Rules for Farm and Ranch Run

AUSTIN, TEXAS, July 8—The motor car run from Dallas to San Antonio and return, which is to start July 22, and return to Dallas July 27, to be conducted under the auspices of the Texas Farm and Ranch Publishing company of Dallas, is attracting much attention not only among the people of Texas but other parts of the country. It is said to be the first event in which only farmers and ranchmen living on their own farms and ranches and driving their own cars are eligible as entrants.

The eligible cars embrace any touring car or runabout. Cars shall be divided into two classes according to body equipment, as follows:

Touring Car Class.—Touring cars shall be divided into seven divisions of Class A as follows:

Division 1 A, $800 and under; division 2 A, $801 to $1,200; division 3 A, $1,201 to $1,600; division 4 A, $1,601 to $2,000; division 5 A, $2,001 to $3,000; division 6 A, $3,001 to $4,000; division 7 A, 4,001 and over.

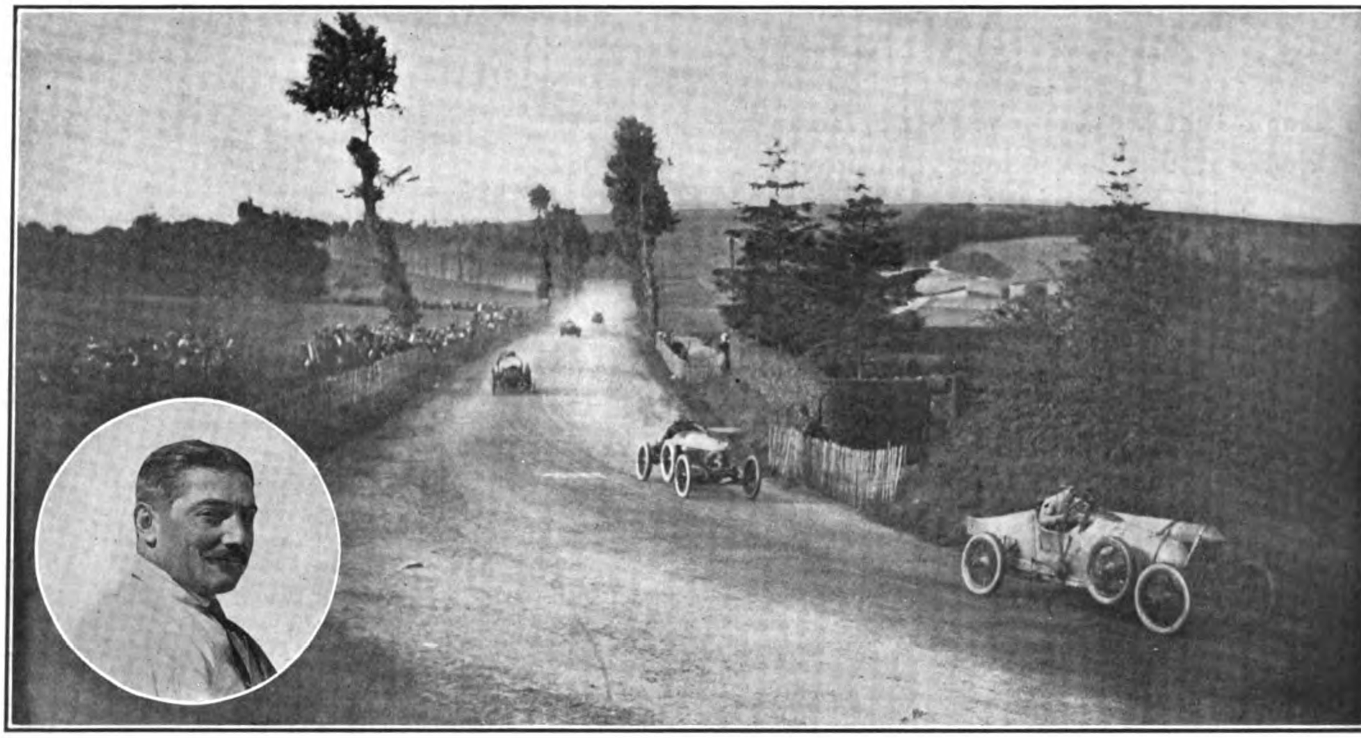
Runabout Class.—The runabouts, miniature tonneaus, surreys and single or double rumble-seated cars shall be divided into seven divisions of Class A as follows:

Division 1 A, $800 and under; division 2 A, $801 to $1,200; division 3 A, $1,201 to $1,600; division 4 A, $1,601 to $2,000; division 5 A, $2,001 to $3,000; division 6 A, $3,001 to $4,000; division 7 A, 4,001 and over.

The speed of contestants is: Division 1 A, 14 miles per hour; Division 2 A and 3 A, 16 miles per hour; Division 4 A, 5 A, 6 A, 7 A, 18 miles per hour.

Four States Tour Is Well Under Way

INDIANAPOLIS, IND., July 9.—Thirty-three cars got away on the second annual Indiana Four States Tour this morning. The first night control will be Ft. Wayne, Ind. A farewell smoker was given the participants in the tour by the members of the Hoosier Motor Club last evening. The tour, which is through Indiana, Ohio, West Virginia and Kentucky, is to last 16 days. It is non-competitive. Seventeen Indiana factories are represented in the cars taking part in the run.



Five cars in view at one time, approaching the village of Eu. (Circle) Boillot, who drove winning Peugeot

Grand Prix Aftermath

Bruce-Brown in Fiat the Virtual Winner, Although Deprived of Laurels by a Vicious Rule

Real Honors of the Race Captured by Sunbeams—Event a Failure from the Viewpoint of Attendance

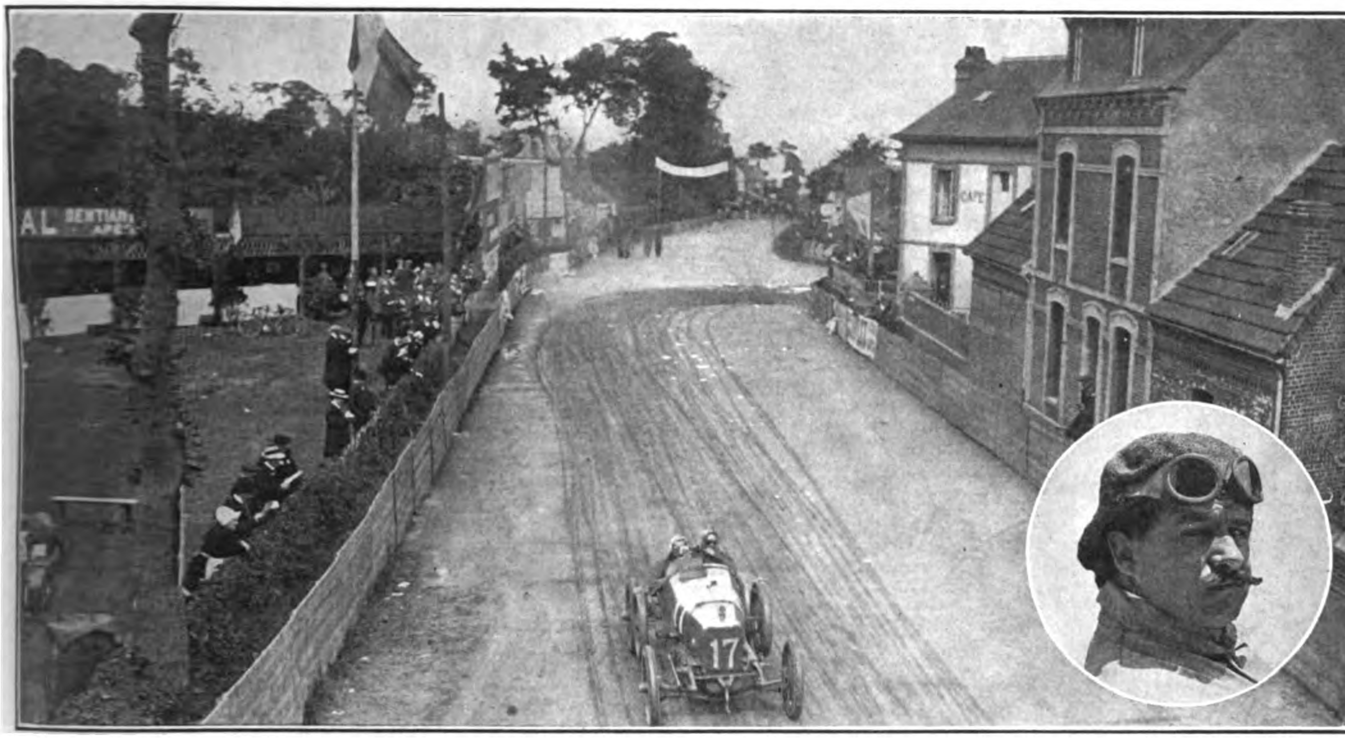
AS had been ardently desired by its organizers, the dual race held on the Dieppe circuit June 25 and 26 turned out before it ended—though with but a skinny chance between successful consummation and dire failure—a love feast celebrating and cementing the cordial understanding of England and France and a move on the chessboard extending this understanding to the English and French automobile industries, but it has not yet been charged that the wish in this case was the father of the result. Nobody has dared to insinuate publicly that the nut which came loose on the second day, spilling the gasoline of the car which stood to win, had been helped over night by an over-zealous patriot to prevent an Italian manufacturer and an American pilot from carrying away the first honors. But this charge is certain to be made in private, since trade animosities had been aroused with regard to the event and German, Italian, Belgian and American manufacturers had practically boycotted it, refusing to second the belated effort of the French industry for re-establishing its former prestige.

It is admitted, however, in the French press that the rule under which Bruce-Brown was prohibited from replenishing his tank more than once during the day's run, though the leakage compelling him to stop carried its own punishment in form of delay, should be amended, being too likely in another instance to turn a virtually earned French victory into unprofitable though not inglorious defeat. *L'Auto* in its issue of June 27 admits that Bruce-Brown should have won the Grand Prix, but consoles its sense of justice by the consideration that the Peugeot car which Boillot, with the aid of the accident, drove to victory, did not only beat the two other Fiat cars in the race on merit alone, but exemplified superior and more modern construction, in so far as the cylinder volume of its motor was only about one-half of the cylinder volume of the disqualified Fiat car, while the weights of the vehicles did not differ materially.

The classification of all the vehicles which finished in the double race is given in the appended table, from which it is seen that the racing interest is exhausted with the performances of the Peugeot car, the two Fiat cars, the Sunbeam team and the

General view of the start and portion of grand stand

De Palma in Fiat passing grand stand at 75-mile clip



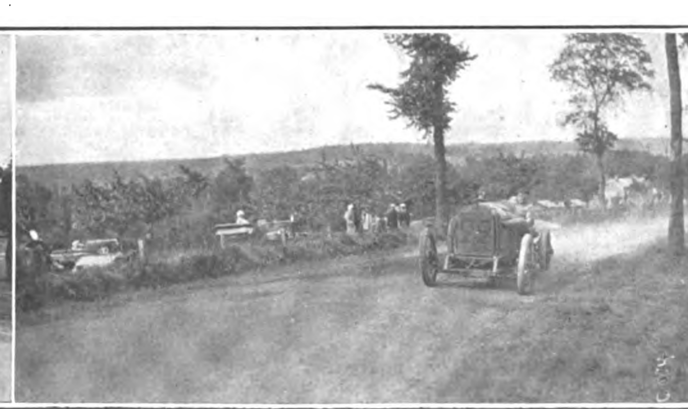
Just beyond the acute-angled turn at Dieppe corner of course. (Circle) Rigal, who drove winning Sunbeam

Belgian Excelsior car driven by Christiaens, the latter being the only six-cylinder car in the race. The others who finished proved regularity at a more moderate speed, and this in the case of the diminutive Mathis car, built at Strasburg and the only German car entered, and in that of the Côte car, whose two-cycle motor required a public demonstration to inspire faith, was a matter of more than commercial interest. The largest share in the racing glory, viewed with an eye to the art of the drivers, the merit of construction and workmanship and the commercial significance—all in one comprehensive glance—goes by unanimous consent to the Sunbeam team that wins the cup for team regularity and with four-cylinder motors of a total cylinder volume of only three liters come within one-half hour of equaling throughout a distance of 1,550 kilometers the speed attained in the unlimited class with motors five times as large. France takes to herself some of this glory of the English manufacture, claiming Louis Coatalen, the chief engineer of the Sunbeam factory, as one of her sons. The merit of the Sunbeam car, says Mr. Faroux in *L'Auto,* lies more in a wonderful workmanship and finish than in any new or extraordinary features of design.

Several cars which were in line for success at the end of the first day are found wanting in the final line-up. De Palma was found to have replenished his fuel against the rules, being in company in this respect with Goux, one of the Peugeot team, who was far behind his colleague Boillot in speed, however, and both De Palma and Goux were counted out. The fast Gregoire cars were withdrawn, out of respect for the dead, when Bassaguana, mechanic to one and brother-in-law to another of the Gregoire drivers, had been killed in the only fatal accident of the event. The Rolland-Pilain car was well up in the race on the first day, driven by Anford and leading De Palma by three minutes, but at the start of the second day Anford's mechanic was incapacitated by fatigue, the spark plugs were found to be fouled, and Anford, in attempting to remedy this trouble, got the wires crossed and was unable to start the car. Pilain was called to assistance, at once discovered the crossing of the wires and corrected it with his own hands. According to the rules, this spontaneous act rendered it necessary that Pilain should himself do the driving, and while he did so he was not fit for the task and lost the place earned for his car in the race.

With regard to the performance of the Fiat team, it is brought out as one of the peculiarities which may develop in an event which is spread over two days that, though Boillot came out winner for both days, he was second to Brown on the first day and also second to a Fiat car on the second day, Wagner beating him more decisively on that day than Brown had done at the opening. As the event was intended as a trial for teams, with a view to bringing into relief the comparative merits of manufacture rather than the skill of drivers, it is considered an anomaly that the Peugeot team, two of which fell behind and did not

Start of Goux's Peugeot. Note how crowd encroaches



The winning Peugeot on the last lap of the big race finish, could come out ahead of the Fiat team though beaten each day by one of them.

The attendance at the race was very meager, and *Omnia*, June 27 issue, comments upon the complete failure of the organizers in arousing popular enthusiasm. People are tired, says the editor, of having it demonstrated to them that the highest speed can be produced more readily by 200 than by 20 horsepowers. They want to know what the speed costs. Hence the construction of racing vehicles should be entirely optional, the distance should guarantee its robustness, and the winner should be he who produces the greatest speed for each liter of fuel consumed. On this basis, he thinks, racing might be revived in France.

FINAL OFFICIAL CLASSIFICATION OF CONTESTANTS
For Grand Prix of the A. C. F.

	h.	m.	s.
1. Boillot (Peugeot)	13	58	02⅗
2. Wagner (Fiat)	14	11	08⅖
3. Rigal (Sunbeam)	14	38	36
4. Resta (Sunbeam)	14	39	51⅘
5. Medinger (Sunbeam)	15	59	41
6. Christiaens (Excelsior)	16	23	38⅘
7. Croquet (Schneider)	17	31	39
8. Anford (Rolland-Pilain)	17	49	32
9. Wyse (Arrol-Johnston)	18	07	19
10. Duray (Alcyon)	18	28	55
11. Vonlatum (Vinot-Deguingand)	19	06	00
12. Esser (Mathis)	20	18	05
13. De Vere (Côte)	20	57	06

Unofficial Classification.

	h.	m.	s.
Bruce-Brown (Fiat)	14	28	13

For the Coupe de l'Auto (Cylinder Volume Limited to 3 Liters)

	h.	m.	s.
1. Rigal (Sunbeam)	14	38	36
2. Resta (Sunbeam)	14	39	51⅘
3. Medinger (Sunbeam)	15	59	41
4. Croquet (Schneider)	17	31	39
5. Wyse (Arrol-Johnston)	18	07	19
6. Duray (Alcyon)	18	28	55
7. Vonlatum (Vinot-Deguingand)	19	06	00
8. De Vere (Côte)	20	57	06

Market Changes for the Week

The market for materials pertaining to the automobile industry showed no important changes this week so far as prices were concerned. Steel remained unchanged, with the active business continuing. Among the largest orders was one for 3,000 tons placed by a radiator manufacturer in New England. Copper and tin were weak, the latter decidedly so in consequence of a panic in the London market for this metal.

Gasoline, after having risen to 20 cents last week, remained at this price. Other oils and lubricants remained also at their former quotation. Rubber showed the same strength it had displayed for the last fortnight and a fair business was done at $1.12 for Fine Up-river Para rubber. Tire scrap advanced 1-2 cent a pound.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb..	.07	.07	.07	.07	.07	.07	....
Beams & Channels, 100 lbs.........	1.41½	1.41½	1.41½	1.41½	1.41½	1.41½	....
Bessemer Steel, Pittsburgh, ton.	21.50	21.50	21.50	21.50	21.50	21.50	....
Copper, Elec., lb...	.17½	.17⅜	.17¼	.17½	.17⅛	.16¾	— .00¾
Copper, Lake, lb..	.17⅝	.17½	.17⅜	.17⅜	.17⅛	.17	— .00⅝
Cottonseed Oil, July, bbl.......	6.84	6.86	6.86	6.84	6.79	6.80	— .04
Cyanide Potash, lb.	.20	.20	.20	.20	.20	.20	....
Fish Oil (Menhaden)	.38	.38	.38	.38	.38	.38	....
Gasoline, Auto, 200 gallons.....	.20	.20	.20	.20	.20	.20	....
Lard Oil, prime...	.85	.85	.85	.85	.85	.85	....
Lead, 100 lbs.....	4.50	4.60	4.70	4.70	4.70	4.70	+ .20
Linseed Oil.......	.75	.75	.75	.75	.75	.75	....
Open-Hearth Steel, ton......	22.00	22.00	22.00	22.00	22.00	22.00	....
Petroleum, bbl., Kansas crude...	.68	.68	.68	.68	.68	.68	....
Petroleum bbl., Pa., crude......	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine Up-River Para.....	1.12	1.12	1.12	1.12	1.12	1.12	....
Silk, raw Ital.....	....	....	....	....	4.15	4.30	+ .15
Silk, raw Japan...	....	....	....	....	3.70	3.70	....
Sulphuric Acid, 60 Beaumé.....	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs......	46.50	46.00	45.50	45.50	45.00	44.25	—2.25
Tire Scrap........	.08½	.08½	.08½	.08½	.08½	.09	+ .00½

Legal News of the Week

Receiver Asks Permission to Sell Plant of Atlas Engine Works—Testimony Taken in Prest-O-Lite vs. Searchlight—Oil Company Bankrupt

INDIANAPOLIS, IND., July 9—A petition has been filed in the Superior Court by Fred C. Gardner, receiver for the Atlas Engine Works, asking permission to sell the property. The petition will be passed on Thursday. Mr. Gardner says that the company's liabilities exceed $100,000, that it would be impossible to obtain sufficient money to operate the plant and that to close the plant would mean a considerable loss. An inventory of the company's property has not yet been completed. The receiver has been authorized by the court to borrow $25,000 to meet the payroll and for current expenses.

Prest-O-Lite vs. Searchlight

CINCINNATI, July 3—Earl W. Griffin, as special master in the infringement suit of the Prest-O-Lite Company *vs.* the Searchlight Gas Company of New York and Coughlin & Davis, of this city, today took testimony in this case at the Sinton Hotel. Victor Gluchowsky, a member of the firm of Coughlin & Davis, was the principal witness, his testimony relating to the business of the firm in Prest-O-Lite and Searchlight tanks for automobiles. Winter & Winter, of New York, represented the complainants, and Herrlinger, Dixon & Stewart, of this city, represented the defendants.

Independent Refiners Sales Co. Bankrupt

A petition has been filed by the Oil Products Company of New York City to have the Independent Refiners Sales Company of the same city declared bankrupt. The indebtedness of the company is said to amount to about $10,000 and the assets to about $6,000. An offer was made recently by the company to pay off the creditors on a percentage basis, but it was decided that more money could be obtained by bankruptcy proceedings.

Decision Pending in Taximeter Suit

The suit of the American Taximeter Company *vs.* John Hefferon, John Kavanaugh and the International Taxameter Company of America was argued in the New York Supreme Court on Monday, July 8. Decision will probably be handed down in the near future.

The motion in the case is to enjoin Hefferon and Kavanaugh from hiring or using taximeters of any make other than the Jones taximeter, of which the plaintiff, as assignee of the patent, is the exclusive agent for the United States, and to enjoin the International Taxameter Company of America from leasing to them any make of taximeter.

Saul S. Myers argued for the plaintiff and Jacob A. Cantor appeared for the defense.

Horn Suits Not Filed Until July 3

Based on information received from G. V. O. Lansing, president of the Aermore Manufacturing Company, Chicago, Ill., THE AUTOMOBILE on June 27 stated that this company filed a bill in the United States Circuit Court, Chicago, against the New Era Manufacturing Company, charging infringement of patent No. 1,015,595, owned by the Aermore Company. Upon investigation in the courts it was discovered that this bill was not actually filed until July 3, although Mr. Lansing was notified June 18 by his attorneys that such bill had been already filed.

Demonstrations Are Passé

So Says Vice-President of the Willys-Overland Company—Thinks They Are Graft on the Part of Joy Riders—Gramm in New Company

TOLEDO, O., July 8—"That demonstrations are a thing of the past was evidenced during the Overland District Managers' Convention held recently at the Willys-Overland plant at Toledo," said Vice-President Bennett in a recent interview. "It was not the consensus of opinion that 'demonstrations must go' but that 'demonstrations have gone.' It has been a time-honored custom since the inception of the motor car to give demonstrations to prospective buyers, so that the purchaser might know what his car would do. In the olden days of the horseless carriage demonstrations were imperative because no one was sure how far a car would run without a breakage of some sort. Today the buyer knows what an automobile can accomplish (providing he is selecting a standard make) and does not ask nor require a demonstration. On the other hand demonstrations have been a "graft" on the part of joy riders and a drainage on the dealer. Many a person has entered a salesroom, feigning an interest in a car when the sole object was to secure a ride. The present-day motor car has time and again conclusively demonstrated that it will go anywhere and everywhere, surmount almost any obstacle, climb the steepest grades, and wallow through mud, sand and snow—that is why the public does not need to be shown."

Gramm in New Truck Company

LIMA, OHIO, July 6—The Gramm-Bernstein Company of Lima, Ohio, has been incorporated with a capital stock of $500,000 of which $200,000 is preferred 7 per cent. accumulative stock for the purpose of manufacturing motor trucks. The officers of the company are Max Bernstein, president; B. A. Gramm, vice-president and general manager; Harry O. Bentley, secretary and Fred Bizantz, factory manager.

This organization places Mr. Bernstein in charge of the financial affairs and Mr. Gramm in charge of the manufacturing and sales end. There will be a sales manager and an expert in charge of the publicity department.

The company has awarded the contract for new roofs to the buildings to be occupied by the concern. Factory Manager Bizantz is preparing specifications for the new machinery to be installed. The plant was formerly occupied by a paper mill.

First Lion Car Ready in 2 Weeks

ADRIAN, MICH., July 8—The Lion Motor Car Co., whose plant was totally destroyed by fire June 2, has been reorganized and within 2 weeks the first car will be ready for demonstration. It is announced that the new factory will be ready within 90 days. The Industrial Association of Adrian guaranteed $100,000 to keep the factory in the city. The Wing & Parsons Company has been taken over by the Lion Motor Car Company. The new factory is of increased size, covering 6 acres.

Stewart Motor Corporation Formed

BUFFALO, N. Y., July 8—At a special meeting held last week by the directors of the Stewart Motor Corporation, just incorporated here with a $250,000 capital, T. R. Lippard was chosen president and general manager of the new concern, while R. G. Stewart was selected as vice-president and chief engineer. R. P. Lentz, of Hartford, Conn., was chosen treasurer and secretary, while Robert W. Ingersoll, manager of the Firestone Tire and Rubber Company of Buffalo, will be sales manager for the new concern.

The latest addition to Buffalo's automobile industry has leased the large plant formerly occupied by the Niagara Machine and Tool Works at Jefferson, Superior and Randall streets for the transaction of their business. The new corporation also will occupy the four-story brick structure adjoining this plant and the power plant in the rear. Extensive improvements and alterations are being made on the building and orders are being placed for new equipment and machinery. Offices have been opened at 1056 Ellicott Square.

The Stewart Motor Corporation will engage exclusively in the manufacture of light capacity motor trucks. Arrangements are being made to have new trucks ready for delivery by September 1 and orders are being taken now for delivery at that time. About fourteen various makes of trucks will be made by the Stewart company, the maximum capacity of the trucks being about 1,500 pounds.

Republic Motor Company Formed

A large piece of property has been acquired by the Republic Motor Company, of New York, on Eleventh avenue between Fifty-sixth and Fifty-seventh street. It is the purpose of the company to build cars and sell them through a factory selling organization. The company has been incorporated under the laws of the state of New York. It is under the management of W. C. Durant, who, when interviewed by a representative of THE AUTOMOBILE, said: "This is the first of a series of ten factories to be put up by separate companies in different large distributing centers to build cars which will be especially adapted for their particular locality." The other cities selected are Philadelphia, Boston, Cincinnati, St. Louis, Minneapolis, Portland, Ore.; San Francisco and Los Angeles.

Automobile Securities Quotations

No startling developments were witnessed in the automobile department of the stock market during the past week. While no general trend made itself felt, the majority of securities advanced to a moderate degree. Some consolidation talk of the street relating to a possible merger of various tire manufacturing interests brought about advances in several issues of this class, notably in Goodyear stock, which rose 40 points. Automobile manufacturing securities changed little if any in their quotation, the most important advance being one of 9 points in the case of the Garford stock. The tone was steady and the volume of dealings satisfactory. Following table shows the prices this week in comparison with those of 1911 at the corresponding time:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., common	..	..	115	..
Ajax-Grieb Rubber Co., preferred	..	..	95	100
Aluminum Castings, preferred	..	..	100	..
American Locomotive, common	40¼	40¾	42½	43
American Locomotive, preferred	108	110	107¾	109
Chalmers Motor Company	149	151	145	155
Consolidated R. T. Co., common	5	10	15	18
Consolidated R. T. Co., preferred	10	20	..	59
Firestone Tire & Rubber Co., common	164	168	276	278
Firestone Tire & Rubber Co., preferred	102½	105	106	108
Garford Company, preferred	..	..	99	101
General Motors Co., common	53	54	31	33½
General Motors Co., preferred	88	89½	74½	75
B. F. Goodrich Co., common	238	240	77¼	75
B. F. Goodrich Co., preferred	115	116	108¾	109
Goodyear Tire & Rubber Co., common	210	215	302	304
Goodyear Tire & Rubber Co., preferred	104	105	102	104
Hayes Manufacturing Co	..	..	..	96
International Motor Co., common	..	..	23	25
International Motor Co., preferred	..	..	82½	85
Lozier Motor Co	..	..	50	60
Miller Rubber Co	..	..	155	160
Packard Motor Car Co	106	107	105	107
Peerless Motor Co	..	..	..	..
Pope Manufacturing Co., common	51	53	30	32
Pope Manufacturing Co., preferred	77½	79	73	74½
Reo Motor Truck Co	9	9½	8¾	9¼
Reo Motor Car Co	19	20	19	20
Studebaker Co., common	..	..	30	32
Studebaker Co., preferred	..	..	91½	92½
Swinehart Tire Co	..	..	99	101
Rubber Goods Co., common	88	93	100	..
Rubber Goods Co., preferred	100	105	108	..
U. S. Moto Co., common	40	41	3	3¼
U. S. Motor Co., preferred	82	83	13	13¼
White Co., preferred	..	..	107½	108½

Trade News of the Week

Death of A. W. Harris, Oil Manufacturer, a Severe Blow to the Entire Automobile Industry

Matheson Affairs Finally Settled and Company Now on a Sound Financial Basis

THE entire automobile industry will mourn the loss of A. W. Harris, president and general manager of the A. W. Harris Oil Company, Providence, R. I., who died on Sunday, June 30, after a short illness. Not alone will his loss be felt in business circles, but throughout a wide social acquaintance as well.

Mr. Harris was a gentleman of education, having taken his degree at a prominent American institution of learning. The reputation for integrity which characterized his business dealings extended as well to his social intercourse.

In the early eighties Mr. Harris began the manufacture of high-grade steam engine and cylinder oil, building up what he characterized as his "smokestack" business until he was among the leaders in that line. When the automobile industry first began to attain prominence, more than a decade ago, Mr. Harris was one of the first to enter the field of supplying high-grade lubricants for gasoline motors.

So insistent was Mr. Harris on keeping up the quality of his product that the name Harris has always been a synonym for the highest standard in the lubricating oil field. The result has been that Harris oils are recognized throughout the world as among the best on the market.

Mr. Harris descends from a long line of Americans who have done things in the mechanical world. His uncle, William A. Harris, was one of the builders of the famous Corliss engine.

The main business office and factory of the A. W. Harris Oil Company are located at Providence, R. I., and there are branches in most of the principal cities of the country, its product being equally as well known in the Far West as it is in the Eastern section of the country. Mr. Harris leaves a wife and daughter.

Matheson Accounts Cleaned Up

When the Matheson Automobile Company, Wilkes-Barre, Pa., extended its capital to $2,650,000 2 years ago and took in the Matheson Motor Car Company, which was at that time in the hands of a friendly receiver as the result of a suit in equity brought by F. M. Quimby et al., about 2 per cent. of the creditors did not immediately obey the court order which declared for an adjustment on a basis of 50 per cent. stocks, 25 per cent. bonds and 25 per cent. cash. These creditors held back with an idea of obtaining all cash. The accounts have now been cleaned up and the reecivers are to be dismissed. The Matheson Automobile Company has been uniformly successful and has been working continually on a sound financial basis.

Sales Managers' Convention Postponed

The convention of sales managers to be held under the auspices of the Automobile Board of Trade will probably be put over until some time in September. Many of the sales managers are away on their vacations at the present time and a better attendance may be expected at that time of the year.

Car Designed on Dachshund Lines

St. Louis, Mo., July 8—A new car, to be called the Shomee-Dachshund, is to be made in St. Louis, by a company backed wholly by local capital. The name comes from the famous Missouri expression; "Show me." A dachshund is to be on the front of the radiator.

The car is to take a dachshund for a symbol because of its low center of gravity and low appearance. The machine will be overslung, and yet the designer, a St. Louisan, claims that the center of gravity will be lower and that it will have a lower appearance than an underslung car.

The machine will sell at about $1,800, will have Bosch and Atwater Kent ignition, left side drive, 120-inch wheelbase, dry multiple disc clutch, full floating rear axle, Continental engine, Rayfield or the designer's own carburetor and demountable rims. The first car is nearly finished. If it works right with a try-out the machine will be immediately put on the market.

An option on a factory site has been secured and 500 cars will be put out the first season.

Abbott Adds Four District Managers

Detroit, Mich., July 9.—The sales force of the Abbott Motor Company has been strengthened by the addition of four district managers. E. D. Hand, who resigned recently as assistant sales manager of the E. R. Thomas Motor Company, has been given the states of Ohio, Pennsylvania and West Virginia. S. T. Henderson, who was formerly with the Bergdoll Motor Car Company, has been given the management of the sales for a number of Southern states, with headquarters at Atlanta, Ga. F. E. Westcott, formerly representative of the Reo Motor Car Company, assumes the control of the Indiana and Kentucky output. J. E. Warren, who has been connected with the Chalmers Motor Car Company for the past 4 years, takes charge of the Pacific Coast sales as special representative.

S.A.E. Meeting to Be in September

There will be no meetings of the metropolitan section of the Society of Automobile Engineers during July and August, the next meeting being scheduled for the last Thursday in September. Work is being pushed forward on the 1912 transactions which are expected to be ready during the latter part of this month.

Outdoor Show for Mound City

St. Louis, Mo., July 8—Beginning October 8 and ending October 14 the St. Louis Automobile Manufacturers' and Dealers' Association will give its second annual fall outdoor automobile show at Forest Park Highlands. This is the sixth annual show given by the association. Forest Park Highlands, a great summer resort in the heart of the city of St. Louis, has had a large sum of money spent upon its improvement this year, which improvements were made at the suggestion of the automobile trade of St. Louis in order to better suit the big resort for their purposes. The show held at the same place the first week in October, 1911, was a brilliant success, and the plans of the committee contemplate novel methods of advertising which will assure a larger attendance and greater success than last year. The show is open to all St. Louis dealers in automobiles and to accessory trade located anywhere. The show committee appointed consists of H. B. Krenning of the Dorris Motor Car Company, John C. Anderson of the Ford Motor Company, John Phillips of the Phillips Auto Company, Samuel Breadon of the Western Automobile Company, T. L. Houseman of the Overland Automobile Company and Frank R. Tate of the United Motor-St. Louis Company.

Suits have been filed in the United States District Court by the Enterprise Automobile Company for alleged infringement of Dyer patents, Nos. 885,986 and 921,963, against John H. Hooper, Michael J. Bird, Washington Garage Company, David Rumsey, Alexander Krull, Ludwig Kraus and James Barnshaw.

Car Painting Not Costly

Renovating the Automobile No Longer The Expensive Proposition It Was In the Early Days

How Work May Be Done at a Minimum of Cost —Dressing Anew the Accessories

EXPENSIVE painting of the automobile is not always necessary. Plenty of good painting may be done and, as a matter of fact, is being done on a lower cost basis than at first glance may appear possible.

In some way the car owner has come to believe that the painter is an expensive man to visit when painting repairs are needed. Such is contrary to the facts, considering the value the painter is expected to give, and, indeed, does give.

One of the important items of expense attached to the painting of the car is that covering the cleaning up and making the car ready for the painter. To this extent the owner of the car can save himself, for it is manifestly cheaper for him to have the main part of the cleaning up done prior to taking the car in for repairs.

When the automobile was making its sensational entry into the world it was deemed wise to perform a lot of unnecessary operations upon the paint and varnish surface once the car came within the confines of the paint shop. The owner of the car, apparently to keep up appearances and add to the gayety of the situation, came bravely to the front and demanded that all things be done unto the machine to make it one of the finest, regardless of cost. Reasonably enough, he got what he demanded, and quite naturally paid plenty enough for it.

Cheap Work Not Necessarily Bad

But the former things have passed away and today most excellent painting is being applied to the car at a price, generally speaking, which a few years ago would have given everybody concerned a serious case of heart trouble.

To be sure, the automobile, when compared with the horse-drawn vehicle, is at the minimum figure a formidable proposition. However, as stated at the outset of this article, good painting can be done and is being done at reasonable cost.

The surface of the car when it shows a varnish film practically intact, with nothing more serious than shallow checks, is in no condition to need a series of primary coatings, unless the car is above the average and the owner is very willing to pay for non-essentials.

Simply lay hold of the body of the car and put it through a hard cleaning process, scouring all the grease flakes and sandpapering the surface. Surface dents and fractures should get a touch of some good lead and oil paint, and as soon as they have dried putty up with a hard drying putty. The day after scour all putty smears down level with the surrounding surface, using a block of rubbing brick dipped in gasoline.

Then select the body color, dust off and apply color, using a 2½-inch camel's-hair brush. Put on two thin coats, if necessary, in preference to one heavy coat due to make the work look brushy and rough. Then apply a coat of varnish color, which in due time is to be given a light rub over with a block of felt dipped in water and floured over with pulverized pumice stone.

Clean this surface up nicely and with a striping pencil run on some fine relief lines of a contrasting color to give a charm and distinction to the big fields of black, or blue, or green, or maroon or lake, as the case may be.

When this line work is properly dry apply for a moderately fine finish one heavy coat of clear rubbing varnish. For a still finer surface apply, in order, two coats of the rubbing varnish. Rub one or both of these coats carefully down with water and pumice flour and finish with a high-grade elastic body finishing varnish.

In the meantime fetch the chassis along, first by scouring every particle of dirt and grease from the parts.

This is a hard job and it takes patience and soap, and turpentine and crude oil, and sometimes a wash of sal soda to bring the parts out clean and decent to paint over. Then sandpaper over all, dust off and size the conditions up. Any breaks in the surface should get a touch of lead paint, and when this has dried the places needing it should be puttied with a hard drying putty.

Now apply a coat of color, then a coat of varnish color. Rub the gloss of this coat off with a clutch of upholstering moss or curled hair, apply the desired lines of contrasting color and finish with a single coat of heavy chassis varnish.

Along with this work must be taken into account mud guards, fenders, lamps, windshield brackets, radiators and other lawful accessories, all of which, as the car owner may elect, should be given their due proportion of renovating, painting and varnishing.

The automobile top is likewise in order for a process of renovation or for an application of some dressing material. Hand-buffed leather tops seldom require any treatment other than a gentle wash over with castile soap. Machine-buffed leather, when the enamel becomes worn off, will need, and should have, an application of some reliable dressing. All such dressings, however, should be put on very thin and uniform. Mohair tops brushed thoroughly with a whisk broom and then gone over with a soft brush, will come forth renewed and freshened up. Pantasote tops may receive some sort of a renovating treatment to renew them when but little worn, and if past this stage of renewal they should be given a thin, transparent dressing of an elastic nature. Pantasote curtains for railway coach use are often given a dressing of car-body finishing varnish thinned a little with turpentine.

Lamp and windshield brackets, etc., which are desired to go in some dark color corresponding to that of the car body, should, in the absence of a baking oven, be roughened with emery cloth and then given a lead priming coat. Then in due course they should be brought up with color, then one coat varnish color, rubbed, and finished with a coat of hard drying varnish.

Striping Automobile Bodies

Painters have accepted the fact that automobiles are not being, and are not likely to be, extensively striped. The plain lines in harmony with, and enriching the field color are the only ones that are being attempted in the best establishments. And, even with this narrow field of colors, the striping of an automobile is a considerable tax on the painter's ingenuity. It is difficult to find combinations of colors which give a striking or pleasing effect and still are in good taste. A few suggestions as to solving this problem are given herewith:

For medium and deep blue panels, fine lines of deep shade gold bronze, glazed with a light shade of ultramarine blue rivet attention immediately. Upon green fields of Naples yellow at one end and of primrose yellow at the other, glazed with No. 40 carmine or with English lake, the effect is enticing. Lines of chrome yellow glazed with English scarlet lake give a fine appearance.

Battleship gray, striped with 1-2-inch lines of aluminum, edged on one side with ivory black, coating the black in a fine line, reveal a splendid show of color contrast. Substitute a fine line of orange chrome for the black, or a similar line of English vermillion, and the combination produces a pleasing appearance. White striping on a gray field, lined on the edges with carmine, also imparts a distinguished air to a car.—From *The Carriage Monthly*.

Digest of the Leading Foreign Journals

Development of Automobile Fire Engines in Germany, While Split Into Electric, Gasoline and Gas-Electric Types, Agrees on Consigning Reciprocating Pumps to Scrap Heap—One of the Rotary Pumps—Subjects under Inquiry

FIRE ENGINE PUMPS—Among automobile manufacturers in Germany who build fire engines of one design or another, chosen largely in each case according to their own preferences, and who naturally wish to sell this product, and, on the other hand, the engineers of the municipal fire departments, who in some instances havé to figure on utilizing the values in wagons and steam pumps which have been in use with horses, and who in all cases wish to suit the design of the fire-fighting implements to those ideas of fire-fighting work which have been developed among themselves and their men through their experience with the old-style equipment—there is at present a lively row which finds expression at public meetings and lectures as well as in the press. The main question involved seems frequently to be this, whether the firemen can be expected to do good work from day to day when they have to learn new fire-fighting tactics as well as the handling and care of new machines. Manufacturers wish to have all those possibilities of improved tactics which they think they have incorporated in their product considered in the light of improved efficiency, and the men who bear the responsibility for the fire protection prefer to await standardization of the modernized equipment, and of the tactics to be adopted with it, before abandoning the idea that the best automobile fire equipment for the present is one which, in everything but locomotion, can be used as nearly as possible in the same manner as the old equipment was used.

Under these circumstances the technical interest centers in the fire engine pump which was a slow stroke stream pump with reciprocating pistons, but which under the new conditions is preferably operated by means of a high-speed motor—either gasoline or electric—and, if only to avoid cumbersome gear reductions, should be a high-speed pump of one type or another. The high-pressure centrifugal pumps developed for this work resemble those known in American practice, but one type has been perfected in the Berlin fire service which is different. It is known as the *Rundlaufpumpe,* or rotary pump, and was designed in the first place by a well-known inventor, W. von Pittler, now deceased. Fig. 1 shows it in its original design and Fig. 2 gives an idea of its most recent development, showing to the right, as viewed from the driving side, a schedule or cycle of the piston action, which may be followed up by comparison with the reference letters in the sectional views to the left. Owing to the indistinctness of the drawings and the cursory character of the description, only a general idea of the mechanism can be gained. The author of the information first comments upon the advantage of piston pumps, that they are adapted for raising water from a lower level where no hydrant pressure is at disposal, while centrifugal pumps must be supplied with water to work with for starting, and refers to the disadvantage that the intermittent pressure stroke of reciprocating pistons subjects the hose to a constant oscillating motion in contact with the ground, which wears the hose out prematurely and which can only be obviated in part by the installation of an air chamber acting as an equalizer. He also mentions the need of safety provisions against sudden changes in the water pressure and the wear to which the pistons are exposed, especially when sand is taken in with the water. His description of the *Rundlaufpumpe* runs substantially as follows:

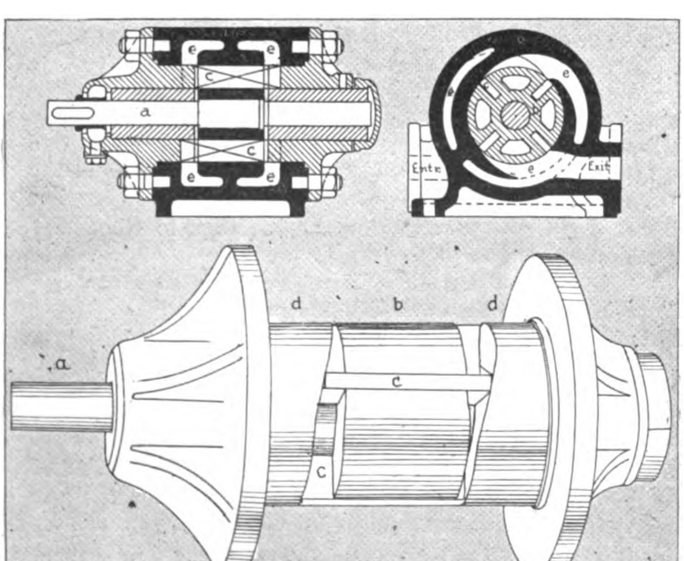


Fig. 1—Sectional views of rotary pump for fire engines as designed by V. Pittler—with side view detail of the rotary piston and adjacent parts

NEW ROTARY FIRE PUMP DESCRIBED

"It is in reality a piston pump with most of the advantages and disadvantages of this type. Its special merit lies in the possibilty of using it at very high speed. It consists of rotary elements operating in a housing, and its action depends upon alternating enlargement and reduction of the spaces formed between the rotary and the fixed parts, without use of ordinary pistons, connecting-rods or crankshaft. The effect is nevertheless that of pistons, being more or less intermittent.

"The interior of the pump consists of a through shaft (*a*) mounted in the extended bearing members noticed to the right and left in two longitudinal views under Fig. 1. This shaft carries a cylindrical body (*b*) in which four radial slots are cut out lengthwise of the body, forming pockets in each of which a rectangular hard-rubber plate is lodged, subject to axial displacement. When the shaft is turned, displacement is effected, because the ends of the plates are guided by contact with the interior end-walls (*d*) of the large bearing members through which the shaft passes, these walls being cut on an oblique curve and at all corresponding points spaced just so far apart that the distance between them is spanned by the length of each of the plates. The spaces *e* (see the sectional views under Fig. 1) are so disposed that those leading to the exit communicate at the right periods with the water which the rotation of the rubber plates brings under pressure, while those connecting with the entrance of the supply are brought under suction, and practically continuous flow from the suction channels to the pressure channels is thus effected. By having four movable plates, eight working spaces are produced and this arrangement in conjunction with high speed gives a continuity in the pressure almost equal to that effected in a centrifugal pump."

In the improved construction represented in Fig. 3 it is noticed that the movable plates are guided by means of obliquely placed ball-bearings K and that the number of the plates has been increased to six.—From *Der Motorwagen*, June 10.

Production of Quartz—The use of pure quartz is coming more and more to the front in art, industry and laboratory work. Mr. B. Daguerre tells in *Revue d'électrochimie et d'électrométallurgie* for April how it is produced. The crushed quartz mineral is placed in a graphite crucible, and the crucible is placed in an electric furnace operated with a current of 70 to 80 volts and 1,000 amperes. The current is tri-phase and acts through three converging carbon poles. The temperature is gradually raised to 1,800 degrees C., whereafter the quartz, now softened, is subjected to the action of an oxy-hydrogen torch.

Artificial Horn—Among the substances which industrial chemists are constantly trying to produce in better and better quality, with a view to the many purposes it may serve, for example, in aeroplanes and automobils, when perfected, artificial horn holds a place comparable to that of uninflammable celluloid. A new product of this nature, which is said to remain flexible and elastic at all climatic temperatures and unaffected by humidity, is obtained by mixing 50 parts of pure caseine, 50 parts of starch, 25 parts of gelatine, 0.25 parts of glycerine, 7 to 10 parts of paraffine and adding to this total quantity from 1 to 5 per cent. of alphanaphtal-sulfonic (sulfonic acid derived from alpha-naphtalene). The process is as follows: The caseine is dissolved in water containing borax. The starch is also stirred into water. In both cases the consistency should be that of a mush. The two mixtures are blended, and the gelatine, to which has been added the glycerine and the paraffine, the latter melted, is virogously stirred in with the rest. At last the sulfonic acid and, if necessary (for economy), inert matter are added. To remove the larger part of the water, the mass is rolled into sheets and, if it is required that all the water shall be removed, these are placed in alcohol. The anhydrated mass is then treated with acetate of alumina. If the substance must be obtained in bulk rather than in sheets the only available method is to unite a number of sheets under hydraulic or other strong pressure.—From *Revue de Chimie Industrielle*, June.

Tire Inflator—If sufficiently simple, inexpensive and reliable, a device which will permit the automobilist to inflate his tires by means of his motor power and without physical effort is likely to meet with popular favor. With this in view, the manner in which a device recently introduced in the French market under the name "Gonfleur Z" is mounted in the chassis as illustrated in Fig. 3. The pump has two cylinders and pistons. Stems extend upward from each piston, inside of the cylinders, of which only the lower halves are used for the working stroke, and the upper ends of the stems are yoked together by means of a crossbar capable of sliding up and down in slits in the upper portions of the cylinder walls. To the crossbar is secured a rod which may be pulled out, passing through the base piece of the pump, by means of a ring fastened to its lower end, thereby compressing the air in the cylinders and driving it out through the discharge valve and into the tire through a hose. A helical spring surrounds the rod and bears against the base. It is compressed by the working stroke and consequently takes care automatically of the suction stroke by its subsequent extension. Both the intake and discharge valves are in the base. The upper end of this pump is swiveled to one of the frame reaches L, as at T. A flexible steel band or chain B is secured at one end to the ring O, and at the other end to the other frame reach by means of a clip, D and C. This band passes under the transmission shaft A and the spring in the pump holds it nearly straight until a small roller mounted by means of a suitable lug upon shaft A, so as to act as an eccentric, is pressed down upon it by the revolution of the shaft. The roller is represented in the illustration by the dotted circles whose positions indicates how the alternate tightening and releasing of the band operates the pump. It is stated in *La Vie Automobile* of June 22, from whose pages this description is taken, that the device is capable of inflating a tire, 33 inches by 3 2-3 inches, to a pressure of 10 1-2 pounds per square centimeter (about 65 pounds per square inch) in 45 seconds, but it is not explained where power can be taken off the transmission shaft without some interference with customary design.

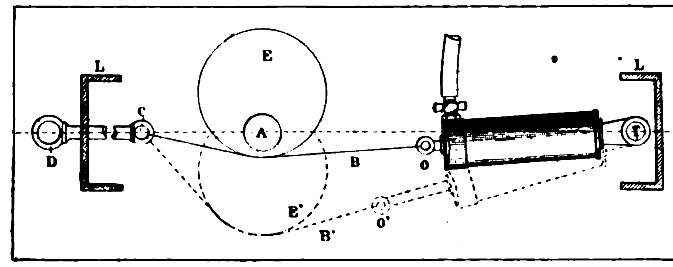


Fig. 3—Gonfleur Z type of mechanical tire pump

Subjects Under Debate—Among the subjects which are at present being investigated mathematically in the European technical press are the following: In *Génie Civil* and *Gasmotorentechnik* the developing of automobile and kindred motors operating on the Diesel motor principle, by preheating the air supply and thereby getting very high temperature at the end of a moderate compression; in *Zeitschrift des M. M. Vereins* the best type of universal joints and the construction of centrifugal speed regulators; in *Die Turbine* the design of centrifugal governors.

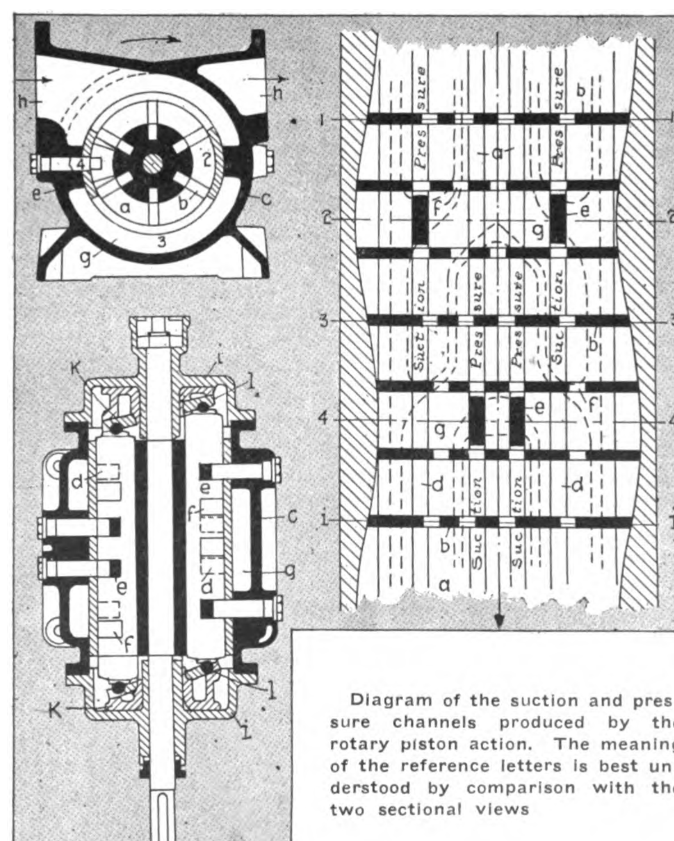


Diagram of the suction and pressure channels produced by the rotary piston action. The meaning of the reference letters is best understood by comparison with the two sectional views

Fig. 2—Lengthwise and cross-section of latest type of *Rundlaufpumpe* as used in German fire engines—an improvement on the model shown in Fig. 1

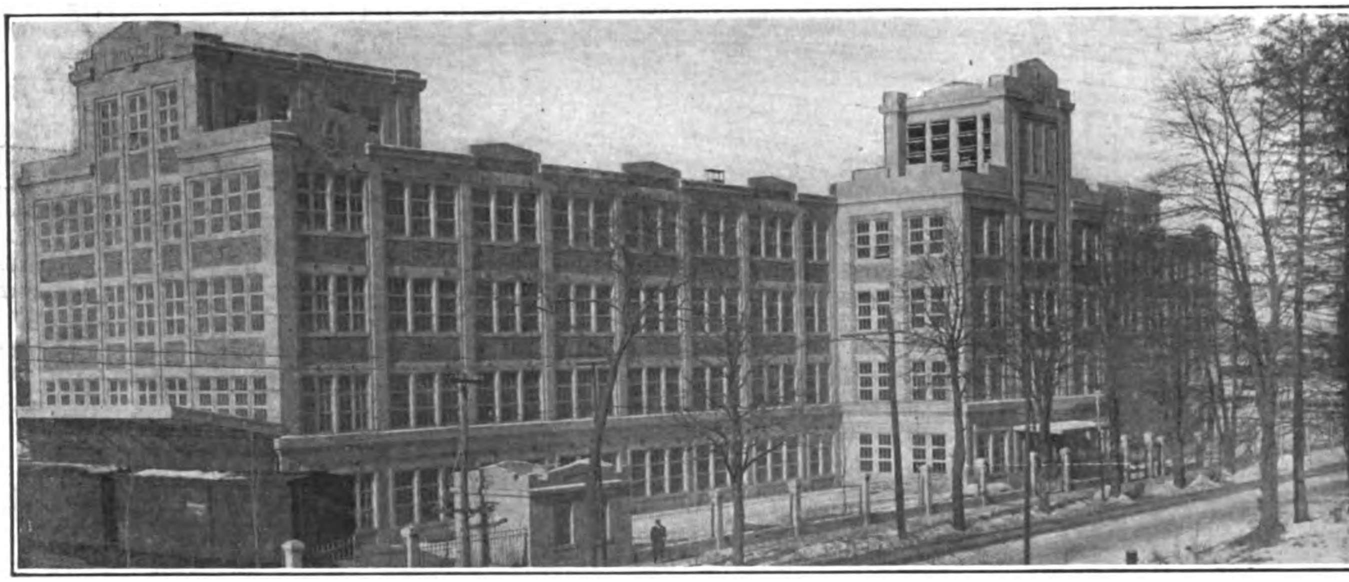


Fig. 1—Front of new Bosch factory at Springfield, Mass., showing railroad tracks coming up against one end of the building

Bosch's Modern Factory

Up-to-Date Shop Equipment and Highly Sanitary Construction Feature The New Works

Workers' Well-Being Considered a Production Factor

SITUATED in the heart of one of the greatest industrial districts of the United States and equipped with the most modern facilities in every respect, the beautiful new Bosch factory at Springfield, Mass., represents a basis upon which healthy and contented laborers may work with a high degree of efficiency. The force of the new factory comprises 1,000 men working on an available floor-space totaling more than 78,000 square feet, giving a space of 78 square feet per man in the establishment, which is illuminated and ventilated in an excellent way. These refinements constitute the most important advancement in the construction of the new plant over that of the old one.

The factory of the Bosch Magneto Company is a four-story building constructed of reinforced concrete, with a street front of 315 feet and a depth of 66 feet. Each story is 13 feet 6 inches high. The front entrance of the building is situated at the middle of the main street side and the way leads through this door to the main stairways which are four stories high and are crowned by the ventilating tower. Opposite the main stairway, on each floor, is a toilet room. From the central section, each floor extends to the end of the building where the ventilating louvers and fire escapes are located. The tower construction above each end of the building contains an intake fan and a cooling installation. The elevators are also situated at the ends of the building, and an electric dumbwaiter is provided which connects the main stockroom on the ground floor with those on the upper stories.

The most interesting features of the factory are: The shop equipment of the plant, which consists of the latest products of machine tool manufacture and includes many tools developed by the Bosch company for its own special uses; the arrangements for ventilating the building, heating the air in winter and cooling it in summer, besides keeping it free from dust, and the power plant.

Details of Ventilating System

In designing the ventilating system, the Bosch company has made a step which puts it in a position to rival the great metallurgical manufactories in Rhineland, Germany, which are famous for their sanitary construction. The fresh air is drawn in by means of two fans, on the two ends of the roof, which force it downward and through the workshops, whence it is expelled by the two large exhaust fans in the ventilating tower, Fig. 2. The quantity of air thus circulated is regulated by louvers, Fig. 4, placed between the work shops and central exhaust flue, and other louvers which are located in the walls of the stairways in the north and south ends of the building. The capacity of the exhaust fans is variable from 50,000 to 200,000 cubic feet per minute, while the intake fans can each deliver 3,000 cubic feet a minute.

In winter, only the exhaust fans are operated, so as to change the air in the shops twice each hour. This action draws in fresh air through 6-inch pipes which extend along the ceilings

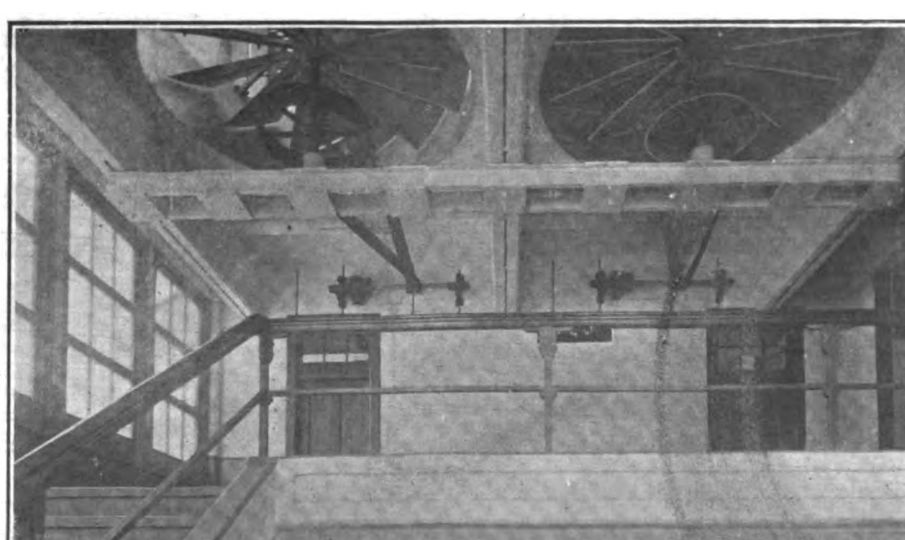


Fig. 2—Exhaust fans over stairway, expelling 50,000 to 200,000 cubic feet of air per minute

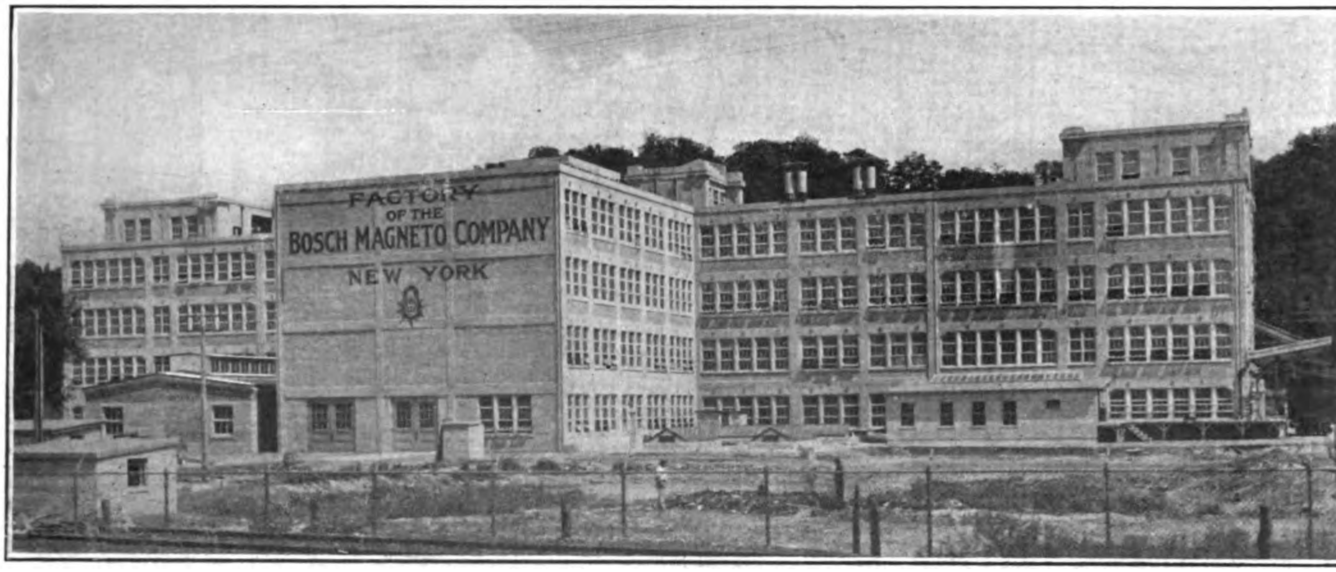


Fig. 3—Rear side of Bosch Magneto Company's new Springfield plant, with platform for unloading railroad trains at the side

and are slotted to permit the air to stream out into the shop atmosphere. This air, being cold, drops toward the floor and replaces the foul air which is exhausted through the louvers and by the fans. In the warmer season, when the windows are opened, the fresh air enters through them, and, as the temperature rises and the need for fresh air increases, the intake fans on the ends of the roof are operated.

During summer the exhaust fans are started 12 hours before sunrise, supplying fully as much fresh air as is necessary. This process also serves to cool the walls and posts thoroughly before work is started and keeps them so for some time. When the weather becomes so hot that a mere change of air does not cool the interior of the shops, the air, before passing through the louvers at the ends of the buildings, is forced through a cooling apparatus, Fig. 5. This installation consists of a series of spray nozzles keeping the chamber in which they are inclosed full of a cold mist which lowers the temperature of the air passed through it.

Heating Scheme is Adequate

An important feature of the ventilating system is that the air currents caused by it do not flow sufficiently close to the floors to raise the dust lying thereon. Incidentally, this arrangement of air streams protects the feet of the workers from cold and its effects.

The heating equipment equals the ventilating and cooling system in ingenuity. The hot air which is used to heat the shops passes through long radiator pipes at a low rate of speed, so that it radiates most of its heat. These radiators extend along the walls, but are separated by partitions from them as well as from the benches placed adjacent to them, the latter partitions being 9 feet high. This arrangement has the following effect: While the workers are protected against direct radiation from the radiator pipes, the air around the latter is heated and rises toward the ceiling, while fresh, cold air is admitted by way of the ventilator shield at the bottom of the windows. The hot air, rising, forms a wall which prevents the cold air from striking the workers and compels it to flow into the space surrounded by the partitions at both sides of the radiator pipes.

Reinforced-concrete factory is well designed and equipped. Elegant outside combined with practical and sanitary interior. Average floor-space per workman, 78 square feet. Fresh air throughout the year keeps the men efficient. The temperature in the factory is kept constant. Electric power and lighting used throughout the plant. Company manufactures many of its own special machine tools. Each magneto is tested and every operation accurately recorded.

Wash and locker rooms are located in the central section, where they form a wing attached to the rear of the structure. A similar wing is attached to the front and it is this wing that contains the main stairway and toilet rooms. The latter are also well ventilated.

Electric power and light are used throughout the factory, being produced by a 280-horsepower Diesel oil engine which is connected to a 200-kilowatt generator. The motor power is transmitted in the form of electric energy conducted from the generator to the shop by the 2-phase, 4-wire, 60-cycle, 440-volt system. The lamps used in the shop when the necessity for artificial illumination arises are 20 and 40-watt units respectively. The main driveshafts actuating the machine tools are 60 feet long. Undoubtedly, these many refinements will tend to keep up, and, if possible, improve the quality of the company's products.

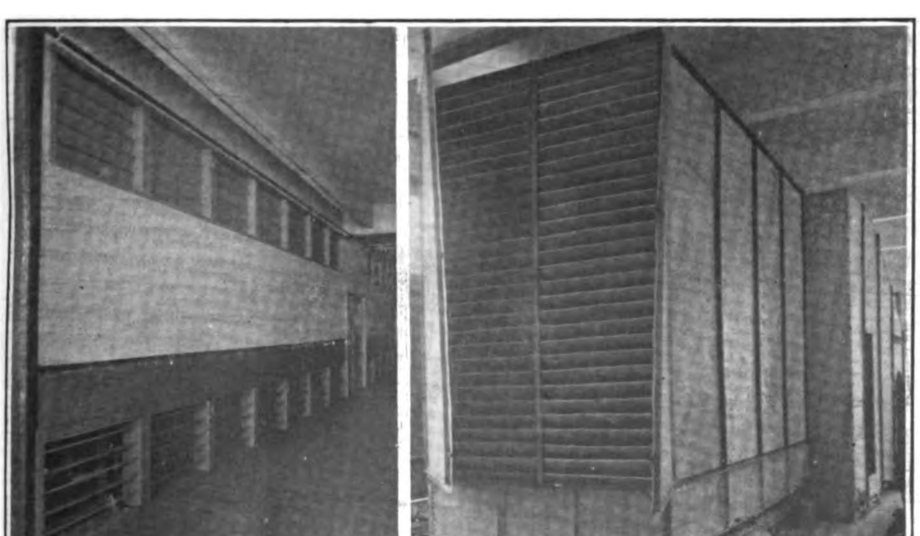


Fig. 4—Louvers regulating the quantity of air. Fig. 5—Air coolers in end towers

Putting Gears into Mesh; Tubes Blow Out Without Apparent Cause; Misfiring in One Cylinder, Motor Chokes; Smaller Radiators to Increase Efficiency; Looking for a Good Decarbonizer; Adjusting an E-M-F Clutch; Increasing Compression

Gears Do Not Mesh Correctly

EDITOR THE AUTOMOBILE:—The driving pinion in the differential set on my car is too deeply in mesh with the large differential wheel. I understand there is a method of curing this by inserting a gasket somewhere in the casing. Will THE AUTOMOBILE tell me how to do it?

Tonopah, Nev. TERRY SINCLAIR.

—You do not mention the type of car you are driving, so that there is a great possibility that you will not be able to make the repair on your car owing to a difference in construction. Taking an average method, however, the work suggested by you would be carried out as indicated in Figs. 1 and 2. The nuts shown in Fig. 1 are taken out and the whole casing containing the differential pinion bearing is removed. A gasket of the thickness that it is desired to pull out the pinion is cut and inserted between the two castings, as shown in Fig. 2. This will have the effect of drawing out the pinion, but the difficulty will not be altogether removed. The chances are that the large differential wheel will have to be moved closer against the small pinion to take up the wear on the parts owing to their wrong engagement. This can be done on some cars, but cannot be done on others. It will be easy to determine if the adjustment is possible in your particular type of car by examining the construction and method of supporting the large differential wheel. If there is an adjustment to move the gear wheel closer into mesh with the pinion it will be readily found.

Do Others Have This Trouble?

Editor THE AUTOMOBILE:—I wish to state my case and find out if there are any others in the same predicament as myself. My tubes, which are of a very well-known make with a good reputation, burst on the rim side and this nearly always happens when the car is standing idle. I have had this happen several times in one day. It started after I had driven my car its first 700 miles, the car and tires being practically new. I have had this trouble ever since. Patches will not cure it, as it rips open under the edge of any patch. I keep the tire fully inflated according to inflation table. The tires are of the clincher type and I have sent to the local agent, who renewed the sample casings I sent, but could not offer any clue to the cause of the trouble. I would like to know if any others are troubled in the same manner.

Lyon Station, Pa. MILTON SAUERMILCH.

—It is impossible to say without being on the ground. Other readers of THE AUTOMOBILE who see this may have had the same trouble and know what causes it. There is a possibility of the security bolts pinching the tubes when you put them into the tire nut, though it does not seem possible that this should happen so frequently. Try taking greater care when placing them in the casing.

Pinching very commonly results from the beads of the casing squeezing the inner tube between them, causing a blowout. Insufficient pressure is the principal cause for this.

One Cylinder Misfires Badly

Editor THE AUTOMOBILE:—Can THE AUTOMOBILE tell me what is the trouble with my car? On a recent trip, soon after starting out, one cylinder began to miss and I could not entirely overcome the difficulty even after changing the spark-plugs, looking over all the wiring and connections, readjusting the vibrator and, in short, doing everything I could think of. It would run along smoothly for a time and then the trouble would develop. The car has been driven only 1,100 miles and has had very careful handling. The compression in each cylinder is the same. The car is a model T Ford.

Portage, Wis. L. E. GRANT.

—Look for a leak in the intake pipe leading to the bad cylinder. There is a chance that the mixture is weakened by a leakage of air into this cylinder which causes it to misfire. Trembler fatigue is sometimes responsible for an elusive misfire. This is rare but should the trouble be traced to this the cure is a new trembler. Clean the contact points in the timer with a few drops of gasoline and be sure that the spark-plug in the missing cylinder is in good condition, both as regards its insulation and the gap at the electrodes, which should be only wide enough to admit the edge of a doubled business card. A mistake which is made occasionally by people who have taken the valves off the motor is putting the inlet spring where the exhaust valve spring should be. After becoming warm, the action of the exhaust valve is

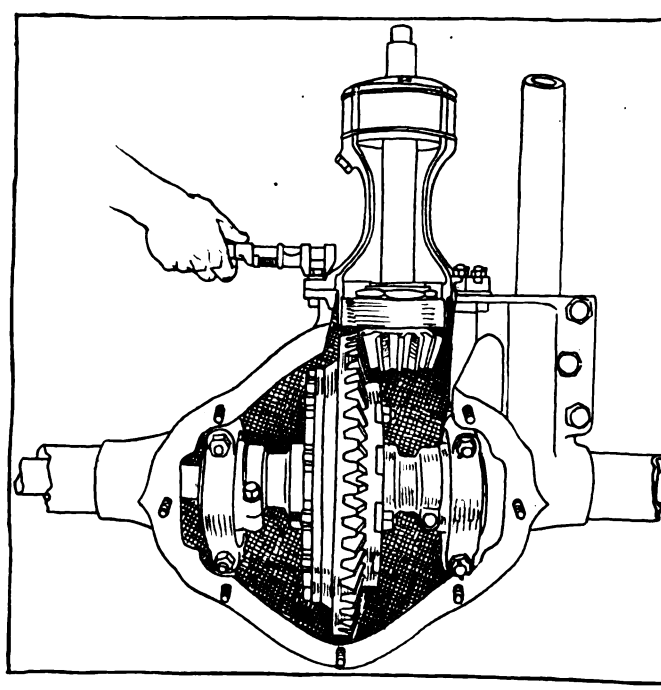


Fig. 1—Showing bolts which have to be removed in adjusting gear mesh

slower, owing to the weaker spring, causing a miss in this cylinder. On the Ford cars a very light trembler adjustment is necessary. If you have not tried a still lighter adjustment it would be advisable to try this. In case the valves have been ground, in spite of the short distance that the car has been run, there is the possibility that the stem of the valve is too long. It is a fact with these cars that the stems wear very much slower than do the valve seats so that a change of adjustment is necessary after a time or else the valves will open too early.

Chokes After a Fast, Stiff Pull

Editor THE AUTOMOBILE:—I have a 1911 Velie which is giving me a lot of trouble by choking up and skipping after a stiff pull of say 1-2 mile or more at the rate of from 25 to 35 miles an hour. I have tried all adjustments on both the B4, 1 1-4 and B5, 1 1-2-inch Stromberg carbureters, but without helping the situation any. The valves are in good condition as are also the piston rings. Can THE AUTOMOBILE suggest a possible cause for this trouble?

Easton, Me. H. R. DELAITE.

—If you are not bothered by air leaks of any kind, the whole trouble lies in an improper carbureter adjustment. It is entirely a matter of starting at the bottom and working through the adjustment rather than simply trying different adjustments after the motor starts to develop trouble. The correct way to adjust the carbureter is as follows:

After you have the gasoline turned on, first notice if the level is correct. It should be 15-16 inch above the rim on the bottom of the glass. If it is not, the level may be adjusted by turning the gasoline level adjusting nut M, Fig. 3. The level in the float chamber does not change as the nut M is turned but only after the motor has been started and stopped. If the level is not correct, it is a matter of turning the nut, starting the motor and then seeing if the level is correct when the motor is stopped. If not, the nut will have to be turned again and the motor started and stopped until the level is finally correct. Next, see if the air valve is seated correctly. It should rest lightly against its seating and this condition can be determined by tapping on the nut above the high-speed spring. If it does not seat, turn up the adjusting nut K, or, if too tight, turn the nut K down. Prime the carbureter until the float chamber is full. It will be noticed that some of the gasoline drops into the adjustable air

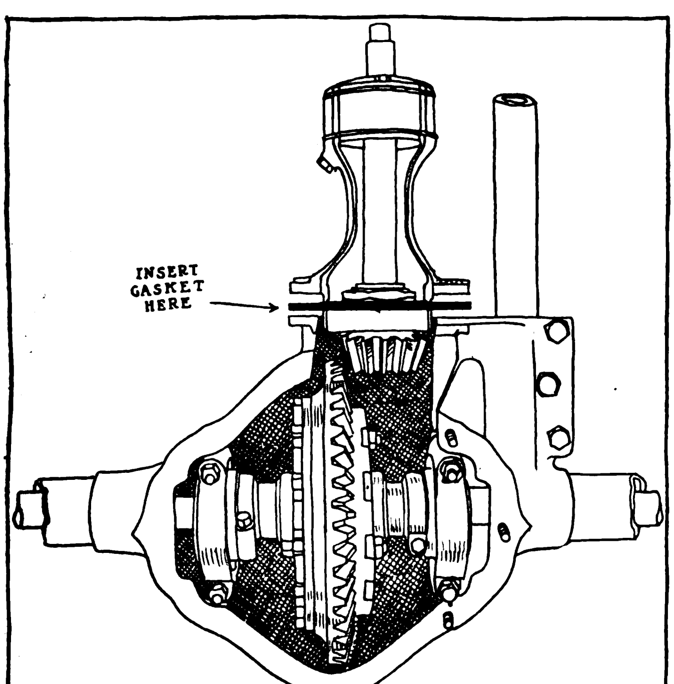


Fig. 2—Where the gasket should be inserted to bring gears into mesh

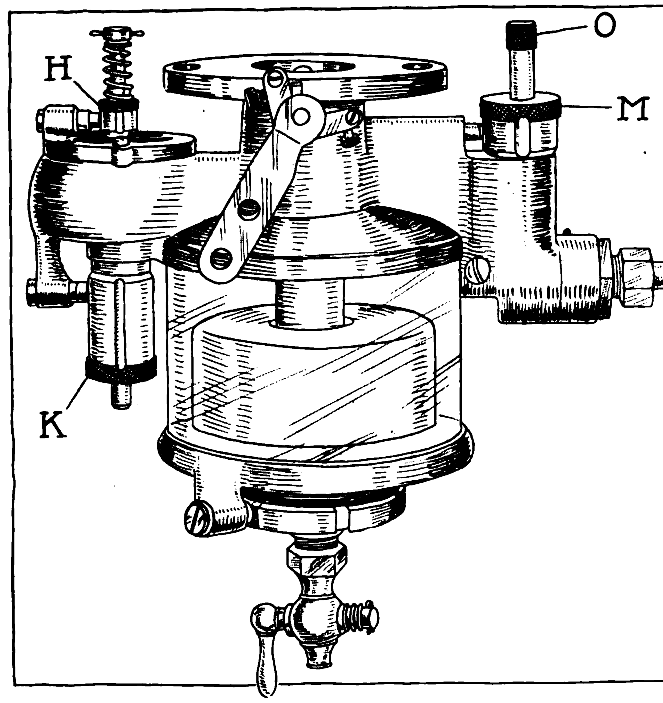


Fig. 3—Illustrating the adjusting points on B-type Stromberg carbureter

cup on the bottom of the carbureter. Turn this cup up as far as it will go and then turn it back two turns. On the average motor this will admit the proper amount of air, which regulates the gasoline supply. Next start the motor and turn the low-speed adjusting nut K with both the throttle closed and the spark retarded until the proper adjustment is secured. If the mixture is too rare, the engine backfires. In this case, turn up the nut K until the motor runs smoothly. It is wise to allow the motor to backfire at first, starting with this condition and screwing up on the adjustment until it runs smoothly. Next advance the spark and open the throttle gradually until it is wide open and if the motor backfires turn up the high-speed adjusting nut H one notch at a time until the motor runs without backfiring. Remember that the valve above the high-speed adjusting nut simply controls the air valve on open throttle or high speed. It should not be in contact with the nut above it when the motor is at rest. The seating of the auxiliary air valve is entirely controlled by the low-speed spring and there should be a space between the nut and the high-speed spring of not over 1-8 inch. It may be that, in adjusting the high-speed nut, in order to stop backfiring at high speeds, you will have to turn up the low-speed nut one or two notches. Do not do this unless you have to. After this be sure to see if the motor runs smoothly on a closed throttle.

The motor uses just enough gasoline to keep it going on low speed, and, as it increases in speed, it takes the necessary supply automatically. The motor suction draws air through the fixed air opening between the adjustable air cup and the bottom of the gasoline chamber, the air passing up through the mixing chamber through the spray nozzle, after which it is joined by the air entering through the auxiliary air valve, producing the required mixture. The more air that comes in through the adjustable air cup and the less through the valve, the richer will be the mixture, and *vice versa* Therefore, the low-speed spring should not be adjusted too tight. To change the spray nozzle, take off the draincock, whereupon the spray nozzle may be removed by means of a screw-driver.

Radiators Could Be Smaller

Editor THE AUTOMOBILE:—In reference to the communication by P. G. Tismer, I think that, in the main, he is wrong. The writer seems to ask a lot of questions but does not pause to

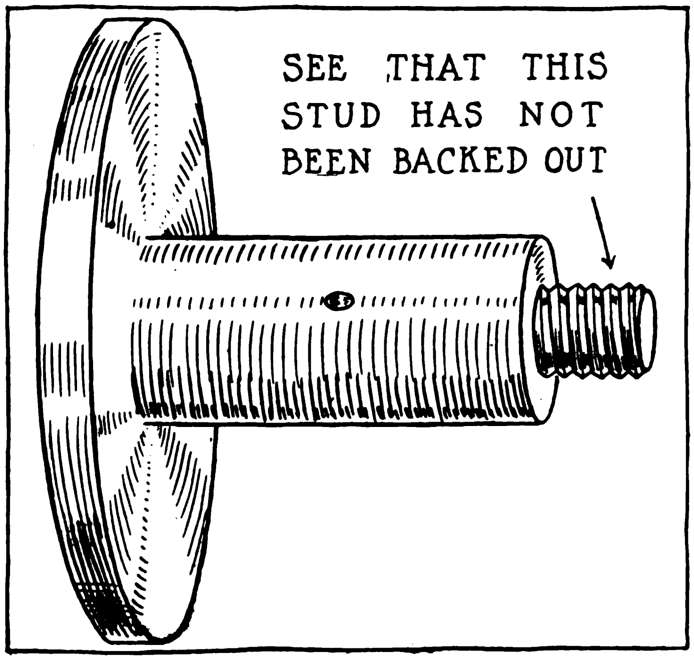


Fig. 4—Stud in flywheel end of E-M-F crankshaft which should be kept tight

take the obvious answer to many of them from daily practice in the automobile field. The Franklin car, for instance, is operated without waterjackets and operates very well indeed, but, nevertheless, it is a fact that the engineers of this concern were compelled to use their utmost resourcefulness in designing the excellent cooling system which they have today. The greatest cooling area which it is possible to submit to the cooling currents of air has been given the cylinders. The motor runs at a higher temperature than the water-cooled motor, but certainly does not reach the high temperature at which Mr. Tismer claims that his motor operates. I would like to know the make of the motor and horsepower. That lubricating difficulties have not developed is remarkable, considering the circumstances under which the motor is compelled to act.

What I do think, however, is that the modern gas engine could be made to operate at a slightly higher temperature and thus raise the thermal efficiency to some degree on account of less loss of heat to the cooling water. I would recommend that the merits of greatly reduced radiator area be investigated as I think that this is a solution of the problem of raising the thermal efficiency of the average touring car.

New York City. READER.

—A reduction of the heat thrown away in cooling the motor would be a very long step towards increasing the thermal efficiency of the motor, but practical difficulties in the way of steam intervene when the temperature of the water goes above 212 degrees Fahrenheit. The boiling radiator is a barrier in the way of reducing cooling area.

Car Has No Clutch Adjustment

Editor THE AUTOMOBILE:—I have an E.M.F. 30, 1910. I would like to know how to adjust the clutch. I have examined it and can find no way to adjust it, although it is slipping continually. How do you do it?

Parkersburg, W. Va. READER.

—There is no way of adjusting the clutch on the car of which you write. There are five things which could cause your clutch to slip and each of them is readily curable. As you offer no clue to which of these five your trouble is due, it would be best to take these up one by one in the order of their probability:

(1) Rivet projecting through leather. The rivets in the leather facing of the cone are supposed to be countersunk. This is essential as otherwise the clutch will not hold. When the metal sticks out beyond the leather there is a metal-to-metal contact which will not hold at all. It often happens that the rivet is only slightly countersunk when the car leaves the factory and after a time the leather wears away, leaving the rivet flush with the surface. The cure is to punch out the offending rivet, counterbore the leather for a short distance and put in a new copper rivet, being careful to get the head well below the surface after the rivet is flattened out.

(2) Leather glazed and somewhat hard. The best cure is to renew the leather. To do this, take the old leather as a pattern to cut out a new piece, or, better still, send to the factory for a new clutch leather. It will cost $2.00, but it will be correctly treated for the clutch facing. When putting it on be careful to counterbore the leather for each rivet. That is, make the hole in the leather first the same size as the hole in the metal against which the leather fits. Then, for a distance of 1-2 the thickness of the leather drill a hole with a slightly greater diameter with the same center as the first hole. This will give a seating in the leather for the rivet. Be careful in fitting the leather to stretch it on tightly or it will wrinkle and the clutch will seize. The probability is that, if the trouble has been the projecting rivet, as taken up under (1), the leather has become somewhat glazed, owing to the frequent slipping. The cure for a slight glaze is to thoroughly saturate the leather with neat's-foot oil. It must stand at least 24 hours after the application of the oil or the leather will not have time to take it all up. The clutch leather must be soft or the action of the clutch can never be right. It would be advisable, as long as you are working on the clutch, to give it this treatment of neat's-foot oil, no matter what the trouble may be.

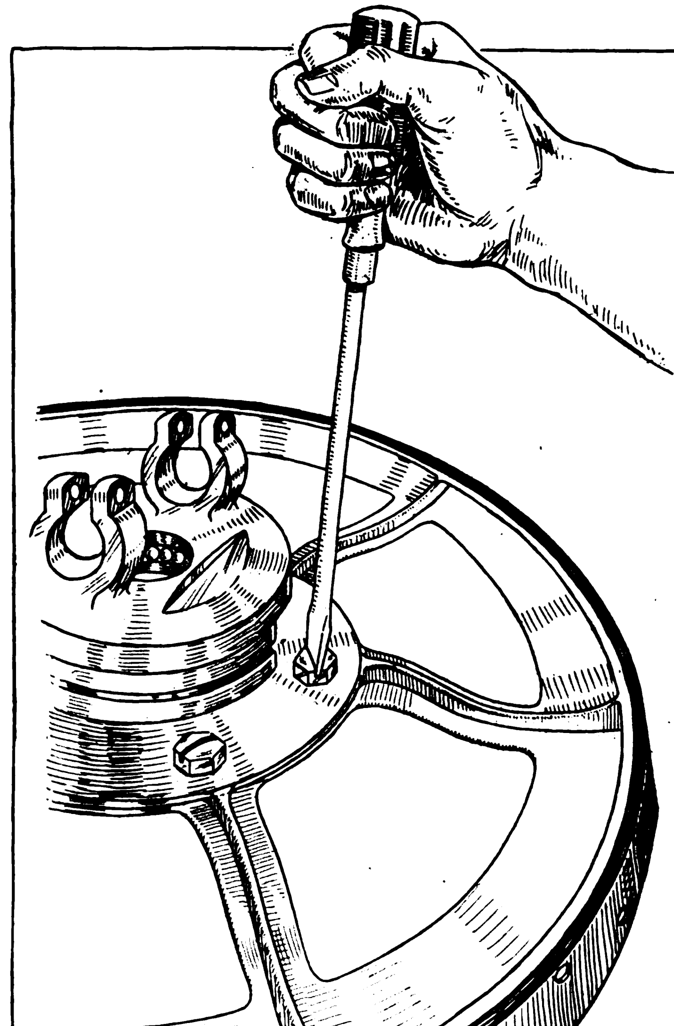


Fig. 5—Removing screw to get at the spring of the clutch used on E-M-F

(3) Leather worn away. In a case of this kind the only possible cure is to apply a new leather facing which may be accomplished under the directions given in (2).

(4) Crankshaft stud bolt backed out. In the flywheel end of the crankshaft is a stud, Fig. 2. The purpose of this stud is to hold the clutch in its correct relative position When the stud backs out a short distance, as often happens after the car has been in use for some time, it does not permit the clutch to fully engage, and, as a result, it slips. The remedy is to turn this stud up as far as it will go. When the clutch is removed the stud should be tried and, if loose, tightened at once.

(5) The last possibility is that the clutch spring is broken. This is extremely unlikely, for you would have found it out before now. Should this be the case, however, the cure is to renew the spring. The new spring will cost very little and it is easily put in place. The bolts shown in Fig. 5 will have to be removed to get at the spring. In replacing these bolts tighten them alternately. That is, take up a turn on every other bolt going around the flange so that the strain falls equally on all of them.

Looking for a Decarbonizer

Editor THE AUTOMOBILE:—I often see dry powder carbon removers advertised. The powder is put into the cylinder after a run and is said to clean out carbon well. Do you know anything about them? I have been in the habit of using a little kerosene oil. The only objection to this material is that you have to clean out the crankcase after it is used. If one could find a really good preparation in powder form it would certainly be a boon. I do not care to try experiments and greatly prefer to learn from the other fellow's experience. I have a 1912 Overland touring car and after more than 1,500 miles on our none-too-good roads, am delighted with it. No carbon has formed as yet in the cylinders.

Bridgetown, N. S. W. A. WARREN.

—The method you use in injecting a little kerosene into each cylinder is very good and should prove very satisfactory. You will not have to renew the oil supply if you do not put more than a tablespoonful of oil into each petcock while the motor is hot. The kerosene will vaporize and dissolve the carbon. There are all kinds of good carbon removers on the market, some giving better results than kerosene because they are stronger solvents. Without an exception they cost more, however, and you should not need them except occasionally if you use the kerosene after each trip. Carbon deposits will never trouble you much, anyway, if you do not use an oversupply of oil and take pains in selecting the oil you buy. Never stint the price on this important article as poor oil will mean all sorts of trouble in the end, not only from carbon but from other evils of bad lubrication.

To Reduce Compression Space

Editor THE AUTOMOBILE:—I wish to reduce the compression space in my Ford 20-horsepower car. I have been thinking of putting aluminum plates inside the cylinder heads, bolting them on in good shape, the plates being cast to the shape of the cylinder heads. I would like THE AUTOMOBILE to tell me how much space to have between the plates and the piston heads.

Mellen, Wis. JOHN LUNDQUST.

—If you are fortunate, this change will cost you only about $2.00. Look at your cylinder at the point where the water pipe to the radiator leaves it and see if there is a small X on the outside of the casting. If so, you have one of the low-compression heads which can be exchanged for a high-compression head at a cost of $2.00 if you take the matter up directly with the Ford people. Aluminum melts at 1,157 degrees Fahrenheit and would not be suitable for use within the cylinder as the temperature at the time of combustion runs considerably above this and the waterjackets may not be able to take care of the extra plates fast enough to prevent trouble Soft gray iron would be more suitable if you intend to put anything

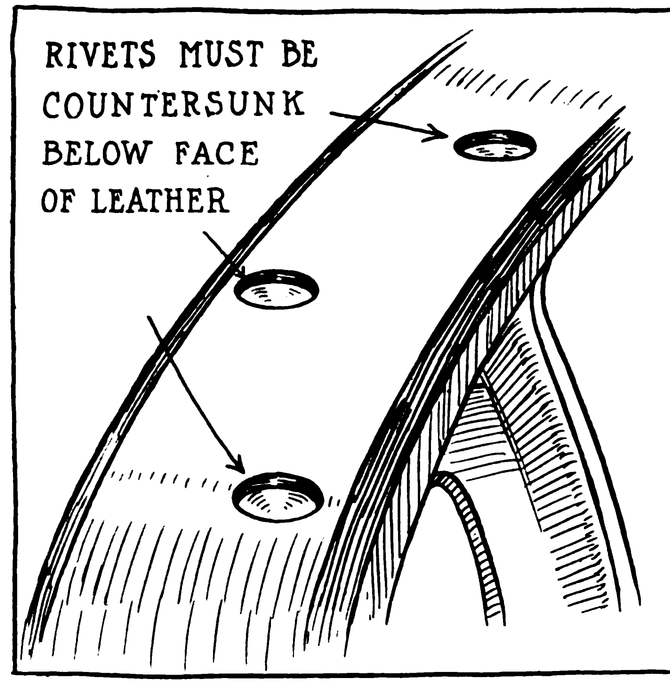


Fig. 6—The copper rivets must always be below the surface of the leather

in the cylinder, although it is not advisable. The amount of space left above the piston would depend on the extent to which you wished to increase the compression. For racing purposes, this could be as much as 90 pounds. The way to determine the volume of extra metal to put into the combustion space is as follows: Measure the compression that you have now in the cylinder. Call this P. Measure the present volume of the compression space as nearly as you can by putting the piston on upper dead center and filling the space above with heavy oil and then measuring this. The way to proceed with this is as follows: Take a gallon, exact measure, of heavy cylinder oil and weigh it. Then pour in enough oil to fill the entire compression space when the piston is on the top dead center of the firing stroke Now weigh the oil that remains. The former weight of the oil divided by 231 will equal the present weight of the oil divided by the cubic inches remaining in the can. 231 less the latter quantity will be the volume of the compression space, V. The volume of metal to be added to the cylinder to increase the compression D pounds would be

$$\frac{DV}{P}$$

A better way of reducing the compression space would be to plane off the lower face of the cylinder where it again fits against the crankcase casting and also to plane off the face of the cylinder head, making closer fits at both these points and permitting the piston to travel further up into the cylinder, thus increasing the compression. It is greatly to be doubted if you will find a perceptible gain in the running qualities of your car after you have changed the compression, except, perhaps, the engine will start more easily.

Letters Should Be Signed

[THE AUTOMOBILE is holding a few queries and communications which have been received unsigned. If a correspondent does not wish his name published it is merely necessary to state this fact in the letter and a nom de plume will be substituted. As an evidence of good faith, however, it is required that all communications be signed. Those which have been received up to date will be held until the identity of the sender is known. All communications will be answered strictly in the order in which they are received.—EDITOR.]

Papers Read at the S. A. E. Convention

Shipboard Meeting Brought Forth Several Valuable Contributions To Automobile Engineering Science

Much of the Material Brought to Light Had to Do With the Commercial Phase of the Industry, and the Discussion Which Followed the Reading of Each Paper Was Particularly Interesting In That It Developed Many Additional Points of Value

Motor Sizes and Drive Ratios for Commercial Vehicles

By E. P. Batzell, S.A.E.

Showing Necessity of Sufficient Power in Motors Designed for Every-Day Truck and Delivery Work—Importance of Proper Gear

ONE of the milestones of the midsummer session of the S. A. E. on the Great Lakes, between Detroit and Mackinac Island and return, was the attention devoted to the most suitable designs of motor for different size trucks, as well as the work in standardizing truck wheel sizes and tires. The two moving convention spirits in this work were E. P. Batzell, who exploited the matter of motor sizes, and W. P. Kennedy, who dealt with standardizing wheels sizes and tires. The discussions on both subjects were exhaustive, particularly that on motor sizes, which brought responses from nearly every representative of truck concerns at the session. The general consensus regarding motors for trucks was that they are too large, consume too much gasoline, are too heavy and out of all proportion to the transmission parts. Every one concluded that it was an error to try to adapt a pleasure car motor to truck uses because the services are so different. In a pleasure car the motor works but a very small proportion of the time, whereas in trucks it is working steadily for 10 hours a day under load. This steady service calls for large crankshafts, large crankshaft and connecting-rod bearing surfaces, large crankcase parts and slower motor speeds. There was a general consensus of opinion in favor of lower piston speeds and the design of motors, to give high efficiencies at medium crankshaft speeds.

The question of permissible or advisable speeds in miles per hour for trucks came up for sharp discussion. Some held for 8 to 9 miles per hour for a 5-ton truck, as compared with 12 or 13 miles per hour by others.

Variations in Truck Practices

Mr. Batzell in his paper, "Motor Sizes and Drive Ratios for Commercial Vehicles," showed the startling variations in truck motor practices, drew attention to the errors of motorizing a truck with a power plant taken from a pleasure car and the expense of over-motoring. Space permits of publishing here only leading extracts from Mr. Batzell's paper, together with the views expressed in discussion by the members. The complete paper may be published later. The following are extracts, setting forth the general points of the paper, but leaving out all of the mathematical calculations required in demonstrating the necessary construction in a motor truck, as well as the numerous charts illustrating the results of various tests:

The question of the selection of motor sizes for commercial vehicles has not been discussed much or often. It may be discussed as to several different basic conditions. In this paper it will be taken up principally from the standpoint of general economy, this being presumably most vital in successful commercial car service. Under general economy there are not only economy in consumption of fuel and oil, but also economy in the initial cost of the motor and its whole upkeep expense. At first the consumption of fuel only will be investigated, as to its variation according to different motor sizes for the same work. By assuming equal working conditions whenever comparison is being drawn, one need not keep track of the total fuel consumption in every case, but of merely the consumption per developed unit of work.

The abnormally great variation of present truck motor sizes is obvious. Taking the motor sizes of trucks of equal hauling capacity, as shown this year at the principal automobile shows, one will find in the case of 1-ton trucks the piston displacement varying from 144 cubic inches to 350 cubic inches, and in the case of 3-ton trucks from 230 cubic inches to 570 cubic inches. Figuring the above volumes at an equal piston speed of about 800 feet per minute, the respective variations become: total piston displacement per minute of 1-ton truck motors from 100 cubic feet to 178 cubic feet, and of 3-ton truck motors, from 135 cubic feet to 264 cubic feet. Taking into consideration the difference of the weight of the vehicles proper, together with their rated load, the piston displacement per pound of this weight in the case of the 1-ton truck varies from 40 cubic inches up to 61 cubic inches, and in the case of the 3-ton truck from 21 cubic inches to 38 cubic inches per minute.

Efficiency Depends on Design

When a truck does a definite amount of work by using some 50 per cent. less volume of piston-swept cylinder space than a similar truck of another make, one motor may be developing less power per cubic inch of piston displacement than the other, or the power losses in the mechanism of one truck may be much greater than in the other. The efficiency of an automobile driving mechanism differs greatly according to the general constructive features incorporated. However, in many cases of well-built trucks the transmission of the motor power to the driving-wheels occurs under approximately equal conditions. Consequently the motors of different size, but developing the same power, are acting under entirely different conditions in regard to transforming their gas explosions into outside work.

The power developed per unit of piston displacement depends on the charge taken into the cylinder, the compression ratio, the heat losses, the carburation and gas mixture consistency, ignition, timing and a few other things. The present discussion refers only to common 4-cycle engines. The compression space in truck motors is frequently 28 to 30 per cent. of the total cylinder volume, as against 20 to 23 per cent., and sometimes less in pleasure cars. Inasmuch as high compression motors develop at medium speed relatively more power than low compression motors, the difference in truck motor sizes can be explained in part by the difference of compression used. A variation of motor size within 5 to 10 per cent. of the piston displacement can be thus explained.

In certain cases it happens that a manufacturer uses a pleasure car type motor for trucks, either because the same motor is used also in his pleasure cars or because he is able to secure the motors on otherwise profitable terms. Putting pleasure car motors into trucks explains further why truck motor sizes vary so much. A comparatively small pleasure car engine is apt to have enough power for commercial car purposes in certain cases where otherwise a larger motor would be advisable; the high compression of the former assisting somewhat in power development. Such an engine, if kept working at comparatively slow piston speed, may hold out well and also prove sufficiently economical in fuel consumption, because it has a higher thermal efficiency than the low compression motor, providing it has a good volumetric efficiency. On the other hand, when an oversized pleasure car engine is used for a truck of comparatively small carrying capacity, the engine will have an abundance of power for even any extreme case of requirement during service, but most of the time it will be developing only a small part of its power capacity. Consequently this engine will work with very little cylinder filling by fresh charge, with small throttle opening, and the thermal efficiency will be low, as well as the mechanical efficiency, because the amount of power lost in the mechanism of the engine proper will be large as compared with the amount of power generated by the motor. Moreover, the initial cost of oversize motors is considerable, and they weigh more and take more space than motors of rational size and power for a given purpose.

Power Plant Should Be Adequate

It might be said that a larger engine gives better assurance against interruptions in service apt to occur from lack of power. This may be true in cases where severe requirements and hard work with large power consumption are anticipated. However, instances of abnormal use of power are not encountered very often, and it should not be considered good policy to fit all trucks of a certain carrying capacity with a power plant large enough to take it at high speed over hard roads on a steep grade. The proper way is to furnish trucks of a certain carrying capacity with power plants of different size to suit most economically the conditions to be encountered in the prospective service. If the selection of power plants is correctly made marked results in economy of service operation can be shown.

It has been already stated that relatively high compression raises the thermal efficiency. On the other hand, it means higher pressure throughout the moving parts of the engine, and consequently the losses due to friction in them become greater also. Moreover, at slow speed the heat losses through the cylinder wall, especially through that surrounding the combustion chamber, are greater with high engine compression than with low, notwithstanding the larger area exposed to cooling in the latter. In some instances these losses may more than offset the gain in the thermal elapsing of the engine cycle. At any rate, they limit the compression ratio, which is economical for commercial car purposes.

When considering the high compression employed in pleasure car motors it must be remembered that they are high-speed motors working most of the time with comparatively low volumetric efficiency. It seldom happens in pleasure car practice that the motor is run at slow speed with the throttle wide open, and when it does happen the duration of such running is generally short. The high-compression motor has sufficient time to recover from this severe working condition which imposes great requirements upon all its parts, and especially upon the cooling system. Pleasure cars, being driven at slow speed mostly with small throttle opening, or with larger throttle opening at higher speed, take only a small quantity of fresh charge into their cylinders per suction stroke, and consequently, notwithstanding the theoretical compression ratio, the compression pressures are comparatively low. This is because the absolute pressure at the end of the intake stroke is lower in a cylinder working with smaller volumetric filling. The commercial cars generally make use of slow-speed engines, which have a more complete cylinder filling by fresh gases, other things being equal. Therefore the high compression ratios, if used in them, would disclose much sooner the bad effects upon the engine parts from the higher pressures of the working cycle, resulting from the more complete volumetric cylinder filling, than if the pressure had been preserved at the average pleasure car values. Thus is established the advisability of a fairly small compression ratio in commercial car motors. Even if this slightly reduces the thermal efficiency, the prolonged life of the motor ought to offset it. Contrary to the nature of pleasure car work the commercial cars are run much more frequently under conditions requiring a fairly constant and large amount of their motor power for a long time. One cannot rely on relieving the motors from signs of overwork during easy runs which alternate with the periods of harder work.

Maximum Torque at Slow Speed

Torque—The volume of cylinder filling by fresh charge during 1-cycle period is closely interconnected with the engine's pressure diagram, it being supposed that the engine has reached the stationary state of its thermal balance, viz., its cycle heat exchange. The cylinder filling is likewise interconnected with the developed motor power and torque, the latter being equal to the mean diagram pressure, times the piston area, times the crank radius, times the mechanical efficiency of the motor. In most well-proportioned automobile motors the maximum torque is developed at very slow speed, the slowest at which the motor will run under full load. However, many features of motor construction, parts alignment, carbureter action, timing, etc., affect this in one way or another so that the point of maximum torque cannot actually be foreseen even approximately. As mentioned, the heat losses occurring during an engine cycle are considerably higher at slow speed, which reduces accordingly the thermal efficiency and the rate of power production per contained amount of fresh charge in the cylinder. If no heat were lost through the cylinder walls, the greatest pressure diagram area of the motor working cycle would be reached at the moment of greatest cylinder filling, perfect carburetion of gas mixture being assumed. But on account of the existing loss of heat this greatest area is located at certain higher revolutions per minute when the length of time per motor stroke, during which the cylinders are exposed to the charge, is reduced. This time should be reduced enough so that notwithstanding a less complete cylinder filling at the higher speed, the most favorable conditions of generating power from the explosive charge are had. These conditions are seldom obtained in practice. They require that the motor deliver considerable work at a low speed, when the latter does not influence appreciably the volumetric cylinder filling through choking in the intake valves and passages. In fact, the slowest obtainable motor speed under load with full-throttle opening would lie most often above the revolutions per minute at which the rate of reducing the heat losses equalizes the rate of volumetric filling decrease with rising speed.

When considering the cylinder filling purely theoretically, as the result of filling a compartment under influence of a pressure difference created by the suction action of a piston, the greatest volumetric filling corresponds to the lowest recorded motor speed. However, if a true reproduction of the motor performance is desired, certain practical points which might alter the former theoretical result must be introduced. One must separate the meaning of actual volumetric cylinder filling, which refers only to volume, from the best cylinder filling, as mentioned in this article. The second meaning is intended to denote not only the volume of gas freshly taken into a cylinder during the inlet period, but also this volume adjusted according to the state of the air and gasoline mixture in regard to the capacity of power development by this latter. Although the greatest measurable volume of air and gas would be drawn into a cylinder at the lowest speed, the conditions of the air, of the gasoline, of the carbureter adjustments, etc., may be such that the most effective mixture consistency, considered from the point of power development per unit of volume, would appear at a somewhat higher revolution per minute. Consequently the point of the best cylinder filling would lie somewhere between the lowest obtainable motor revolution per minute and the revolution per minute at which the best mixture consistency is reached. Its location marks the point at which the decrease of volumetric filling is counterbalanced by the improvement occurring in the mixture quality. Moreover, the condition of some of the motor parts might exert an influence on the moment of best cylinder filling, deduced as the result of apparent power generating, when, for instance, leaky places around the valves, pistons, etc., permit the escape of a larger amount of gases at slower speed.

Changes in the Gas Velocity

The actual volumetric cylinder filling is represented by a curve which has a maximum at the slowest motor speed, gradually decreased up to certain much higher revolution per minute, and then begins to rise slowly once more. This last rising part of the curve can be explained partly by the inertia of the gases acquired during the suction stroke, the inertia increasing rapidly with the revolutions per minute. After a certain speed is reached the gas velocity is so high that a larger amount enters the cylinder during the latter part of the suction stroke; then the decrease is effected through greater throttling of the gas flow due to higher velocity. This would become particularly noticeable at high revolution per minute in motors with late inlet closing, and also in motors with earlier inlet closing, when their inlet valves are small and choke the passing gases considerably. The curve mentioned can also represent the elapsing of the best cylinder filling with the motor speed; in other words, this latter filling coincides with the volumetric one, when assuming that the carbureter delivers a mixture of best consistency from the lowest motor speed on, and that the motor itself is in good condition throughout.

Within practical limits the coefficient of friction generally decreases as the motor runs faster. Another item to be included in the mechanical motor losses is represented by the power required for driving the air fan, the oil and water pumps, the magneto, etc., which also increases with the motor speed. Whether the resulting percentage of total mechanical losses in a motor will increase, remain constant or decrease with the gain of speed depends on the relation between the above-named kinds of power losses. Were it possible for a motor to retain a constant pressure diagram area through a range of speeds, the respective torque curve would gradually drop or rise according to whether the mechanical efficiency dropped or rose. However, the pressure diagram area will almost always be reduced at higher speed, and therefore the point of maximum torque lies at higher revolutions per minute than the area maximum for the case when the percentage of mechanical losses is decreasing at rising speed; the exact location of the point would be where the decrease of diagram area is equaled and compensated by the simultaneous decrease of mechanical losses. On the contrary, should the percentage of the latter represent a value increasing with the motor speed, the maximum torque will be located at the point of greatest recorded diagram area, on the assumption that this corresponds to the lowest speed of which the motor is capable under full load, and that the functioning takes place properly. In the case of an irregularly acting motor, showing from the beginning a rising value of the pressure diagram area, the maximum of the developed torque will be located at lower revolution per minute than that of the area, and also at the point where the increase of one item is compensated by the decrease of the other.

At present many commercial cars are equipped with too powerful motors and with only two forward speeds. Reconsidering the statements of this paper for a case of a two-speed transmission one would find that here the motor must be more powerful than where a greater number of speeds are used because it has to have ample torque when the tractive resistance does not warrant the use of the low gear, but is greater than the average encountered. The single reduction in the drive necessarily being low enough to overcome the greatest expected resistance, and present practice seldom making it more than 30 to 1, or more than twice higher than the lowest ratio figured in the above example, in equally extreme conditions the two-speed transmission requires more than twice the developed motor torque of the four-speed one with a proper lowest ratio, determined in accordance with the description given above. Such an oversize motor would actually perform the service required, but without any consideration of desired economy. In many instances the motion of the vehicle would occur with a tractive resistance by far smaller than that which the motor can overcome with full-open throttle; consequently, the frequency and duration of its runs with partially closed throttle increase. An observation of such trucks in actual service conditions would make this plain, because there is hardly a chance of seeing them running with wide-open throttle, which indicates that the motor is not loaded to economical capacity. On the other hand, the road resistance might become too great to be taken care of by the direct-drive ratio of the car, with open throttle, necessitating the use of the low gear. This ratio might be so low that a very small throttle opening would suffice to develop the required power. Moreover, the speed of the vehicle would be reduced correspondingly, bringing the vehicle down to 4 to 5 miles per hour, or even less, whereas a much greater promptness could be maintained with the intermediate ratio of a three or four-speed transmission. The two-speed transmission involves extra expense, such as for fuel consumed, time wasted by slowing down below the speed corresponding to the actual requirements of the road conditions, large motor with interconnected inconveniences, etc., all for the sake of gaining a trifling simplification in the transmission construction. It is easily seen that the two-speed transmission is not satisfactory in commercial work.

Some Economical Requirements

It is to be noticed that the foregoing discussion deals with the question of the most economical motor size without consideration of the power consumed when accelerating the vehicle. It would be entirely wrong to base judgment as to essential motor size on an assumed rapidity and ease of get-away. A buyer can be influenced easily by a demonstration when a loaded truck is starting under way from standstill with second or high gear in mesh, although in reality ability to do this indicates merely uneconomical action during average service conditions. Starting, as well as the propelling of a vehicle, imposes certain requirements on the motor torque, not its power. The favorable shape of a motor torque curve has been explained, dropping gradually from the lowest revolution per minute on. This gives a double advantage in starting the car with the motor running comparatively slowly. On the other hand, it is often profitable to use flywheel inertia to assist in making the start or overcoming some other increased resistance of short duration. A torque curve having a rise at its beginning makes starting somewhat easier than the gradually dropping one because it is apt to give greater torque values in a certain range of revolution per minute after its maximum. Combination of the torques and flywheel inertia in connection with a slipping clutch gives a quicker start, with the faster running motor with the greater torque, but, as stated above, the rising and subsequently dropping torque curve shape is not favorable to economy and the distribution of drive ratios.

Quick acceleration in congested traffic is more important in a pleasure than in a commercial car; it causes some overwork of the motor and adds severe requirements of efficiency of the general brake system, which ought to cause a stop at least as quick as the time of acceleration; otherwise a heavy vehicle with a great momentum gained by acceleration brings very undesirable conditions into traffic. It is proper to run a heavy truck with low gear in mesh in a tight place, when a comparatively small motor will develop sufficient torque and power to keep the vehicle within reasonable limits of acceleration without disturbing the general traffic order. At any rate, the question of acceleration can be introduced as an item of some importance into the selection of the proper motor size only in those circumstances when frequent stops and starts are anticipated during service. In all other cases it would prove of too little advantage to gain time by a rapid start with a larger motor in the car, as against the lack of economy due to running continuously under a small percentage of its power development capability. The possibility of frequent starts being practically excluded in the service of trucks of large carrying capacity one can omit entirely any consideration of power required for acceleration when determining their motor sizes. On the contrary, motors for delivery wagons, passenger buses, etc., should be selected so as to assure reasonable promptness during starts, which means using larger motors comparatively.

Returning to the motor size finally indicated as the result of the example figured hereinbefore for a 3-ton truck, its dimensions, 3 1-2 inches by 5 1-4 inches, seem much too small, particularly when comparing them with those of present practice. However, one is more accustomed to the latter, although they have been adopted without investigating actual normal and extreme requirements. As stated before, it has appeared safe to use an oversize motor in a truck; thus one did away with possible future criticism as to lack of power. With increasing attention being paid to economical performance in service, which ought to influence the scope and extension of commercial car application, the matter of properly selecting motor sizes according to service conditions rises in importance. It can cause not only a general revision of truck motor sizes, but introduce a greater variety of motor sizes for cars of the same capacity, of the same make, whereby different motors will be selected in accordance with prospective service. Thus one may become gradually educated to the fact that the use of a four-cycle, four-cylinder, 4 3-4 inches by 6-inch motor in a 3-ton truck regardless of the prospective service means at the least a serious disregard of economy. A buyer of commercial cars will do well to look into this side of the question to assure himself that the extra expense connected with the oversize motor remain within allowable limits. The proper solution of the question requires considerable experience and ability. Nevertheless introducing principles of "scientific management" into the matter of purchasing commercial cars is justified, not restricting their application to the organization and management. In this connection it may be mentioned that although this article deals with the question of motor size only, a similar investigation could be made of the other parts and constructive features of the vehicle.

Torque Determines Motor Size

It is of interest to consider in what cases motors of the present large sizes can be worked to their capacity economically, taking for example, a 4 3-4-inch by 6-inch motor in a 3-ton truck. This motor has a piston displacement of about twice that of a 3 1-2-inch by 5 1-4-inch motor, and ought to be treated as capable of delivering twice the torque of the latter under otherwise equal conditions, including piston speed. It can propel the loaded vehicle over a level road of 40 pounds per ton tractive resistance at a speed of 17.5 miles per hour; up a 10 per cent. grade with 100 pounds per ton resistance at a speed of 2.25 miles per hour; and the empty vehicle at 26.5 miles per hour. With the same lowest gear ratio as with the small motor this larger one can take the fully loaded car up a grade of 20 per cent. (11.4 degrees incline) with a tractive resistance of 200 pounds per ton, which corresponds to a soft, muddy road surface. There is no doubt that conditions might be met in practice when reliable service could be rendered only with a motor not smaller than this, but that does not justify its use in all cases. As to the methods by which the proper motor size can be determined, one can say that attention should first be paid to the developed motor torque and its elapsing through a wide speed range, leaving the motor power to play a secondary rôle. It is the required motor torque and not the required power which determines the economical motor size for a commercial vehicle, as well as the suitable drive ratios.

Discussion on the Batzell Paper

C. T. Meyers, General Motors Company, in opening the discussion on the paper, said:

The views in this paper should be attractive to any one who has a truck. Motors in American trucks are too large for the loads they have to draw. The American motors are too much along the line of touring car types. They deliver far less than the maximum torque under ordinary conditions. We can reduce the piston displacement 33 per cent. in many of our truck motors and still have enough power. Mr. Batzell suggests for a 3-ton truck a four-cylinder motor with 3.5-inch bore and 5.25-inch stroke. I do not think this would give enough power with our gearset limitations. I think a motor of this size would be ideal in a 1.5-ton truck carrying a 2-ton load. After many experiments with a 3.5-ton truck with a 5x5-inch motor we put in one 4.5 inches square and carrying a 10.5-ton load, took grades of 3.5 to 4 per cent. on direct drive with a 6.5 rear axle ratio. I should like to give data we have collected on trucks to prove that the motor is rarely called upon to show its maximum torque. When using the too large motor we are burdening the truck with additional weight and making the owner spend too much for gasoline. Many important changes can be made in gearbox design. A motor truck speed of 13 miles per hour is perfectly feasible under many conditions, but the average truck of today operated over average city streets and average country roads by the average driver will not operate at the best advantage to the owner at such a pace. Our 5-ton truck works at 9 and 9.5 miles per hour. If all of these matters are taken into consideration by designers it is possible to make a good truck at less cost to the maker and owners.

David Fergusson, Pierce-Arrow Motor Company, said: The motor should be made as small as possible in order to do the work, and in trucks it should be kept at as constant speeds as possible. Regarding motor size, it should be such that it has not to work at over 75 per cent. of its capacity for a 10-hour day; otherwise it will not endure as it should. Experience is the main factor in determining motor sizes in trucks. We have over 200 in daily service, many of which have been working for over 18 months. For 5-tons the motor is four-cylinder, 4.875 by 6 inches, and it gives good results. It is an easy problem to determine the necessary motor size for a commercial vehicle when you have the correct size for one truck model. I think 18 miles per hour for a 2-ton truck, 15 for a 3-ton size, and 12 or 13 for a 5-ton, satisfactory. The truck motor must last longer than that of the pleasure car; it should readily last for 10 years and many more. If you put in too small a one, it will not last that long.

Mr. Bachmann's Brief Comments

E. R. Bachmann, the Autocar Company: I have been with our company since the inception of the truck movement, and think Mr. Batzell has offered material to furnish the basis of some very valuable thought for commercial vehicle practice. The correct size of a motor for a truck calls for more care than in a pleasure car. The necessary motor size in a pleasure car depends on the speed that the buyer wants, whereas in the commercial field it is solely a problem of transportation, and the various truck parts must be so proportioned as to transport goods at the lowest possible cost. Our company made an analysis of the different motors and trucks at the recent commercial vehicle shows, and the motor sizes in relation to truck load varied so much as to conclusively prove that the industry is in a very young state. In many trucks the motors are too large for the gearbox used; these must be proportioned. If a truck designer in laying out a truck installs a motor capable of taking all grades from the Atlantic to the Pacific on direct, he is wrong and his action is as absurd as that steam engineer who would use the same locomotive to transport merchandise over the Rocky Mountains that he would use on the plains.

Charles E. Duryea, C. E. Duryea Company: I have been building occasional delivery wagons since 1898, and I am in favor of keeping the motor speed low, and I have always aimed at designing a motor to give high torque at crankshaft speeds of 600 or 800 revolutions per minute. The difference between the high-speed motor and the low-speed motor is that between the race horse and the draught horse. We should have the draught horse type of motor. I favor the two-cycle type, as it fills its cylinders better at low crankshaft speeds and so pulls better than the four-cycle. You cannot get as much power out of a two-cycle at high speeds as a four-cycle, but more at low speeds.

J. G. Perrin, the Lozier Motor Company: The relation of tire life to truck speeds is a vital factor. The motor can be made to drive the truck at high speeds, but the life of tires under such service is limited. We must calculate the critical point in this regard.

Mr. Birdsall Gives His Views

E. T. Birdsall, Detroit, Mich.: I agree with Mr. Batzell. I favor a small high-speed motor with crankshaft, crankshaft bearings and crankcase parts of size for a very large motor. To be explicit, I favor using a motor of 3.75-inch bore and 5.5 or 6-inch stroke, and making these parts as heavy as would ordinarily be used in a 5.5 by 5-inch motor. This would do for a 3-ton truck, the motor operating at 1200 revolutions per minute. In the matter of truck speed in miles per hour it resolves itself solely into what you want to pay for tires. If, like some truck owners, you propose to use it for 18 months, working it 24 hours out of the day and at highest speeds, so by that time you will have got your money out of it and be ready to buy a new one, as some do, because they vainly imagine it is cheaper, then speed is everything. A 5-ton truck should not work at over 9 miles per hour.

Howard Coffin, Hudson Motor Car Company: The foundation of this matter is not a question of cylinder bore, but one of piston speed in feet per minute. It is a question of determining the speed limits for cast iron pistons to work against cast iron cylinders and the experience of big engine practice has settled this question, and why should we throw such information to the winds? Our basis of design for a truck motor should be the same as the basis of design on which makers of large motors have been following.

Henry Souther, New York City: The weight of the truck motor with relation to the weight of the truck is important. We made a mistake in the pleasure car field; we began with too light motors and then made them heavier. In the aviation field the makers started with too light motors and are now making them heavier; and now in the truck field the same error is being committed. The truck motor must run steadily and longer than the pleasure car one, and we must make the parts larger and heavier and use better materials. These factors must be taken into consideration in connection with low piston speeds. Such a motor will last.

W. A. Brewer, London, Eng.: In England we built trucks too light at the start. Now we use a 4-inch bore on 3- to 5-ton trucks. The cylinder sizes are not the fundamental point from which you carry out your truck design. With us the depreciation in trucks averaging 20 miles per day in heavy service, has been in the replacement of small motor parts or accessories.

Worm and Helical Gears As Applied to Rear Axles

By Frank Burgess, S.A.E.

An Outline of the Qualifications Necessary in an Efficient Worm Gear, With a Description of an Apparatus for Testing Same Before Installation

FRANK BURGESS by reading a paper on "Worm and Helical Gears as Applied to Rear Axles" struck a responsive chord in many listeners, and the discussion which followed the reading of the paper was comprehensive. The paper is as follows:

European practice, extending over a period of 15 years, has given ample evidence of the eminent success of the helical type of gearing, and I feel confident in saying that in the near future a large percentage of the cars in the United States will be equipped with this drive. Mileage records of 50,000 to 124,000 have been established.

Regarding the terms worm, helical and spiral I would say that spiral gear is the term commonly given to a gear the teeth of which have a uniform twist parallel to the axis, although for technical correctness the word helical should be used instead of spiral. A spiral is a line generated by progressive rotation of a point around a fixed axis, with a constantly increasing distance from the axis. Two forms of the spiral are the plane and the conical. Kent states: "When the axes of two helical gears are at right angles, and a wheel of one, two or three threads works with a larger wheel of many threads, it becomes a worm gear, or endless screw, the smaller wheel or driver being called the worm and the larger or driven wheel the worm wheel."

I suggest standardization of terms, and that to avoid confusion any gears of the helical type transmitting motion with shaft angle at 90 degrees, with a speed reduction less than 10.1, be termed right-angle helicals; and with any other than 90 degrees shaft angle the term helicals, stating specifically the exact angle of shafts. If shafts are parallel the term helical spurs should be used.

As the term right-angle helical is not as convenient as the term worm gear, and inasmuch as for automobile work most ratios will be less than 10-1, with 90-degree shaft angle, I would suggest the term helical gears as most appropriate. Otherwise it would be better to use the general term worm or worm gear to include all reduction ratios, even as low as 1-1. This matter should be settled promptly one way or the other.

The History of the Worm Gear

Worm gears were used at an early date. Archimedes is credited with the invention of the screw in 250 B. C. for the purpose of launching a large vessel built under his direction. Hero of Alexandria in 150 B. C. showed the screw in several forms of his spiritalia. About 1600 Jacobi Bessoni designed a rude lathe for cutting wooden screws. Important improvements in screws and screw-cutting machinery were made by Jesse Ramsden, Henry Maudslay, Sir James Barton, Sir Joseph Whitworth and William Sellers.

During the past 20 years great strides have been made in the development of helical gears. The adoption of these gears for parallel and right-angular drives has made practically a new element in machine design. Until this form of gearing was made commercial by the invention of special machinery suitable for economical production, there was considerable reluctance on the part of the manufacturers to adopt the helical gear.

The principal reason for the adoption of the helical form of tooth appears to be its peculiar quality of silence, regardless of speed or load. With the best methods of design and assembly, great durability, strength and efficiency are obtained.

I believe that on all styles of cars in the United States the worm gear could be used successfully for rear axle purposes.

The successful worm gear should embody the following qualifications:

1. Cheapness of construction.
2. Strength for resisting shocks
3. Hardened and smooth surfaces for durability.
4. Material of a suitable composition to reduce friction.
5. Simplicity of construction and mounting.
6. Perfect bearing condition.
7. Noiselessness at any speed or load.
8. Reversibility.
9. Lightness in weight.
10. Efficiency in power transmission.

Granting that there is some argument against the worm in regard to trucks as to the dead axle proposition, this could be overcome by using the worm gear on each end of the axle, the same as sprocket wheels, having a double worm gear drive in place of the cumbersome chain drive. If at first slightly more expensive than the chain and sprocket drive, less repairs will more than make up the difference. Care should be taken to have accurate and first-class bearings, both radial and end-thrust.

Considerable discussion has arisen in regard to the relative merit of the straight and Hindley types, the latter having been first used by Hindley, of York, England. In my opinion both can be used successfully, although each has its own advantages and disadvantages. For most purposes, particularly where considerable power is to be transmitted, the Hindley has the advantage, but with ordinary machinery it is somewhat more difficult to obtain the same degree of accuracy that can be obtained in the case of the straight type.

From tests made there is no question but that there is a larger bearing surface on the Hindley type of worm than on the straight. Therefore this type of gearing will for the same pitch present a bearing of greater durability and manifestly heat less than the straight type, particularly under heavy load.

With first-class bearings the Hindley type has the advantage, as a smaller and lighter gear can be used, thus reducing expense, especially if made up in large quantities

The hardening process for the worm should be such as to cause the least amount of distortion, careful methods of heat treatment being employed. The benefit of this is that the gear teeth of the Hindley type which it is impracticable to grind can thereby be lapped, making the teeth concentric with the hole, which is very essential in a worm of this type. The gear should have a mirror-like polish. In this way with hardened concentric polished tooth surfaces the Hindley type presents a better surface of contact than the best form of straight worm, even though the latter is finished by grinding.

Details of the Hindley Type

The gear is flanged on one side with eight lugs with hole in the center of each for mounting on differential casing. There is a slight shoulder on each side of this gear so that the differential casing will form a double web, stiffening the gear so that there is no opportunity for side vibration, thereby reducing the bronze metal to a minimum.

The worm gear should be made of a special mixture of hard bronze. The gear should be slightly polished after being cut to insure a perfectly smooth glazed surface to mesh with the hardened polished worm. This set of gears, properly housed, with ball bearings and the right lubricant used, will give an efficiency of at least 90 to 95 per cent.

A simple method of testing the gears for efficiency without elaborate apparatus is to run them in their regular housing, containing a bath of oil, subjected to load to be transmitted. If they do not have a high temperature after running several hours they indicate high efficiency and suitability for the given purpose.

Proper Testing of Motors, Determining Various Factors

By Herbert Chase, S.A.E.

Finding Friction Losses in Motor, Analyzing the Exhaust and General Standardization of Testing Methods Are Among the Needs of Present Practice

ONE phase of the recent S. A. E. meeting which will interest every car owner, every car maker and every car salesman, was the appointing of a committee to investigate the question of motor testing and submit a report on the possibility of standardizing to some extent motor testing. At present there is anything but standardization in this work, with the result that motor tests mean little and have no basis of comparison. The feeling is strong for uniformity for purposes of comparison. At present many of the tests have little meaning and scarcely any permanent value. They are often deceptive to everyone except the person making them, and often he is misled in his conclusions.

This subject was presented by Herbert Chase, in charge of the testing laboratory of the Automobile Club of America, who presented in printed form a voluminous report on the testing of a Pierce motor in that laboratory. This test was very exhaustive and took recognition of frictional losses in the motor, back pressure in the exhaust manifold, heat distribution, pressure drop in the intake manifold, thermal efficiency, constituents of exhaust gases, ratio of air to gasoline weight, power required to drive the motor when idle, and other details. Much of the data presented were more or less discounted, owing to the fact that in the test the regular Pierce-Arrow carbureter was not used and Designer Fergusson of the Pierce-Arrow Company claimed many inaccuracies of motor performance were due to fitting a carbureter not designed for the motor.

Friction Inside the Cylinders

In the matter of the ratio of air to gasoline it varied from 12.2 to 1 to 14.2 to 1 for wide open throttle and 10 to 1 up to 13.5 to 1 for part-open throttle positions.

The test showed that in analyzing the power required to drive the motor when idle, a large proportion of friction in the motor is due to the rubbing of the pistons and rings against the cylinder walls and the friction of gases passing into and out of the cylinders. When the intake and exhaust manifolds were off, spark-plugs out, compression reliefs out and valve covers off, it took 2 horsepower to drive the motor at 600 revolutions per minute, a little over 4 horsepower at 1000 revolutions per minute, 8 horsepower at 1400 revolutions, and 10 horsepower at 1600 revolutions per minute.

The net horsepower necessary to drive the motor when the throttle is wide open and the other openings to the cylinders are only those which the valves allow, as in the regular functioning of the motor when running under its own power, is as follows: At 600 revolutions 2 horsepower; at 1000 revolutions 6.5 horsepower; at 1400 revolutions 12 horsepower; at 1600 revolutions almost 16 horsepower.

When the pistons and connecting-rods were removed the horsepower necessary was as follows: At 600 revolutions one-fifth horsepower; at 1000 revolutions 1 horsepower; at 1400 revolutions 2 horsepower, and at 1600 revolutions 2.1 horsepower.

The test on back pressure in the exhaust manifold showed that it amounted to nearly 8 pounds per square inch at high speeds. The report suggested a dividing of the exhaust manifold in six-cylinder motors because two cylinders are exhausting at the same time, and before one cylinder has completed exhausting, the exhaust valve of the next cylinder opens and some of the exhaust from the latter causes a considerable rise of pressure in the former. This, the speaker claimed, could be obviated by the divided manifold.

Some interesting facts on the operation of gasoline motors were presented in connection with the analysis of the exhaust gases. The manograph used in the tests showed that combustion in the cylinders is seldom the same in two consecutive cycles, and so the expelled gases are not likely to have the same composition. In the test the combustion was not perfect in any run, there being always some CO, carbon monoxide, present; and in some cases the proportion was almost as great as the CO_2. Again, there was in many cases a trace of pure oxygen remaining, as much as 2 or 3 per cent. of the latter existing side by side with the CO. This proved that the mixture within the cylinders was never absolutely homogeneous. Apparently some molecules of oxygen never came into contact with molecules of CO until the temperature was reduced to such a degree that combustion of the latter did not take place.

Finding Volumetric Efficiency

Volumetric efficiency is an important motor test, by it being meant the percentage of total volume gases drawn into the combustion chambers at different crankshaft speeds. To explain: If a motor has 300 cubic inches piston displacement it should, to be at maximum efficiency, raw in 300 cubic inches of gasoline mixture, but it rarely does this. The slower the motor works, the higher the efficiency, but almost proportionately as the speed increases there is a falling off of the volume of gases drawn in, or volumetric efficiency, as it is designated. In the tests the following volumetric efficiencies at different crankshaft speeds were obtained: At 300 revolutions crankshaft speed, the efficiency was 87 per cent.; at 1000 revolutions it was 79 per cent.; at 1200 it was 74; at 1400 it was 71 per cent.; at 1600 it was 68, and at 1700 revolutions it was 64 per cent.

Herbert L. Connell of the Packard Company, in his paper on standardizing motor testing and co-operating in this work, outlined the necessity for such work.

The great present need is for uniformity in the carrying on of each class of motor tests and in the reporting of the same. As conditions are now there is such a divergence of methods that even the most carefully developed tests are only of value for their individual conclusions, and it is almost impossible to link them with other tests for the purpose of drawing conclusions from a broader point of view or for direct comparison. The same condition existed at one time in the field of steam engineering. To meet this the American Society of Mechanical Engineers developed their codes of boiler and power plant tests. These codes have been revised at intervals as conditions and continued study dictated, and have been held as practically absolute and universal standards. Tests carried on under them give engineers an opportunity to pick out relative values, for there is the assurance that the results are really comparable. The buyer bases his specifications and conditions of acceptance upon these standard tests. Although the time has not yet come when the purchaser of a gasoline motor is given or demands standard tests and characteristic curves, yet that time may not be so very far off. A study of past and present announcements shows a tendency to this. At first there were the exaggerated claims of power which the public soon learned to discredit; then came the general rating by the very arbitrary A. L. A. M. formula, and now we notice numerous statements of the formula rating followed by actual brake test readings. The advantage of the old formula method was that it dealt with definite denominations only, and there could be no question as to the methods used behind the mysteriously locked doors of the experimental room. The inadequacy of the A. L. A. M. horsepower rating is well known, but some of those who are stating brake horsepower have based their claims on very low averages, doubtless for fear of reviving the old distrust of such ratings. This state of affairs is obviously unfair to all concerned, but until tests can be conducted in accordance with a code that is universally known to be standard, and to give comparative results, the conservative can hardly do otherwise.

To get back to the engineering standpoint, a very few examples will suffice to show the present state of chaos and the advantages of standard methods. The effect of atmospheric and barometric conditions on the action of a motor has often been observed, but one practically never sees these conditions mentioned in a report. In exhaust pressure measurements comparisons are now impossible because one investigator may have taken his readings 3 feet from the motor with the pressure tube flush with the inside of the pipe, while another may have used a tube extending some distance into the pipe, near the motor, and with the tube end beveled. It is not hard to imagine the effect the difference of position might cause, while in the latter case a velocity factor would be added to the pressure reading. It would really make but little difference if the tube were placed to get the average pressure or not, as long as the method was uniform in each case, for then the results would be comparative.

A standard length of brake-arm has been suggested. This length could be established as that found in the majority of laboratories and would mean only a minor change in the equipment of those not belonging to that majority. Of course, each engineer in his own laboratory knows the relative meaning of his own brake-pulls even without converting them into inch pounds of torque or to horsepower, but think how a standard arm would facilitate the quick grasping of results by the number of our consulting engineers who visit many different test rooms. So much seems ample to suggest the possibilities and need of standardization in this line, and to justify the S. A. E. in doing in its own field what the A. S. M. E. has done so well in power plant work.

Fields Open to Research

Other possibilities are open to a committee on motor testing after a code has been developed and while developing it. One of these is to act as an advisory board in broadly mapping out lines of investigation. This would apply especially in relation to the work being done at the leading technical schools in this country. Here we have well equipped laboratories and well trained men, but it is surprising to know the difficulty advanced engineering students have in settling upon a line of research. The difficulty of picking a particular field is not so great, but to know where to begin and how to get somewhere in the allotted time is the sticking point. Take the hypothetical case of the man who chooses the internal combustion engine. The chances are almost ten to one that his first thought is an investigation of alcohol as a fuel. Why? Because every one who has read the semi-technical magazines, and even the Sunday newspapers, knows that alcohol as a motor fuel is still an almost unsolved problem, from the commercial standpoint at any rate, and it is a peculiarity of youth that it desires to tackle something new instead of building up on an old foundation. Our student probably does not even dream that the engineers responsible for the creation of the smooth-running motor cars do not know the state or condition of the fuel entering the cylinders, and therefore he chooses a problem he knows exists. By the time his "credit" has been earned he probably has not developed a wonderful alcohol carbureter or given any very valuable data to the world, although he has learned a lot about running a balky motor. To carry the hypothetical case further, let it be assumed that the S. A. E. testing code is a standard and that the committee that devised it has been continued and has turned its attention to its advisory function. Our student who has chosen some kind of motor testing, and is further presumed to be in a laboratory which has adopted the S. A. E. code and co-operates with the S. A. E. program when practical, finds that he no longer has a wilderness before him, but that certain paths have been mapped out. Even if the time at his command is relatively short, he may work on a subdivision of a subject that will form a definite link in a definite chain of investigation. You will probably ask if the student and the instructor will take to such a plan. Observations and direct expressions of opinion are emphatically in the affirmative. The why and the how of the student appreciating suggestions in the choice of work has been shown. As to the interest and care that would be given to the work after it was started, there is a psychological factor that will take care of that. Men reaching the point of such work have already learned to be careful, and by that time they have mostly gotten the engineering bug so that anything that looks to be a practical engineering problem instead of the classroom variety is attacked with a zeal that is surprising. There should be no fear that the personal activities of the engineers in charge of the laboratories would be infringed upon. It is not the idea to dictate work, but merely to make suggestions that might well be studied, thereby giving opportunity for a greater common interest.

There are problems of a general nature and of considerable importance which have had to wait while those of more momentary interest were disposed of. Some of these investigations have lapsed because no laboratory of a manufacturer could give the time to carry them through. With co-operation between the technical, commercial and private laboratories a committee should be able to direct the course of a general investigation so as to make it produce definite results and be of a great deal of benefit.

At its last meeting the Detroit Section of the S. A. E. passed a resolution to inquire into the availability of the United States Bureau of Standards for carrying on certain tests of a highly technical nature This was a definite expression that there is need for work that cannot well be carried on at the motor car factory. It also suggests the possibility of including the government departments in the plan of co-operation.

There are two further advantages that would arise if the S. A. E. took an official or semi-official interest in the technical schools. The first is in the matter of equipment. Manufacturers are constantly being requested to loan or donate motors and other modern equipment to the school laboratories. This is often at the request of some particular student, and when he has completed his course the investigation is not continued. Under the new plan the donor would have far greater assurance that the tests on the apparatus would be carried to the end intended and that a real benefit would result from his generosity. The second benefit would be the training gotten by the young men doing the work, for this would particularly prepare them for the motor industry.

Berlin Prefers Electric Fire Engines

In reply to persistent declarations to the effect that the fire department of Berlin and adjacent metropolitan fire district contemplates to introduce gas-electric fire engines, Commissioner Reichel, who has all the development of fire apparatus for this important district completely in charge, makes the emphatic statement that propulsion by electric batteries for the city proper and by gasoline engines for the remoter districts, and for the vehicles used in the administrative work of the fire service, remains the approved system which has been found perfectly suitable. When the automobilization of the rolling stock began in 1906, twenty steam pumps were on hand and it was made obligatory to use them. They were mounted in the electric vehicles. In some instances the steam plants have worn out and have been replaced by gasoline engines driving rotary gear pumps of a construction developed by the department, which never found the centrifugal pumps satisfactory. In some instances a dynamo equipment has been added in order to utilize the gasoline motor better, but the pure electric propulsion system in these cases remains what it was. The fire engines propelled by gasoline engines are also equipped with rotary gear pumps. Summing up, the commissioner writes: "The Berlin fire service now possesses fifty automobiles and needs in all 145. If I did not test everything thoroughly and did not keep all strange influences energetically at a distance, I would, no doubt, by this time have in Berlin the largest museum of automobile fire-fighting equipment in the world. Smaller museums of this description have unfortunately already been collected in several places."—From *Der Mortorwagen*, June 10.

Harking Back a Decade

FROM *The Automobile and Motor Review*, July 5, 1902:

It has been demonstrated recently that a small private automobile stable can be built for about $300 with sufficient accommodations for a single small car. The tendency of the times is to use private automobile stables rather than to patronize the new-fangled garages or public automobile stations.

The Automobile Club of Great Britain and Ireland will put on a road test of pneumatic tires early in the Fall. The conditions call for a run of 3000 miles at 150 miles a day. Hostile observers will accompany each car as well as official observers. Alfred Harmsworth has offered cash prizes of $750. The competing tires will become the property of the club after the run and will be carefully examined. The set of tires that goes through the run under the conditions and appears to be in the best shape after its conclusion will be declared the winner.

The first machine which the H. H. Franklin Manufacturing Company of Syracuse put on the market was bought last week by a New York customer. It is a four-cylinder, air-cooled engine 3 1-4 by 3 1-4 inches and is capable of 15 miles an hour on high speed at 750 revolutions per minute. The extreme speed of the machine is reckoned at about 30 miles an hour. The transmission is by sun and planet gears inclosed in an oil-tight box.

William M. Lewis, president of the Wisconsin Wheel Works of Racine, Wis., announces that his company is perfecting engines which will be used in automobiles to be turned out by the company in January. It is stated that the new cars will be called Mitchell, from the middle name of Mr. Lewis.

The National Association of Automobile Manufacturers proposes to exhibit vehicles made by its members at the international automobile show which will be held in London next March. The association figures on securing a large space and proposes to ship the cars in a single consignment on both ocean trips.

The developments of the past week have shown that the Quaker City council is amenable to reason and as a result of the brake tests, control tests and other demonstrations of various types of automobiles, the proposed ordinance limiting motor speed to 5 miles an hour in Philadelphia has been amended out of all semblance to its original shape. The bill, as it will be presented for action, will probably divide the city into three sections, allowing a maximum speed of 15 miles an hour.

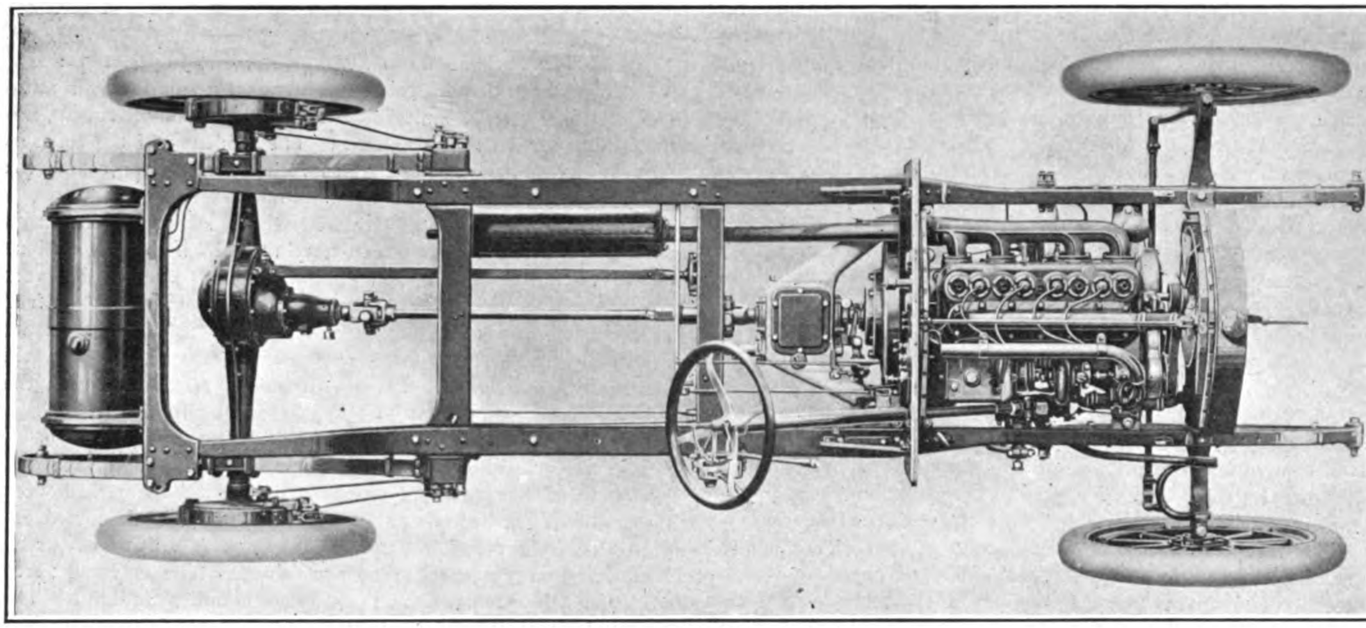
Alexander Winton in his new powerful racing car, The Bullet, set a new world's mark for a measured mile at 51 4-5 seconds. This is 3-5 seconds lower than Fournier's mark. The trial was not sanctioned and the A. A. A. probably will not recognize the record. Mr. Winton has declined to state what is the horsepower of the new machine.

Small Truck to Oust Army Mule

MILWAUKEE, WIS., July 8—That the 3-ton truck will probably never be sufficiently utilitarian for army use, and that if the army mule is to be supplanted by the modern means of transportation, it will be the 1½-ton truck that will be utilized, are deductions gained by Capt. C. R. Williams, U. S. A., in charge of the exhaustive tests of motor trucks which have been going on since February, 1912.

Following the truck run from Washington, D. C., to Indianapolis during last spring, the manufacturers who made the best showing were invited to compete in a more severe test, under actual martial conditions, during the march of the middle western regiments of regular infantry, cavalry and artillery from Dubuque, Ia., to Sparta, Wis.

By the time the army reached Madison, Wis., 124 miles from Dubuque, Capt. Williams came to the conclusion that no truck with a capacity rating of more than 1½ tons would form a feasible means of army transportation. To quote Capt. Williams: "The heavy 3-ton truck has proven a failure for army use. The 1½-ton truck I predict will supplant the army mule."



Chassis of the new Hudson Model 37, showing new location of gasoline tank and drive features

Two New 1913 Hudsons

Model 37, the Four-Cylinder, Is Very Different from the Company's Product Last Year

Details Regarding the New Six-Cylinder Model Not Yet Made Public

THE coming season will see entirely new types of cars on the market under the Hudson name. These are to be two models, a four-cylinder and a six-cylinder type. The features of the new four-cylinder model, which is known as model 37, are in no way similar to those of model 33, which was the company's only type last year. Considerable speculation is in evidence as to the features of the six-cylinder car, the details of which are not yet made public.

The model 37, which is just out, has a new type of motor, the body design is distinctive and much more sweeping in its lines than that of its predecessor. The chassis is entirely new, the self-starting system is different, the location of the gasoline tank has been changed. In fact, it is an entirely new proposition except that the frame is the same as that of the 33 and the gearbox, gears and method of mounting the transmission as a part of the power plant are features which have not been changed.

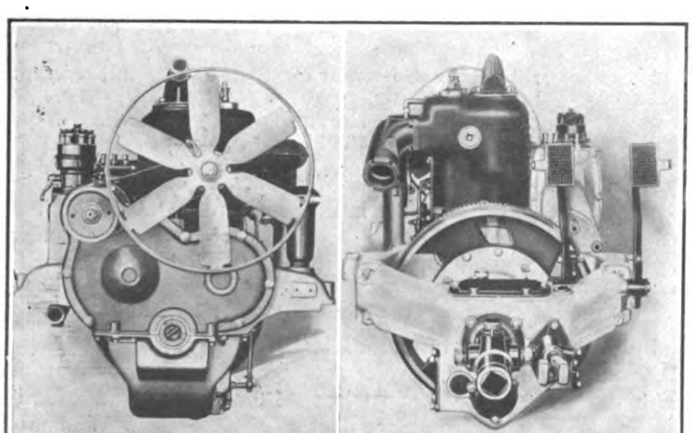


Fig. 2—Front and rear views of new four-cylinder Hudson motor

The motor of the new four-cylinder model is of the monoblock construction, the bore of the cylinders being 4⅛ inches and the stroke 5¼ inches. It has been designed to develop 37 horsepower at 1,500 revolutions per minute. Intake and exhaust manifolds are mounted on the same side of the motor as shown in Fig. 9. Either of these may be removed without in any way disturbing the other. The water outlet manifold WM is of large proportions, while there is a single connection with the cylinder casting for the vertical intake manifold IM, which is water-jacketed, the water being piped from the cylinder water jacket. As shown in the illustrations, the exhaust manifold EM connects individually with each cylinder, running parallel with the top of the motor up to the third connection, where it slopes downward to clear the floor of the car.

Valves Are Interchangeable

The valves are constructed to be interchangeable and are of nickel steel. They have a clear opening of 1¾ inches, this being possible on account of a diameter of 2 inches. The push rods are extra long and the springs are conically wound, the smaller diameters being at the bottoms, as shown at VS. The tappets P are of the mushroom pattern, being in contact with the cam faces at all times. They are provided with means for taking up at their upper ends in the form of nuts and lock-nuts. A casing having two large cover plates completely houses the valves, rods and tappets to the exclusion of dirt. This feature insures the proper lubrication of the bearings, as no dirt can get in to interfere with the effectiveness of the lubricant.

The pistons are of gray iron and have been made specially long in order to better distribute the side thrust between them and the cylinders and thus to reduce the wear on both to the minimum. With the idea of reducing motor vibration, the pistons are carefully balanced before being assembled in the motors.

Nickel steel studs secure the wrist pins WP in place, being made to have a press fit within the bosses to prevent shake. The studs are prevented from working loose by cotter pins. The wrist pin bearings are of hard phosphor bronze, 1 1-16 inches in diameter by 1⅞ inches in length, being pressed into the small ends of the connecting-rods.

As to the connecting-rods CR, they are of drop-forged, heat-treated alloy steel of I-beam section. At the crankshaft ends four nickel-steel bolts fitted with castellated nuts hold the bearing caps in place. In taking up the connecting-rod wear, thin shims are used, and they are interposed between the caps and the rod ends.

A three-bearing crankshaft CS is used with this motor, this being a marked change from that of the former model 33, which was equipped with a two-bearing crankshaft The bearings are of bronze, lined with nickel babbit. The front bearing and the center bearing are each 2 inches in diameter, thee former being 2 9-16 inches in length, while the latter is 3 inches. These two bearings are seen at A_1 and A_2 in the sectional view of the motor. The rear bearing A_3 is the larger, having a diameter of 2¼ inches and a length of 3 15-16 inches. The connecting-rod bearings are 2 inches in diameter and have a length of 2⅝ inches.

Like the crankshaft, the camshaft S is mounted on three bearings of nickel babbit, the sizes being 2¼ inches in diameter by 2⅜ inches in length for the front bearing B_1, 2¼ inches by 1⅜ inches for the center bearing B_2 and 1⅞ inches by 1¼ inches for the rear bearing B_3. The camshaft has been made extra large in diameter to preclude any possibility of its deflection when lifting the valves. The cams are integral with the shaft, and, in addition to the eight which operate the valves, there are two cams which actuate the small horizontal oil pump and the air pressure pump.

Helically-cut steel timing gears are used, being mounted in the usual location at the front of the motor. Oil-tight cases fit over them and they run in oil to increase their silence and wearing qualities. Easy removal has been aimed at in their mounting, which is made a simple matter once the gear cover is taken off.

Flywheel Is Close to Bearing

The flywheel F is so designed that its weight is brought as close to the bearing as possible. This aids in reducing whipping stresses and relieves strain on the shaft. The rim overhangs the bearings completely, as will be evident from an inspection of the sectional drawing of the motor, Fig. 9.

The cooling system is made positive through the use of a large centrifugal pump located on the opposite side of the motor from the valves and on the motor-generator shaft. This pump may be removed by means of couplings at either side without in any way disturbing the other apparatus. This also applies to the packing of the stuffing-boxes. Reference to the illustration brings out the peculiar mounting of the shaft on two bearings, one at either side of the pump and each made integral with the upper half of the crankcase. Due to the monoblock casting, there is only one inlet water manifold connection with the cylinders, the waterjacket space being a unit around all four cylinders. The jacket space has been made ¾-inch wide all around, and, with its very wide type of water outlet manifold, the motor is designed for free water circulation. The cooling fan is belt-driven from a pulley mounted on the end of the pump and motor-generator shaft.

A constant level splash lubrication system is employed for lubricating the connecting-rod bearings, wrist-pin bearings, camshaft bearings, and so on. The front and rear main bearings are positively lubricated by means of the plunger oil pump already mentioned. This pump is operated by a cam mounted on the camshaft and it has a horizontal stroke. There is a sub-bottom to the crankcase where the oil is first led. Four troughs LT hold the oil into which the ends of the connecting-rods dip, and the overflow from these troughs runs down into the bottom of the crankcase, which slopes downward to the center. A sump here collects the lubricant, and it is pumped from here through OP back to the main bearings by the oil pump. The breather pipe and oil-filler pipe are combined and placed over the left front mounting of the motor. There is an inner wall to this pipe through which the oil enters, while the space between this and the outer shell forms the air outlet or breather. Inspection of the sectional view reveals the large oil holes for lubricating the bearings. Two holes G_1 are provided in the front bearing of the crankshaft, two J_1 in the center bearing and one H_1 in the rear main bearing. The pipe connection to the latter is seen in the figure at H_2. The piping from here to the pump and also from the front bearing to it is clearly seen in the halftone illustration of the left side of the motor. For lubricating the lower bearings of the connecting-rods, the holes R are drilled into the centers of the rod ends from the sides of the rods. Some of the oil which is splashed from the troughs LT enters the bearings through these holes. The oil, before entering any of the motor parts, is strained to exclude any foreign matter. A pressure gauge on the dash indicates whether or not the oil is circulating properly.

The motor is fitted with a Zenith carbureter, which is designed for factory adjustment once and for all. To facilitate starting in cold weather, the carbureter is fitted with a dash strangler

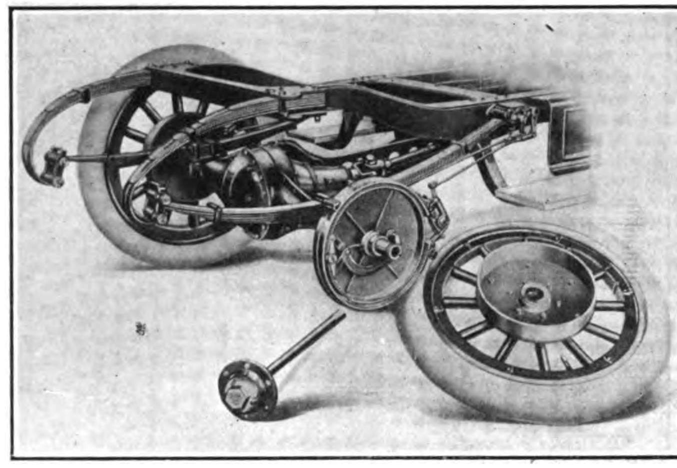


Fig. 3—Rear system of Hudson 37, showing springs and brakes

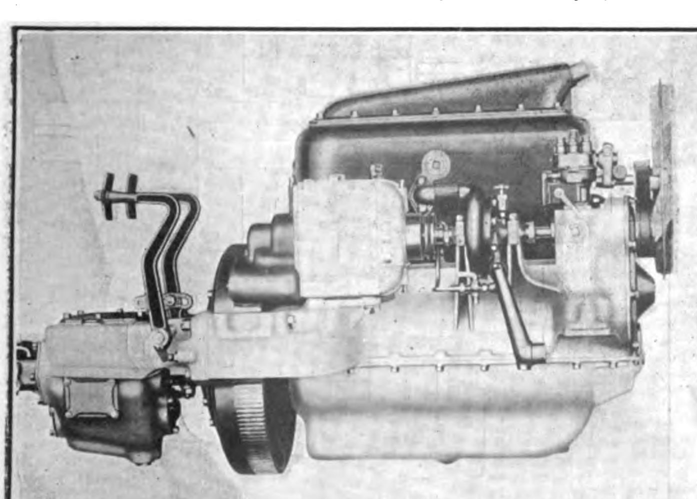


Fig. 4—Right side of motor used in the Hudson Model 37 to be marketed this year

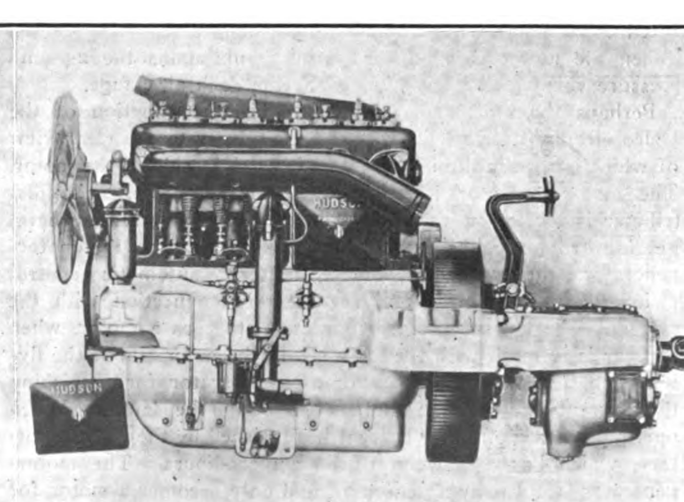


Fig. 5—Left side of the motor

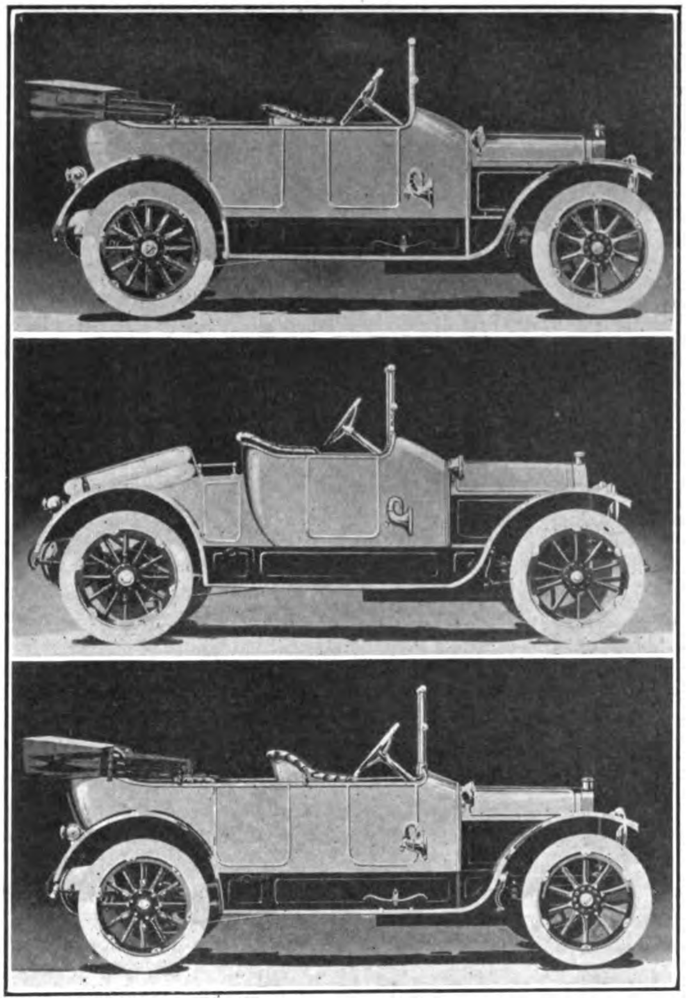


Fig. 6.—Torpedo, roadster and touring bodies to be furnished as regular equipment

which causes an extra-rich mixture to be sent to the cylinders. By means of the air-pressure pump the gasoline is fed to the carbureter under a 2-pound pressure from the gasoline tank, which is located at the rear of the machine under the frame, a new departure for the Hudson concern and one which is rapidly gaining in favor with American manufacturers and users of cars. Two substantial leather-lined brackets hold the tank in place. It has a capacity of 22 gallons and is of cylindrical shape made of heavy-gauge pressed steel. At one end of the tank a gauge is mounted which indicates at all times the amount of fuel in the tank. If necessary to drain the gasoline for any reason, the plug fitted at the bottom of the tank may be pressed into service. When the motor is running, the pump maintains the 2-pound pressure very closely, as indicated by the dash air gauge.

Perhaps the most radical change is in the adoption of the Delco electric starting, lighting and ignition system, a clear view of which is seen in the illustration of the right side of the motor. The motor-generator is mounted to the rear, while the distributer is located at the front, its shaft being driven by bevel gearing from the horizontal shaft. In addition to the motor-generator, there are a storage battery, automatic control switches, cut-out device and regulator in connection with the system. The motor-generator operates either as a motor, when its gear is in mesh with the teeth cut in the outer rim of the flywheel to turn the crankshaft, or as a generator for furnishing the current for ignition and for lighting the lamps. When operating as a motor, the current is furnished by the storage battery, which has a capacity of 80 ampere-hours. The motor-generator is normally a generator, and only becomes a motor for starting. In starting, the driver pushes a button on the dash and presses the clutch pedal forward. This sends current from the battery to the motor and at the same time meshes the flywheel teeth with the motor gear. As soon as this turning over of the engine causes fuel charges to be drawn into the cylinders the motor starts to run on its own power and the operator releases the button. The generator then takes up the work of supplying the ignition current and of charging the battery to its capacity. When the latter reaches this state, it floats on the line and is ready for use in driving the motor. The system furnishes dual ignition, with magneto type of spark for ordinary running and the battery ignition in cases of emergency. A kick switch on the dash controls the operation of either source of current. The lamps may be operated either from the generator direct or through the storage battery. A three-key light switch is placed on the dash for sending the current to the lamps, and a special feature is the placing of a small lamp on the dash for reading of gauges at night. This lamp is in circuit with the rear lamp, and, if the small dash lamp goes out, it is an indication that the other lamp is also out of order. An extension lamp is furnished which can be attached to any of the regular lamp sockets.

Clutch Is of Noiseless Disk Type

The clutch is of a noiseless disk type, self-contained in an oiltight case which is a part of the flywheel. The disks are steel stampings ground 8 11-16 inches in diameter. There are eight disks, which have cork inserts, on the driving member. The driven disks are seven in number and are of plain steel. The idea of the corks is to insure a soft and smooth clutch engagement and to eliminate jerks and slippage in getting under load. The clutch spring is located in a hole bored in the end of the crankshaft. A ball-thrust bearing transmits the pressure to the clutch drums. Small springs are placed between disks to insure their separation when the clutch is released. A half-and-half mixture of oil and kerosene lubricates the arrangement and serves to prevent grabbing and to aid in free action. Lubricant is added through a plugged hole in the casing, which may also be used for cleaning the clutch.

The transmission is the same as that used on the previous model 33. It is of the three-speed selective type, with direct drive on third. A V-shaped member bolts to the rear of the motor, making a unit power plant construction and carrying the transmission gears. Gears are of large size, have strong teeth and wide faces and are mounted in malleable iron cages which prevent them from working loose in the aluminum case. Roller bearings are used throughout the transmission and the gears and bearings are kept running in oil.

Power is transmitted from the transmission to the rear axle through a propeller shaft of nickel steel and two universal

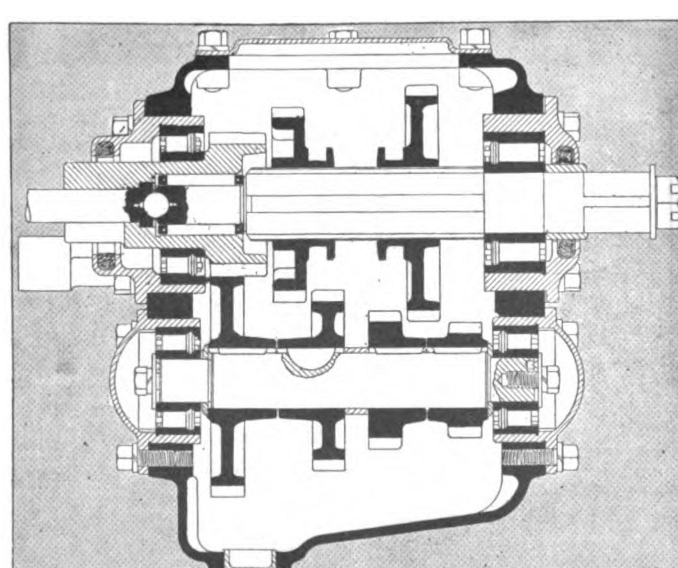


Fig. 7—Plan view of the Hudson gearset

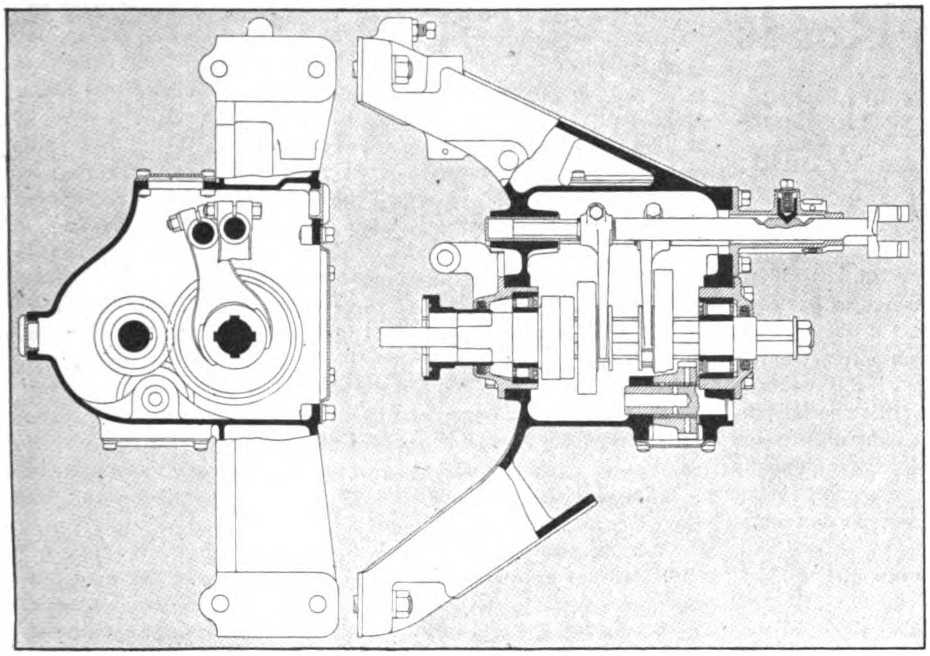


Fig. 8—Transmission and frame used on the new four-cylinder Hudson

joints. The sliding shaft, squared for the universal joint mountings, has a width of 1 3-8 inches across the face and is 5 1-2 inches long.

Specially Strong Front Axle

The front axle is an alloy steel, one-piece rock forging, heat-treated. It is an I-beam section and at its smallest point measures 2 3-8 inches in height and has a depth of 1 1-2 inches. The pressed steel rear axle is of the floating type made by the Bower Company, the two halves being welded together and bolted for extra strength. Driving gears and differential are mounted as one unit, which is bolted to the axle and easily removable without taking the whole axle down. The construction of this unit is such as to allow the adjustment of pinion and driving gear without interfering with the other parts. The pinion and differential case are mounted on large roller and thrust bearings, and the whole runs continuously in a bath of oil. Driving shafts are constructed of nickel steel, oil-treated and due to the floating construction may be removed without disturbing any other parts of the axle. The driving pinion is made of hardened nickel steel and the crown gear is of a specially hardened alloy steel of large section. The plate on the back of the axle may be removed for inspection or adjustment of the differential part. Each end of the axle carries two roller bearings on which the wheels are mounted.

Another departure from former Hudson four-cylinder automobile design is in the use of a substantial torsion arm which runs from the front cross-member of the frame, on which it is mounted in a double spring buffer, to the rear, where it fastens to the axle, as shown in Fig. 1, instead of the torque tube construction in which the propeller shaft was completely inclosed.

The brakes are of the usual double type mounted on the rear wheels. They are 14 inches in diameter and have a 2-inch face. Foot brakes are external contracting, emergency brakes internal expanding. Brakes are lined with special non-burnable lining fastened to the brake bands with copper rivets. The brake drums are pressed steel of one piece type, bolted to the wheels with twelve bolts.

Side frame members are of one piece pressed steel, heat-treated. They are of channel section, 4 inches high, 3 1-4 inches deep and 5-32 inch thick. These members are narrowed in front to give a smaller turning radius. A drop of 4 1-2 inches is made on the rear of the frame in order to secure a lower center of gravity for the whole chassis. There are three cross-members, one at the center of the frame, one half-way back, to which the front shackles of the springs are fastened, and the rear member, which extends out to receive the spring ends.

The springs are made flexible by the use of a large number of thin leaves, which are tongued and grooved to prevent side motion, in addition to which leaf retainers are used. Phosphor-bronze bushings are provided in all spring eyes and the shackles are drop-forged and machined to size. Grease -cups are provided to lubricate the spring bushing. The front springs are semi-elliptic, have a length of 37 inches and a width of 2 inches, while the rear springs are of three-quarter elliptic type and are 50 inches long by 2 inches wide.

The wheels are of the artillery type, the spokes being 1½ inches in diameter, and constructed of second-growth hickory. In the front wheels 10 spokes are used, with a corresponding

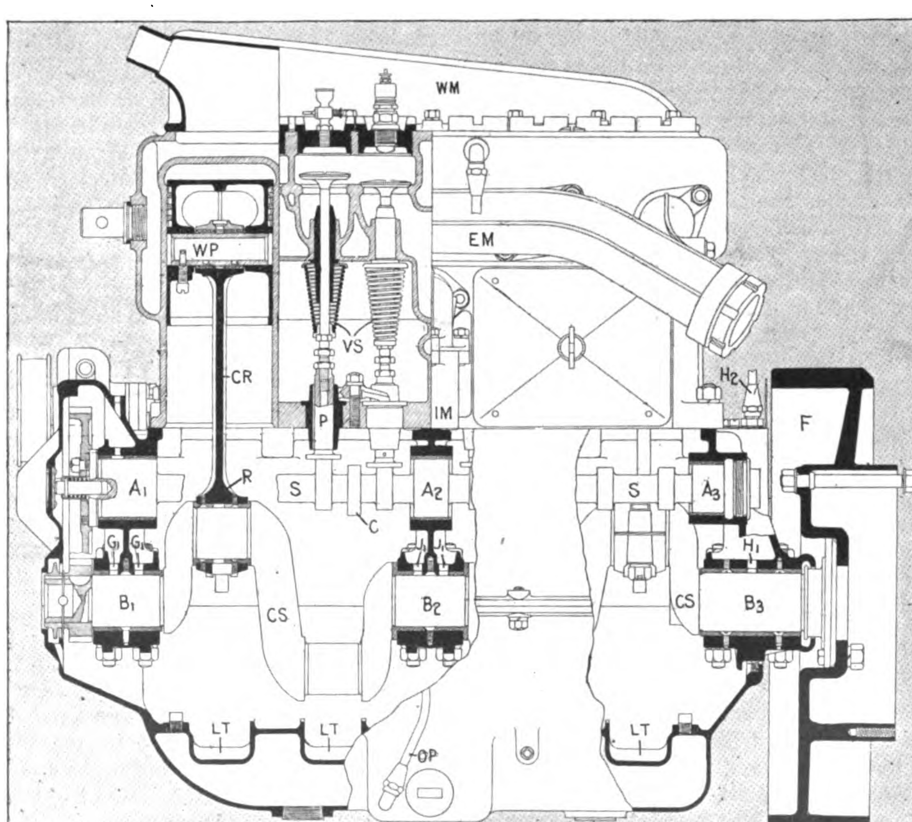


Fig. 9—Sectional diagram of the new four-cylinder Hudson motor

Says We Have No Roads

Lord Montagu Thinks That with Suitable Highways Foreign Tourists Would Flock to This Country

LORD MONTAGU of Beaulieu, editor of the English motoring publication *The Car* and one of the men who has done much toward bringing the automobile into general use in England, has just returned to New York after an extensive trip through the motor car manufacturing centers of this country. When a foreign expert comes to our shores for the special purpose of studying us we can be sure that the searchlight is turned on our tenderest spots; our weaknesses stand out prominently against the background of our successes and an unequaled chance of seeing ourselves as others see us is offered if we but make use of the rays of this same searchlight.

When the staff man of THE AUTOMOBILE saw our distinguished visitor in his apartment at the Ritz-Carlton shortly after his arrival from the middle West, where he had made a critical tour of our largest factories, Lord Montagu had formed concrete opinions regarding the status of the industry in this country. In response to a question regarding the impressions gathered during his stay in this country, his reply showed amply that in his opinion the manufacturing industry had far outstripped an industry which should have kept pace with it; that is, the art of road-building.

"Just think," said Lord Montagu, "here in America you have three-quarters of a million cars and next year you will have a million, and yet you have no roads to run them upon. Not that you do not spend enough money; your appropriations are on a generous scale; still you put all the money in building the roads and hardly any in keeping them up. There seems to be no legislative method of obtaining money to maintain the roads after they are built. I know nothing whatever about your politics, but I do think that your future President, whoever he may be, should heartily endorse a nation-wide good roads campaign. In our country the roads were built before the motor car; in many instances these come down from the early Romans. Our whole road system has gradually developed and we have a regular maintenance tax laid upon the road users. Your roads have come after the automobile and you eat up your appropriations in building, but there is no system by which you tax those who use the road, in order to maintain it.

"Why, if you had good roads throughout the country, tens of thousands of foreign tourists would gladly pay a tax of say a dollar for each 50 miles to come to the United States and view its wonderful scenery. This would mean an enormous inflow of foreign money into the country. The customs house could make arrangements with tourists who intended taking their cars out again so that there would be little expense in that direction. Now these tourists are kept away by the roads. The best roads I have seen during the time I have spent in traveling about the country have been in the vicinity of New York, Boston, and Washington. Throughout the middle West the roads are nearly all dirt and are in extremely bad condition.

"Regarding the motor car industry itself, needless to say it is tremendous; it is growing so fast that it is impossible to tell where we will end. In the cheaper cars especially the manufacturing business is tremendous, as is shown by the great number of your lower-priced cars which are sold in England. We have not done much in the cheap car way, but so far have left that for you to do.

"The use of the car in England is different from what it is in the United States. You use your cars mostly for pleasure driving; we have outgrown that. Our business men use their cars to come to the office. We use them in place of the trains. In our own office there are gentlemen who come from their homes, 40 miles from town, daily in their cars. America has not reached the stage yet where automobiles are used on a large scale for purposes of utility; here they are used nearly entirely for pleasure purposes."

Lord Montagu will leave New York on July 16, having booked passage on the Lusitania.

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number of hub-clamping bolts. The number of spokes and bolts is increased to 12 in the rear wheels. All wheels are fitted with 36 by 4-inch demountable rims.

Steering is accomplished through a worm and worm gear combination of the irreversible type. The worm gear is integral with the shaft and is of the full gear type, the design being carried out in this way in order to provide an adjustment in case of wear.

Control features are standard, the throttle and spark levers being mounted on a sector on top of the steering wheel as in the usual design. The control is right-hand, the levers being placed at the driver's right inside the body. Clutch and service brakes are adjustable and are found in the usual positions. The steering wheel has a diameter of 18 inches.

As to the standard equipment, this consists of the starting-lighting-ignition system already described, full complement of lights, 12-inch upholstery, speedometer, magnetic gasoline gauge, demountable rims with extra rim and tire holder, 36 by 4-inch tires, windshield, mohair top and curtains, top cover, license-carrier and full set of tools.

The standard body types are the torpedo, touring car and roadster designs. These are all new and distinctively cleancut in appearance. The cowl and dash are made in one piece of sheet metal, no wood being used. The roadster in particular is of pleasing design and is fitted with doors of large size. A new feature is the rear compartment, which is also fitted with two small side doors and through which a suitcase may be slipped, the inner compartment being large enough to accommodate two. Tire brackets are placed on top of this compartment, and, in addition to the tires, a tire trunk may be carried. There is also a door in this part which provides space for the tools, tire chains and so on. In the roadster and torpedo models tire brackets are provided for carrying extras at the driver's right, while the only other apparatus which is carried on the running board is the storage battery of the electric system.

Other body types, such as limousines and coupés, are furnished by the makers on special orders.

The price on the three standard models has been fixed at $1,875, a slight increase over the prices placed on the model of last season.

Delay Buying Licenses Pending Test

JACKSON, MISS., July 9—Much public opposition has developed to the automobile license tax imposed by the last legislature. Thus far only 207 machines have been registered and it appears that the majority of owners will wait until the new law is tested. The state's attorney announces that prosecutions will begin promptly after August 1, when it is provided that all taxes must be paid.

Advocating Good Roads in Ohio

COLUMBUS, O., July 8—The Ohio State Highway Commission and the Ohio Good Roads Federation have started a 3-months' campaign in the interest of good roads building in Ohio. The primary object of the campaign will be to influence the voters of the State in adopting the provision of the Ohio Constitutional Convention of issuing $50,000,000 bonds for road improvement in the Buckeye State. The matter will be voted upon at a special election to be held September 3.

Calendar of Coming Events

What the Months Ahead Have in Store for the Automobilist—Shows, Conventions, Race Meets, Etc.

Shows, Conventions, Etc.

July 10-20	Winnipeg, Man., Canadian Industrial Exhibition.
July 22-27	Detroit, Mich., Cadillaqua Week.
Aug. 5-7	San Francisco, Cal., Pacific Highway Convention.
Sept. 17-20	Denver, Col., Convention International Association of Fire Engineers.
Sept. 23-Oct. 3	New York City, Rubber Show, Grand Central Palace.
Dec. 7-22	Paris, France, Paris Automobile Show, Grand Palais.
Jan. 4-11, 1913	New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 4-11	Cleveland, O., Annual Automobile Show.
Jan. 20-25	Philadelphia, Pa., Annual Automobile Show.
Jan. 27-Feb. 1	Detroit, Mich., Annual Automobile Show.
Feb. 1-8	Chicago, Ill., Annual Automobile Show.
Feb. 10-15	Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22	Kansas City, Kan., Annual Automobile Show.
Feb. 24-March 1	St. Louis, Mo., Annual Automobile Show.
March 3-8	Pittsburgh, Pa., Annual Automobile Show.
March 8-15	Boston, Mass., Annual Automobile Show.
March 17-22	Buffalo, N. Y., Annual Automobile Show.
March 19-23	Boston, Mass., Annual Truck Show.
March 24-29	Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

July 15	Milwaukee, Wis., Reliability Run, Wisconsin State Automobile Association.
July 15-18	Cleveland, O., Reliability Run, *The Cleveland News.*
July 21	St. Louis, Mo., Track Meet.
July 22	Dallas, Tex., Farm and Ranch Tour, Dallas Automobile Club.
Aug. 8-10	Galveston, Tex., Beach Meet.
Sept. 17	Milwaukee, Wis., Grand Prize Race.
Sept. 20	Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.
Sept. 21	Milwaukee, Wis., Vanderbilt Cup Race.
Sept.	Chicago, Ill., Commercial Vehicle Reliability Run, Chicago Motor Club.
Sept.	Washington, D. C., Reliability Run, Automobile Club of Washington.
Sept.	St. Louis, Mo., Track Races, Universal Exposition Company.
Oct. 7-11	Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 12	Salem, N. H., Track Meet, Rockingham Park.
Nov. 6	Shreveport, La., Track Meet, Shreveport Automobile Club.

Foreign

Sept 26-Oct. 6	Bourges, France, Agricultural Motor Car Exposition.
Nov. 8-16	London, England, Olympia Automobile Show.
Jan. 11-22	Brussels, Belgium, Annual Belgian Automobile Show. Centenary Palace.

If the proposition is carried the money is to be used to carry out the state-wide plan of road improvement and will be expended under the direction of the highway commissioner. None will go except for the improvement of what is known as main traveled roads from one center of population to another. Later roads leading into the main thoroughfares will be improved under the direction of county commissioners, and it is expected to have all of the highways in the Buckeye State improved within a very few years.

Friends of the movement assert that there is no commercial proposition of greater importance at the present time than the improvement of wagon roads. It is estimated that 75 per cent. of the commerce of the United States starts over the public highways of the country. The average American farm is 10 miles from a railway, although in Ohio the distance is less.

Boom Trunk Road Across Alabama

SELMA, ALA., July 9.—After more than a year's work motor car owners in this city and vicinity feel that they are assured a model road which will span the state from Georgia to the Mississippi lines. Thursday a meeting of all those interested will be held in Demopolis for the purpose of forming the Selma-to-Mississippi Highway Association. The road is to start on the Alabama side of the river just opposite Columbus, Ga., and will extend through Montgomery, Selma, Uniontown, Faunsdale, Demopolis and on to the Mississippi line near Meridian. Missionary work has been done along the whole line of the road during the past year and there is no question but that, when put to a vote, the building of the road will be authorized. The object of the association will be to aid the work done by the counties financially and in other ways.

T. C. A.'s Canadian Frontier Branch

The Touring Club of America has established at Niagara Falls, N. Y., the Niagara Frontier Branch, under the direction of Howard O. Babcock, a prominent and well-known automobilist of that city.

The Touring Club officials decided to locate a touring bureau at this point, owing to its splendid geographical location, and especially for the convenience of motorists touring from the United States into Canada.

Automobilists will find always available at the Niagara Frontier Branch, in the International Hotel, bulletins giving the latest information. not only of road conditions in New York, Ohio and Pennsylvania, but of the main travelled highways in the Dominion.

Motorists in the United States contemplating touring in Canada can receive valuable assistance from Manager Babcock of the Niagara Frontier Branch in securing through the Customs House bonds, permits and licenses which will facilitate their entering the Dominion.

Still After Illegal Tag Users

HARRISBURG, PA., July 8—The crusade made by the state highway department in forcing the automobile dealers of the Keystone State to observe the law governing the use of the dealers' tag is being continued. The fault found is that few, if any, of the men selling cars use any other than the tag that can be used under the law for demonstrating the car to a possible purchaser.

Another point which the highway department is about to enforce is the wearing of the drivers' personal registration pin. These pins have been secured by every dealer, but it is claimed that the section of the law prohibiting the chauffeur from running a car without the pin prominently displayed is a dead letter.

Alco Truck Acts as Pathfinder

KEYSTONE, IA., July 6—The transcontinental Alco assumed the rôle of pathfinder today when the crew in charge agreed upon request from Denver Board of Trade transcontinental route boomers to supply information on roads and bridge conditions. A delegation of tourists from Denver are on their way West, following in the path of the big motor truck.

Iowa bridges have been found woefully weak. The truck fell through a bridge near this city, the second in three days. It was jacked up and pulled through under its own power. Sentiment is strong along the Iowa route for better bridge facilities. The vehicle fell through a bridge 11 miles west of Clinton, dropping 6 feet to the bed of the creek. The crew jacked it up on boxes of soap which makes up the cargo. A runway was built with more boxes and the truck reached the other end of the bridge easily. A group of farmers notified the crew that they had been agitating for a new bridge for some time.

Aside from this incident considerable work was required in replanking and bracing other bridges. A few required block and tackle to keep them secure.

Pope-Hartford Stars at Davenport

DAVENPORT, IA., July 6—The annual hill climb of the Davenport Automobile Club took place on the morning of the Fourth, being witnessed by several thousand spectators, although started at 7 o'clock in order not to conflict with the races of the Mississippi Valley Power Boat Association. There were eight events. The Pope-Hartford carried off the honors of the day, winning four firsts, a second, third and establishing the best time of the day for the steep climb of four blocks, 18 seconds flat. The Cadillac made the next best record with three firsts and a second.

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The Engineering Balance Wheel

WHETHER the mature judgment of the conservative engineer or the snap judgment of the masses shall determine the features of design in the new models is a question which the board of managers of not a few factories have not possessed enough stamina to sanely adjust. They have wavered. Their corps of consulting engineers planned a well-balanced chassis, a mechanical creation worked up into a symmetry of efficiency; a resultant in which each part was proportioned with regard to its perspective in the final picture; they completed it, they tested it and found it efficient, equal to the demands and more. Then came the crucial moment: The selling representatives from the four corners of the land met to lift the veil, to analyze the new car, to see it with the eyes of him who meets the public face to face, and with the eyes of him who has to market the product and satisfy the consumer.

They saw and were not content. They objected to the body lines; the convex line must be changed to a straight one, and the concave to a convex. The public would not buy anything else; all selling effort would be increased five-fold if such alterations were not made. The engineer heard and obeyed. It was his to design to sell and not design to drift the company into the shoals or onto the rocks. The public had its way.

A year passed by. Once more the engineering corps fashioned their product, scaling it in accordance with the engineering formulæ and moulding it in harmony with the best accepted practices. But once more the dealer calipered the product through the eyes of the public and once more engineering worth was set aside and public demand pedestaled.

This vacillating program has been going on for several years; each season sees sane engineering dethroned and public taste enthroned, and each succeeding year witnesses the discarding of the public whim of yesterday and the adoption of the engineering fact of the day before. So it continues, not with one firm but with a hundred, every one terrified as to what the public will say. Will they buy or leave it?

Many concerns have experienced this nightmare for several seasons, particularly since the early announcement of models which has resulted in the setting of certain automobile fashions which the makers must make at least a pretense of following. A brief survey shows that the public demands are often wrong; used this year only to be discarded tomorrow; adopted today for a little glittering tinsel and discarded tomorrow because of absolute inefficiency.

This has taken place this year, it has taken place within the last 6 months and it will take place again. It assumes hundreds of different forms. With one maker it is wheels. He has found that a certain diameter of wheel is best suited for his chassis. He has tested it out with such and found it correct. With a larger or smaller wheel the performance of the machine is entirely different, far from being so good. But when the factory aims meet those of the selling force, the engineer has to give way, the other size is put on and the car starts out on its career badly handicapped, just because the dealer imagines that the public wants it.

There must be a line drawn, a line on one side of which the engineering requirements of the designers are placed and on the other side the wishes of the public. At present many factories have never drawn such a line. They will give almost anything to sell and give a different anything each succeeding year. Selling is their only goal. On the other hand, there are those who have stood solid on the rock of engineering practice, and, although they were lagging at times when gauged by public pulse, yet the passage of 4 or 5 years invariably has found them in the lead.

There are too many concerns which are afraid to draw the line. They have not enough confidence to take the step. They hang onto the old, because it has suited the public, until without warning this fickle public casts it aside. The strong concern is the one that decides what is right and then goes ahead, determined not to be led by the public but to make the public think its way. More of such are wanted.

There is a right and a wrong in engineering and the right cannot be followed continuously because the public constitutes the other half of the equation. One construction may be better in the hands of the public than another, at which time it is business acumen to give way to conditions for a time, only as a stepping-stone to the eventual. But where a company is constantly turning east, west, north and south only to take an about-face turn the next season, an engineering balance wheel is needed. The strongest concerns today are those that get things right from an engineering point of view and then start out to convince the public. They continue their warfare until they convince the public. With some, they were not all right, and they generously gave away, not afraid to acknowledge their errors. Others have proved too obstinate, slaves to their own whims, and it is rarely that a whim does not rise to the surface although its period of attention may be very brief.

Not a few concerns lack that business stamina necessary to go out to convince the public. They are afraid others will reap an immediate advantage and they see the rewards of today rather than the cumulative profits of the year. Instead of convincing their dealers, they let their dealers convince them. Instead of progressing, they are merely vacillating. Instead of educating the public, they are merely letting them play the ostrich rôle.

Big Registration in Bay State

Figures for the Past 6 Months Show that Receipts Are Already $110,667.25 Ahead of Last Year—Many New Commercials

BOSTON, July 6.—From the figures just compiled by Edward J. O'Hara, who has charge of the automobile department of the Massachusetts Highway Commission, further evidence is given of the importance and growth of the motor industry in the Bay State.

Although but 6 months have passed the total receipts have run $110,667.25 above the same period for 1911. Not only that but the entire year of 1911 is bettered by $9,039.22. And there are still some heavy registrations to come for many of the summer residents will help swell the total between now and August.

Last year there were 38,907 cars registered. Up to July 1 last there were 40,833. As a lot of men are still waiting for their machines, some of the factories being somewhat behind, the total registrations will go much higher.

The increase has been general along the line, too. For example last year there were registered 3658 motorcycles. Up to date there have been 3759 such machines registered. The manufacturers and dealers have increased also, for there were but 870 named throughout 1911 while there are now 1027, an increase of 157. New concerns are being formed every week, so the figures will increase.

That there has been a steady growth in the number of commercial vehicles sold throughout the state is shown by the figures for these. In 1911 there were about 2000 trucks registered. This year a distinct tabulation is kept on these vehicles and up to July 1 there had been registered 3100 such vehicles.

This shows a gain of about 35 per cent. That there would be more sold if there had not been the agitation to keep such vehicles off the road by hostile legislation, but which fortunately did not pass this year, is the opinion of some dealers. Some of the men who now own trucks have said that until reassured that commercial vehicles would not be legislated off the road they would not invest in more equipment.

In the number registered this year are many old cars that have been turned into delivery wagons. They come under the truck rating. But not being built originally for the heavy truck work they will last but a year or two under the hard service and so they will be displaced by real trucks.

With the state receiving $513,201.67 to date and considering what will be received from fines this year in addition to the total from motor trucks it is estimated that the receipts this year will easily go over $550,000 and they may even reach as high as $600,000.

The following table shows the increase in the motor industry in the Bay State, during the past year:

	Year 1911	To July 1, 1911	To July 1, 1912
Automobiles	38,907	32,212	40,833
Motorcycles	3,658	2,854	3,759
Manufacturers or dealers	870	783	1,027
Operators	11,061	6,370	7,939
Operator renewals	25,345	21,079	24,388
Chauffeurs	4,183	2,241	2,702
Chauffeur renewals	11,361	7,157	7,771
Examinations	6,137	3,321	3,736
Commercial vehicles	*2,000	*1,500	3,100
Total fees	$504,162.45	$402,524.42	$513,201.67

*Approximately.

New Roads in Yellowstone Park

Heyburn, of Idaho, Introduces Amendment to Sundry Civil Bills Asking for Appropriation of $250,000 for the Purpose

WASHINGTON, D. C., July 8—Senator Heyburn, of Idaho, following the introduction of a resolution calling for an estimate of the cost of construction of new roads, or changes in the present roads, in the Yellowstone National Park, in order to permit the use of automobiles and motorcycles therein, without interfering with the present mode of travel in vehicles drawn by horses or other animals, followed it up with an amendment to the sundry civil bill calling for the appropriation of $250,000 with which to make the suggested changes.

So far the estimate asked for from the Secretary of War has not been submitted, but it is expected that it will be in time to be used as an argument in favor of Senator Heyburn's amendment. At present the use of automobiles in the Yellowstone Park is seriously interfered with, due to the restrictions placed on the practice. In addition, there is danger to the drivers of horses or mules when the latter meet motor vehicles on some of the narrow roadways.

Senator Heyburn thinks the Yellowstone Park is destined to be one of the most interesting of spots for motorists and, while he would extend this use of it, he is anxious to protect other travelers.

Senator Jones, of Washington, has also introduced an amendment to the sundry civil bill under which the sum of $35,000 is appropriated for the improvement of the government road between the National Park Inn, in the Mount Rainier National Park, and the point where the government road leaves the national forest reserve.

Wisconsin Gains 3,000 Registrations

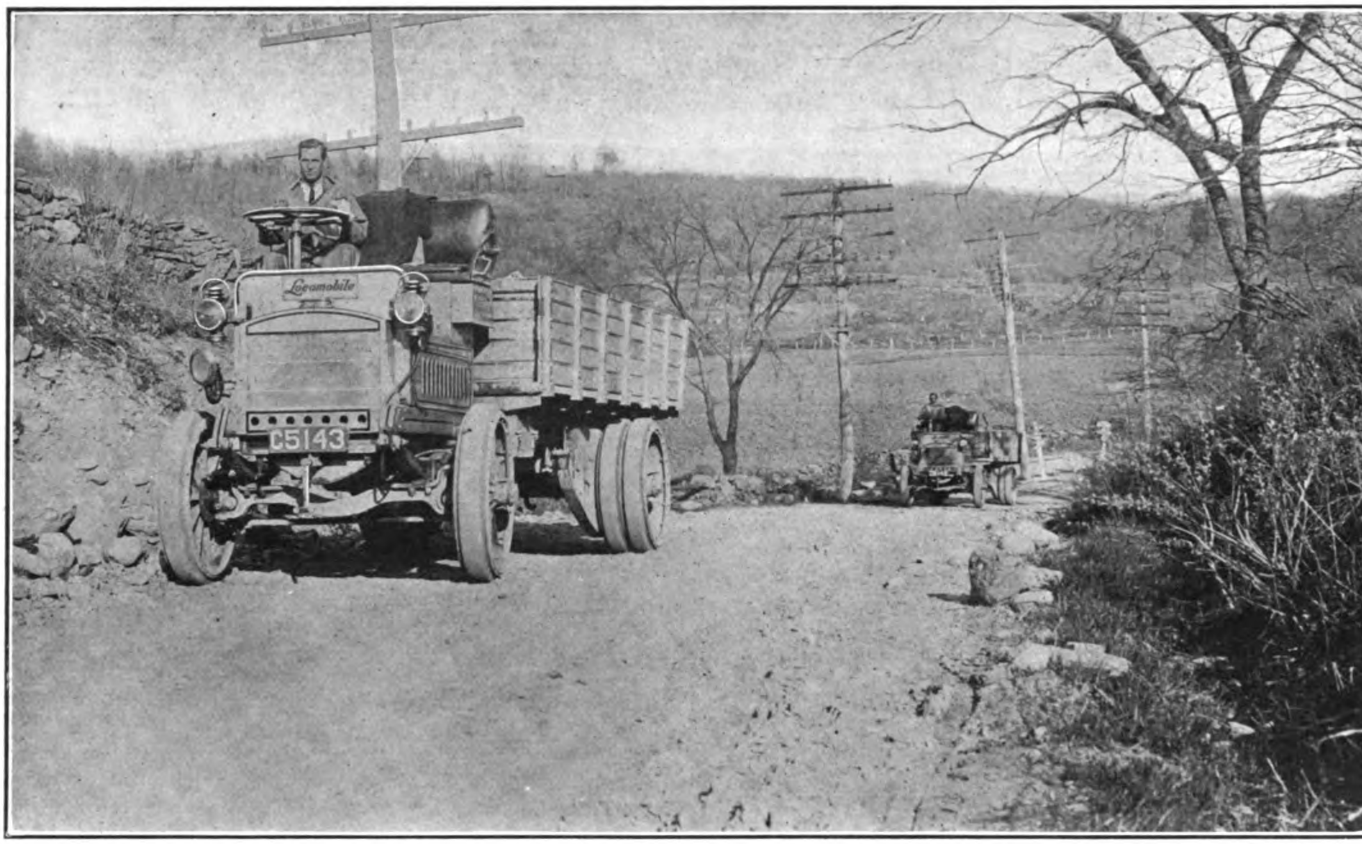
MADISON, WIS., July 8—On July 1, 1912, 21,416 licenses for motor cars had been issued by the secretary of state of Wisconsin, an increase of more than 3,000 over the corresponding period a year ago. In addition, there have been issued 4,100 motorcycle licenses and 972 dealers have been registered. Private owners and dealers pay $5 per year and motorcycles $2 annually, making total receipts by the state of $120,000. After paying the expenses of maintaining the registration bureau, the secretary of state turns the residue into the state highway fund. It is calculated that nearly $100,000 will be raised for highway purposes each year in Wisconsin under the new state aid law, which appropriates $300,000 for the building of highways.

Pennsylvania's Big Registration

HARRISBURG, PA., July 8—The $500,000 mark was reached several weeks ago by the state highway department in licenses and registration fees for automobiles, motorcycles and chauffeurs when the registrar issued license No. 50,000. The record for less than half a year breaks all past registration.

The money is not available for the improvement and maintenance of state highways, but at the next session of the Legislature a bill will be introduced specifically providing that this money and other similar fees can be used for road purposes. There is also $1,000,000 in the fund from past years.

News of the Week Condensed



5-ton Locomobile truck used by Bridgeport Hydraulic Company in constructing dam. Note the hilly country covered

LUNCHEON for Batchelder—A representative committee of Seattle automobilists gathered at luncheon recently in honor of A. G. Batchelder, chairman of the executive committee of the A. A. A. In the company were Judge J. T. Ronald, president of the Pacific Highways Association; Judge Richard A. Ballinger, Judge Alfred Battle, C. E. Plimpton, president of the Automobile Club of Seattle; Joseph Blethen, W. A. Avery, Frank M. Fretwell, R. P. Rice and George Bentel, of San Francisco.

Philadelphia has Motz Branch—A Philadelphia branch of the Motz Tire & Rubber Company, in charge of William M. Shibbs, has been established at 1409 Race street.

Moore Nyberg's Assistant Manager—W. E. Moore has been promoted to assistant general manager of the Nyberg Automobile Works, Anderson, Ind. His position as production manager will be filled by Otto Schultz.

Whiting has Philadelphia Agency—The Philadelphia branch of the Mercer Automobile Company has been absorbed by the Whiting Motor Company, of New York, which will hereafter have the agency for Pennsylvania, Delaware and Maryland.

Willys at North Shore—President John N. Willys, of the Overland-Garford-Gramm companies, has opened his summer home on the north shore of Massachusetts near President Taft's cottage, and he will spend as much time as possible there.

Studebaker Branch in San Antonio—C. W. Hartman, manager for the Studebaker Company in Texas, with headquarters in Dallas, announces the opening of a branch house in San Antonio. This is done with a view of handling the south Texas trade.

C. H. Washburn Dies—Charles H. Washburn, for 35 years associated with the Mitchell-Lewis Motor Company, Racine, Wis., died on July 5, aged 61 years. Mr. Washburn was prominently identified with the evolution of the present Mitchell-Lewis company.

Boorse Interested in Schreiber—Hugo C. Boorse, Milwaukee, Wis., has taken a large financial interest in the Schreiber Motor Car Company, state agent for the Locomobile, Haynes and Hudson. The name of the company has been changed to Schreiber-Boorse Motor Car Company.

Perrin Resigns from Regal—C. C. Perrin, who for the past 3 years has been assistant sales manager for the Regal Motor Car Company, Detroit, Mich., has resigned from that position to accept a position as sales manager with the American Motors Company, Indianapolis, Ind.

Buy Up Duplex Coil Company—F. C. Rueping and R. C. Wells, Fond du Lac, Wis., have purchased the interest of E. J. Huber and J. C. Fuhrmann, principal owners of the Duplex Coil Company, manufacturing coils, magnetos, ignition supplies and electric lighting systems for motor cars, and will continue the business with Mr. Wells as general manager.

Makes Record Time—H. W. Topping, 1093 Summit avenue, St. Paul, Minn., made an automobile trip last week from New York City in 5½ days plus 3 hours.

Sells Accessories in Batimore—Ferdinand C. Latrobe is now handling a general line of automobile accessories in the Oakland Motor Company building, Baltimore, Md.

McCool Wins Promotion—O. N. McCool, formerly sales manager of the Start-Lite Company, Chicago, has recently been made secretary and general manager of the company.

Gets Zilio Agency—The Baltimore, Md., agency for Zilio, the vegetable compound which is used in place of air in tire casings, is now in the hands of H. F. Parker & Company.

Making Over Its Building—The Auto Tire Sales Company, 151 West Sixth street, St. Paul, Minn., has begun to make over its building to get additional space. A. P. Jungck is manager.

Magee Flanders Comptroller—Charles A. Magee, formerly comptroller of the General Motors Company, has taken a position of similar nature with the Flanders Manufacturing Company, Pontiac, Mich.

Salina Now Motorized—The last horse in the Salina, Kan., fire department has been discarded for a KisselKar truck, which has been found much more efficient in responding to alarms than the horse-drawn type of apparatus.

Hawes Joins Everitt Forces—F. W. Hawes has been appointed production engineer for the Metzger Motor Car Company, Detroit, Mich. He was formerly in the engineering department of the Cadillac Motor Car Company.

More Bids Wanted—All of the bids received by the director of safety of Columbus, O., for the erecting of a municipal garage to house the police patrols were above the estimate and were rejected. The work will be re-advertised.

Young Goes to Regal—C. S. Young, engineer and designer for the Lozier Motor Car Company, Detroit, Mich., has severed that connection and has joined the forces of the Regal, with the title of assistant general manager to Fred Haines.

Redwood Falls Tour Begins—The second annual tour of the Redwood Falls Automobile Club began July 12 and will end July 15. The first night stop was at Austin, Minn., and the second and third nights at the Hotel Radisson, Minneapolis. There are about 100 of the tourists.

Builds a Racing Car—C. E. Ross, of the Ross Garage Company, of Columbus, O., has completed a 90-horsepower racer which he will enter in the Columbus 100-mile race August 25. The engine is one of Mr. Ross's own construction and he claims that the car will make 100 miles per hour.

Good Roads Club Formed—The Yakima County Good Roads Association, consisting of all the civic bodies in Yakima County, Washington, was formed recently. The purpose of the association is to work out plans for the location of the roads to be built with the proposed $1,000,000 bond issue.

Many to Tour to Detroit—Invitations to participate in the Cadillaqua parade and festivities have been accepted by automobile clubs in Cincinnati, Indianapolis, Dayton, Chicago, Milwaukee and Grand Rapids in addition to a large number of smaller cities in the state of Michigan. It is announced that all will tour to Detroit.

St. Louis Firms Combine—The Chicopee Motor Car Company, handling the Cutting and Stevens-Duryea in St. Louis, Mo., has consolidated with the Superior Motor Sales Company, holding the Stoddard-Dayton. The combined concern will be known as the Superior Motor Sales Company.

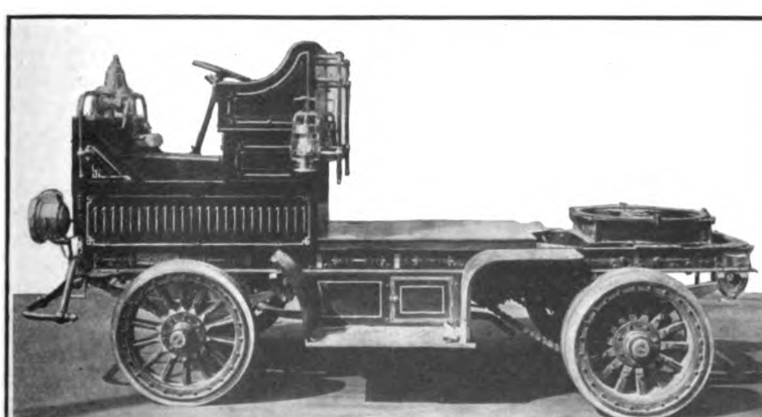
Now Hudson Agents—Walter J. Bemb, central district sales manager, and L. J. Robinson, southern district sales manager, for the Hudson Motor Car Company, have resigned from the Hudson company and have established the Bemb-Robinson Company as distributors for the Hudson line in the vicinity of Detroit, Mich.

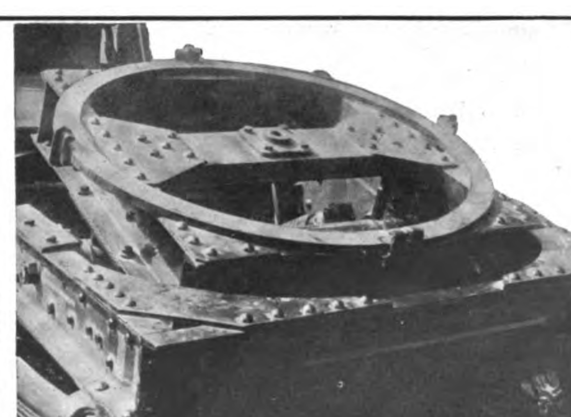
Archey-Atkins to Move—The Archey-Atkins Company will move into a new salesroom at Capitol avenue and Michigan street, in Indianapolis, Ind. The Globe Realty Company has completed a three-story reinforced concrete building for the use of the company, which has the agency for the Hudson, Pierce-Arrow and Detroit Electric.

Big Regal Convention—Preparatory to the distribution of the coming season's output, there has been held at Detroit, Mich., a convention of the traveling representatives of the Regal Motor Car Company. Business sessions were held each day, but mixed in with the more serious parts of the program was enough pleasure to make the gathering one of the most enjoyable as well as one of the most profitable in the history of the Regal organization.

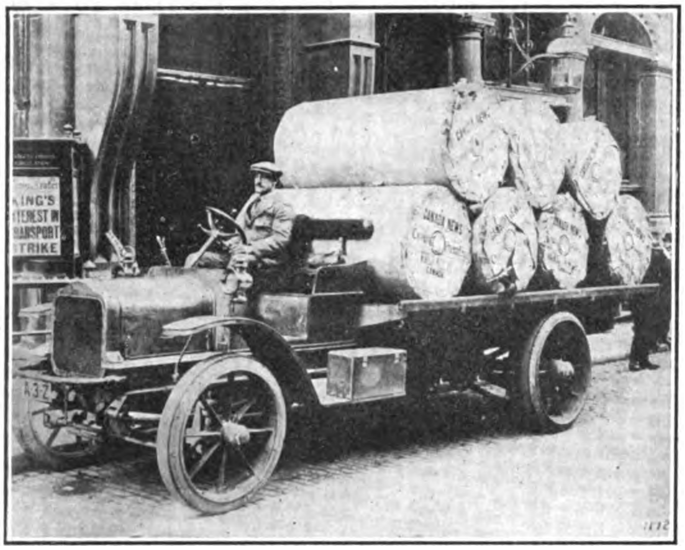
Peerless Men Honored—Academic recognition of the contributions made by the heat-treating department of the Peerless Motor Car Company, Cleveland, O., to the improvement of metals for use in motor cars was given by the Case Scientific School, of Cleveland, recently when it conferred the degree of Metallurgical Engineer upon Robert Abbott and Mark Ammond. Abbott is the chief metallurgist of the Peerless Motor Car Company and Ammond his assistant.

Alco Tractor for Schenectady—The American Locomotive Company has just furnished to the Schenectady fire department an Alco tractor designed to replace horses in drawing hook-and-ladder trucks to fires. Upon the tractor is mounted a fifth-wheel device to which the ladder truck is attached, the latter being guided independently of the tractor. The operation of the fifth wheel is not affected when the tractor drops into a depression of the road. The tractor has a 110-inch wheelbase, and its tire equipment consists of 36 by 5 single solids on front and 36 by 4 dual solids on the rear.





Alco tractor built for the Schenectady fire department, used to draw hook-and-ladder truck. Detail of fifth-wheel device



White truck used by London newspaper during strike

Henderson Offices Are Transferred—The Henderson Motor Car Company, Indianapolis, Ind., has removed its offices to its factory at North West and Fourteenth streets.

Motz Branch in Cleveland—The Motz Tire & Rubber Company, Akron, O., has established a direct factory branch in Cleveland, O. The branch is in charge of Charles Serfass.

Nelson Resigns from Diamond—F. O. Nelson has resigned as manager of the Diamond Rubber Company's Los Angeles, Cal., branch and will shortly enter business for himself.

Work Begun on Atlanta Building—Work was started recently on the new building for the Oakland Southern branch in Atlanta, Ga. The building will be located at the corner of Peachtree and Linden streets.

Crane Chicago Locomobile Man—George A. Crane, formerly with the Knox Automobile Company and United States Motor Company, has taken charge of the Locomobile business in the Chicago territory.

Garford Sells Patrol Wagon—The Garford Company, Elyria, O., has sold a patrol wagon to the city of Newark, N. J. The wagon is a 40-horsepower machine, has a capacity for twelve passengers and a maximum speed of about 45 miles an hour.

Tire Company's Branch Moves—The United States Tire Company's St. Louis, Mo., branch will move to the northeast corner of Compton avenue and Locust street about July 15. This is directly across from the new building of the Firestone Tire & Rubber Company.

Kemps Purchase Repair Station—Harry C. Kemp and Matt C. Kemp have bought from W. D. Rightmire the tire repair station at 1629 Hennepin avenue, Minneapolis, Minn., and will change the name from the Minneapolis Auto Tire Repair Station to the Minneapolis Tire Repair Company.

Republic Branch has New Quarters—The Northwestern branch of the Republic Tire Company, St. Paul, Minn., has moved to a new building at 167-169 West Sixth street. The showroom is 25 by 100 feet. It has a heated driveway for winter use. In the basement is 5,250 square feet of storage space.

Wheeler Now Manager—C. E. Wheeler, formerly connected with the Franklin branch in Boston, Mass., has been made manager of the R. C. H. Corporation branch in that city, filling the vacancy caused by the transfer to the Pacific Coast of William Jordan, who has been manager of the Hub branch for several months.

To Have Sociability Tour—The Mankato, Minn., Automobile Club will have a sociability tour July 16 to Faribault by way of Madison Lake, Elysian, Waterville and Morristown. The Faribault club will meet the tourists on the road and escort them to the picnic grounds. The Mankato club will then return by Owatonna, Wasseco and Janesville.

Minneapolis Club After Thieves—The Automobile Club of Minneapolis, Minn., has paid $500 in rewards to two city detectives for capture of automobile thieves, one of whom is in St. Louis to be brought back. The club paid a large sum toward expenses in the capture of four automobile bandits who have terrorized the city and vicinity for a year.

White Bear Grows Again—The White Bear Auto Company has absorbed the St. Paul, Minn., agency for the R-C-H cars, and will have sale of the cars in Ramsey, Dakota, Washington and Chisag counties. The salesroom will be in the new garage of the company at 161-163 West Sixth street, St. Paul, into which the company has just moved.

Truck as a Strikebreaker—During the recent teamsters' strike in England which tied up practically all the transportation in London, the *London Daily News* employed a White 3-ton truck to haul its supply of paper from the docks to the publishing office. Without the truck publication would have been suspended during the strike. The *News* is now a convert to motor draying.

New Electric Ambulance—Washington, D. C., has added another motor-driven vehicle to its fleet of municipal machines. It is a Detroit-Electric ambulance and is used by the emergency hospital. The machine is the gift of a Philadelphia woman who formerly resided in the national capital. The car is finished in battleship gray, with bird's-eye maple interior and red upholstery and has all the latest hospital equipment.

Automobile Incorporations

AUTOMOBILES AND PARTS

Boston, Mass.—Marion Motor Car Company; capital, $5,000; to deal in automobiles. Incorporators: Albert R. Atwater, Albert L. Dinnin, Russell W. Campbell, Archie W. Campbell.

Brooklyn, N. Y.—Dunham Auto Company; capital, $15,000; to deal in automobiles. Incorporators: Louis Carmadella, Charles A. Apfel.

Buffalo, N. Y.—L. G. Schoepflin Company; capital, $10,000; to engage in the automobile business. Incorporators: Louis G. Schoepflin, L. O. Schoepflin, Herbert G. Schoepflin.

Chicago, Ill.—Seek Auto Company; capital, $8,000; to engage in the automobile business. Incorporators: James H. Seek, Herbert W. Crane, Emmet W. Mick.

Corinth, Miss.—Corinth Auto Company; capital, $10,000; to deal in automobiles. Incorporators: W. A. Stewart, W. A. Hinton, T. F. Hinston, H. N. Young.

Cuero, Tex.—R. C. Flick Auto Company; capital, $10,000; to do a general automobile business. Incorporators: R. C. Flick, R. F. Flick, N. M. Crain

Indianapolis, Ind.—Ideal Motor Car Company; capital, $100,000; to manufacture automobiles. Incorporators: H. F. Campbell, H. C. Stutz, W. F. Glickert.

Marion, Ind.—Railway Motor Car Company; capital, $200,000; to make automobiles for use on railways. Incorporators: G. R. Stewart, J. D. Worth, Eben H. Wolcott, Hiram Beshore, W. G. Worth.

Rye, N. Y.—Jacob Werner, Inc.; capital, $1,000; to deal in automobiles. Incorporators: Jacob Werner, Ellen J. Werner, George J. Werner.

San Antonio, Tex.—Ford Sales Company; capital, $5,000; to deal in automobiles. Incorporators: M. D. George, Clifton George, G. H. King.

GARAGES AND ACCESSORIES

Buffalo, N. Y.—Stewart Motor Corporation; capital, $250,000; to manufacture light capacity trucks. Incorporators: T. R. Lippard, R. G. Stewart, R. P. Lentz.

Clarksdale, Miss.—Essenkay Sales Company; capital, $4,000; to deal in punctureless tires and fill inner tubes. Incorporators: J. L. Hartshorn, J. W. Primrose, I. L. Ledbetter.

Detroit, Mich.—Capital Auto Lock Company; capital, $10,000; to manufacture automobile locks. Incorporators: Benjamin Noble, Arthur E. Schreiter, Walter W. Martin.

Detroit, Mich.—Parker Avenue Garage Company; capital, $10,000; to conduct a garage and repair shop. Incorporators: F. P. Schneider, Joseph E. Weisenberger, Walter M. Trayor.

Dothan, Ala.—Alabama Airless Tire Company; capital, $6,000; to make punctureless tires.

Elmira, N. Y.—International Resilio Company; capital, $50,000; to make and sell a preparation to take the place of air in tires. Incorporators: Raymond Nichols, Daniel L. Tharp, Samuel L. Welch, Henry Collin, Philip E. Lenergan.

Far Rockaway, N. Y.—Far Rockaway Garage; capital, $1,000; to conduct a garage and repair business. Incorporators: John A. Kilgallon, Michael J. Walsh, John J. Walsh.

Club to Post Road—The Automobile Club of Southern California is making preparations to post the road from Los Angeles to Mt. Wilson.

Clement Leaves Spokane—G. B. Clement has resigned as manager of the Spokane branch of the Goodyear Tire & Rubber Company, and will go to San Francisco to engage in the automobile business.

Essenkay in Maryland—The Essenkay tire filler is now being handled in Maryland and the District of Columbia by the Essenkay Sales Company of Maryland, Baltimore, Md. Clarence H. Clark is manager.

Installed in New Quarters—The Missouri Motor Car Company has moved into its new building at 3005-07 Locust street, St. Louis, Mo. The concern handles the Amplex, Alco, Abbott-Detroit and Marmon.

Hadley with Lenox—W. K. Hadley, until recently with the Marion Motor Car Company at Indianapolis, Ind., is now general sales manager and purchasing agent for the Lenox Motor Car Company, Boston, Mass.

Automobile Line Started—A motor car service has been installed between Gueydan and Florence, La. A seven-passenger car is being operated on a regular schedule and initial business is said to be encouraging.

Boston Firm Dissolves—White, Ware & Leatherbee, Boston, Mass., for some time New England representatives for Louis J. Bergdoll Motor Company, Philadelphia, Pa., have discontinued their agency and the firm will be dissolved.

Williams Made Advertising Manager—D. B. Williams, who has occupied the position of assistant sales and advertising manager of the American Motors Company, Indianapolis, Ind., has been appointed advertising and publicity manager.

Death of W. M. Jenkins—Williard M. Jenkins, one of the best known of the Boston motor dealers, and agent for the Abbott-Detroit and K-R-I-T cars in Boston and vicinity, died recently at his home at Exeter, N. H., after a brief illness.

A. N. Mayo Dead—A. N. Mayo, Springfield, Mass., one of the heaviest stockholders in the Fisk Rubber Company, died recently at his home. Besides the interests held in the Fisk company, Mr. Mayo also owned stock in the Knox Automobile Company.

After Good Roads in Montana—Secretary P. N. Barnard, of the Kalispell, Mont., Chamber of Commerce, suggests bonding the state for $10,000,000 to build a uniform system of highways in Montana. Resolutions will be submitted to every similar association for presentation to the Legislature for action.

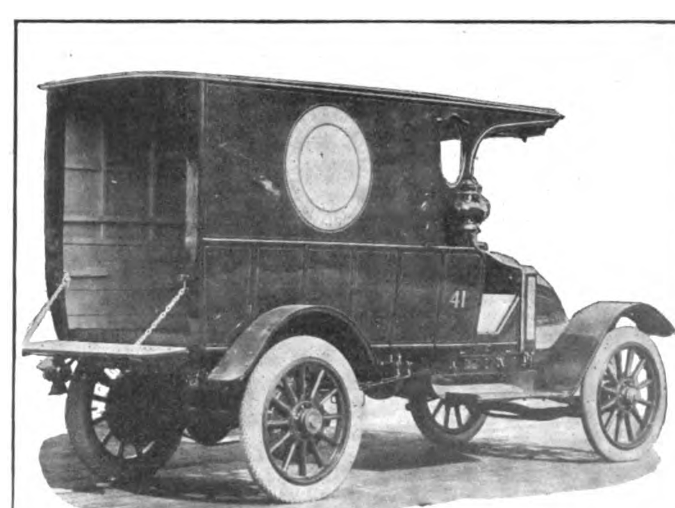
Combine Against Gasoline Rates—In order to be able to purchase gasoline and oil at better rates than could be obtained from local retailers automobile owners in Texarkana, Ark., have formed a co-operative society. It is claimed that arrangements have been made whereby several cents per gallon will be saved on gasoline.

No Meeting at Atlanta—The Atlanta Automobile and Accessory Association, Atlanta, Ga., has decided to give up its attempt to hold a meeting this summer on the Atlanta Speedway. A canvass of the situation demonstrated that a good entry list could be secured but the scheme was deemed impracticable when the cost of putting the track surface in condition was learned.

Hood Goes to Boston—Wallace C. Hood, formerly sales manager of the Everitt Motor Car Company, has gone to Boston, Mass., to join the firm of J. S. Harrington & Company, New England agents for the Everitt. He will have general charge of sales and distribution from the Boston, Worcester and Providence salesrooms making his headquarters in Boston.

Philadelphia Peerless Branch—A new factory branch of the Peerless Motor Car Company will soon be opened at 245 North Broad street, Philadelphia. R. W. Cook, formerly sales manager of the Philadelphia Peerless agency, will be in charge of the branch. Pending completion of the building the offices of the Peerless company are in the Abbott building, Broad and Race streets.

Special Ice Cream Trucks—The Lippard-Stewart Motor Car Company, Buffalo, N. Y., has built five panel body delivery cars, of 1,500 pounds capacity each, for the Hoefler Ice Cream Company, of Buffalo. The floor of the bodies is lined inside with zinc to prevent salt water from leaking down on the mechanism. Over this zinc is a removable oak grating on which the freezers are set.



Lippard-Stewart delivery car designed for ice cream business

Automobile Incorporations

JERSEY CITY, N. J.—Republic Auto Tire Vulcanizing Company; capital, $25,000; to manufacture and deal in automobile accessories. Incorporators: W. Merkel, N. J. Stinard, M. Levine.

MILWAUKEE, WIS.—Fisk Rubber Company; capital, $50,000; to deal in tire and rubber goods. Incorporators: Frank Lee and others.

MILWAUKEE, WIS.—Layton Park Oil & Soap Company; capital, $50,000; to manufacture and deal in motor oils and greases. Incorporators: Leo Hofmeister, W. O. Meilahn, E. A. Baker.

NASHVILLE, TENN.—Seaton Wheel Company; capital, $130,000; to manufacture automobile wheels. Incorporators: Cranberry Jackson, Samuel S. Lord, B. C. Seaton.

NEW YORK CITY—American Motor Freight Company; capital, $25,000; to transport freight by means of automobiles. Incorporators: H. G. Waring, H. W. Bell, H. G. Phillips.

NEW YORK CITY—Canadian Overman Company, Inc.; capital, $50,000; to manufacture and deal in tires. Incorporators: Albert Z. Gary, Lucius Wilmerding.

NEW YORK CITY—East End Garage, Inc.; capital, $1,000; to conduct a garage business. Incorporators: Henry Krauss, Pauline Krauss, Max Steindler.

NEW YORK CITY—Russian Tire Sales Company; capital, $30,000; to deal in pneumatic tires. Incorporators: Otto Braunworth, H. Ray Paige, Maud Steinway Paige.

NEW YORK CITY—Standard Auto Coach Burial Company; capital, $200,000; to conduct an automobile funeral business. Incorporators: J. Newberger, Frank C. Cochren, S. S. Lowenstein, Wayne Litzinberger, C. H. Tebbetts.

SPARTANSBURG, S. C.—Little Automobile Supply Company; capital, $10,000; to deal in automobile accessories and supplies. Incorporators: S. C. Littlem, T. S. Sease, D. D. Little.

SYRACUSE, N. Y.—Jefferson Garage Company; capital, $30,000; to conduct garage and repair shop business. Incorporators: Antonia Matzene, Charles J. Roehm, Charles J. Baumer.

TOLEDO, O.—Rapp Manufacturing Company; capital, $15,000; to make spark plugs and other accessories. Incorporators: Samuel W. Rapp, Clifford D. Stone, Samuel L. Thorburn, Otto L. Hankinson, Chester D. Few.

TORONTO, ONT.—Automobile Owners' Association; capital, $100,000; to manufacture machinery for the making of automobiles. Incorporators: Arthur W. Holmstead, William L. Carr, W. B. McKenzie.

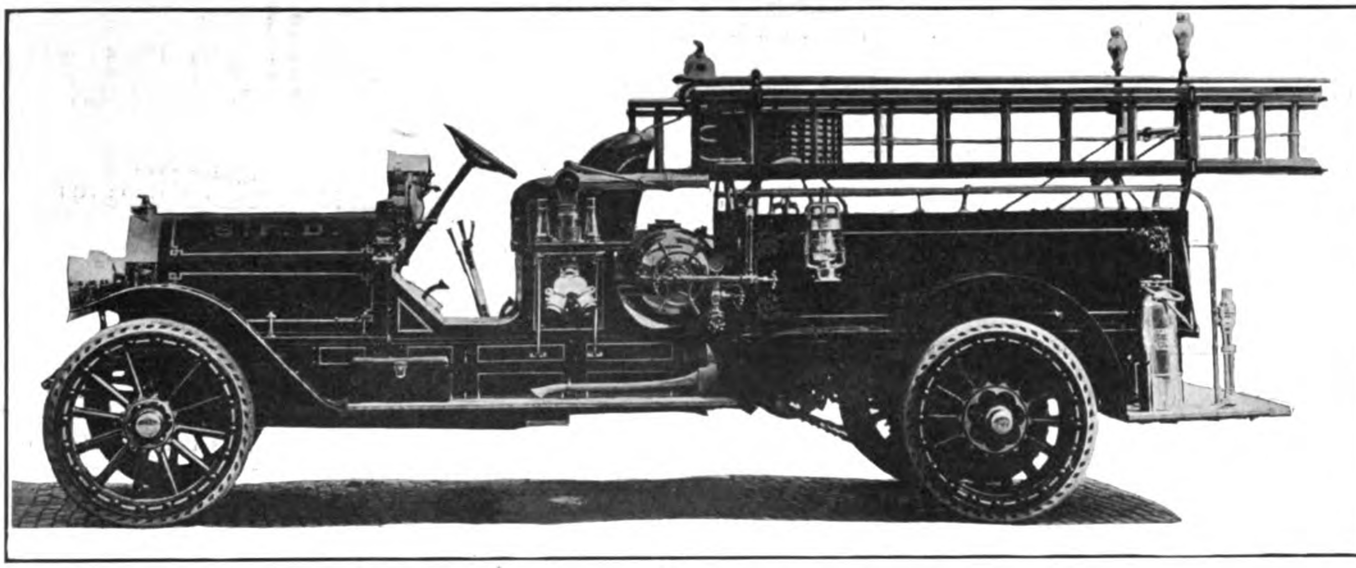
TORONTO, ONT.—Toronto Rubber Company; capital, $100,000; to deal in rubber products, including tires. Incorporators: Thomas Price, Carl H. Smith, Walker B. Stratton, E. E. Erskine, Louise O'Neal.

WEST FALLS, N. Y.—Golden & Buffalo Auto Service Company; capital $2,000; to conduct a passenger service in Erie County. Incorporators: Fred Hey, S. Hey.

CHANGES OF CAPITAL

CINCINNATI, O.—Hanauer Automobile Company; capital increased from $20,000 to $50,000.

TOLEDO, O.—Toledo Motor Truck Company; capital increased from $95,000 to $150,000.



New KisselKar 2-ton chemical truck in the service of the Salina, Kan., fire department

News of the Garages

Grayling Has a New Garage—Grayling, Mich., has now a first-class garage operated by the Grayling Machine Repair Company.

New Garage in West Rutland—Richard Mead and Arthur Walker are erecting a garage and repair shop on Clarendon avenue, West Rutland, Vt.

Onley Garage Is Opened—Lee B. Kellam and his nephew, J. T. Kellam, have opened an up-to-date garage in Onley, Va., under the name of the Onley Garage Company.

Another Garage for Fitchburg—F. B. Higgins has opened a public garage on Water street, Fitchburg, Mass., where he will do a general accessory business as well as garage work.

Bluefield Garage to Build Soon—John L. Crockett, Bluefield, W. Va., has awarded a contract for a concrete-steel garage to P. A. Dunn. The garage will cover an area 50 by 130 feet.

New Automobile Agencies

PLEASURE CARS

Place	Car	Agent
Ada, O.	King	J. H. Jones.
Atlanta, Ga.	Alco	M. Neighbors & R. M. Northcutt.
Atlanta, Ga.	Cole	M. Neighbors & R. M. Northcutt.
Baltimore, Md.	Detroiter	Detroiter Baltimore Co.
Atlanta, Ga.	Packard	Jack O'Dell.
Binghamton, N. Y.	Alco	H. T. Rogers.
Calgary, Alta.	Alco	Geddes & Sheffield.
Edmunton, Alta.	Alco	Taylor & Musson.
Memphis, Tenn.	Alco	Six Thirty-Eight Tire & Vulcanizing Company.
Milwaukee, Wis.	Detroiter	R. A. Creek.
Milwaukee, Wis.	Oakland	R. A. Creek.
Milwaukee, Wis.	Stutz	George W. Browne.
New Haven, Conn.	Thomas	Knight Garage, Inc.
Owens, Ohio	King	J. D. Owens.
Peekskill, N. Y.	Alco	W. H. Ash.
Rochelle, Ill.	Alco	Geo. E. Stocking.
Seattle, Wash.	American	George E. Johnson.
Seattle, Wash.	Hudson	C. L. Ross.
Seattle, Wash.	Marion	George E. Johnson.
Seattle, Wash.	Painge Detroit	George E. Johnson.
Spokane, Wash.	Lozier	Metropolitan Motor Car Company.
Winnipeg, Man.	Chalmers	Joseph Maw & Co., Ltd.
York, Pa.	R-C-H	York Garage & Supply Co.

ELECTRIC CARS

Place	Car	Agent
Portland, Ore.	Ohio	Braly-Dubois Auto Co.

COMMERCIAL VEHICLES

Place	Car	Agent
Atlanta, Ga.	Federal	M. Neighbors & R. M. Northcutt.
Kansas City, Mo.	Lincoln	Indiana Garage & Sales Co.

Macon's Two-Story Garage—The Harrold Banking & Savings Company, of Macon, Ga., has awarded a contract for the erection of a garage on First street. The building will be two stories high.

Perkins & Corliss Build—A large brick garage is being erected on Western avenue, Gloucester, Mass., for the Perkins & Corliss Company, giving the firm much larger room than it now possesses.

Rothfuss Garage Being Enlarged—The Rothfuss Garage, of Williamsport, Pa., is to be expanded so as to have a capacity for forty automobiles. The addition to the building will be of brick and concrete.

Goltra Opens in Greenwich—Newton R. Goltra has opened a garage on Railroad avenue, Greenwich, Conn., under the name of the Depot Garage & Machine Works, in which a general garage will be carried on.

Council Bluffs' Growing Motordom—The continued progress of the automobile in Council Bluffs, Ia., is illustrated by the fact that Barney Gilinsky is constructing a garage on corner Broadway and Eighth street.

Cohen Buys in New Britain—The garage on Arch street, New Britain, Conn., conducted by H. B. Freeman, of Hartford, has been sold to Aaron Cohen. The purchase includes the Ford agency formerly conducted by Freeman.

To Store Cars in Gardiner—M. M. Spear and W. L. Tozier have taken the lease of the garage building on the causeway opposite the depot at Gardiner, Me., and have opened a general accessory business and storage service there.

Loos' Garage Has No Posts—Loos & Son, Coshocton, O., have moved into their new garage, which is of cantilever construction, so that cars may be driven through the garage without meeting an obstruction.

Fillow Company Expands—The Fillow Auto Company, Danbury, Conn., has purchased two lots immediately east of its garage on Crosby street, and the land will be leveled immediately and used for day storage temporarily. Later on a new structure devoted to the motor truck business will be erected on the property and joined to the company's present structure.

Minneapolis Has Electric Garage—Fred H. Day and Harry I. Murphy have opened an electric garage in Minneapolis, Minn., the establishment being named the Owl. It is a two-story building and covers a space of 70 by 70 feet; the capacity of the garage is for 150 cars. The new electric garage building by the Kemp Brothers Automobile Company will be completed in July.

BIG Chalmers Addition—The Chalmers Motor Company, Detroit, Mich., has approved the first general plans and will start work at once on an extensive addition to the present plant. The immediate operations will consist of the erection of one four-story building which will form a connecting link between the present assembling building and machinery building, both of which are four stories, 60 by 400 feet. This structure will be 191 feet long by 71 feet wide and four stories in height, adding 55,000 square feet of floor space to the present manufacturing facilities of the Chalmers Motor Company. Construction arrangements will also be made for an additional building to be joined to the new structure and to be an exact duplicate of the three main buildings of the factory, which are 60 feet wide by 400 feet long and four stories in height. The new structure will be an all-concrete and steel building. There will be no beams or girders showing anywhere in the interior of the building. The estimated cost of this building is approximately $75,000. Equipped as now contemplated the total cost of the structure will be between $150,000 and $200,000.

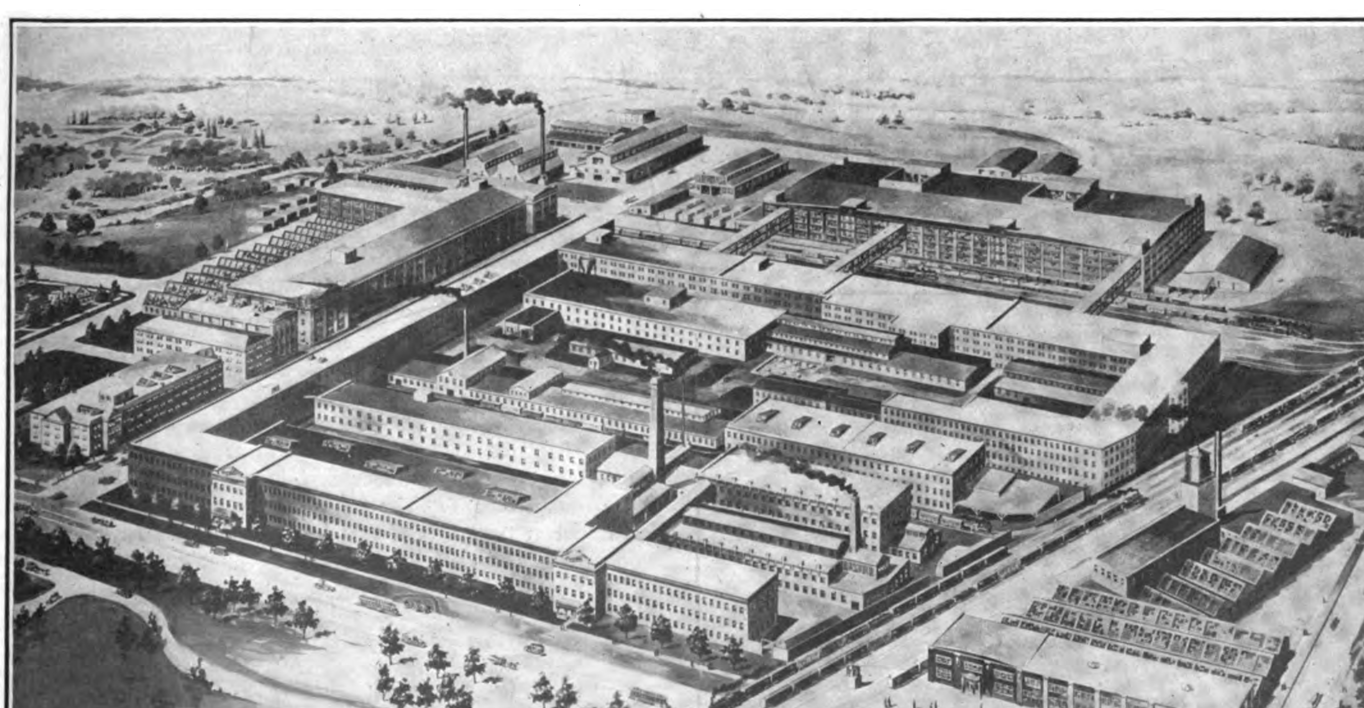
Ford Buys Real Estate—The Ford Company has completed the purchase of a trackage site in Minneapolis, Minn., which will be used for the erection of an assembling and distributing plant for the Northwestern service of the company. The cost of the site is $51,000. Operations will start at once.

Nyberg Works to Make Trucks—The Nyberg Automobile Works, Anderson, Ind., is to manufacture trucks on a large scale. The Nyberg truck will have a 3,000-pound capacity and sell for $2,000. One of these trucks, loaded to its full capacity, will be in the Indiana Four States Tour. This will be one of the most severe tests to which a gasoline truck has ever been subjected, for the route through Ohio, West Virginia, Kentucky and Indiana will present obstacles which only the best of trucks can overcome.

Kissel Increases Capacity—The Kissel Motor Car Company, Hartford, Wis., began work on July 1 on the construction of a new body building shop to be 100 by 100 feet in size, two and one-half stories high, of fireproof construction. The new building will nearly double the Kissel company's body-building facilities, and is made necessary by the 40 per cent. increase in the 1913 production as compared with 1912.

Hess-Bright Company Moves—The Hess-Bright Manufacturing Company has transferred its office to its new factory at Front street and Erie avenue, Philadelphia. Removal of the manufacturing department of the business will be performed progressively during the month of July. The old quarters at Twenty-first street and Fairmount avenue have for the past two years been inadequate for the rapidly growing business of the company, and the new site, which covers some 13 acres, affords ample room for much needed expansion.

Hartford Rubber Works Expanding—As soon as inventory is closed at the factory of the Hartford Rubber Works Company, Hartford, Conn., extensive alterations will take place at that plant. The boiler plant capacity will be increased by the addition of a new building, 50 by 100 feet, which will be built of reinforced concrete. This will enable the company to enlarge its engine power to 3,000 horsepower. Among the improvements planned is an automatic coal-feeding mechanism, a 200-foot smoke stack and numerous improvements of the plumbing. A turbine, driving an 800-kilowatt generator, will also be installed.



Plant of the Willys-Overland Company at Toledo, O., where the Overland cars are made

Manifold-Injector Starter; Vacuum Core Tire; New Model of Gasoline Meter; Coes Special Wrench for Automobile Use; High-Grade Rubber Casings and Tubes

The Blitzen Acetylene Starter

AMONG the many acetylene starters which have been offered to the automobile public of late, the Blitzen starter, Figs. 1 and 2, is especially deserving of mention because of its simplicity. The starter consists of a needle valve interposed in the acetylene lead between tank and intake manifold, this valve mechanism being combined with an electric cut-out. In the cut-away view, Fig. 1, N is the needle, which is made of tool steel and seats on soft metal S1. The needle-valve stem which is screw-threaded to engage the spindle S is actuated by the handle H, and, when the needle is opened by turning the handle as far as possible in a clockwise direction, the handle touches the piece C1. This piece has an extension T which is connected to the low-tension terminal on the magneto, so that when acetylene is admitted to the manifold, the contact of the handle and the piece C1 cuts out the ignition system by short-circuiting the magneto and admits a charge of acetylene to the motor. The acetylene enters through L1 and leaves through L2, and the needle is brought back to its seat by the action of a coiled spring inside the casing C; at the same time the contact of H and C1 is interrupted. The charge of acetylene in the motor keeps the same ready for starting, so that by throwing the switch on the battery the motor is started, after which the switch is kicked over on the magneto. If the motor has been standing for some time, especially with the compression release cocks open, the first thing to do is to close these, give the crank a quarter-turn with the ignition cut out, then switch on the battery and thereby start the motor.

A Thermos Lunch Restaurant

Under the name Thermos Motor Restaurant, the American Thermos Bottle Company 243 West Seventeenth street, New York City, manufactures a touring lunch outfit containing two Thermos bottles, plates, knives and forks for either four or six persons, napkins, salt and pepper shakers and wicker-covered glasses. This equipment is inclosed in a black patent-leather waterproof casing.

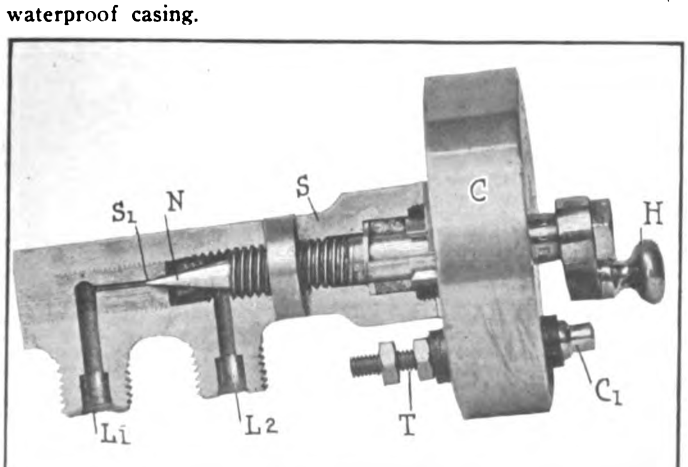


Fig. 1—Distributer of Blitzen starter with one half cut away

Woodcock Vacuum Tire

Substituting an evacuated space for the air of inner tubes, W. J. Woodcock, 102 Gates avenue, Brooklyn, N. Y., has constructed a vacuum tire for automobiles which consists of a rubber core bored with an annular vacuum chamber, the cross-section of which is in the shape of a figure eight. A fabric layer of substantial thickness is arranged around the rubber core, and a rubber tread is laid over the tread portion of the fabric. The vacuum space is also surrounded by a layer of fabric. To put the tire in running condition it is deflated by a pump, the influx of atmospheric air being prevented by a check valve. With the load of the car acting on the tires, the tendency is to compress the shape of the vacuum chamber. This tendency is counteracted by the exterior atmospheric pressure, resulting in a very elastic tire, according to its inventor and manufacturer. The partial vacuum in the tire tends to keep it cool.

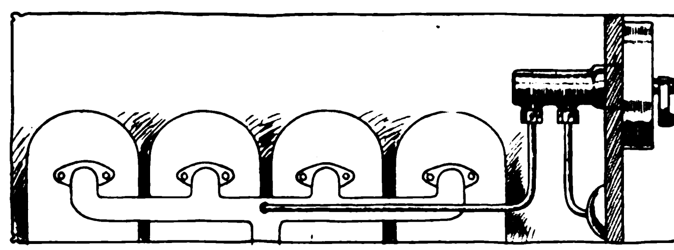


Fig. 2—Scheme of Blitzen self-starter on a motor, showing the manner of leading gas to the intake manifold

Latest Smith Gasoline Meter

The Smith Gasoline Meter, 1789 Broadway, New York City, has redesigned its product, which is shown in Fig. 5. In the newer model, the indicator part of the meter is a brass cylinder over which slides a tape on which is printed the maximum number of gallons of gasoline contained by the tank, while the older model has an indicator finger moving over a circular dial printed in gallons. The construction of the meter is clearly illustrated in Fig. 5. It consists of a float F carried by the gasoline in the tank and held in the same vertical plane, at all times, by a brass rod R and a brass pipe P. A linen cord attached to the float is led through the pipes P, P1 and P 2 and its end is connected to that of the linen indicator tape which is held tight by the weight of a square brass column, 2 inches long, sliding in the square tube T. The float is made of 18-gauge brass and perforated at two places in its top and bottom, the holes being connected by short pipes soldered thereto, making the entire float perfectly tight. The float is made in two sections, an upper and a lower one, which are soldered together. The height of P and R varies with that of the gasoline tank and is so dimensioned that the pulley-containing connection comes within the space of the filler cap which holds the top of the rod and pipe in position while their lower ends are held in place by the plate P3 resting on the bottom of the tank. Tightness around the passage of the pipe P is insured by a lead packing placed between the tank bottom and the nut N screwed up against it.

The connection between the cord and tape is obtained by the use of the piece C1, which is of brass and bored with an axial passageway opening into one worked toward the opposite and along part of the length of the piece. A knot made in the cord is slipped through the second-mentioned passage, while the tape is drawn through the axial passage and a knot is used to keep it in place. The mechanism M, which consists of the brass cylinder and two spindles over which the tape slides, being kept in alignment, is simple and strong, and made of very few parts. This mechanism is inclosed in the indicator casing C2, the front of which is of beveled glass marked with a black line to give exact readings on the tape. The installation of the gasoline meter on the car and the correct marking of the tape are simple operations, and once installed, the device need never be worked with again as it is practically foolproof.

Special Automobile Wrench

In Fig. 3 is shown the special automobile wrench made by the Coes Wrench Company, Worcester, Mass. The tool is of the ordinary monkey-wrench design and works on the same principle of worm and nut engagement. The strength of the material and the proper shaping of its portions make it especially suitable for automobile use. One of the distinguishing features of this wrench is the strong, heavy, movable jaw. The gripping faces of the jars are plain, and a tight hold on the object may be obtained by this tool although there is no locking provision made in its construction.

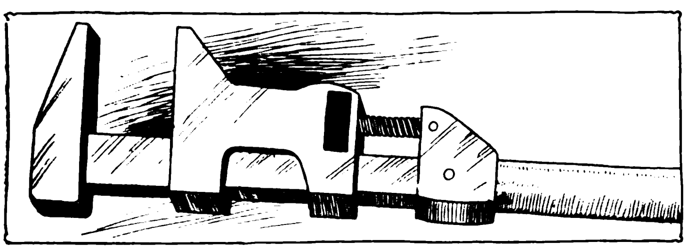


Fig. 3—Coes special automobile wrench, showing simple and substantial lines and very strong grip jaws

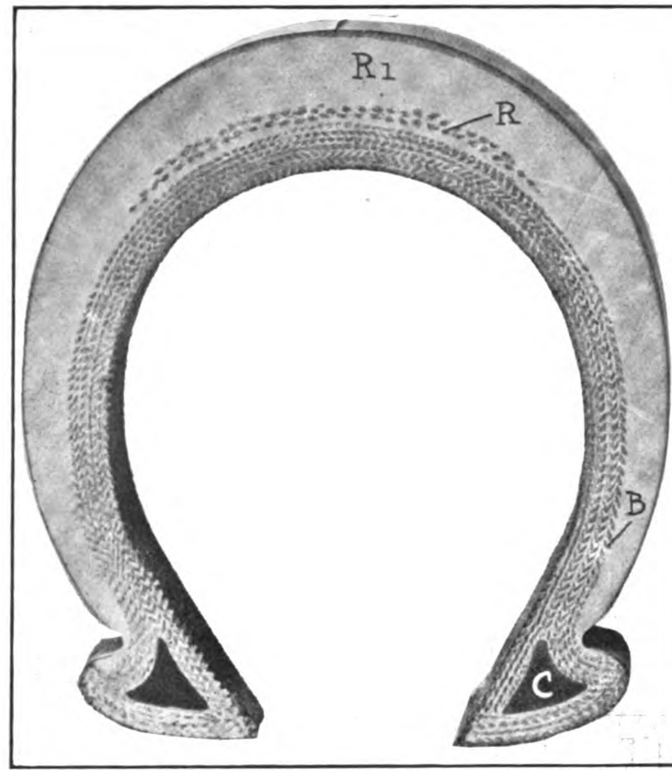


Fig. 4—Cross-section of Portage casing for light motor trucks

Portage Casings and Tubes

The Portage Rubber Company, Akron, Ohio, is the manufacturer of the casing which is shown in section in Fig. 4. The casing illustrated is designed for use on 1-ton trucks for fire-department work and similar purposes. The tread R_1 is built up on a cotton fabric of seven layers thoroughly frictioned together and strengthened at the tread side by a double reinforcement layer R. A single breaker strip B affords additional strength at the bead, where a cushion C of live rubber is enclosed in the vulcanized Para forming the tread material. The tubes manufactured by the company are of one of the best grades of up-river Para gum.

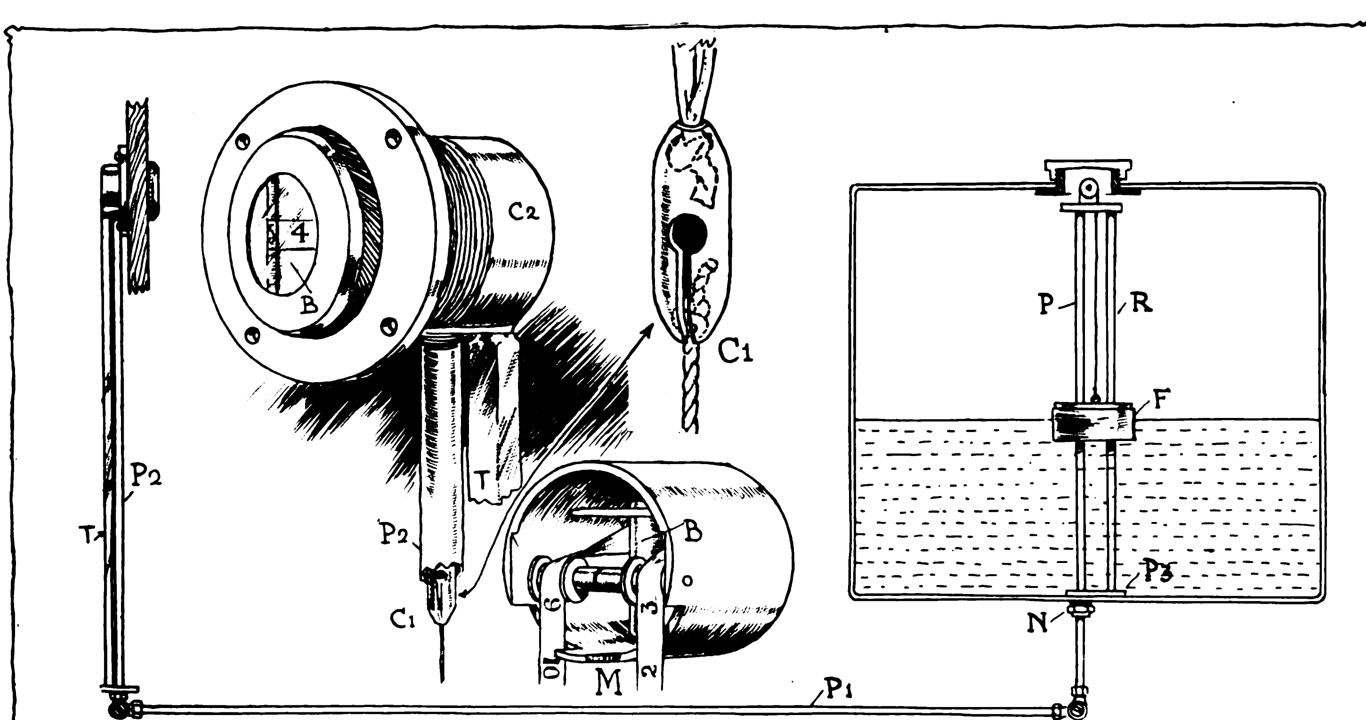


Fig. 5—Arrangement of the Smith gasoline meter, showing connections between tank and dashboard indicator and principal parts

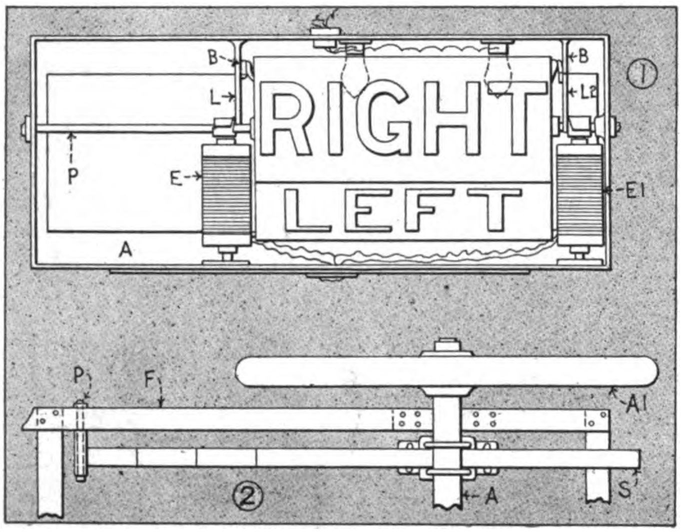


Fig. 1—Tail-light signal to be operated from the driver's seat
Fig. 2—Trott special circular vehicle spring suspension

VEHICLE Signal—A tail light indicator signal which is electromagnetically operated from the driver's seat.

This patent refers to an automobile rear signal, Fig. 1, consisting of a casing which contains electric lights L and a clear glass pane P in its rear wall. A rod R traverses the front of the casing, and two spaced brackets B are pivoted on the rod R, carrying a convex transparent sign arranged to be swung into a position behind the pane P. Another pair of brackets is pivoted on the rod between the other two; these brackets carry another sign which may also be swung in the same way. One of the signs bears the word Right, the other the word Left. At each of the signs an electromagnet E, E1 is arranged in the casing, each having an armature which is pivoted on the rod, lying over the respective magnet and has its rear end linked to a lever L, L1 fulcrumed above the armature. A link connection is provided between the forward ends of the two levers and one pair of brackets near their pivots. Electric circuits which are controlled by the driver excite the magnets and thereby regulate the relative positions of the signs.

No. 1,028,854—to Edward J. Best and Charles M. Fitch, Chicago, Ill. Granted June 11, 1912; filed December 27, 1910.

Vehicle Spring—A suspension type consisting of a circular spring fixed to a pivot and restrained in its movements by an alignment spring.

Fig. 2 shows the subject matter of this patent. A vehicle frame F is used in combination with a wheel axle A, a spring S being interposed between them and being pivotally connected at P with the frame. This spring is adapted to move circularly about its pivotal support. A non-supporting alignment spring is connected with the frame so that it resiliently opposes the circular movement of the first-mentioned spring.

No. 1,029,730—to Rolland S. Trott, Denver, Colo. Granted June 18, 1912; filed July 19, 1909.

Shock-Absorber—Comprising two sets of springs above and below the axle, which tend to hold the latter in position.

This type of shock-absorber, Fig. 3, requires the design of an axle with two forks F at its ends. To the ends of each fork a pair of horizontal cross-bars C is secured. An inverted U-shaped member A straddles each wheel, and the inner legs of these members extend through the above mentioned cross-bars to which they are rigidly connected. In the same plane as the cross-bar C of each fork end an upper and a lower cross-bar is arranged; the latter cross-bars being perforated to receive the outer legs of the member to which they are rigidly attached. On the inner leg of each member a sliding cross-head H is mounted, and another H1 on the outer leg of each arm. Springs are mounted on each leg of each member, being disposed between the opposite faces of the cross-heads and the cross-bars. A spindle for carrying the wheel has its ends secured to the cross-heads H and H1.

No. 1,031,381—to Herman H. Schmitt, Creswell, Ore. Granted July 2, 1912; filed March 4, 1912.

Windshield—Which is of the flexible type and may be moved to various positions.

This patent refers to a windshield, Fig. 4, which is so arranged that it may be made to slide on a curved rail disposed in the longitudinal plane of the automobile. The windshield is supported on the rail by means of an adjustable mechanism, and a slidable connection between shield and rail permits of clamping the windshield in position at desired points.

No. 1,031,020—to George F. Murphy, New Haven, Conn. Granted July 2, 1912; filed January 18, 1911.

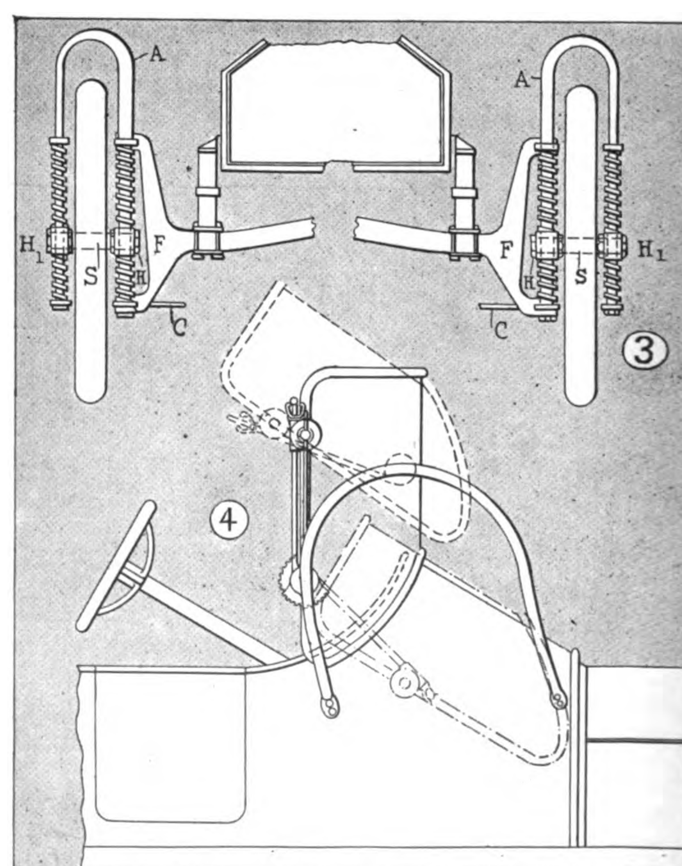


Fig. 3—Schmitt type of spring action shock-absorber
Fig. 4—Murphy adjustable automobile windshield

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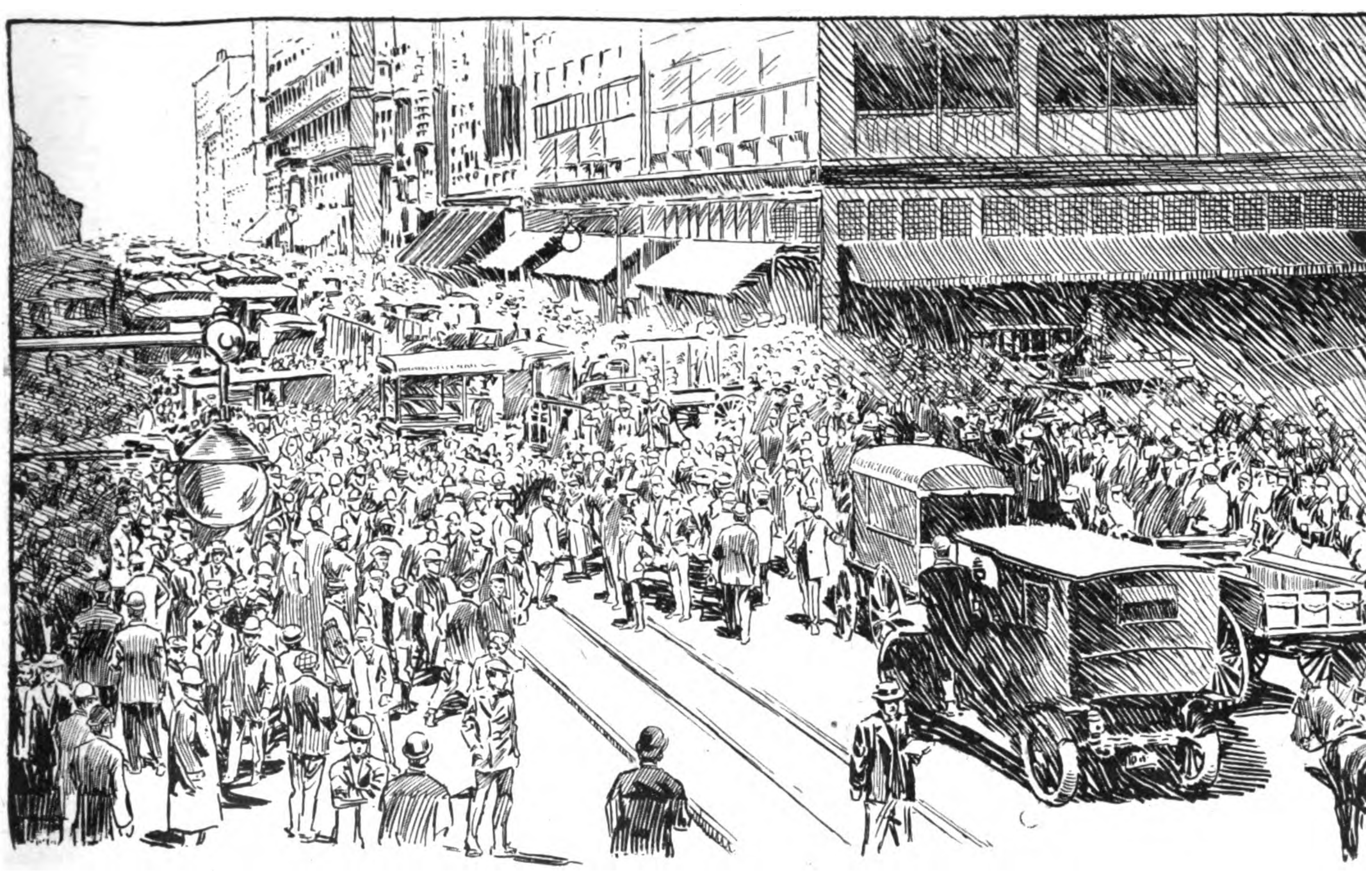
THE AUTOMOBILE

New York Traffic Problem Serious

Police Insufficient in Number—Travel Must Be Diverted to Parallel Streets—Elimination of Horses Would Relieve Pressure—Pedestrians Must Be Controlled



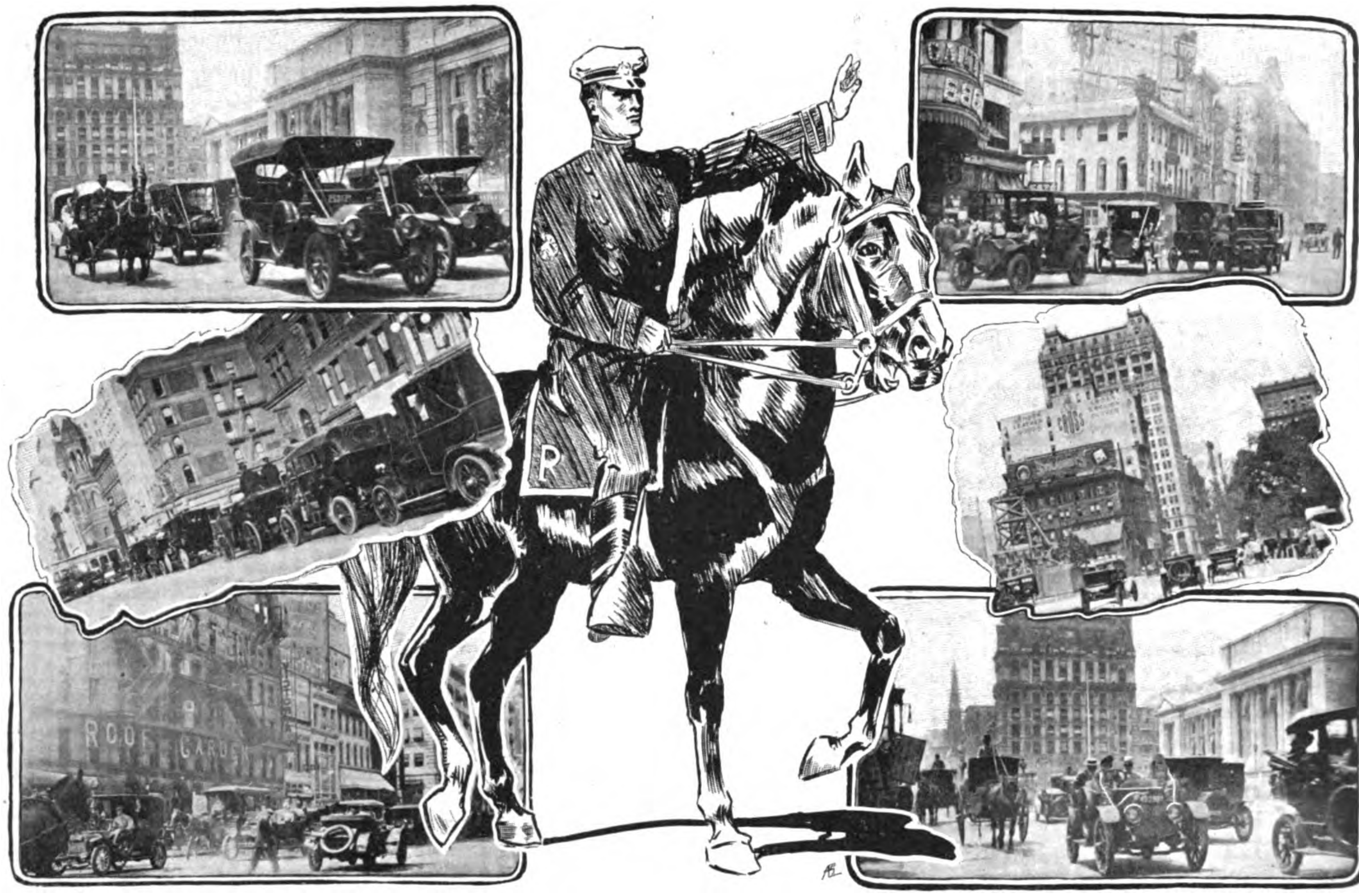
How metropolitan street traffic piles up when steady progress of vehicles is impeded for even a few minutes

EVEN when the horse shall be eliminated from urban traffic, as he bids fair to be within the measurable future, the problem of street congestion will be one of the most urgent puzzles to be solved by communities all over the world within the next 10 years.

Today New York has approximately 40,000 automobiles of one kind and another. In 10 years' time it is not at all unlikely that there will be 140,000, and many hopeful members of the automobile fraternity place the figures at 200,000.

Exclusive of motor buses and taxicabs, there are at the present time in daily use in carrying passengers in Greater New York on elevated and surface roads 8,836 vehicles. These transported during the past year the immense total of 1,617,182,963 passengers, a daily average, estimating Sundays and holidays as ordinary business days, of 4,430,638 passengers. While there is no means of accurately estimating the proportion of this traffic which eventually reaches the section south of Central Park, it is safe to say that half this immense total helps to form the human element in the problem which sooner or later must be solved if the preservation of life and the smooth transaction of business in the largest city of the western hemisphere be considered.

Of the total of 8,836 public passenger-carrying vehicles men-



Without this modern Centaur, the pedestrian's progress across New York's highways would be practically impossible. Some street scenes showing how vehicles accumulate during a 15-second stoppage

tioned above as constituting the rolling stock of the Greater New York transportation companies, no less than 5,150 run on tracks laid on the surface of the ground. Of these fully 75 per cent. navigate the section south of Central Park, and form of themselves one of the greatest factors in the problem of traffic management. During the past year these surface cars carried 834,024,416 passengers. In other words, each day there alight from surface cars in the metropolis 2,284,998 human beings who at once become important elements in the immense task imposed upon the city's guardians. The safeguarding of the proportion of this great throng that finds its way into that section of the city where the vehicular traffic has already brought about a condition of near-congestion is the task that confronts the police department of Greater New York at the present time. With the passage of the years these figures will increase in proportion with the increase in the number of automobiles, pleasure and business, and with the number of surface cars, if not with the number of horse-drawn vehicles, for it is the one fortunate phase of this situation that the number of horses to be found on the streets of the great city is gradually growing smaller with each succeeding year.

Daily Traffic Is Tremendous

One glance at the traffic that passes Fifth avenue and Forty-second street in any minute of the 10 hours from 10 o'clock in the morning until 8 o'clock at night is sufficient to show the major character of the problem that will be presented when there are twice, three or five times as many motor vehicles in service in New York as there are now.

Even in the heart of summer, when it is estimated that at least 30 per cent. of the local automobiles are not in use in town, the traffic is impressive during about 4 hours each day. Actual experiments with a stop-watch showed an average of fifty vehicles a minute moving over the crossing in both directions and for a while, between 3 and 4 o'clock in the afternoon, the average ran up to sixty-four cars a minute.

When the traffic policeman blows his whistle for the cars to halt either east and west, or north and south, a jam of automobiles results almost instantly. The cars pile up for a block back of the crossing in less time than it takes to tell it and at the same time the blocked cars in the transverse street move rapidly across the avenue, or street, as the case may be.

Ordinarily the way is left open across Fifth avenue for only 15 seconds at a time, while the north and south traffic is allowed to flow for 45 seconds during the most congested hours. A positive check on the Fifth avenue traffic for 2 minutes would serve to block traffic for a half mile and one such delay has often had the effect of choking vehicular movement for an hour.

Horses Complicate Situation

The elimination of horses would go far toward making the passage of the streets more comfortable and if such a result could be produced within a reasonable time, the chances are that the natural increase in automobile traffic would not reach the impossssible stage, even on the streets in use at the present time, until the number of cars in use touched the 100,000 mark.

But with the streets freed from the horse and with only the present facilities for handling automobiles, the advent of 100,000 cars would make for chaotic conditions.

In crossing Fifth avenue any afternoon when the shopping, business and theater-going public is abroad, it takes an alert mind and responsive muscles to keep out of trouble. Two robust traffic officers are stationed at the crossing. When the whistle is sounded for travel in a certain direction to stop, it stops, and with it pedestrians moving in that direction stop also, if they are wise.

When the signal is to stop the north and south movement, the street-cars, cabs, wagons and automobiles in the cross-street are motioned to come on. As far as vehicular traffic is concerned, such a signal is simple enough to understand and follow, but when it comes to the pedestrians, there is a different story to tell. The vehicles proceed along the right side of the street in the direction in which they are going, but the pedestrians move both ways on both sides of the street. This results in collisions and congestion and, while accidents are rare indeed where the police are stationed, any day's experience will show the potential possibilities. Often groups of pedestrians will dart from the sidewalk, passing in front of a halted file of automobiles just as the signal is given to move. If the street is crowded, they may be obliged to stand between two lines of rapidly moving cars, flanked by two lines of slower-moving vehicles, until the policeman signs for the procession to halt. There are several hours a day when it would be like inviting accident to attempt to cross Fifth avenue except when the traffic is halted.

The handling of this current of travel is admirably accomplished by the traffic squad. Policemen have never reached a higher expression of perfection than in this division of the New York force, and yet present facilities are close to their limit of usefulness and the influx of thousands of additional cars must mean more traffic policemen and a slower rate of travel.

Traffic Outgrowing Regulation

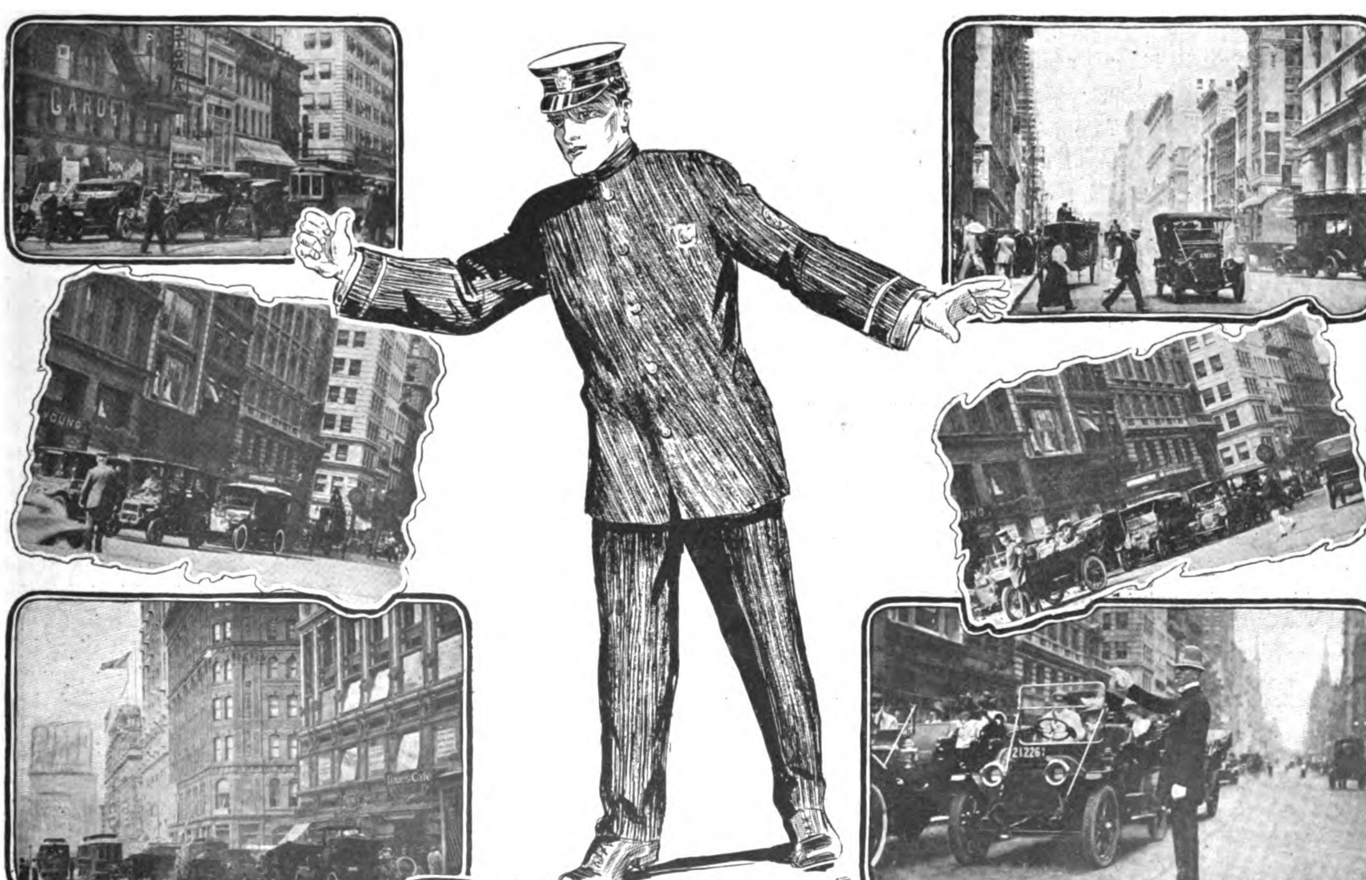
The traffic squad of Greater New York is made up of approximately 500 men, of whom 65 per cent. are assigned to duty in the business sections of the city during the day; but so rapid has been the growth of the traffic in these sections that it is fast outgrowing the means of properly taking care of it. True, a certain proportion of the regular police on fixed post assist in straightening out traffic tangles; but the rules require that they stick close to their stations, and in the event of a tie-up anywhere else but in their immediate neighborhood they are usually of but little assistance in relieving the congestion.

The solution of the difficulty is highly complex. In the first place, no matter what is done, the present courses of traffic are not sufficient to carry 100,000 automobiles. Therefore, the prime essential is the use of more streets to carry such a volume of traffic. The time will come when all the numbered avenues must be paved and maintained as Fifth avenue is today, or better. With fifteen main arteries to carry the flow of travel where three or four are used to any extent now, the physical necessities of the case would be ameliorated. Sixth avenue, with its elevated railroad pilllars and wicked pavements, could be arranged to relieve the situation by taking a portion of the business traffic and certain of the parked and boulevarded streets could be set aside exclusively for the passenger travel. There are enough avenues to carry ten times the present amount of traffic and the difficulty lies in the fact that everybody wants to use Fifth avenue, Park and Fourth avenues and Broadway.

Horses Handicap Automobiles

Second, while horse-traffic is decreasing, there are still a tremendous number of equine obstacles to progress in New York. If there were no horses there could be four lines of rapidly moving vehicles on some of the avenues instead of two rapid and two slow lines. It would be possible to move 100 vehicles a minute past a given point on Fifth avenue without endangering the lives of automobilists or pedestrians. At present, the extreme number of automobiles that can be thus handled is less than fifty a minute. In the figures given above, horse-drawn vehicles are reckoned in the totals.

Third, the experience of years has shown that, where the traffic is under the direction of the police, accidents are negligible in number. This, of course, does not take into account the reckless handling of automobiles contrary to law and against the orders of the police. It follows, therefore, that increased



The traffic officer must be the sole judge of the conditions at his particular crossing. He should be given unlimited sway in the direction of traffic and drivers and pedestrians alike should obey him

traffic must carry with it a need for more traffic officers. As these factors affect traffic they rank as placed: First, more streets; second, the elimination of the horse; third, more traffic police.

The details of caring for five times the present volume of vehicular traffic present problems that come properly within the province of the various municipal departments. It is only fair to say that each department in the city of New York is already overwhelmed with suggestions for meeting the exigencies of the case. Some of the suggestions display marvels of ingenuity and range all the way from subways for pedestrians, elevated platforms and other ideas based upon the desire for safety without reference to cost, to the most visionary dreams of unbalanced minds.

The first step toward solving the problem will be the enactment of a new motor vehicle law. Just what this should contain is a matter upon which almost everybody has some ideas, and most of them are divergent. It would seem that a provision should be inserted to give the traffic squad control of pedestrians as well as vehicles. All citizens have an equal right in the streets and the pedestrian has the right of way over the vehicle at the regular crossings. That being so, it would seem simply good judgment on the part of the pedestrian to move only when the police guardian of the crossing deems it safe for such procedure. The policeman, knowing that the pedestrian has the right of way, cannot arbitrarily hold him longer than his safety seems to require.

Conditions Same in Other Cities

The experience of other American cities is very similar to New York's. In Chicago, where, from the topography of the city, there is not such a prospect of congestion in the outlying districts, the loop section is almost as badly crowded and the stream of traffic requires very strenuous efforts on the part of the police to keep it flowing. In Philadelphia the situation is somewhat better, owing to the way the city is spread out between the rivers. But in all of them the problem of handling vehicular traffic will become acute sooner or later and, for that reason, the eyes of the country are upon New York and Chicago, particularly the former, to learn how the big towns will go about the solution.

In London, where the horse has all but disappeared from the more congested sections, 400 persons were killed and 10,000 persons were hit by vehicles during 1911.

Crossing from the south side of the Strand to Cockspur street the pedestrian has to avoid eight files of fast moving vehicles, four lines moving in each direction. The city of London is now at work upon the idea of a traffic board, which has been recommended to consider the matter of vehicular traffic by a royal commission.

According to the conclusions of the British investigators of the subject, there is nothing that can be done to check automobile traffic, because it represents the highest stage to which the art of transportation has been developed. Therefore, the energies of the Britons will be directed toward regulating and diverting traffic from certain streets so as to avoid congested conditions.

An idea of the volume of New York traffic may be gained from a consideration of the following facts:

Average number of automobiles that pass Forty-second street on Fifth avenue each day is 11,432.

Average number in summer between 3 and 4 o'clock in the afternoon, 2,940. In winter, the rush hour sees about 3,500.

These figures do not represent as many cars as they seem to, because, in many cases, the same car passes twice or more during the illustrated period.

Lord Montagu, editor of *The Car*, during his recent visit to New York, remarked that, in his opinion, "the solution of New York's transportation problem is the omnibus. With this type of vehicle," he stated, "the driver has more freedom to wind in and out of the traffic and is not compelled to remain on one set of tracks."

The claim was also advanced that the city policeman was an important factor in the situation and this proved the subject of an intensely interesting address by Chief Justice McAdoo, who made comparisons between the city policeman of London and New York. In considering the former, he stated that, in London, "every traffic policeman is an inspector of vehicles. He has the power to order off the streets any car which is undesirable on account of its appearance, or by reason of any doubt as to its safety. Any car that is ordered off the streets cannot get back until it has passed through a special examination."

Lord Montagu also expressed considerable surprise that any one owning a car could drive the same about the streets of the city without first passing an examination establishing his competence as an operator.

With regard to the suggestion of Lord Montagu as to the effect of buses on New York traffic congestion, it may be said that there are over 2,000 motor-buses in use in London and it is contemplated to increase the total to 4,500 next year. It is interesting to note that of the 400 fatalities due to automobile accidents in London last year, 107 were the results of motor-bus accidents.

Hence, it might be reasoned that buses as operated in the British capital might not be the answer to the puzzle from the viewpoint of the pedestrian.

During the year beginning with July 1, 1911, and ending with June 30, 1912, the traffic casualties in New York were as follows:

Killed by automobiles	190	
Injured by automobiles		1,268
Killed by street cars	119	
Injured by street cars		851
Killed by wagons	165	
Injured by wagons		303
Total killed	474	
Total injured		2,422
Total casualties		2,896

Practically all of these mishaps occurred where there were no traffic officers on duty. In the item covering injured by wagons, the number is undoubtedly less than the actual number and the street car mishaps where the pedestrian was at fault and the injuries trifling is understated.

The showing is measurably worse than that of London, where there is a vastly larger population and congestion.

The National Highways Protective Association is working for uniform laws covering traffic in all the main centers in the United States.

Automobile as Naval Adjunct

Los Angeles, Cal., July 13—The fact that the automobile is really practicable for the use of landing parties was forcibly demonstrated recently when Lieutenant-Commander A. H. Woodbine of the Seventh and Eighth Divisions, Naval Militia of California, took a full gun crew of thirty-three officers and enlisted men, a one-pounder weighing 800 pounds and three drivers to Pasadena in three Oldsmobile cars furnished for the test by Captain Ryus of Los Angeles.

The cars used were the three leading types of the Oldsmobile line. Captain Ryus drove the Limited, in which the commanding officer rode with the gun and gunners; Ensign Linck had the Autocrat in which the caisson was carried, with ten members of the crew, and the Defender was in command of Ensign Smith. In this car, the smallest of the trio, thirteen men rode, and it kept its position right behind the big Limited, which played the part of the flagship.

The gasoline fleet covered the distance from Los Angeles to Pasadena armory in 21 minutes. The gun, which was mounted on the tonneau of the Limited, rode perfectly, and it was not necessary for the gunners to give it any attention whatever on the way.

Legal News of the Week

Receiver Authorized to Sell Atlas Engine Works on July 29—President Hanna Protests

Suit Over Taxicab Company Names—Motor Cabbies Fined for Maintaining Nuisance

INDIANAPOLIS, IND., July 15—Judge Clarence E. Weir, of the superior court, has authorized Fred C. Gardner, receiver for the Atlas Engine Works, to sell the company's property and has fixed July 29 as the date of sale. The only bidder in sight at this time, is a motor car concern in Detroit.

The date of sale was fixed over the protest of Hugh H. Hanna, Sr., president of the company, who owns all of the common stock, some of the preferred stock and who is also indorser on $1,100,000 in notes of the company given 5 years ago, when a creditors' committee took charge of the plant. Mr. Hanna, through his attorneys, contended the sale should not take place for at least 60 days, in order to permit proper advertising in trade journals and to enable him to have an opportunity to undertake to finance a bid on the property himself.

Attorneys for the receiver, however, opposed Mr. Hanna's suggestion. They contended if the sale were delayed or not made to the prospective purchaser in sight the bondholders would not receive 50 cents on the dollar and other creditors of the company would lose everything.

In the proposed terms of sale, which have been agreed to by the receiver and the prospective purchaser, the common stock, preferred stock and the $1,100,000 notes indorsed by Mr. Hanna will be eliminated and nothing paid on them. The stocks and securities of the company have not been listed for several years, but a manual issued in 1906 states that the authorized common stock was $1,000,000 with $750,000 issued and the preferred stock bearing 6 per cent. interest, $1,000,000, all of which was issued. The undivided profits in 1904 were $60,969.95 and in 1905 the undivided profits were $66,343.44.

The prospective purchaser proposes to assume a mortgage against the property securing bonds amounting to $1,050,000, to pay $105,000 indebtedness incurred in a bond issue of $150,000 and turn over enough cash to the receiver to pay all mercantile accounts contracted since a creditors' committee took charge, as well as the salary rolls and receivership expenses, amounting to about $80,000, which has been fixed as the upset price. The purchaser is to cancel the bonds.

It is said the proposed purchaser, if it gets the property, may not continue the manufacture of Silent Knight motors or crude oil engines, but will make a line of four-cylinder cars selling at from $1,200 to $1,500.

Decision Soon in Klaxon vs. Waite

PROVIDENCE, R. I., July 13—Judge Brown, of the United States district court, who heard the case brought against the Waite Auto Supply Company for an injunction on behalf of the Lovell-McConnell Manufacturing Company, the Hutchinson Electric Horn Company and the Miller-Reese-Hutchinson Company to restrain the former company from selling the Klaxon and Klaxonet horns, has taken the case under advisement and will render a decision shortly.

Taxicab Companies' Names Confuse

BOSTON, MASS., July 13—Franklin T. M. Hammond, who was appointed master in the suit brought by the Taxi Motor Cab Company, of Boston, against the Motor Cab Company, of Boston, for an injunction to restrain the latter company from using that name has filed his report with the Supreme Court of Massachusetts and a decision is expected shortly. The Taxi Motor Cab Company operates about fifty vehicles with taximeters, and has its headquarters at 541 Tremont street, South End. The Motor Cab Company operates its cabs without taximeters, basing the fares on the hackney cab rates, and its headquarters are the Hotel Somerset, Back Bay. Neither company has its name on its cabs to tell them apart, and the plaintiff claims the similarity of names brings confusion. The master in his report says the ordinary traveler is ignorant of the fact in which company's cab he is riding and that confusion results and the name of the defendant will be likely to be mistaken for that of the plaintiff. An injunction may be granted therefore.

Motor Jehus Fined as Nuisances

PHILADELPHIA, July 15—That automobiles bearing "to hire" signs standing on certain of the principal thoroughfares in the central section of the city are an obstruction to traffic and a nuisance, is the gist of a decision rendered recently by Magistrate MacFarland in the Central Court, who held two chauffeurs under $200 bail each for court for permitting their machines to stand in front of the Bingham Hotel after being warned not to do so. On the part of the accused it was contended that discrimination was practiced by the police in ordering some cars away while not molesting others, but in the case of the latter it was claimed by the police that they held permits. As no permits are issued, Magistrate MacFarland said that all chauffeurs similarly charged with obstructing the highways were to be arrested.

Broke Law in Setting Speed Trap

BUFFALO, N. Y., July 15—Because they failed to file with Secretary of State Lazansky a notice of their intention to create an ordinance governing the speed of motor vehicles and because the state law prohibits enforcement of ordinances in cities other than those of the first class restricting speed of motor vehicles to less than 15 miles an hour, the Salamanca, N. Y., police department violated the law when they arrested motorists who were driving 12 miles an hour and fined them various sums. At the trial of the motorists, it developed that the Salamanca police placed the speed trap in operation so that a deficit in the Salamanca department could be offset.

A NUMBER of new licenses have been issued by Dyer, Dyer & Taylor to automobile owners in New York and the metropolitan district. About half of these licenses cover imported cars, while the remainder is made up largely of Sultan automobiles. The list of licenses and the cars owned by them is as follows:

Alexander Krull, Queen; William A. Delano, Lancia; John H. Cooper, Lancia; Michael J. Bird, Sultan; Ludwig Kraus, Darracq; James Bernshaw, Darracq; Thomas Callahan, Sultan; Washington Garage Company, Sultan; David Rumsey, Lancia; Alwin Young, Sultan; Adolph S. Berquist, Rochet-Schneider; Joseph G. Fornecker, Sultan; David H. Gaines, Zust; L. H. Cuneo, Itala; J. Applegate & Company, Cortlandt; C. F. Welch, Cleveland; John H. Meyer, Isotta; Joseph Lacherque, Sultan; John H. Bowers, Sultan; J. F. Pierson, Jr., S. P. O.; Peter Pavlovich, Charron; John A. Camera, Sultan; Hector Califfe, Sultan; Frank J. Tampone, Sultan; Dr. George H. Smith, Cleveland; John Kostukevich, Sultan.

C. A. Glentworth, the New York agent for Napier cars, has paid Dyer, Dyer & Taylor damages for infringement in acknowledgment of the basic Dyer patents.

DAYTON, O., July 15—Entry of settlement and dismissal was filed in the common pleas court in the action brought by Bert Shroyer against the Peckham Motor Car Company for $1,800. The $390.30 suit brought against the same concern by the Michelin Tire Company was also settled up and dismissed.

Board of Trade Meeting

New York Show Will Open in Two Buildings on Night of January 11, 1913—Republic Plans

Big Dividends by Canadian Ford and Reo Companies—Amplex Company to Start on August 1

THE Automobile Board of Trade at its quarterly gathering in New York City Thursday listened to the report of the Show Committee, covering plans for the big exhibition of next January, which will be conducted in two buildings, the new Grand Central Palace and the Madison Square Garden, with a single admission covering both buildings.

It was definitely decided to open the show on the evening of January 11, 1913, with an exhibition of pleasure cars in both buildings, continuing until the 18th. The commercial vehicle division, which will be held in both buildings, will open on the evening of Monday, January 20, closing on Saturday evening, January 25.

Suitable resolutions were passed on the death of Mr. Alfred N. Mayo, of the Knox Automobile Company, one of the oldest members of the Automobile Board of Trade and a leader in the industry since its inception.

It was also voted to begin compilation of data for the publication of the 1913 handbook.

Among the companies represented at the meeting were the Autocar, Buick, Cadillac, Cartercar, Chalmers, Cunningham, Elmore, Franklin, Garford, Haynes, Hudson, Knox, Lozier, Marquette, Matheson, Mercer, Metzger, Mitchell, Moline, Moon, Marmon, National, Oakland, Olds, Packard, Peerless, Pierce-Arrow, Pope, Premier, Pullman, Rapid, Reliance, Stearns, Thomas, White, United States Motors, Overland and Winton.

Amplex to Resume on August 1

MISHAWAKA, IND., July 13—Operations at the plant of Amplex Motor Car Company, which recently underwent reorganization, will begin about August 1. W. J. Mead, president of the concern, announces that the daily output of the company will be five cars. It is the intention to employ between 750 and 1,000 men. Mr. Mead will soon take up his residence in Mishawaka. E. C. Wetten, the secretary of the company, is a Chicago attorney. Considerable interest attaches to the announcement that the two-cycle cars which the concern has been making will be discontinued. A six-cylinder, long-stroke, pocket-valve car of standard design is planned and a Knight type motor machine to be made in limited quantities. There will be no change in the Amplex chassis.

Locomobile Increases Capital Stock

BRIDGEPORT, CONN., July 16—In order to take care of real estate deals involved by the building of several large service buildings in some of the leading cities, especially New York, Chicago and Philadelphia, the Locomobile Company of America has increased its capitalization from $5,000,000 to $6,500,000.

Republic Motor Announces Its Plans

The Republic Motor Company of New York expects to be in full possession of its new headquarters at Eleventh avenue and Fifty-seventh street in 90 days. It has been learned that it intends to build two styles of car, a four-cylinder light type to be sold at $715 and a six-cylinder five-passenger touring car to be sold at $1,000.

W. C. Durant, president of the company, stated that it is the belief of the concern that further economy in the automobile industry will not be in the manufacture of the car, but in its distribution. The Republic Motor Company is designed especially to secure greater economy in the distribution and to go still further in selling in each locality a car which is adapted especially to that vicinity. He stated that it was necessary for a car that was designed to meet all sorts of service to be a compromise, as a car designed for flat country would be under extreme disadvantages in hilly country. This condition is to be met by the establishment of ten factories in the largest distributing centers.

The parent company is the Republic Motor Company of Delaware which has been incorporated for $65,000,000, the stock being divided into $15,000,000 of 7 per cent. cumulative preferred and $50,000,000 common. The ten operating companies are each incorporated at $1,500,000. They all have the name of the Republic Motor Company and are located in New York, Boston, Philadelphia, Chicago, St Louis, Kansas City, Minneapolis, Portland, O., Los Angeles and San Francisco. The Little Motor Car Company, of Flint, Mich., and the Chevrolet Motor Car Company, of Detroit, will, it is said, form a part of the Republic combination.

Companies Declare Big Dividends

WINDSOR, ONT., July 13—The Ford Motor Company, of Walkerville, has declared a dividend of 20 per cent. on the new issue of stock. The original capital was $125,000, on which annual dividends were paid of 100 per cent. Then capital was increased to $1,000,000, of which $750,000 was paid up. On this

Automobile Securities Quotations

A downward trend characterized the week's stock market of automobile securities. Comparison of the table given below with the quotations of last week show that where changes occurred they were almost invariably in the nature of decreases. The tire stocks, which rallied last week on the ground of a possible consolidation of a number of independent tire makers, declined when these reports were officially denied. Goodyear held an exceptional position, proving strong and being the center of considerable activity. Firestone also scored a respectable advance. Among the automobile manufacturing securities Packard and Studebaker preferred stood almost alone with fractional rises, while the other stocks in this department either remained unchanged or declined.

	Bid 1911	Asked 1911	Bid 1912	Asked 1912
Ajax-Grieb Rubber Co	..	..	120	..
Ajax-Grieb Rubber Co	..	..	..	100
Aluminum Castings, pfd	..	..	100	..
American Locomotive, com	40¾	41¼	41	41½
American Locomotive, pfd	..	..	108	108¾
Chalmers Motor Company	..	..	145	155
Consolidated Rubber Tire Co., com	5	10	13½	15
Consolidated Rubber Tire Co., pfd	10	20	50	59
Firestone Tire & Rubber Co., com	160	170	285	293
Firestone Tire & Rubber Co., pfd	105	107	105	107
Garford Company, preferred	..	..	99	101
General Motors Co., common	54½	55½	31	33
General Motors Co., preferred	87½	88½	75	76
B. F. Goodrich Co., common, old	245	248	76¾	77½
B. F. Goodrich Co., preferred, old	115½	117½	109	109½
Goodyear Tire & Rubber Co., com	230	240	315	320
Goodyear Tire & Rubber Co., pfd	105	107	103	104
Hayes Manufacturing Company	..	..	..	97
International Motor Co., com	..	..	23	25
International Motor Co., pfd	..	..	83	85
Lozier Motor Company	..	..	50	60
Miller Rubber Company	..	..	145	150
Packard Motor Car, preferred	..	..	104½	106½
Peerless Motor Company	..	..	..	150
Pope Manufacturing Co., com	51	55	30	31
Pope Manufacturing Co., pfd	78	80	73	74½
Reo Motor Truck Company	9	9½	8¾	9¼
Reo Motor Car Company	19	20	19	20
Studebaker Company, common	..	..	29¾	31
Studebaker Company, pfd	..	..	94	94½
Swinehart Tire Company	..	..	98	100
Rubber Goods Company, common	88	93	100	..
Rubber Goods Company, pfd	100	105	105	110
U. S. Motor Co., common	39	40	2¾	3¼
U. S. Motor Co., pfd	79½	80½	10½	12
White Company, preferred	..	..	107½	108½

amount dividend checks of 20 per cent. are being paid for the first half year, which amounts to about 120 per cent. on the original stock.

LANSING, MICH., July 15—The Reo Motor Car Company has declared another dividend of 10 per cent. and about $200,000 in cash will be distributed. A few weeks ago a 10 per cent. dividend was declared, making a total profit of $400,000 the stockholders have received this year. Nearly 75 per cent. of the dividends goes to Lansing residents. At the present time the plant is being run at full capacity, a car being turned out every 11 minutes. Two thousand men are employed, but the company is unable to keep up to the rush of orders.

How Canadians Attract Industries

BERLIN, ONT., July 15—After the officials of the Canadian Consolidated Rubber Company, makers of rubber tires for automobiles, expend $250,000 in building and equipment of their factory in this city, they will be awarded a bonus of $25,000 which has been raised by local property owners, and a fixed assessment for that amount for 10 years. This rubber concern, which already has large interests here, will purchase fifteen additional acres of land on which they will construct two mammoth tire factories. During the first year 100 skilled workmen will be employed at this plant, 200 the second and 500 in 5 years hence. That was an agreement reached before the bonus was awarded. Hamilton, Ont., tried hard to land this industry, which is considered the largest industrial proposition in the history of Berlin.

Market Changes for the Week

Businesss in the metal market was limited last week, and quotations declined slightly in the case of lead and more noticeably in that of tin. Copper and steel remained practically unchanged. Characteristic of the condition in the metal market is a general downward trend of the products of other than the iron and steel industry, while the demand for the products of the latter has fallen off when compared to what it was 2 or 3 weeks ago.

One of the most important developments of the week was the 3-cent rise in Para rubber which took place on Friday last. Fine Up-river sells now for $1.15 a pound, and, while the activity of the rubber market is none too intense, the general tone is strong. A feeling of restriction noticed about a week ago was due to a vague apprehension that artificial rubber could possibly develop, in the near future, as a serious competitor of the natural product. The week's changes follow:

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb..	.07	.07	.07	.07	.07	.07	....
Beams and Channels, 100 lbs.........	1.41½	1.41½	1.41½	1.41½	1.41½	1.41½	....
Bessemer Steel, Pittsburgh, ton..	21.50	21.50	21.50	21.50	21.50	21.50	....
Copper, Elec., lb.	.16¾	.16½	.16¾	.16¾	.17	.17	+ .00¼
Copper, Lake, lb...	.17	.16⅞	.16⅞	.16⅞	.17	.17	....
Cottonseed Oil, July, bbl.......	6.80	6.79	6.79	6.68	6.46	6.39	— .41
Cyanide Potash, lb.	.20	.20	.20	.20	.20	.20	....
Fish Oil (Menhaden)	.38	.38	.38	.38	38	.38	....
Gasoline, Auto, 200 gals. @.....	.20	.20	.20	.20	.20	.20	....
Lard Oil, prime...	.85	.85	.85	.85	.85	.85	....
Lead, 100 lbs.....	4.70	4.65	4.65	4.65	4.70	4.67½	— .02½
Linseed Oil......	.75	.75	.73	.73	.73	.73	— .02
Open-Hearth Steel, ton	22.00	22.00	22.00	22.00	22.00	22.00	....
Petroleum, bbl., Kansas crude...	.68	.68	.68	.68	.68	.68	....
Petroleum, bbl., Pa. crude......	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine Up-river Para......	1.12	1.12	1.15	1.15	1.15	1.15	+ .03
Silk, raw Ital....	....	4.15	....	....	4.15	....	....
Silk, raw Japan...	....	3.65	....	....	3.65	....	....
Sulphuric Acid, 60 Beaumé	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs......	44.60	44.75	44.50	44.50	44.25	44.12½	— .37½
Tire Scrap.......	.09	.09	.09	.09	.09	.09	....

No Tire Merger Probable

Firestone and Goodyear Officials Say That Rumors Are Without the Slightest Foundation

Keeton Will Confine Its Energies to Six-Cylinder Cars—Will Brown to Head New Truck Company

AKRON, O., July 16—Publicity has been given during the week to reports tending to show that another big consolidation of rubber plants here is about to take place. The two firms mentioned are those of the Firestone Tire & Rubber Company and the Goodyear Tire & Rubber Company. It has been claimed that the same parties who worked out the Goodrich-Diamond merger are working out plans for the next two largest plants here. No sooner had the rumors appeared in print than vigorous denials were made by H. S. Firestone, president of the Firestone Company, and F. A. Seiberling, president of the Goodyear Company.

"There is absolutely no truth in these reports of consolidation," said Mr. Firestone. "The Firestone Tire & Rubber Company will not sell out to, consolidate with or absorb any other rubber company. The Firestone Company has sufficient capital stock and real cash to run the business, and there is no stock or cash consideration which will change that policy."

"There is not the slightest foundation for these rumors," says F. A. Seiberling, president of the Goodyear Company, "and if I understand the temper of the management, there is not the remotest possibility of the Goodyear being absorbed by any of them, and I am equally certain that there is no thought of its becoming an absorber."

Keeton Will Not Build Fours

WYANDOTTE, MICH., July 13—The Keeton Motor Company has purchased the plant formerly owned by the Seitz Automobile & Transmission Company, where the manufacture of a six-cylinder car will be begun immediately, the company having abandoned its original intention of making both fours and sixes. The six will have the same construction and body details as already announced, with the exception that the motor will have a stroke of 5 1-2 inches, this being 1-4-inch longer than that originally planned. The bore remains at 3 3-4 inches. The motor will be a special design and will be made for the company by the Wisconsin Motor Manufacturing Company, Milwaukee, Wis., at which plant R. P. Brown, engineer of the Keeton Company, has spent the last 6 weeks in directing the preliminary steps in its manufacture.

Brown Forms New Truck Company

PERU, IND., July 16—The Brown Commercial Car Company has been organized by Will H. Brown, who has interested several prominent local bankers and business men in the enterprise. Mr. Brown has been elected president and Carl H. Wallerich vice-president. The new company will occupy the plant formerly used by the Otis Elevator Company, a finely equipped structure, sufficiently large and up-to-date in every respect.

A light delivery car which has been developed during the past year will be manufactured to sell at about $1,600.

Will H. Brown is president and general manager of the Mais Motor Car Company, Indianapolis, which makes the Mais truck. He will continue his duties with the latter company, at the same time devoting considerable attention to the new enterprise. Carl H. Wallerich until recently has been manager of the General Industrial & Manufacturing Company, Indianapolis, from which he has resigned to enter the new company.

The Indiana Four-States Tour stopped for a breather at Findlay, Ohio, where the inhabitants turned out in force

Four-States Tour Success

Fifteen Indiana Automobile-Making Concerns Represented—Business Results Already Apparent

Affair Has Been Advertised Ahead and Prospective Buyers Are Rounded Up to Inspect Cars

CANTON, O., July 14—Indiana automobile manufacturers are now on their second annual Four-States Tour. They have crossed the northeastern section of Hoosierdom, have invaded Ohio, and are now preparing to bend southwestward toward West Virginia. As a fitting climax to a successful first lap of their journey the entire Indiana motoring party this afternoon placed in the imposing mausoleum of William McKinley a beautiful floral set piece as a token of their esteem of one of Ohio's most beloved sons.

It is with the intention of investigating automobile trade conditions and arousing general enthusiasm that this tour is covering nearly 1,300 miles of road in the states of Ohio, West Virginia, Kentucky and Indiana. With twenty-eight cars in the party, including four commercial vehicles, the tourists left Indianapolis on Tuesday morning, July 9, and ran to Fort Wayne, making stops in Kokomo, Peru, Wabash and Huntington. On Wednesday they journed to Lima, O., and on Thursday to Tiffin, stopping en route at Findlay, Fostoria and Fremont. To the home of the rubber industry they ran on Friday and this afternoon a short journey brought them to this city.

Tire Town Gave Famous Welcome

Akron will always be famous in the memory of those making this trip. The rubber industry entertained as royally as is its wont and there was one continuous round of festivity from the time the cavalcade reached Barberton on Friday afternoon until it bid goodbye to Akron this afternoon.

Saturday morning was given over to the inspection of seven of the tire factories—Diamond, Firestone, Goodrich, Goodyear, Kelley-Springfield, Motz and Swinehart, the concerns which entertained the Indiana visitors.

Trade conditions along the route are apparently in a splendidly prosperous state. They depend largely upon agricultural prospects and with the close approach of the actual harvest season automobile dealers are most sanguine of a continuance of the present healthy buying demand. In every town visited the motor car representatives give interesting accounts of the amount of business being done. The low-priced cars are in the lead in numbers; the second-hand problem is not as serious as in the big cities; and the size and trade of the garages indicate the stability of motor car affairs along the 450 miles traversed.

The dealers are looking forward to closing their 1913 contracts and the majority of them expect to continue the lines which they are at present handling. Naturally their interest in the Indiana-made products has been much increased during the last few days.

Northeastern Indiana and the northern tier of Ohio counties cannot boast of pleasant road conditions. To the limit of the Hoosier state hard pikes were covered, but their surfaces were not as even as could be desired. For 3 days the dirt roads of Ohio have had a great cloud of dust raised from their rough and corrugated faces. For a few miles on either side of Akron brick roads have been experienced, and these have been really the only good roads covered by the cars.

Fifteen Companies Represented

Fifteen automobile makers and one of an accessory are participating in this event. They are: American Motors Company, Cole Motor Car Company, De Tamble Motors Company, Great Western Automobile Company, Haynes Automobile Company, Lexington Motor Car Company, McFarlan Motor Car Company, Marion Motor Car Company, Nordyke & Marmon, Maxwell-Briscoe Motor Company, Motor Car Manufacturing Company, Nyberg Auto Works, Premier Motor Manufacturing Company, Service Motor Truck Company, Whitesides Commercial Car Company and the Double Fabric Tire Company of Auburn.

These companies represent the cream of the Indiana producers and they have entered upon this method of showing their latest models with the zest and thoroughness for which they are famous. They have circularized the dealers along the entire route, have used advertising space in the daily newspapers and have posted large lithographic sheets to herald their coming; and have made arrangements which are bringing forth actual results in business for them. They have made the daily runs purposely short and have scheduled stops in all important towns in order to show to the trade and to the public 1913 models.

The American Motors Company has gone to the extent of corresponding with every prospective purchaser within 50 miles of the line of march, inviting them to come to the route. Maxwell dealers along the way and for a large distance on either side have been supplied with Maxwell pennants and information regarding the tour, and Maxwell owners have been seen in great numbers at the crossroads and in the towns.

The personnel of the party is composed mainly of sales and advertising department men. At each stop the former have the opportunity to call on the dealers while the latter generally form a line toward the newspaper offices. The cars themselves include a number of famous and particularly interesting features. The two De Tamble cars are equipped with rotary-valve motors. One of the Haynes cars is the last of the 1912 series, and is the machine which was assembled in less than 2 hours during the convention of Haynes dealers recently. The Maxwell carrying the number 3 is the one which carried the same numeral when it won the 1911 Glidden tour. The Premier Schooner is the same car which made the Overland trip from Atlantic City to Los Angeles last year, and now is acting as an emergency ambulance. The Nyberg truck carries a pipe organ, the Whitesides truck a piano, and the 6-60 Premier and the Pathfinder touring car each have ten-tone Gabriel horns—furnishing ample music for the party.

The Great Western is the confetti car, the pacemaker is drawn for each night, the Marion is the checker's car, the chairman rides in an American and a Lexington carries the secretary's flag. A Nyberg car preceded the tour one week, putting out handbills, posters and distributing advertising matter.

Redwood Falls Sociability Tour

REDWOOD FALLS, MINN., July 16—The second annual sociability tour of the Redwood Falls Automobile Club started in a driving rain at 6 a.m. July 12, with twenty-one cars in line. George Jaehning drove a Cadillac as a pilot car and Rud Stensvad a Cadillac as a pacemaker. There were six Cadillac cars in the tour, three E-M-F cars, four Mitchells, a Cole car, KisselKar, Imperial, Locomobile and a Chalmers.

The first day's run was through southern Minnesota to Waseca for the night control. Short stops were made at New Ulm, Janesville, Waseca, New Richland and Albert Lea. Mankato was the noon stop, where the tourists were addressed by William Jennings Bryan. At each stop automobiles were picked up as escort to the next large city. Gumbo roads and several side slips resulted in the change of night control 60 miles from Austin. That city became the noon control the second day. The night control at the Hotel Radisson was reached long after dark, and the tourists put up for a rest all day Sunday. The time was spent at the Bloomington Country Club and touring the city. The last day's run was by way of Lake Minnetonka and along the Minneapolis & St. Louis road to Redwood Falls.

Farmers and Ranchmen's Tour

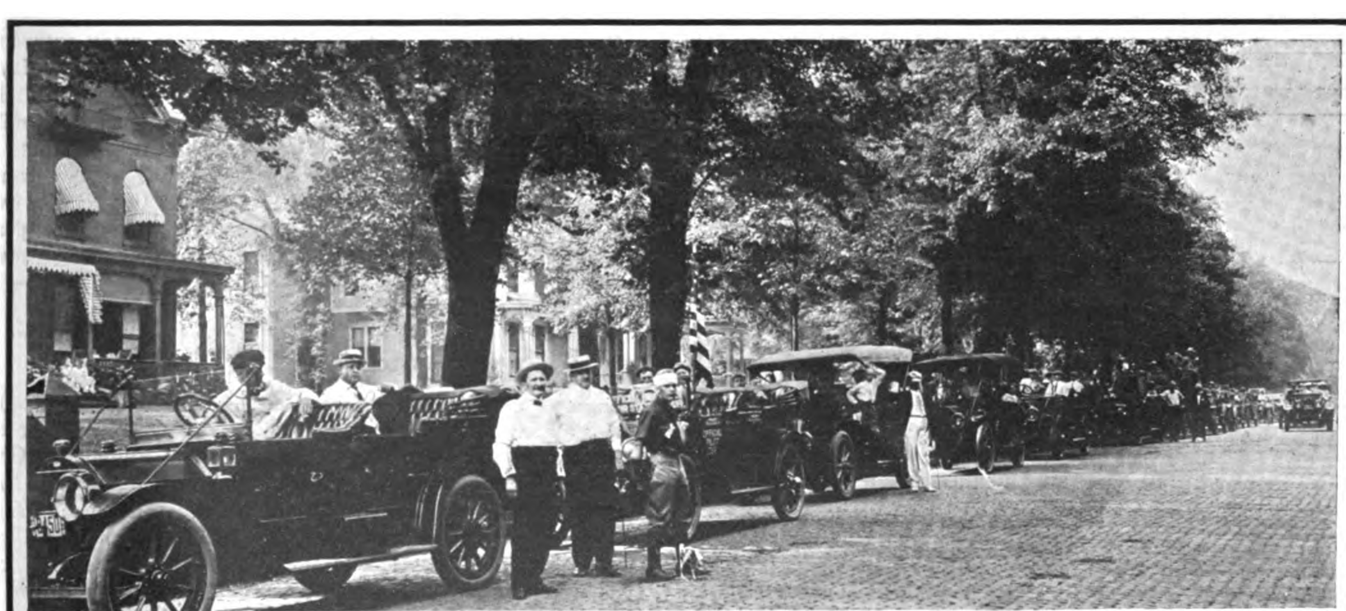
DALLAS, TEX., July 13—Everything possible for the success of the Farmers and Ranchmen's tour from Dallas to San Antonio, July 22-27, has been done. Entries close July 17. Sixty automobiles will leave Dallas on the morning of July 22 and will endeavor to tour to San Antonio and return. Each car must carry four passengers and must be driven by the owner of the car, said owner to be a farmer or a ranchman.

Leaving Dallas the official route is as follows: Lancaster, Red Oak, Italy, Hillsboro, West, Waco (night control), McGregor, Moody, Pendleton, Temple, Holland, Bartlett, Granger, Georgetown, Austin (night control), Buda, Kyle, San Marcos, Godwyn, New Braunfells and San Antonio. Return trip: New Braunfells, San Marcos, Austin, Taylor, Rockdale, Cameron, Ben Arnold, Rosebud, Lott, Marlin, Groesbeck, Doyle, Mexia (night control), Wortham, Richland, Corsicana, Rice, Ennis, Garrett, Palmer, Trumbell, Wilmer and Dallas.

Cleveland Reliability Abandoned

CLEVELAND, O., July 15—Announcement was made late Friday afternoon that the run to be conducted by the Cleveland *News* would not be held July 15 to 18 as planned. The abandonment of the tour was due to the fact that the event this year would not have the broad character of previous years, and would, therefore, fail to meet the prime purpose of the undertaking. While the entries were exceptionally generous variety of make was lacking, and in that variety lay the chief public interest in the event.

WASHINGTON, D. C., July 14—So successful was the sociability run of the Automobile Club of Washington, held several weeks ago, that the club is planning to promote another contest along the same lines. A different route will be laid out and efforts will be made to secure the entry of more than 100 machines. It is likely President Taft will be asked to set the secret time in which the run will be made.



The Four-Staters halted at Canton, Ohio, in front of the former home of William McKinley, the martyred President

C.A.C. Gets Elgin Meet

Aurora and Illinois Trophy Races Set for August 30—Elgin and Free-for-All to Be Run Off Next Day

Course Already in Fine Shape, and Numerous Entries Promised—Prize List More Than Doubled

CHICAGO, July 13—The annual road races at Elgin, Ill., will be continued after all, the Chicago Automobile Club having taken the place of the Chicago Motor Club as promoter, the alliance with the Elgin Automobile Road Race Association being completed this week. Following the closing of the deal, there was a change in dates, the races being billed for August 30-31 instead of August 23-24, which had been selected by the Chicago Motor Club. This move was made in order to have more time in which to complete the details. The Milwaukee Automobile Club has consented to this change, believing there will be no conflict with the Vanderbilt and Grand Prix.

No attempt will be made to run stock car races as in the past, for it is recognized that it would be almost impossible to get together representative fields. There will be four races as heretofore, but instead of having three races in one day and one the second, there will be two races each day, with the free-for-all the trump card. The complete card is as follows:

FRIDAY, AUGUST 30

AURORA TROPHY RACE.—Open to class C, non-stock, division 3-C, for cars of 231-300 cubic inches piston displacement; distance, 152.5 miles or eighteen laps of the circuit, which is 8 miles 2499 feet in length. Prizes: Aurora trophy and $700 in cash to the winner; $200 to second and $100 to third.

ILLINOIS TROPHY RACE.—Open to class C, non-stock, division 4-C, for cars of 301-450 cubic inches piston displacement; distance, 203 miles 1896 feet or twenty-four laps. Prizes: Illinois trophy and $700 in cash to the winner; $200 to second, and $100 to third.

SATURDAY, AUGUST 31

ELGIN NATIONAL TROPHY RACE.—Open to class E, non-stock, open to class C cars of 600 cubic inches piston displacement and under; made by a factory which has during the 12 months prior to date of the contest produced at least fifty motor cars, not necessarily of the same model; distance, 254 miles, 1050 feet or thirty laps. Prizes: Possession of the Elgin National Trophy for 1 year and $1000 in cash to the winner; $300 for second, and $200 for third.

FREE-FOR-ALL—Open to any car conforming to the definition of a motor car as definited by the American Automobile Association; distance, 306 miles, 920 feet or thirty-six laps. Prizes: $1750 in cash to the winner; $500 to second and $250 to third.

The entry fee in each case will be $100 per car, a reduction from the $300 for first, $200 for second and $100 for the third car charged last year. Also the Elgin association has more than doubled last year's prize fund. Whereas in 1910 and 1911 this amounted to $2,500, this time the association is hanging up $6,000. It is possible for an Elgin National trophy car to run in the free-for-all at the same time, which is likely to augment the field in the big event.

Entries of Big Drivers Expected

No time has been wasted in getting the entries. Fred J. Wagner has been appointed representative of the club in the East, while in the Western territory the work of securing entries will devolve on F. E. Edwards, chairman of the technical committee of the American Automobile Association, who also is a member of the contest committee of the Chicago Automobile Club. Application for a sanction has been made and it is expected that entry blanks will be out early next week. Entries will close August 24.

Tentative nominations already have been made, pending the issuing of the blanks. Ralph Mulford and Erwin Bergdoll both promised to drive at Elgin, and Mulford volunteered to go after the entries of Teddy Tetzlaff, David Bruce-Brown and Ralph de Palma. It also is thought there will be nominations made almost immediately by the Mercer, Cino, Stutz and several others with whose makers members of the club's contest committee have been in touch.

It will not require much work to put the course in shape and Elgin has plenty of time in which to smooth out the wrinkles. Had the deal been closed earlier the backstretch would have been widened, but that will have to wait until another year. The citizens of Elgin are more interested than ever, for when it looked as if the races would be abandoned they began to realize what they were losing.

The deal also marks the return to the promotion field of the Chicago Automobile Club, which has held aloof from the sport since the Crown Point road races in 1909, which were handled by the C. A. C.

Columbus to Have 200-Mile Race

COLUMBUS, O., July 15—At a meeting of the Columbus Automobile Club preliminary plans for a 200-mile race on Sunday, August 25, immediately preceding the opening of the centennial, were made. The race will be held at the Columbus Driving Park.

It is the object of the club to duplicate as nearly as possible the event held last year, and efforts will be made to go even farther. Cash prizes and cups will be awarded the winners.

Though it is probable there will be a number of small events, the 200-mile contest for racing cars will be the chief feature. It is expected that many of the best drivers in the United States will be entered in the program. It will be a free-for-all event. A race for stock cars probably will be included in the program.

The racing course, with the additional work which will be put on it, will be in better condition than last year.

Alco Truck Passes Half-Way Point

OMAHA, NEB., July 11—Acting on the suggestion of the Omaha good roads boosters, the crews of the transcontinental truck decided to go through Nebraska by way of Kearney and Julesburg instead of the original route which included Hastings and McCook.

The road boosters of this city thereupon voted to send out an advance guard which will herald the coming of the Alco along the Platte Valley route.

On account of the interest displayed among business men here and the ovation accorded the truck by the Omaha Commercial Club, the crew remained over a day before putting out "for the farther west."

CENTRAL CITY, NEB., July 12—The climax to many enthusiastic demonstrations along the way was reached today when Mayor Wolz, of Fremont, came East to meet the transcontinental Alco truck. With an escort party he piloted the vehicle for 30 miles and then arranged for pilots and courtesies across the State of Nebraska. The truck today negotiated 133 miles, and it would have covered more but for the delays necessitated by the ovations accorded it. The day's run was made with the temperature at 94 degrees. The half-way point across the continent was passed just west of Kearney; distance, 1,773 miles.

Singer Wins Standard Car Race

LONDON, ENG., July 17 (Special Cable to THE AUTOMOBILE)—The standard car race which was run over 100 laps of the Brooklands course under the auspices of the Royal Automobile Club, of Great Britain, was won by Haywood in a Singer car by a margin of 4-5 of a second. This is a remarkable finish as the length of the course was 277 miles and not more than two lengths separated Haywood from Usmar who was second in a Gladiator. The race was for four-cylinder cars the R. A. C. rating of which could not be more than 20.1. The prizes were £100 for the first car to finish the distance. The second and third prizes were £40 and £10 respectively. Out of fourteen entries there were eight starters, and only three finished. Two Singers, a Vinot, S.C.A.R. and Crespelle retired from the race after starting, while two Stars and a Straker-Squire were disqualified as not being stock cars. Summary:

Car	Driver	Rating	Time h. m. s.	Miles per hour
Singer	Haywood	20.1	4:48:46 4/5	57.49 +
Gladiator	Usmar	15.9	4:48:47 3/5	57.49 —
Turcat-Mery	Engley	20.1	6:18:17	43.88

Vinot ran out its bearings, two Singers broke timing gear chains, while the leading Singer broke an exhaust pipe. Haywood repaired this twice and yet won. Both the winning Singer and the Gladiator went through without tire troubles, although others had numerous punctures and blowouts. The Gladiator made only one stop, that being in the seventy-first lap of the 100-lap race, when the oil supply was replenished.

The specifications required in the race were that the minimum weight of the car should be 2,000 pounds. This was the weight when ready for the race with the driver, mechanic, fuel, oil, water and all tools aboard. The chassis must be of standard touring design all through and must have been shown in the manufacturer's catalogue as such prior to June 25, 1912.

The first stock car race at Brooklands was run last year, the winner being a Star, which averaged 56.24 miles for the 277 miles. That event, however, had a limit of 15.9 on the horsepower and the weight was limited to 1,600 pounds.

Raising Funds for Milwaukee Races

MILWAUKEE, WIS., July 16—The Milwaukee Automobile Dealers' Association, promoter of the Grand Prix, Vanderbilt, Pabst and Wisconsin Challenge road races at Milwaukee on September 17, 20 and 21, is working hard to get together its big fund needed to cover the expense of the reconstruction of Milwaukee county roads, erecting or leasing grand stands and other official stands, and a hundred and one other matters in connection with the running of the big road-racing carnival. While the $50,000 guaranty fund has already been filled by subscription among the big business men, hotelkeepers and individuals, the association is seeking to play safe and sure by adding about $25,000 to the amount.

Dallas Planning Brick Speedway

DALLAS, TEX., July 13—Planning an automobile race track that will rival that in Indianapolis and Atlanta, Secretary Ed. Vaughn of the Dallas Automobile Club has gone to St. Louis and other cities to get capital interested in the movement for this city. A corporation chartered for $200,000 under the laws of Texas is planned to assure the success of the race track. In all probability the course will be built of brick and not asphalt. Already persons in the leading cities of the South have written the Dallas Automobile Club concerning the enterprise and capitalists of Northern cities have evinced a willingness to take part in the enterprise.

Wisconsin Reliability Under Way

BELOIT, WIS., July 15—Fourteen cars entered for the third annual Wisconsin reliability tour for the Sentinel and Emil Schandein cups. Twelve of the entries are trying for the first cup while the other two are in the private owners division and are after the prize donated by Emil Schandein. At the end of the first day's run to Beloit from Milwaukee all had finished with perfect scores. The distance is 112.9 miles.

BARABOO, WIS., July 16—All the cars in the Wisconsin reliability tour finished the second day's run, 134 miles, with perfect scores. About half the distance was over recently-built roads of finest quality. The tourists climbed two of the highest ridges in Wisconsin, crossing the Wisconsin river country to Baraboo. Interest in the tour among the farmers is unabated, and the inhabitants of cities and villages along the route are furnishing elaborate entertainment to the tourists.

Cino Features at Portland

Wins the 5-mile Free-for-All and Breaks Record for 300-Cubic-Inch Cars at Same Distance

Tetzlaff in Big Fiat Only 1 Minute Faster—Christie Car Goes Mile in :53

PORTLAND, ORE., July 10—Portland got a taste of thrills and excitement yesterday during the automobile race meet at the Country Club track. Chris Dundee in "Whistling Billy," the famous White car, went over the bank, while records were smashed and sensations were given the 6,500 persons who packed the grandstand, and occupied hundreds of automobiles.

In the big 300-horsepower Christie, Barney Oldfield made the circuit in 53 seconds flat. The races were featured by the consistent and surprising work of the little 30-horsepower Cino racer driven by Fritsch, who landed victory after victory. Fritsch won the 5-mile free-for-all and was awarded the Budweiser cup. He also won several other races and set a new world's record for cars of the 300 cubic inches piston displacement when he drove 5 miles in the fast time of 4:48. In the big car event Teddy Tetzlaff had to drive his best to go 5 miles in 4:47.

The races started with a 5-mile match between Fritsch, driving his Cino wonder, and Lew Heinemann, piloting the Prince Henry Benz. The timing of the Benz went to the bad and Fritsch came on to win easily in 5:21 1-2, the latter loafing after the foreigner went out. The race was later run over, but Fritsch was put out by an accident. The time was 5:03 2-5.

In the second race Teddy Tetzlaff made a runaway of the event. He was pitted against Verbeck in a 120-horsepower Fiat. Tetzlaff drove rings around his teammates and won as he pleased in the fast time of 4:59.

In the contest for the mile track record, the White driven by Dundee did it in 59 seconds and then went again for a second mile in :54 2-5. Teddy Tetzlaff followed in his Fiat and thundered around the mile track faster than the "Whistling Billy." He turned the mile in 54 seconds flat. Then Oldfield made a new record in the big Christie, turning the course in 53 seconds.

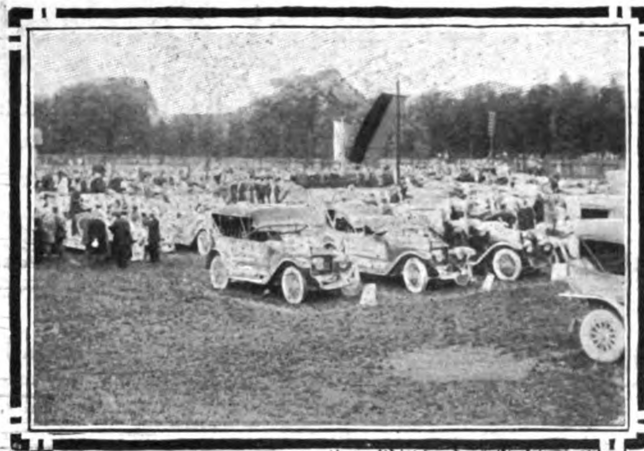
In the last race only Tetzlaff and Fritsch started. Teddy won in the fast time of 4:47, the Cino showing a bad tire.

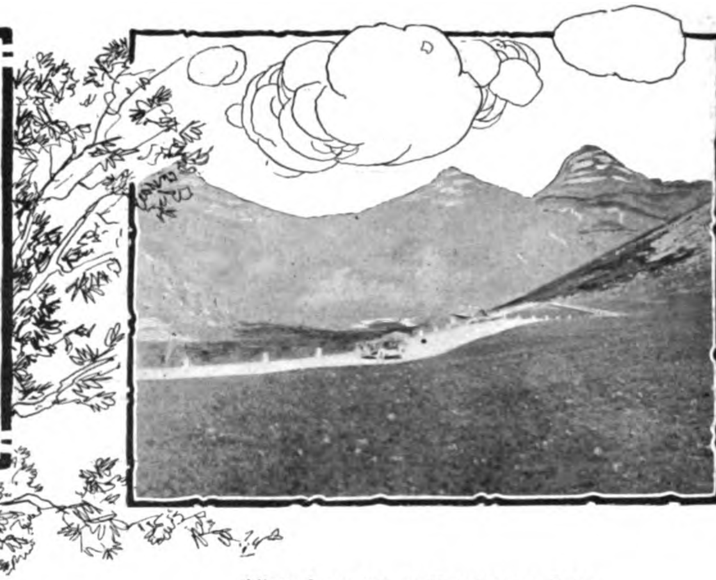
To Start Metropolitan Speedway

That the period of talk on the proposed speedway on the Jersey meadows is passing and actual work to be commenced seems to be the general opinion of those interested in the proposition. Mr. A. R. Pardington, general manager of the Metropolitan Speedway Association, has made a statement in which he says that "actual work would be started on or before the first of August." It is proposed to have the engineers and workmen who were engaged on the Vanderbilt motor parkway do the work on the new speedway so that the benefit of the 4 years' experience of these operators will be gained.

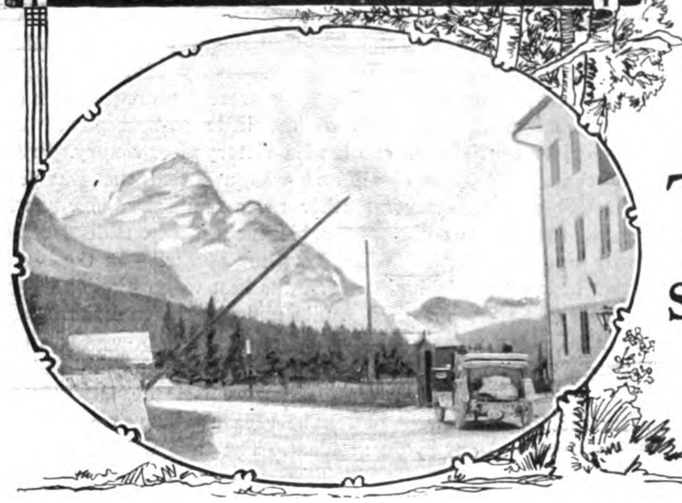
May Resurrect Fairmount Race

PHILADELPHIA, July 12—In addition to a bill now awaiting action in Councils to the end that the Fairmount Park Commission revoke its action of last spring in abolishing the Fairmount Park road race, a petition addressed to Mayor Blankenburg for renewal of the annual automobile classic is being circulated, largely through the efforts of Harry C. Harbach, former secretary of the Quaker City Motor Club. It is planned to take the responsibility for backing the race out of the hands of the Commissioners and have the municipal authorities stand sponsor, together with local automobile men.





View from top of Talyareggo Pass



Cars at the checking station in Sarbach
Austrian customs house at Centuna

Twenty-four Survive in

Strenuous 8-day Test Over Stiffest Eliminates All but Two Dozen of Most Exhausting on Drivers, Being Punctuated by

VIENNA, AUSTRIA, June 24—What is probably without exception the most arduous and searching test to which the present-day automobile could be subjected ended to-day in Vienna. Eighty-one mud-stained cars, with their occupants weather-beaten and utterly fatigued after their week's toil, rolled up to the club house in the Kamtner Ring during the early evening, and of these no less than twenty-four are shown by the official records to have completed the 1,420 miles without a single stoppage of any kind. This is a wonderful testimony to the endurance and capabilities of the modern automobile, particularly so in view of the fact that when Trieste was reached, 3 days ago, there were only twenty-six cars left in the non-stop list. It was fully expected that half of these would be eliminated by the remainder of the contest, which has embraced some truly awful mountain tracks, and it is a matter of general surprise that only two more cars out of the twenty-six have suffered penalty. With so many victors on hand, the club finds itself in somewhat of a dilemma, for it was always expected that the twelve handsome awards provided by the various Austrian clubs would go round and leave something for the less fortunate competitors. With true eastern feeling the successful drivers have agreed to cast lots for the order of merit, and the difficulty will be solved in this way. As regards the team-prize, the Opel crew takes the first award, for the Minerva-Knight trio, after doing excellently right up to this last day, found their record spoilt through the driver of car 22 missing his gear on the Stubalpe climb.

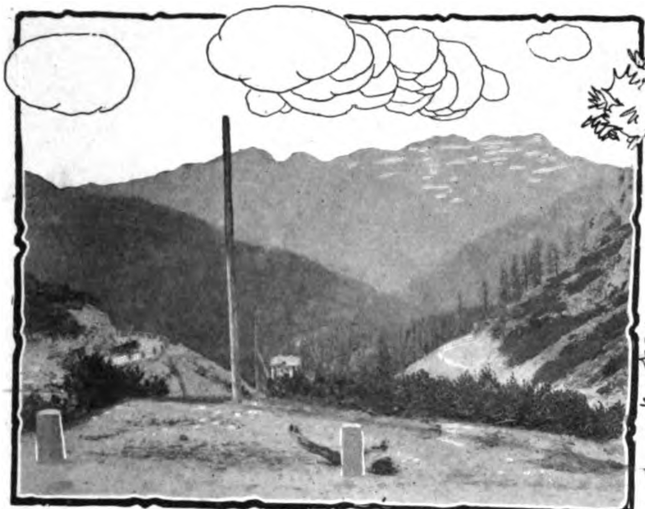
Of the ninety-five cars entered for the tour (this word is a misnomer, for no rational individual would think of touring over the hilliest part of the Alps at 250 miles per day and without a stop), Austria was represented by forty-one cars; Germany, by thirty-one; Italy presented twelve (all Fiats); France had six; the three Minervas upheld the reputation of Belgium; the Rolls-Royce carried the British flag, while the sole representative of the United States was a standard Ford, which, however, failed to materialize at the starting line along with six others. The Rolls-Royce, too, fell out on the first big climb, for it was geared much too high, and it has therefore fallen to the lot of the Daimler press car, on which THE AUTOMOBILE representative was kindly accorded a seat, to uphold the reputation of both countries. With the Union Jack and the Stars and Stripes (the latter as a tribute to C. Y. Knight) flying from the radiator cap, the Daimler did valiant service, and it should really be added to the list of non-stoppers—though, of course, it could not run in the contest on account of the necessity for photographic stoppages.

Severe Work for All the Drivers

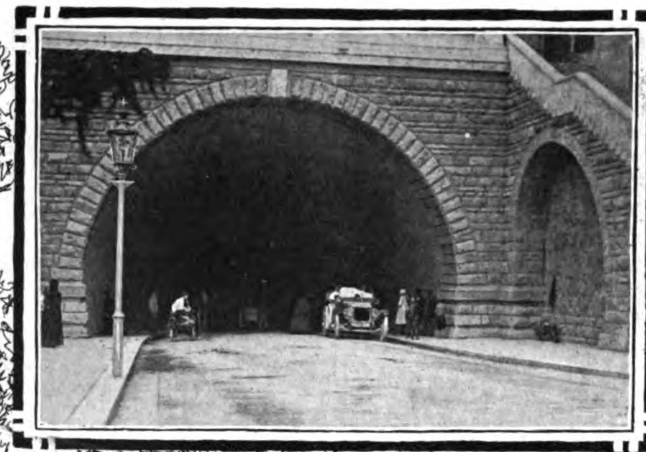
It was the non-stop nature of the work which proved so trying for all the drivers. On these mountain roads—and the committee hunted out all the worst grades they could possibly trace—there is not a 50-yard stretch which does not call for vigilance, and after 250 miles of this game one's brain begins to reel. On three reported instances drivers fell asleep at the wheel—numerous accidents from this cause were only narrowly averted.

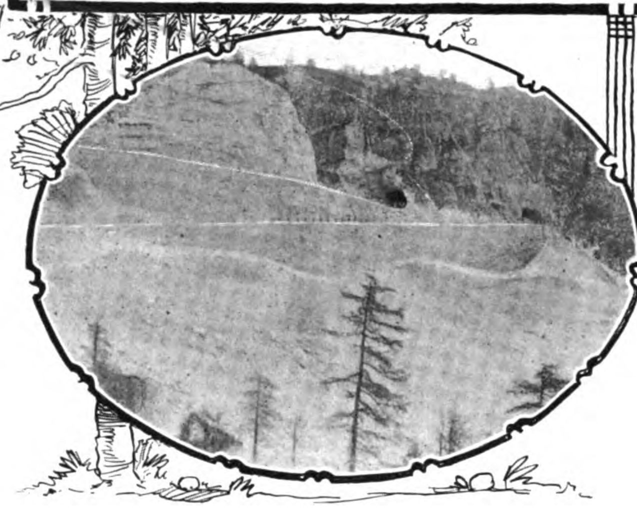
The starting hour was 5 each morning; rarely did the bulk of the cars reach the night control till 6 o'clock or later, after a full 12 hours of continuous running. These facts will tend to show how strenuous it has all been and how remarkable it is for the victorious twenty-four to have gone through without a single mark against them.

Many notabilities figured in the contest, and among the eighty-eight starters there were Prince Elias von Parma, the Grand Duke Karl Francis Joseph and the Grand Duke Joseph Ferdinand—the latter a passenger in his own car. The result of this royal patronage—to say nothing of the dozen counts in the running—was that the military element predominated all through.



View from top of Pordoi Pass





Tunnel at Severest connecting two parts of city
Hairpin turn and tunnel in Talyareggo Pass

Austrian Alpine Tour

Grades to Be Found in the Alps Passes the Eighty-one Starters—Contest All the Mountain Highways Many Hairpin Turns

Most of the official observers were army men, and at each village and town on the route soldiers guarded the corners and lined the streets in most solicitous fashion. Another attraction was the one and only lady driver, Miss Helene Morariu, who bravely drove right through with much skill and pluck.

The cars varied in power from the big Mercedes of 70 horsepower to the little Bugatti of but 12 horsepower. On the average about 20 horsepower was most popular. All the cars had to be open four-seaters and all without exception were low-geared on account of the exceptional severity of the mountain tracks—25 per cent. grades being quite common.

But it is very important that the reader should have a clear idea of motoring conditions in Austria, and particularly in the Tyrolese Alps. No one in the world has a better idea of the correct way to make motor roads than the Austrian government engineers, and the chief mountain passes are truly wonderful achievements. When it is said that our Daimler-Knight on two occasions—the Broccone and the Monte Mauria Passes—climbed up above the 5,000 foot level without dropping below third gear it will be appreciated that much skill has been expended in winding the road along the mountain side, with plentiful use of hairpin corners to ease the grade. Regarding these hairpins, there are no less than twenty-eight on the ascent of the Pordoi Pass, while the classical example of the Stelvio, where the road rises to a height of over 9,000 feet, has forty-six hairpin corners on the Austrian side and nearly as many on the descent into Italy.

Picturesque Features of Tour

The roads in the Tyrol are magnificent—their surface is, in general, quite up to the level of their easiness of grade. As a touring district the country is in every way to be preferred to Switzerland, which should be boycotted by every motorist on account of the existence of the interminable anti-automobile laws and regulations. In regard to scenery, too, the Tyrolese Alps are second to none; the beautiful white Dolomites create a lasting impression on the mind, and the view of these high and rugged peaks from the Broccone Pass is one never to be forgotten. Let the reader of these lines who purposes running his car in Europe start off from Trieste (whither his car can conveniently be shipped) and follow the itinerary of this Austrian Alpine tour. The results will without doubt provide a most enjoyable remembrance of a delightful tour.

To deal in brief with the details of the contest, it was on Sunday, June 16, that the cars were despatched from Vienna at 5 a. m. on their 250-mile run to Spittal. German drivers are proverbial speed-merchants, and till the mountain country was reached, some 50 miles south, the pace was up to the limit of each car's capabilities. But let it be said that there is a great deal more bark than bite about these pointed-nose, wind-cutting touring cars; they race past you at 50 miles an hour, with deafening exhaust, scattering the stones and raising the dust in high clouds. As soon as a hill is reached, however, back they come, and at the summit one has the pleasant satisfaction of knowing that they are toiling slowly up, some miles in the rear.

The Semmering, once the scene of historic climbing events, was the first of the passes, but the modern car has advanced to such levels that this 4,000-foot ascent was hardly enough to slacken progress. On this first day's run the severe climbing was not encountered till 200 miles had been traversed; then, however, there was enough to satisfy the most ambitious. An old Roman road had been unearthed at Tauem, and so steep was it that six cars failed utterly, including the big Rolls-Royce, while seven or eight more suffered delays and had to pay penalty marks. Ten miles farther on came the Katschberg—a grade of something worse than 25 per cent. and with a fearful surface. All the cars which had toiled up the Tauern managed to crawl up this climb, but the boiling radiators told their own tale of

The Grif & Stift car spinning around the curves of the road through the Monte Maggiore Pass

laboring engines. Thus was Spittal reached with over twenty cars out of the non-stop running.

On Monday the objective was Trento—in an Austrian district where Italian speech and customs still survive. On this run came the Bruneck (4,200 feet), Jauffen (5,500 feet) and Mendel Passes (the latter rising to 4,500 feet), and the competitors had enough and to spare of hairpin bends and hill-climbing work before the day was over. Fortunately, the roads are wonderfully good as regards surface and little or no tire trouble was experienced—in pleasant contrast to the opening day's journey, on which the rough going played havoc with the casings.

Then followed the wonderful Dolomiteristrasse—a magnificent highway constructed by the Austrian Government after 16 years of work, at a cost of over 4,000,000 kronen ($800,000). No less than five times does the road rise to a height of above 5,000 feet; on the Pordoi the 7,000 feet level is passed, and on the Falzareggo this is only missed by some 30 feet. All along the road magnificent panoramas of mountain peaks and valleys open themselves out, and it may be said, without fear of contradiction, that this run across the Dolomites is the finest day's journey available in the whole of Europe. For the average driver of the average car there is not a single danger point on the run; care has, of course, to be exercised when descending these mountains by reason of the hairpin bends, which can only be rounded at a slow pace. Otherwise, the car can be allowed to coast down at a good speed, with the comforting knowledge that nowhere on the descent will the grade become steeper than 8 per cent.

Three Fatalities During Tour

After the fourth day's run to Trieste, on the Adriatic, the route ran to the borders of Bosnia, and it was here, on the Monte Maggiore Pass, that the only fatal accident took place. It was the old story of taking risks; a front spring was cracked through, but the driver refused to stop and be penalized. At the first bend of the descent the driver lost control of the car, the result being that three of its passengers were killed. This car was No. 5, driven by Fischer, and an extraordinary coincidence has to be related in that another driver named Fischer passing this place soon afterwards fell asleep at the wheel and ran his car into the side of the road. Fortunately no serious damage was done.

No other accidents occurred to mar the event, and, as was stated before, despite the exceptional severity of the side roads traversed on the last 2 day's route, no cars fell out of the running and the twenty-four drivers who arrived at Vienna this evening can congratulate themselves on having emerged triumphantly from the most strenuous trial in automobile history.

Canada Holding Up Tourists

MONTREAL, CAN., July 13—The following notice as to customs regulations is being sent to members of the Automobile Club of Canada by the secretary and is of prime importance in view of the recent holding up of the cars of two Montreal motorists at the border:

"We beg to draw your attention to the importance of strictly observing the customs regulations when crossing the international boundary between Canada and the United States. Motorists are required to stop and report at the frontier port in all cases and not at some interior port. The American customs department is now rigidly enforcing this regulation, and the Canadian customs likewise. It is necessary for motorists to report at the Canadian frontier port when leaving Canada, and at the first frontier port when entering the States; on the return journey the same formalities must be carried out.

"In cases where the tourist intends stopping from 1 to 3 days only in the States, the officer may use his discretion and waive the requirement of a bond, but for a longer period, not exceeding 6 months, a bond is required, and may be secured at most of the frontier offices, while you wait, at a reasonable fee. For your information we give hereunder the frontier ports of the principal routes in this section of the province, where motorists are required to stop:

Canada.	United States.
Lacolle Junction.	Rouses Point, N. Y.
Noyan Junction.	Alburgh, Vt.
Abercorn.	Richford, Vt.
Mansonville.	North Tray, Vt.
Dundee.	Newport, Vt.
Hemmingford.	Ft. Covington, N. Y.
St. Armand.	Mooer's Junction, N. Y.
Rock Island.	St. Alban's, Vt.
Coaticook.	Derby Line, Vt.
Comin's Mills (to July 1st).	Island Pond, Vt.
Hall's Stream (after July 1st).	Beechers Falls, Vt.

Elements That Affect Truck Tire Guarantees

Too Much Speed and Overloading Must Be Considered, as Well as Proper Distribution of Load

Local Conditions, Such as Hilly Streets and Poor Paving Should Also Be Taken Into Account

WHY is it when solid-tire makers guarantee mileage delivered by their product from 8,000 to 10,000, and where certain large users can get an average of 1,000 miles more than the extreme guaranteed figure, that one of the chief complaints heard about truck operation is that some of the users of that form of transportation fail to get the guaranteed figures from their tires?

Why is it that in regular service one company can get over 30,000 miles from an exceptional tire and as low as 2,500 miles from another?

The answer lies in the difference in service conditions.

Standard brands are not very unlike, one from the other, differing only in some of the structural details. The fact that the guarantees under which they are sold are similar, speaks clearly on that point.

The exact fact is that the standard tires must be good for the guaranteed mileage or the guarantees would bankrupt the makers. Guarantees are not made on wild claims, but are based upon long experience and careful compilation of data covering years of service.

As to Maker's Tire Guarantees

The truck-using public is still uncertain as to the significance of tire guarantees. As a matter of common practice, the user is told that the tires he purchases are guaranteed by their makers for 8,000 or 10,000 miles under certain conditions. If he can get more than the guaranteed mileage, he is that much winner; if he falls below, he can obtain an adjustment from the tire company that made the goods.

On the face of it, it would seem that tire costs ought to be one of the least troublesome items in truck operation, but the contrary is the truth.

The difficulty lies in the fact that there are numerous obstacles in operating trucks that make for short life of tires. These may be grouped in a general way as follows:

Character of road surface.
Excessive grades.
Overloading.
Overspeeding.
Bad distribution of loads.

The first four elements may be passed over briefly, as they are generally recognized by truck users and will only be considered with relation to their bearing upon the last factor in tire abuse.

It is quite apparent that if a road surface is sufficiently rough that tires will suffer no matter how moderate the loading or speeding may be. An excessive grade will impose an unwarranted strain upon tire equipment without reference to any other factor.

Overloading the tires will break them down and cause short mileage, and overspeeding will result in burnt-out tires under the inexorable rule of V^2.

The two latter subjects are taken into consideration by the tire makers in framing their tabular guarantees, and the first two are so thoroughly recognized that there is no further need of discussing them.

But with regard to poor distribution of the load, the users of automobile trucks are just beginning to recognize its importance as a factor in reduced tire mileages. Some of the makers and sellers are not quite clear on the point, although numerous claims for adjustments for as much as 3,000 miles per tire have been presented to several of them.

A recent case presented to the B. F. Goodrich Company for adjustment gives an excellent idea of the principle involved. In the case in point, a Pierce-Arrow 5-ton truck used for hauling metal and equipped with adequate tires and run within the speed and load limits of the guarantee, failed to deliver the mileage. The dual rear tires wore out about 2,500 miles short of the guaranteed figure and an adjustment was demanded by the user. It was shown that while in this particular model of car and the special body used, 90 per cent. of the load should have been carried by the rear wheels, that in practice, the owner of the truck placed 98 per cent. of the load over the rear axle and upon the extension back of the axle. The road surfaces were poor and some heavy grades had to be surmounted and the tires gave way.

Excessive Weight on Tires

The speed rate was well within the limit, and as the actual maximum load carried was just the rated amount for the tire equipment, the user could not understand why the tires failed to stand up until it was explained to him that the continuous use of the truck with 8 per cent. excessive weight on the rear tires was sufficient to account for their failure.

In this case the rated load was 10,000 pounds, of which 9,000 pounds should have been carried on the rear axle. But the convenience of loading and unloading caused the user to place the whole load upon or so near to the bearing point upon the rear axle that tests showed it carried 9,800 pounds, exclusive of the empty weight, and the extra 800 pounds did the business for the tires in steady service.

Another case, illustrative of a different phase of bad loading, was that of a Peerless 3-ton truck equipped with sufficient tires for its rated load. The car was designed to carry 77.5 per cent. of its total loaded weight on the rear axle and in practice the user

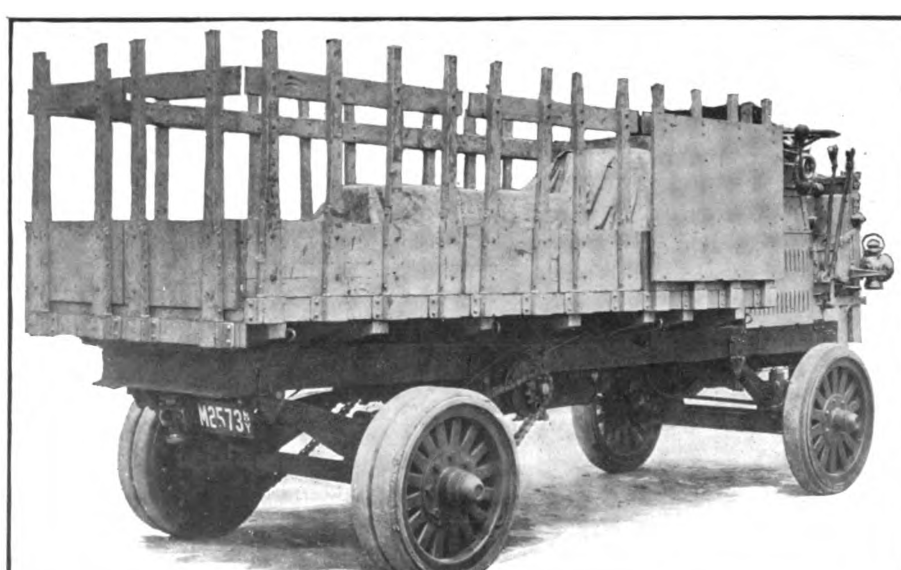


Fig. 1—In cars of the motor-under-the-seat type, such as this 5-ton General Motors Company truck, the life of tires depends in a measure upon an even distribution of the load. The heavy front tires are designed to carry 40 per cent, and in this illustration a 4-ton casting and a barrel of white lead are correctly placed

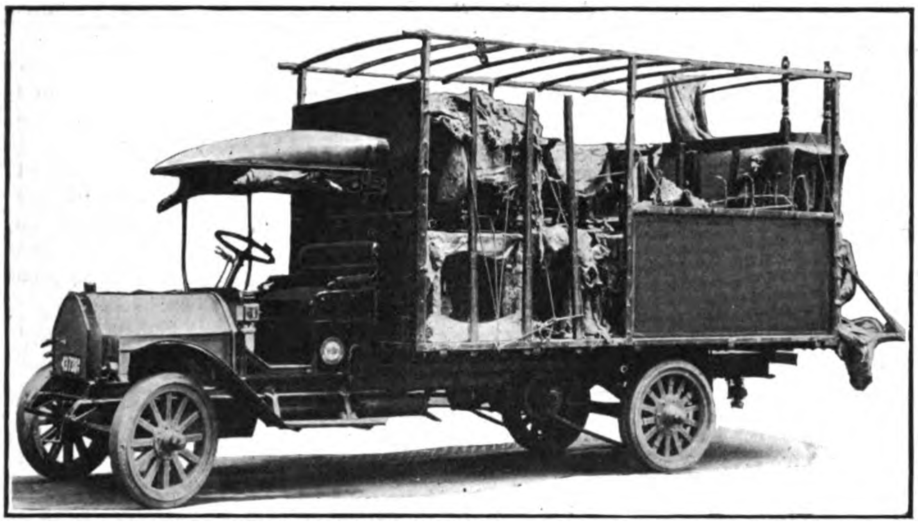


Fig. 2—Velie 2-ton truck, a type of the motor-in-front style of construction which allows 3-4 of the total weight to be carried on the rear axle. With such light bulky freight as furniture the best practice is to put the heavier articles to the front of the center of gravity

kept well within the limit of load and speed except for 1 day's service, when it was necessary to move a load of steel castings in addition to its ordinary and usual load of light, bulky merchandise. The total load carried that day on a run of 22 miles was exactly the rated load of the truck, but the castings were placed amidships with the result that the front tires carried 48 per cent. of the load of freight. Two weeks later in ordinary service, both front tires pegged out.

The tires had been in service for 7,000 miles and up to the time of the single instance of misuse, appeared to be good for at least 5,000 miles more. A careful inspection of the ruined tires showed that the structure of the rubber had been changed and that it had lost a large measure of its original resiliency where it had not been disintegrated.

The two cases cited show the effect of constant overloading of one set of wheels and of a single case of overloading. In both cases the results attained are similar—the destruction of the tires.

Various Forms of Guarantee

The manufacturers of truck tires, such as the Goodyear and United States Tire Company, guarantee 10,000 miles conditioned upon moderate speed and rated load. Other companies place their guaranteed figures at 8,000 miles. Among these concerns are Goodrich, Diamond, Swinehart and various others. The Firestone company's guarantee is framed on slightly different lines, but long experience has shown that it is equal to about 8,000 miles.

The Firestone guarantee is as follows:

"When subjected to no greater loads, and run at no greater speeds than specified in our schedule, we guarantee Firestone Motor Truck Tires as follows:

"12 months on cars not exceeding 25 miles daily service.

"10 months on cars not exceeding 25 to 35 miles daily service.

"7 months on cars not exceeding 35 to 50 miles daily service.

"4 months on cars not exceeding 50 to 75 miles daily service.

"3 months on cars not exceeding 75 to 100 miles daily service."

The load limit per wheel upon which the B. F. Goodrich Company bases its guarantees is set forth in the tabulations below covering both the single and dual types of tires.

Practically all solid tires are now made in conformance with the specifications of wheel sizes and dimensions laid down by the S. A. E., thus simplifying the problem of the manufacturer as to

MAXIMUM LOAD TO BE CARRIED BY FIRESTONE SOLID MOTOR TRUCK TIRES PER WHEEL

Size	32"	34"	36"	38"	40"	42"	Speed M.P.H.
Single	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	
2"	450	475	500	525	550	575	20
2½"	670	710	750	790	830	870	20
3"	900	950	1000	1050	1100	1150	20
3½"	1130	1190	1250	1310	1370	1430	18
4"	1350	1425	1500	1575	1650	1725	16
5"	1800	1900	2000	2100	2200	2300	14
6"	2250	2375	2500	2625	2750	2875	12
7"	2700	2850	3000	3150	3300	3450	10
Dual	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	
2"	1125	1188	1250	1312	1375	1438	18
2½"	1675	1775	1875	1975	2075	2175	18
3"	2250	2375	2500	2625	2750	2875	16
3½"	2825	2975	3125	3275	3425	3575	14
4"	3375	3560	3750	3940	4125	4310	13
5"	4500	4750	5000	5250	5500	5750	12
6"	5625	5940	6250	6565	6875	7190	10
7"	6750	7125	7500	7875	8250	8625	10

GENERAL DIMENSIONS—SINGLE TYPE

Carrying Capacity for Wheel	Width of Tire A	Height of Tire B	Thickness Steel Tire Rim C	Width Steel Tire Rim D	Width Wood Felloe and Band E	Diameter Wheel F	Nominal Size of Tire
950	3"	2½"	⅜"	4"	2¼"	26"	32x3"
						28"	34x3"
						30"	36x3"
						32"	38x3"
						34"	40x3"
						36"	42x3"
						38"	44x3"
						40"	46x3"
						42"	48x3"
1375	3½"	2¾"	⅜"	4½"	2¾"	26"	32x3½"
						28"	34x3½"
						30"	36x3½"
						32"	38x3½"
						34"	40x3½"
						36"	42x3½"
						38"	44x3½"
						40"	46x3½"
						42"	48x3½"
1750	4"	2¾"	⅜"	5"	3¼"	26"	32x4"
						28"	34x4"
						30"	36x4"
						32"	38x4"
						34"	40x4"
						36"	42x4"
						38"	44x4"
						40"	46x4"
						42"	48x4"
2000	5"	2¾"	⅜"	6"	4¼"	28"	34x5"
						30"	36x5"
						32"	38x5"
						34"	40x5"
						36"	42x5"
						38"	44x5"
						40"	46x5"
						42"	48x5"
3000	6"	2¾"	⅜"	7"	5¼"	30"	36x6"
						32"	38x6"
						34"	40x6"
						36"	42x6"
						38"	44x6"
						40"	46x6"
						42"	48x6"
4000	7"	2¾"	⅜"	8"	6¼"	30"	36x7"
						32"	38x7"
						34"	40x7"
						36"	42x7"
						38"	44x7"
						40"	46x7"
						42"	48x7"

odd-sizes and allowing him to center attention on the standard sizes.

Analyzing the guarantee of any of the standard companies shows that the wheel-load is taken as the unit. Time was when the guarantee covered a certain minimum number of miles at a certain maximum carried load, but the modern practice is to regard each wheel as a separate problem. So far, the shifting of the load from one side to the other so that extra stress has to be borne by one wheel, either front or rear, has not been considered in a definite way, but emphasis is laid in 1912 on the fact that each set of wheels must be adequately tired in order to enjoy the guarantee of the manufacturers.

An excellent way to determine what tire equipment to use on a certain track is to load it as heavily as it is ever likely to be loaded in service and then weigh the front end and the rear end of the loaded car. Suppose that the truck in question is rated at 3 tons carrying capacity, entirely disregarding the factor of overload allowed under the guarantee furnished by its manufacturer.

Fig. 3—Packard 3-ton truck with full load of pianos. Note that the middle pair stand only a trifle in front of the rear axle and that the end pair and forward pair balance each other in such a way as to throw almost 90 per cent. of the load weight on the rear wheels

GENERAL DIMENSIONS—DUAL TYPE

Carrying Capacity for Wheel	Width of Tire A_2	Height of Tire B_2	Thickness Steel Tire Rim C_2	Width Steel Tire Rim D_2	Width Wood Felloe and Band E_2	Diameter Wheel F_2	Nominal Size of Tire
2500	6"	2½"	½"	7"	6"	26" 28" 30" 32" 34" 36" 38" 40" 42"	32x3" 34x3" 36x3" 38x3" 40x3" 42x3" 44x3" 46x3" 48x3"
3500	7"	2¾"	½"	8"	7"	26" 28" 30" 32" 34" 36" 38" 40" 42"	32x3½" 34x3½" 36x3½" 38x3½" 40x3½" 42x3½" 44x3½" 46x3½" 48x3½"
5000	8"	2¾"	¾"	9"	8"	26" 28" 30" 32" 34" 36" 38" 40" 42"	32x4" 34x4" 36x4" 38x4" 40x4" 42x4" 44x4" 46x4" 48x4"
6000	10"	2¾"	⅝"	11"	10"	28" 30" 32" 34" 36" 38" 40" 42"	34x5" 36x5" 38x5" 40x5" 42x5" 44x5" 46x5" 48x5"
8000	12"	2¾"	⅝"	13"	12"	30" 32" 34" 36" 38" 40" 42"	36x6" 38x6" 40x6" 42x6" 44x6" 46x6" 48x6"
10000	14"	2¾"	¾"	15"	14"	30" 32" 34" 36" 38" 40" 42"	36x7" 38x7" 40x7" 42x7" 44x7" 46x7" 48x7"

Suppose that the load placed upon the truck weighs 6,000 pounds and the car with its body, driver and supplies weighs, say, 7,200 pounds, or a total of 13,200 pounds.

The car will probably fall within one of three classes of design. It may be propelled by a gasoline motor located in front under the hood, the driver sitting behind the motor; or it may be driven by a motor placed back under the driver's seat; or, again, it may be an electric with the batteries swung under the platform and bearing about equally upon all four wheels. If in the first general class the percentage of load to be carried on the rear wheels, including chassis and body weight, runs as high as 92 per cent. In such well-known makes in the 3-ton size as Grabowsky, the percentage of weight carried by the rear wheels is 60; Packard, 72; Peerless, 77.5; Velie, 75.

In the second class cited, the following examples show the general idea: Sampson, 66; Garford, 60; Hewitt, 60; Mack, 62.

Load Divided Between Axles

In the electrics of the 3-ton size the load is well divided between the axles, the proportion being about 45 to 55. Of course, in all the cases used for illustration the type of body makes all the difference in the world about the ratio of load to be carried by each set of wheels. If a short body is used the tendency would be to lessen the percentage of weight carried by the rear wheels. If a long overhang is the type selected, the rear wheels must carry a higher percentage of the load than is indicated by the figures.

Suppose that the car in question is a Velie, which in the regular type is supposed to carry 75 per cent. of its total load on the rear axle. If the figures of the weighmaster show that the front end of the loaded car weighs 3,300 and the rear end 9,900 the user should divide each number by 2 to give the weight-rate for each wheel. Then by turning to the tabulation of tire sizes in relation to loads it is a simple matter to pick out the size recommended to carry a shade more weight than is shown by the division.

In this case the rated weight for the front wheels would be 1,650 pounds, which calls for a single type of front tire not less than 4 inches wide. This model is equipped with dual rear wheels and the weight to be carried will be found to be 4,950 pounds per wheel. Dual rear tires at least 4 inches wide are recommended by the manufacturer; in fact, 5-inch tires are supplied as stock equipment.

If a Packard, equipped with a long overhang and designed to carry more of the freight on the rear axle than the foregoing example, should be used, and the weight on the rear wheels should reach 6,000 pounds per wheel, dual tires of at least 5 inches in width would be indicated.

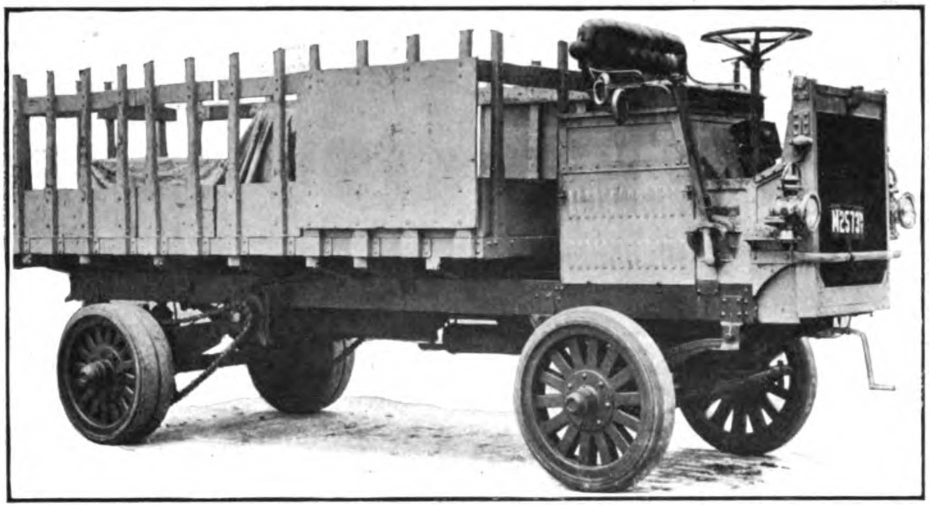


Fig. 4—In this picture of the General Motors Company 5-ton truck the casting, weighing 4 tons, and the barrel of white lead are placed too far aft, and if carried in those positions would make short work of the best tires. Loading, in the final analysis, must depend largely on the intelligence of the driver, because each trip presents its own problem

The tire makers say that the solution of the problem requires individual treatment. They say that no matter what type of car, body and capacity is considered, the simple expedient of weighing both ends of it loaded and then providing the size of tires indicated for service will insure maximum mileage, always providing that the loads are so distributed as to equalize the tire burdens in conformance with their size and ability to bear them.

In every truck on the market, irrespective of whether or not a special point is made of the fact, there is a margin of safety in the construction. In some cases a limit to overload is specified that is far below what the truck is able to carry. The manufacturers insist that they shall not be held liable for mishaps in case the load-tolerance is exceeded by the user. Nevertheless, many truck operators habitually press the limit of overload. So far as the truck itself is concerned the user may be able to overload to the limit of the rated tolerance without doing appreciable damage to the mechanism. But when it comes to the tires, why that is a different story again, as Mr. Glass says. There is no margin of safety in the tires. They have no overload capacity.

They are built to carry a certain maximum load at a certain maximum speed and until it is possible to give rubber composition an overload capacity the result of overloading will always be less mileage and tire life.

Of course, there is one way to accomplish such a result. If the user finds that the maximum load to be carried by the tires calls for 4-inch singles in front and 5-inch duals behind, he may put on 5-inch singles in front and 7-inch duals behind and go clear to the limit of load-tolerance allowed by the manufacturer without losing the benefits of his guarantee on car or tires.

This plan is not economic in its principles and does not work out satisfactorily as a theory, but it surely works splendidly in actual practice. Take one of the largest express companies in the country, for example. The engineers of this company soon after the introduction of the automobile learned that under-tiring was an expensive proposition. Many trucks were operated early in the history of the industry and the battery has been tremendously increased with each step toward improvement in construction. Nearly 7 years ago the conclusion was reached that larger tires would add to tire mileages and the result is to be seen in the average of 11,182 miles per tire, which is the amount delivered by those in service of this company.

The United States Tire Company bases its guarantees and recommendations as to loading on the following tabulation:

GENERAL DIMENSIONS OF UNITED STATES STANDARD SOLID MOTOR TIRES (DEMOUNTABLE)

Single Tires										Dual Tires	
Width of Tire	Height of Tire	Overall Width	Flange Wedge	Carrying Capacity	Nominal Tire Size	Width of Tire	Height of Tire	Overall Width	Flange Wedge	Center Wedge	Carrying Capacity
A	B	D	No.	Lbs.		A-n	B-2	D-2	No.	No.	Lbs.
2½	2 5/16	3⅝	1	650	30x2½ 32x2½ 34x2½ 36x2½ 38x2½ 40x2½ 42x2½	5¾	2 5/16	6⅝	1	3	1400
3	2½	3⅞	1	950	30x3 32x3 34x3 36x3 38x3 40x3 42x3	6¾	2½	7⅝	1	3	2500
3½	2 13/16	4½	2	1375	30x3½ 32x3½ 34x3½ 36x3½ 38x3½ 40x3½ 42x3½	7¾	2 13/16	8¾	2	4	3500
4	2 13/16	5	2	1750	30x4 32x4 34x4 36x4 38x4 40x4 42x4	8¾	2 13/16	9¾	2	4	5000
5	2 13/16	6	2	2000	34x5 36x5 38x5 40x5 42x5	10¾	2 13/16	11¾	2	4	6000
6	2 13/16	7	2	3000	36x6 38x6 40x6 42x6	12¾	2 13/16	13¾	2	4	8000
7	2 13/16	8	2	4000	36x7 38x7 40x7 42x7	14¾	2 13/16	15¾	2	4	10000

Express Work a Severe Test

Express service is a severe test of truck efficiency and the equalization of loads to tire equipment is a difficult problem for such companies. This is due to the character of much of the service required where deliveries are made at short intervals, or where loads are picked up along regular routes. In the freight service between depots and warehouses or distributing stations the matter can be given more care. Part of the satisfactory showing made by the tires of this company's automobile service is undoubtedly due to the careful adjustment of the loads to the tire equipment per wheel.

For the purpose of illustrating another factor in the problem of tire life in connection with proper loading, the street conditions in various American cities are interesting, particularly with reference to the mileages delivered. New York has a total of 2,707 miles of paved streets involving every grade and type of pavement known to mankind and averaging from poor to fair. The cobble pavements and sharp-edged stone blocks are destructive to truck tires in New York as may be seen from the fact that fragmentary data indicate an average of only 6,161 miles per tire used on all classes of commercial vehicles excepting omnibuses in the metropolis.

THE SOCIETY OF AUTOMOBILE ENGINEERS IN AIDING THE STANDARDIZATION OF PRACTICE WITH REGARD TO WHEEL DIMENSIONS HAS ADOPTED THE FOLLOWING STANDARDS:

S. A. E. WHEEL DIMENSIONS FOR SOLID TIRES
NON-DEMOUNTABLE AND DEMOUNTABLE EQUIPMENT

All Dimensions in Inches
Single Tires

Sectional size of tire	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8
Width of felloe and band	1[illegible]	1[illegible]	2[illegible]	2[illegible]	3[illegible]	3[illegible]	4[illegible]	4[illegible]	5[illegible]	5[illegible]	6[illegible]	6[illegible]	7[illegible]
Thickness of steel band	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Minimum thickness of felloe	1[illegible]	1[illegible]	1½	1½	1[illegible]	1[illegible]	2	2	2	2[illegible]	2[illegible]	2[illegible]	2[illegible]

Dual Tires

Sectional size of tire	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8
Width of felloe and band	4	5	6	7	8	9	10	11	12	13	14	15	16
Thickness of steel band	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Minimum thickness of felloe	1[illegible]	1[illegible]	1[illegible]	1½	1[illegible]	1[illegible]	2	2	2	2[illegible]	2[illegible]	2[illegible]	2[illegible]

Wheel Diameter Over Steel Band
Single and Dual Tires

Nominal outside diameter of tire	30	32	34	36	38	40	42
Wheel diameter over steel band	24	26	28	30	32	34	36
Exact wheel circumference over steel band. No shrinkage allowed	75 [illegible]	81 [illegible]	87[illegible]	94¼	100[illegible]	106 [illegible]	113[illegible]
Tolerance over exact circumference of bands before application to wheel	75 [illegible]	81[illegible]	88[illegible]	94[illegible]	100[illegible]	106[illegible]	113[illegible]
Tolerance over exact circumference of bands after application to wheel	75 [illegible]	81 [illegible]	88[illegible]	94[illegible]	100[illegible]	106 [illegible]	113[illegible]

Bolt Equipment for Side Flanges
Bolt Hole Circle
All Bolts to be ½" Diameter

Outside diameter of tire	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54
Diameter bolt hole circle	18½	20½	22½	24½	26½	28½	30½	32½	34½	36½	38½	40½	42½	44½	46½
Number of bolts	6 or	9 or	18	8 or	12 or	24	10 or	15 or	30	12 or	18 or	36	14 or	21 or	42

A very large percentage of this astonishing showing is undoubtedly due to habitual overloading and overspeeding, but the lack of intelligent loading so that the weight carried on each wheel corresponds with the capacity of the tire unquestionably has some effect.

Baltimore Is Hardest on Tires

The extraordinary mileage achieved with tires used on bus lines raises the average to 8,274. These figures appear to be out of proportion, but it should be taken into consideration that all of the 8,000 commercial cars owned in New York were not reported and that all the buses were reported. Another angle may be viewed when it is understood that the buses travel only the best streets.

Baltimore, with its vicious pavements and lack of them, has the worst record in the United States, although Pittsburgh with its hills, Seattle located on the slope of the Cascade Mountains and San Francisco with its fierce grades, are not far behind. In Kansas City, where the hills are insurmountable for the average truck, the record is better, reaching 8,000 miles per tire, or approximately the guaranteed figures. In Baltimore the mileage average is 4,024. The difference is due solely to the variation in street conditions, as Baltimore grades are as flat as a spirit level compared with those of Kansas City.

In Chicago, which is as flat as a board, but where paving conditions are not quite perfect, the average mileage delivered per tire is 8,115. In St. Louis, which has more hills but better surfaces, the mileage is 9,793. Washington, with its fine streets and level general surface, is reported as giving 15,000 miles per tire, but the figures are based upon insufficient data as compared with the large use of the truck in the capital. Another factor in the Washington situation is that electrics of 1 and 2-ton capacity are largely used with oversize tires. Still another is the sharp application of the speed laws.

The highest percentage of asphalt streets, or equivalent pavement, is found in Kansas City, where the proportion is 64 per cent. Washington has less than 50 per cent., Baltimore only 9.28 per cent. and Boston 4.3 per cent. The deduction to be drawn from the figures is that where there is a good road surface the tires last disproportionately longer than that factor would seem to justify, despite heavy grades and fast service. Where there are good roads and streets and few grades the increase in mileage is astonishing. The ideal condition will be found where smooth, traction-giving roads, level grades and

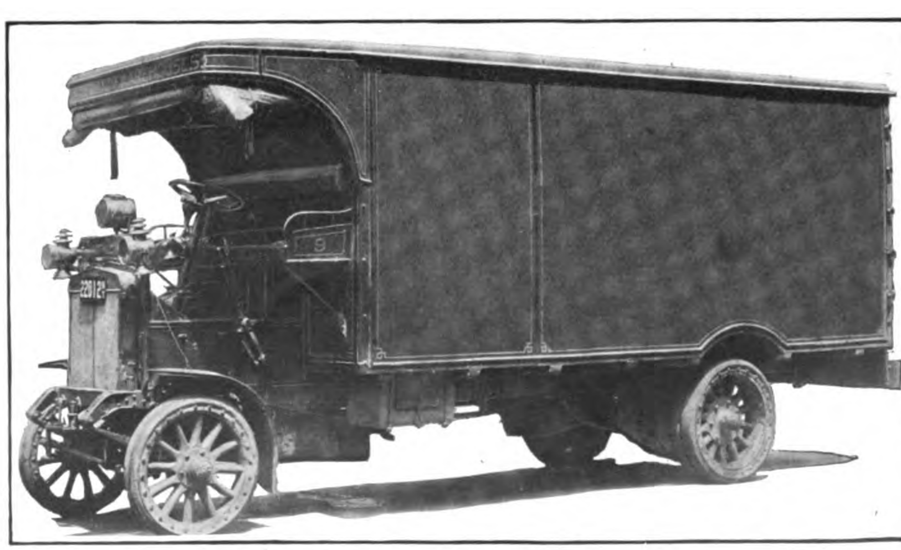


Fig. 5—Sampson 3-ton truck equipped with a very heavy van body. The chassis structure of the Sampson lends itself to this type of service, and in this particular wagon the weight is so evenly distributed that loading of furniture makes little difference in tire wear

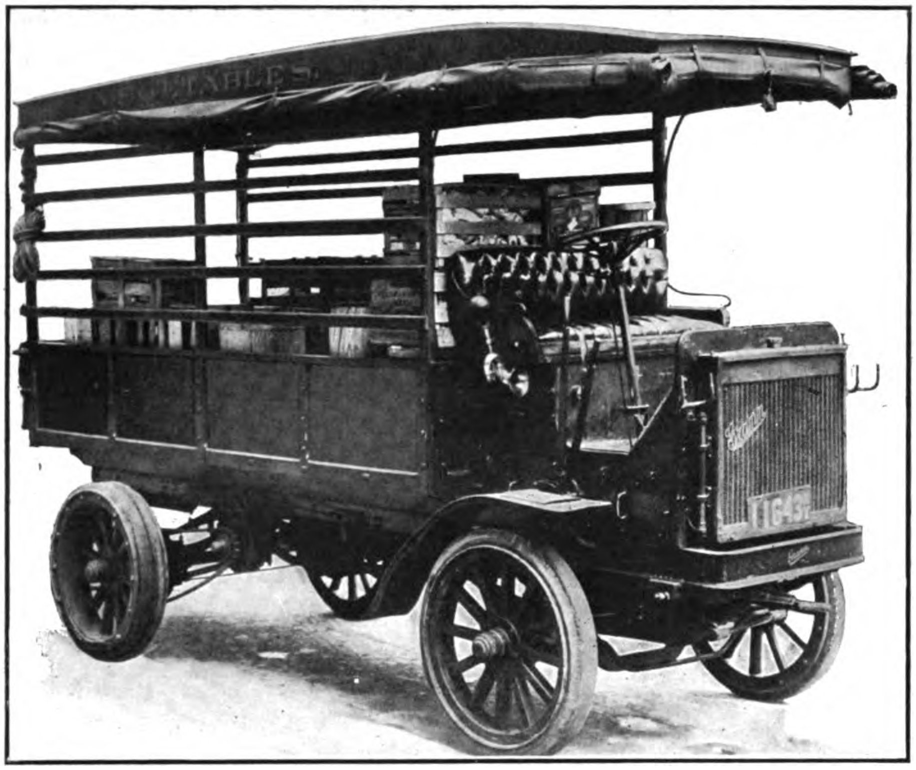


Fig. 6—Gramm truck which ordinarily carries too much of its heavy freight on the rear axle, as indicated by the frayed condition of the inner dual tires. In this picture the heavy packages have been unloaded, and the light stuff forward is shown as an ideal distribution of weight

moderate speed and load are combined, together with a nice discrimination as to distributing the load.

At this date the best place in the United States for tire mileages is Washington and three of the factors mentioned above are present, while the other two have considerable weight in making up the sum.

Tire Expert on Overloading

An expert in solid tires explained the precise effect of overloading, which includes unequal distribution of weight as treated in this article, as follows:

"In the process of manufacture, crude gum is mixed with pigments and the whole mass is kneaded together until the compound becomes homogeneous. After various intermediate steps, the rubber is placed in a mold and vulcanized. During vulcanization the tire assumes a more or less permanent form to which it will normally return if it is not stretched or compressed beyond certain definite limits. If the stretching or compression exceeds these limits, however, the strain will invariably cause a rupture or disintegration of the rubber.

"To illustrate: Take a strong, properly vulcanized rubber band. Stretch it moderately, release it, and it will return to its normal shape. The process may be repeated indefinitely, depending upon the quality of the rubber, and the band will resume its shape. Stretch it beyond its limit of elongation, however, and what happens? The rubber breaks and all the king's horses and all the king's men can't restore it to its previous condition.

"The damage has been done and the rupture is permanent. Similarly, a piece of rubber properly vulcanized may be compressed within certain limits, released, and it will resume its normal shape. The compression may be repeated an indefinite number of times, depending on the quality of the compound. So long as its limit of compression has not been reached, the rubber will continue to spring back into shape and nothing but abrasion or other physical or chemical action will destroy its elasticity.

"Compress it beyond its limit of cohesion, however, or, in other words, beyond its power of resistance, and the rubber breaks down or ruptures just as inevitably as in the case of stretching beyond its limit of elongation. No method yet devised will restore to the unit its former elastic qualities. The difference between a rupture resulting from compression and one brought about by stretching is that in the latter the tear usually results in a clean separation, while in the former the rupture may not be noticeable because the broken parts are held in place by others not yet noticeably affected.

"Nevertheless the damage is done, and disintegration has commenced, not because the average load exceeded the limit of resistance, but because some one load exceeded it, and started the rupture."

The owner should always bear in mind that poor results with any make of truck tire are comparatively seldom due to defects in the materials or in the manufacture of the tires themselves, but may be reasonably expected should he shift to some other make of tires in the hope of obtaining better service. He must always figure on a considerable deterioration in the tires caused by wear and tear of everyday, knockabout, rough use over all sorts of pavements and roads and under all sorts of weather conditions, from the torrid days of July and August, when the superheated asphalt and dirt of the highways over which the truck is obliged to travel well-nigh blister the tortured rubber as it toils on its rotary path, to the frigid days of December and January when the cold contracts the rubber and the ice and snow insidiously permeate the pores of the tread as it bumps over the frozen ruts in the roadway, receiving severe blows and sometimes cuts from stones and sharp pieces of ice.

Then, too, he must consider the character of the load to be carried by the machine, whether it is light or heavy, etc., for this has a great deal to do with the life of the tires, especially as regards the problem of scientific loading.

Driver Most Important Factor

But the factor which is most important in determining the length of life of the tires is the factor which it is most difficult to regulate—the personal equation. Some truck owners have the idea that, after they have bought their truck, or trucks, as the case may be, they have only to get a man who is capable of starting and steering the machine about the streets without running into things too often, and of changing gear or even making minor repairs when necessary. This is far from the true state of affairs at this juncture. The owner should remember that his own interests are at stake, that the sort of a driver he employs means dollars and cents to him, not only in the service he gets out of the truck, but also in the size and frequency of repair bills and, last but not least, in the amount of money he will be obliged to pay out for new tires.

Too much emphasis cannot be laid upon the importance to the truck owner of this question of selecting a driver who knows his business, who knows his automobile mechanics, and, above all, who appreciates the points of good truck driving and is proud of his knowledge in this respect and of his application of this knowledge. For there is more science to be found in truck driving than in a great many other pursuits which claim higher places in the sphere of business. It presents a practically limitless field for the application of mathematical principles and unbounded opportunity for the acquirement of manual dexterity and of mechanical skill.

Best Varnish Is Essential

Good Service Cannot Be Expected of This Beautifier and Protector if Made of Poor Materials

Varnish Must Be Allowed to Ripen Properly Before Using —Storage Place Should Be Uniformly Warm

VARNISH, of all the materials which are applied to the car to make it beautiful and give pleasure to the user, is at once the most sensitive and the most durable. Once assembled on the surface of the car in splendid unity it immediately becomes all things to practically all men.

The service it yields is manifold. Chiefly it is a protector and a beautifier. The varnish user demands that it should work precisely right under all circumstances. It must dry free from dust in the nick of time. It must have an undiminished luster. It must neither sweat, nor pit, nor enamel, nor do other hot-weather tricks. In a word, it must be a garment suited to all kinds of weather.

Varnish making is one of the most highly skilled industries. It is an achievement of science and chemistry. Every varnish maker has special formulæ and methods of manufacture, and mechanical equipment of the finest sort, and to-day varnish, prepared and ready for use, represents the finished product of highly specialized mechanical, scientific and chemical skill.

The laymen with his crude little outfit and his ancient formula cautiously extracted from age-worn tomes should be labeled "handle with care" when he sets forth to school the unsophisticated public in the mystery of making varnish. The automobile painter and the automobile owner should deal directly with the reliable maker of varnish who, with the experience and prestige of years of business, is able and glad to stand back of his products. In this way mutual interests may be safeguarded and the finish applied to the car given a prolonged lease of life.

Automobile varnish of the best quality is made of a combination of copal gum, a product of Africa, and turpentine and linseed oil. Zanzibar copal is said to yield a varnish of the very highest quality.

Many inferior gums or resins, turpentine substitutes, and adulterated linseed oil are consumed in making varnishes for automobile work, but all such varnishes are cheap only in the matter of price. In the end they are the most expensive materials purchasable.

Avoid the Use of Cheap Varnish

All cheap varnishes live on the surface of the car for a comparatively short period only. They lack the vital bone and sinew, and from the very first they are stricken with the "shadow of things to come." Such varnishes, of course, dry hard and fast in short order, but once dry and the story of their decline begins. They are devoid of the elastic properties and of the strength which comes alone from the rich and robust African gum.

It is therefore in order, first of all, for the car owner doing business with the painter to have it stipulated in the contract that a high-class varnish be used on the car.

Varnish should never be used until it is well aged and ripened. The leading varnish makers have thousands of gallons of varnish of the various grades tanked, and held for mellowing out, and taking on a condition, and an appearance, and an age that will make it rare and good, and distinguished in its class.

The untrained counselor in the ways of making varnish who would for some money consideration put the painter in the way of being his own varnish maker knows little, and apparently cares less, concerning this practice of giving age and a ripe condition to varnish before using it. Nothing, however, is more essential; nothing has more to do with its excellence and nothing has more to do with the results obtained.

Even the working of varnish, its brilliancy, and its other characteristics cropping out in a hundred ways on the surface of the car, are in no small measure influenced and controlled by the manner of keeping the varnish preparatory for use. It should be kept in a warm room, preferably upon a shelf located at a point 5 or 6 feet above the floor.

This situation should be dry, and the warmth should be uniform. Varying temperatures keep a varnish in a state of unrest, whereas fine varnish should be disturbed as little as possible.

In not a few publications devoted to things pertaining to the automobile instructions have lately been handed out describing how to use varnish, and quite often these ways are more amusing than instructive. For example, we note that painters are gravely told to apply varnish thin and wipe it out over the surface thoroughly. Such information should under no circumstances be put into practice.

How Varnish Should Be Applied

Varnish should be applied to the surface in a rich, full volume, making the surface carry all it can assimilate and take care of. In this way, and only in this way, is the deep, lustrous, mirror-like surface so greatly to be desired on the automobile developed and rounded out.

Thin, skimpy, laboriously brushed-on coats of varnish are the natural forerunners of seedy, specky, dull, unsatisfying finished surfaces.

Any car owner who doesn't feel qualified to put on and handle such coats of varnish had better turn the work over to the professional painter, who by occupation is an adept in such things.

Rubbing varnish which precedes the finishing varnish on the surface—in fact, going directly over the color—is used for the purpose of building up a surface level and smooth and strong to support the finishing varnish coat.

Rubbing varnish is made up in a different manner from finishing varnish in that it carries harder gums, less oil, and has generally a different composition of ingredients. It is chiefly a bodying up medium, but like the finishing varnish it should be a first-class article. Great things are expected of it.

The fine, clean, smooth, and level surface which the automobile must have to please its owner is worked out in this way: As soon as the color or combination of colors are placed in position upon the surface the entry of rubbing varnish is made. It must, to meet requirements, go to the surface as free from brush marks and roughness as possible. Lacking the flowing properties of finishing varnish, it seldom works out to the same degree of fineness. But if kept clean and worked quickly and skilfully all the natural roughness of the coats will be held down to the minimum. Then in the rubbing use perforated rubbing pads of heavy felt, wet, and dipped in No. 00 pulverized pumice stone. Use plenty of the pumice stone until the desired surface is practically reached, whereupon finish off with a clean piece of felt dipped freely in water; giving the surface, in fact, a water rub. Then wash up carefully and follow with the finishing coat of varnish.

GERMANY, during this year's military manœuvres, is demonstrating the constantly increasing commercial importance—some say indispensability—of the motor car. The reading public know well the use that Germany is making of the automobile for army purposes. It is true that, owing to the expense of maintaining a motor car park, the automobile army corps has never been completely mobilized in the German army. Therefore an authentic test of the total complicated apparatus, including portable workshops, gasoline and tire stations, has never been entirely demonstrated. This leaves Germany behind France in respect of statistical details.

Nougier Discovers that Formulas for Adiabatic Compression Point Way to Recovery of Thermic Waste in Combustion Engines and Many Other Gains Besides—New Porous Metal Multiplies Battery Capacity—Diesel Locomotives

DIESEL System for Automobile Motors—With a view to obtaining for small stationary motors as well as for automobile and boat motors the advantage of operating very economically with any one of a variety of cheap fuels, this advantage being at present possessed by the Diesel motors exclusively, Mr. A. Nougier, of Paris, proposes in *Le Génie Civil,* No. 17 of this year, to try preheating of the air charge as a substitute for the very high compressions employed under the Diesel system. His article is reproduced in German in *Gasmotorentechnik* for May and June, with a critical review promised for July. Nougier tries to show, first, that it is possible by preheating of the air and moderate compression to obtain a temperature at the end of the compression stroke sufficiently high to effect the ignition of the liquid fuel injected at that moment and yet not accompanied by the high pressure used in ordinary Diesel motors, in which compression alone is depended upon for producing the heat for ignition; secondly, that the expansion of the air which is caused by preheating, and which results in a reduced supply of oxygen to serve the combustion of the fuel, need not interfere with the success of the plan, and, thirdly, that the provision for preheating the air need not be too cumbersome, but can be managed within space limitations suitable even for automobiles.

In Diesel motors as now constructed a compression of 30 to 35 atmospheres produces a temperature of more than 500 degrees C., which suffices for igniting crude oil or even tar oil, but this high compression necessitates the installation of a separate air-compressor for injecting the fuel against the cylinder pressure, and this compressor, which of course must operate at more than 35 atmospheres in order to force the fuel in, not only absorbs about 7 per cent. of the motor's power, but renders an extremely expensive and heavy construction necessary in order to safeguard the tightness of pistons and valves. These drawbacks should, if possible, be removed.

THE PRINCIPLE OF PREHEATING

Air follows approximately the formulas for adiabatic compression, with 1 41 as exponent. These are:

(1) $$\frac{p_1 \times v_1}{T_1} = \frac{po \times v_0}{T_0}$$

(2) $$p_1 \times v_1^{1.41} = p_0 \times v_0^{1.41}$$

Equation 2 can also be written:

(3) $$p_1^{0.71} \times v_1 = p_0^{0.71} \times v_0$$

By dividing equation 1 by equation 2, there is obtained:

(4) $$T_1 = T_0 \left(\frac{v_0}{v_1}\right)^{0.41}$$

and by dividing equation 1 by equation 3, there is obtained:

(5) $$T_1 = T_0 \left(\frac{p_1}{p_0}\right)^{0.29}$$

In these equations $\frac{p_1}{p_0}$ stands for the pressure after compression divided by the pressure before compression: $\frac{v_0}{v_1}$ for the volume of the air after compression divided by the volume of the air before compression or, in other words, the compression ratio: T_0 for the absolute temperature before compression and T_1 for the temperature after compression.

From equations 4 and 5 the author draws a diagram from which the value of T_1 corresponding to different values of $\frac{v_0}{v_1}$, of $\frac{p_0}{p_1}$ and of T_0 may be read. The T_1 curves of this diagram are straight lines for any given value of $\frac{v_0}{v_1}$ or $\frac{p_1}{p_0}$. This diagram now gives interesting information bearing on the subject.

Usually it is air of about 15 degrees C. which is taken into a motor, but by contact with the hot cylinder walls this air reaches about 40 degrees during the compression, apart from the rise in temperature due to the compression itself. Assuming 40 degrees as the initial temperature, in accordance herewith, and a pressure ratio (p_1 divided by p_0) equalling 30, corresponding to the use of 30 atmospheres of compression in a Diesel motor, the diagram shows a value for T_1 of 566 degrees, and this agrees with thermometer readings from Diesel motor practice, thus confirming the diagram.

But the diagram shows also that the T_1 value obtained with a starting temperature of 40 degrees does not rise very fast by increased compression. With 50 atmospheres, for example, it reaches only 700 degrees. On the other hand, the same end-temperature can be reached with only 20 atmospheres of compression if the air is preheated to 80 degrees, or by 15 atmospheres and air preheated to 108 degrees. These examples show what advantages are within reach by preheating, if suitable arrangements are provided for heating the intake air by means of the exhaust gas without causing excessive counter-pressure against either the intake or the exhaust. And as the formulas, or the diagram, show that there is question only of raising the intaken air to a temperature of 100 degrees, at most 150 degrees, the practical difficulties do not *a priori* seem particularly forbidding.

The process in view is not comparable with the preheating system employed in automobile motors solely for the purpose of facilitating vaporization, as this preheating must be kept within very narrow limits in order to obviate premature ignition of the highly inflammable fuel.

Whatever reduction in the thermic efficiency is involved in the reduction of the compression contemplated by this method should be more than offset by better mechanical efficiency. The fuel injection, especially, would require much less power than with the high compressions.

Motors with 10 atmospheres of compression, preheating to 150 degrees and with a resulting temperature of 560 degrees available for the ignition of crude oil could be built in sizes as low as 30 horsepowers or less.

APPLICATION TO AUTOMOBILES.

It seems that automobile motors without carbureters or ignition devices, and to be operated with crude oil or naphtalene, could be built on this system. Regulation of the power by means of a good injector pump could be made more dependable than the present throttling system dealing with gases. As the ignition would not depend upon the maintenance of those proportions which produce an explosive mixture, the power development for a given motor speed or the motor speed for a given load might perhaps be extended over so wide a range that the change-gear mechanism could be dispensed with. In other words, a possibility of especial interest for the evolution of motor trucks is at hand by which the three most sensitive organs of the motor vehicle, the carbureter, the ignition device and the gear box, would make room for three more robust organs: namely, an injector pump, an injector and a preheating device, the latter also taking the place of the muffler.

THE LIMITS TO PREHEATING

The fact that heated air weighs less than an equal volume of cold air sets certain limits for the preheating method, since, for example, in the case of naphtha 1 pound of the fuel requires 15 pounds of air for effecting complete combustion, and in practice even a surplus above this figure because all the oxygen in the air does not get a chance at the fuel. The author shows by calculation that excessive preheating for this reason would, in fact, lead to incomplete combustion but also that air heated only to 100 to 150 degrees will afford a surplus of oxygen, although precautions may be necessary for limiting the heating when the motor is working under full load and the heating capacity of the exhaust gases is at its maximum.

A preheating arrangement is described shaped as a large muffler with tubular flues for the exhaust gases flowing in one direction and the intake air flowing in the opposite direction in the interstices, with baffle plates to obviate short-cuts and compel utilization of all the heat. Even when a motor runs idle and gives off comparatively cool exhaust gases it is necessary that the preheating should be so high that ignition is effected, and it is a question whether the gases can heat all the air which is required, under these circumstances. A 200-horsepower motor of a certain construction is mentioned whose exhaust, when it is operated at full load, reaches a temperature of 465 degrees, but only 135 degrees when it runs idle with its minimum of fuel. While these figures apply to operation with cold air intake, they indicate the difficulties. Such a motor requires 1,060 cubic meters of air per hour, and this at a temperature of 100 degrees would weigh 1,000 kilograms. The exhaust gas generated by the motor running idle, using only 10 kilograms of fuel per hour, would weigh 1010 kilograms. This, at a temperature of about 135 degrees is required to heat the 1000 kilograms of intake air to 100 degrees in a small fraction of a second. The author attempts to show what the areas of heating surface in the preheating device must be in order to comply with the needs and arrives at the result that it would be preferable to reduce the preheating to 80 degrees for operation under the throttle, which would still give 720 degrees final temperature for ignition and would make it easier to avoid overheating when running under full load. He figures that the preheater for these conditions should be only 1.06 meter long, 0.6 meter in diameter and provided with 100 flues of about 1½ millimeter diameter. The speed of the exhaust and of the intake air is figured at 19 meters per second, however, which seems high.—From *Gasmotorentechnik*, May and June.

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Railway Motor Cars—While most early attempts at the employment of internal combustion motors for the propulsion of railway cars have been discontinued by reason of difficulties in adapting the change-gear mechanism to railway conditions, recent efforts looking to the use of Diesel motors in railway service are even more ambitious, in so far as the aim is no longer merely to supply a self-powered car for small sidelines and interurban traffic but actually to supplant the full-fledged steam locomotives. The Diesel two-cycle locomotive with cylinders of huge size disposed in V-arrangement is still on trial in Germany. It weighs 85 tons, develops 1,000 to 1,200 horsepower, looks like a steel passenger coach from the outside and runs with either end forward, the engine being located in the middle and the two ends nearly identical in the matter of access to control levers. Its construction has taken five years, as great difficulties were encountered in balancing the moving masses and providing for starting and maneuvering facilities by means of an auxiliary engine and two special air pumps. *The Engineer* of England tells of a somewhat similar enterprise undertaken by the Closed Circuit Air Transmission Company, Ltd. The power is furnished by a two-cycle Diesel motor, burning Texas oil, and the need which exists with all Diesel motors for a powerful air compressor is here exploited to make the compressed air serve not only for the starting and the injection of fuel but also for the transmission and regulation of the power delivered to the driving wheels of the locomotive. From the tanks brought under pressure the air is taken as needed into an air engine with double-acting cylinders, exactly as steam is taken from the boiler to a steam engine, and the locomotive is driven from this air-engine. The compressed air is heated by means of the exhaust gases from the motor before delivered to the engine and the air-cylinder exhaust is carried back to a reservoir to be recompressed with as great a saving of heat as practicable.—From *Auto-Technik*, June 14.

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Porous Metal for Battery Grids—The scientific side of a recent invention by Prof. Hannover of the technological institute of Copenhagen, Denmark, was submitted to the French *Académie des Sciences* at its session on June 10. By taking advantage of the fact that one constituent of a metallic alloy in some instances solidifies more rapidly than another when passing from the molten state, Mr. Hannover has succeeded in expelling by industrial means the portions which remained liquid in half-molten plates of metal, using centrifugality as the active agency, and has obtained highly porous plates composed solely of the more resistent constituent in the alloy. He has for example thrown out antimony from an alloy of lead and antimony. The process is easier the lower the fusion point of the alloy. But a porous lead plate produced in this manner may be filled with copper or silver by electrolysis, and the lead may then be thrown out, leaving a porous copper or silver plate. The method has at once been applied to the production of grids for storage batteries, and these have an active surface five times greater than any which can be produced by mechanical means. They render it possible to either dispense with oxides, which are liable to be shaken off the plates unless expensive precautions are taken against this possibility, or to fill the porous plates with oxides, thereby greatly increasing the capacity of a battery. Batteries of this kind have been tested in the Danish government railway service, and the results are reported to have been very encouraging.—From *Die Automobil-Welt* and *Le Génie Civil*, June 22.

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To Reduce Friction of Pistons—While the thermal efficiency of motors is the feature in their operation upon which most designers spend their best efforts, G. H. Tremolières, of Paris, has conceived a method of enhancing the mechanical efficiency through ample lubrication of the pistons. This, he claims, always results in better compression and increased power. He cuts three sharp-angled grooves circumferentially around the lower portion of the piston, and these act as troughs which, by reason of their location, are filled completely from the oil splash. Narrow grooves traced in the piston surface connect these troughs, and similar narrow grooves are traced upward to the grooves in which the piston rings are lodged. Only the topmost piston ring is isolated from this canalization system. The theory is that, as soon as the piston begins to descend, the oil in the troughs is compressed and forced upward through the canals, reaching all parts of the piston and piston ring surface with great regularity. The improvement is applied to old as well as to new motors.—From *La Pratique Automobile*, June 13.

Four-Speed Transmission

W. H. Cameron, S. A. E., Predicts Its General Adoption—Essential to Power, Economy and Flexibility of Control

Virtues of Four Speeds Graphically Illustrated by Diagrams and Tables

IT may sound strange to predict that the next radical change in automobile engineering will be the general adoption of the four forward speed transmission, but in my opinion it is bound to become generally used in all good American cars.

To-day it is found in this country only in the highest-priced cars; in fact, the cars selling under $3,000 that now have four speeds forward can be counted on the fingers of one hand. Abroad, where special reasons have forced the use of the four-speed transmission in the large majority of cars, its advantages are better understood.

One reason for its use on foreign cars is the extremely small bore of cylinders, due to the fact that the tax is graded by the size of the bore. An American car of more than 4-inch bore is in little demand in England, where a bore of 3 inches and a fraction is generally used with an extremely long stroke to give the maximum horsepower.

Under such conditions the four-speed transmission is positively essential, both to economize the power and to gain the required flexibility of control. Its use under these conditions, however, only serves to illustrate the actual money-saving in fuel and less strain upon the machine, as well as the advantages in driving which will come with the widespread adoption of the four-speed gear-box in America. For the same engineering principles apply in our case as in theirs.

Higher Gasoline—Lesser Bore

Before passing the point of economy, let me say I believe the tendency in America will be decidedly to smaller bore. This is due to the fact that everybody knows gasoline is becoming scarcer, and is sure to mount in price. I think the small bore is coming, even with the effort to popularize the six-cylinder car. The popular six-cylinder car of the future will be one with about the same piston displacement as the standard fours of the present.

The four-speed gearbox has been confined to high-priced cars in America, primarily because of its prohibitive cost. It means a complete change of design—more gears—wider gear centers—a big expense for the improvement, when all are totaled.

Motorists generally realize now that the life of a car depends upon its use and abuse. It does not take a car owner long to reason to the fact that making a car put forth every ounce of power on frequent grades is highly detrimental.

"Learn to control your car exclusively by the gas, as far as possible," says the instructor in motoring, to the school. The salesman says the same thing to the beginner. Everybody who gives advice on running a car says it, thereby admitting that something is wrong, or lacking in the transmission. Yet everybody realizes on a moment's reflection that the transmission is the logical first means for the control of the speed.

It takes long experience and special aptness—I may say genius—for driving to know just how far to throttle in regulating a car by gas. Few ever learn it perfectly. The driver who does it with any degree of skill knows his car like a human friend and brother, and is also guided by some sixth sense if intuition.

With the big majority this dependence almost entirely on the gas for regulating the car is a matter of guesswork. It is disastrous not only to the pocketbook but in not a few cases to human life. It costs money to pull the engine speed down until the car almost quits on high and then to race the engine to pick up on second, as is so commonly practised.

We have grown used to the sight of the driver on high gear, killing his motor at street crossings, street car tracks and railroad tracks, by throttling down before he can get his clutch out.

No. 1

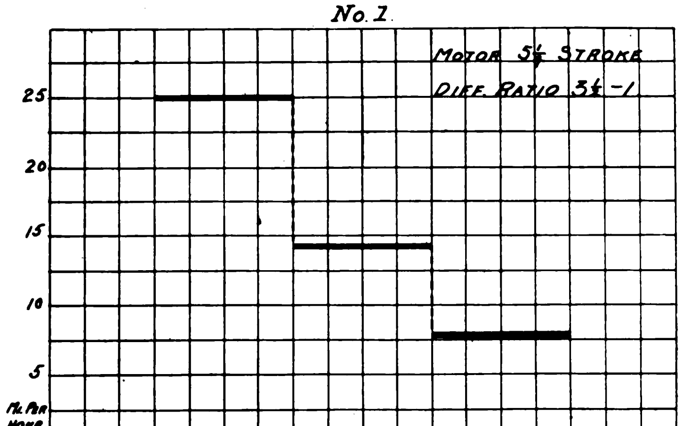

Fig. 1—Three-speed transmission. Note gap between second and high compared to the other

No. 2

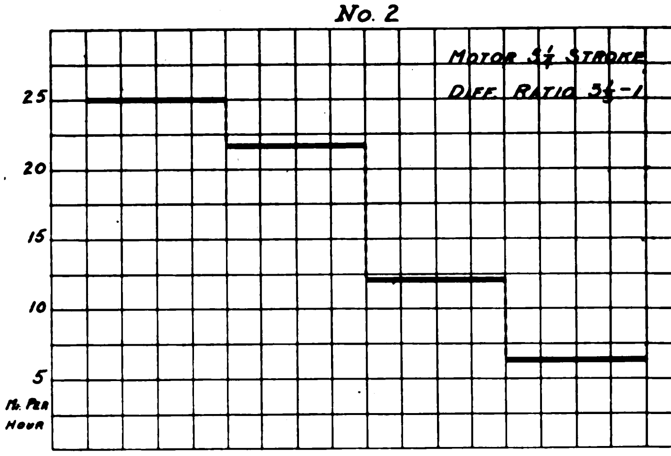

Fig. 2—Showing four-speed transmission, with the indirect fourth

If, instead, he slips into third speed on a proper four-speed transmission, he has a gear ratio which is practically the same as a 4½-to-1 rear axle—by having which, as anyone knows, the car can easily be throttled down to 2 or 3 miles an hour, and still pick up quickly.

By this time it should not be necessary to explain that the basic purpose of four-speed transmission is not to satisfy a mania for more speed. This was a common error when the four-speed transmission was rare practice. Four-speed transmission provides an efficient, feasible and logical control of the car—a control not based on guesswork, but upon an accurate, proved and dependable gearbox, built in accordance with universally acknowledged mechanical principles and in accordance with the best engineering practice the world over.

Four Speeds Easy on the Motor

It provides this control without wasting fuel, without racing the motor, and consequently with far less vibration. It relieves the motor of undue strain, especially in taking heavy grades. With four speeds (the direct drive being on the fourth) the long sand stretches, the heavy mud roads, the miles of axle-deep slush, the hills and mountains may be negotiated without fear of punishing the motor in the way that now works havoc and shortens by years the life of the best car built.

Unless one has actually driven with a four-speed transmission, he does not know the satisfaction and pleasure that it adds to driving. To those who have not tried it I would say: Make a test of two cars, one with a proper four-speed gearbox and the other with three speeds, both having the same topgear ratio, and thus having the same speed possibilities. You will be amazed at the difference in efficiency of control; the certainty of having just the speed you want when you want it; the reduction of the work of driving. You will never want to go back to a three-speed transmission.

Grade climbing is one of the problems most satisfactorily solved by the four-speed gearbox. Every motorist knows that unless he has an engine on which he can depend for a practically unlimited pull, he will find the inclination of many grades just a trifle too much for his top-speed. On such a grade, with a four-speed gearbox he can drop to third speed and it takes his car up like a bird. With a three-speed car he has to drop from top speed to second—and he makes an awful drop—in fact, almost 50 per cent. lower than high. If you have had this experience you know that resigned expression with which everybody settles back in the car to make the best of it until the car can be thrown into high gear.

The same condition is encountered in many roads which are just a little too heavy for top speed. The funeral pace then has to be taken on second speed, although the car is actually capable of much better speed on these roads.

We shall understand the necessity of the four-speed transmission more perfectly if we say that, while the speed ratios of a proper four-speed car are 1, 2, 3, 4 (the fourth being the top speed), the speed ratios of a three-speed car are really 1, 2, 4, the gap between second and high being so great that there is really no third speed. So when we put in a four-speed gearbox we are actually adding a third speed to the car.

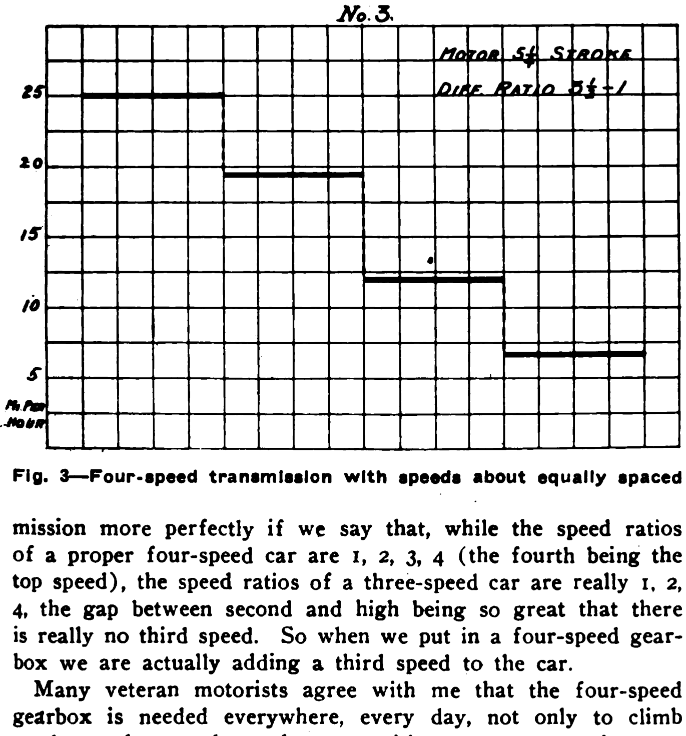

Fig. 3—Four-speed transmission with speeds about equally spaced

Many veteran motorists agree with me that the four-speed gearbox is needed everywhere, every day, not only to climb grades, and not only to do away with unnecessary engine racing, but to provide a really essential speed between second and high, where the gap now exists.

Types of Four-Speed Transmission

The greatest question in four-speed transmission is the ratios of gearing, or number of times the motor must turn over to the number of revolutions of the rear wheels. The subject has engaged the attention of the leading engineers in Europe and America for several years, but it is only lately that they have practically agreed as to the direct drive.

There are two types of four-speed transmissions: One direct on third speed, the other direct on fourth. The latter is generally conceded to be greatly in advance of the former. This is overwhelmingly proved by the practice on the great majority of cars now using the four-speed gearbox. Of 157 four-speed foreign cars, 132 have the direct drive on fourth. Of the American cars now using four speeds, 75 per cent. have the direct drive on the fourth. As the four-speed gearbox gains in favor, the indirect fourth will drop out overnight.

A study of the tables and diagrams shown herewith will enable the reader to see the difference at a glance. Table 1 shows a common three-speed transmission, which is about what is fitted to 85 per cent. of the three-speed cars. It will be noted that three and one-half rear axle gear ratio is used in all three tables. If the driver rushes his car at a hill on the high gear and has to change down, he goes to second, which is almost 50 per cent. lower than high. It will also be noted that in this transmission the first or low speed is only 11.20 to one. This is the reason that so many cars are forced to back over the stiffer grades if there is no other way round. The reverse, of course, is lower. This is the result of transmission design.

Take the next table, No. 2. It shows a transmission of a well-known and popular car. This is for the motorist who thinks he wants to burn up the roads, and who buys a car with an indirect fourth. He overlooks the fact that he loses almost all that he thinks he gains through the inefficiency of the gears, and has two speeds which are almost alike. It will also be noted that he has not much better second and low than his friend with the three-speed.

The ideal transmission, in my opinion, is shown in table No. 3. It will be seen that, when it is necessary to change from fourth to third, a speed is obtained which enables the car to go over the hill at a fairly good rate. The second in this is almost between the first and second of the others; consequently, if the car is fitted with a good clutch, the operation for all ordinary driving resolves itself down to a three-speed job (as the second can be used for starting on the level), leaving the extremely low first and reverse for emergency.

In the above I have but briefly outlined facts on which the judgment of the best engineers at home and abroad is based, in favor of four-speed transmission. Taking all these facts (and the showing of the tables and diagrams herewith) into intelligent consideration, everyone must realize that four speeds, with the direct drive on the fourth is the immediate step in the evolution of the leading cars.

Civilians for Britain's Motor Army

England is adopting new, up-to-date tactics in the management of her army. The latest thing is a scheme whereby civilians are to be enrolled in the special service as army motor car drivers. The department which takes them is known as the Special Reserve. This wing of the army comprises men who perform duties similar to those performed by them in civil life and needing no instruction as soldiers. The new reserve will consist of mechanical transport motor-car drivers for the army Special Corps, to be enlisted for 1 year at any age between 18 and 45, provided they are sound in health and measure 5 feet 3 inches in their boots.

Tables Showing Value of Four Speeds With Direct Drive on Fourth

TABLE NO. 1

Speed	Trans. ratios	Ratios—engine to wheels
3	1—1	3.5
2	1.8—1	6.30
1	3.2—1	11.20
R	3.88—1	13.58

TABLE NO. 2

Speed	Trans. ratios	Ratios—engine to wheels
4	.86—1	3.01
3	1—1	3.5
2	1.76—1	6.16
1	3.4—1	11.90
R	4.6—1	16.10

TABLE NO. 3

Speed	Trans. ratios	Ratios—engine to wheels
4	1—1	3.5
3	1.29—1	4.51
2	2.1—1	7.35
1	3.76—1	13.16
R	4.57—1	15.99

Tells of Heavy Motor Frame; Wants Ignition Information; Best Oil for Clutch Leather; A Carbon Remover; Rules of the Road in New York; Two Tour Routes; Detecting Carbon; Asbestos for Windings

Likes a Heavy Motor Frame

EDITOR THE AUTOMOBILE:—A few weeks ago I noticed in THE AUTOMOBILE a description of a light motor frame with full directions as to its manufacture. In connection with this subject I would like to show you a frame which I have been using with great success for the last 2 years. It is a much larger affair than the frame described in your paper, but I think for a man in the repair business it would be superior because it is not necessary to bolt it down, and hence can be moved about the shop as desired. The cost of the frame is about $60, which is, of course, considerably more than what would have to be paid for that described. A sketch of this frame is shown in Fig. 1. The end view of the frame is shown at A and the elevation at B.

Rockville Center, N. Y. REPAIRER.

Troubled by Weak Spark

Editor THE AUTOMOBILE:—Some time back I think I saw the answer to the following question in THE AUTOMOBILE, but would like to ask a further explanation: How can a high-tension magneto be connected to run through a four-cylinder coil? And would it give a better spark? Would it do any harm to either magneto or coil?

I have a La Coste magneto and it does not deliver a strong enough spark with the throttle wide open, and consequently skips. If running the magneto through a coil will not cure the trouble, kindly tell me what will. Do you think it could be short-circuited?

Bridgeport, Conn. J. W. R.

—You cannot use your La Coste magneto in this way. It is already a high-tension instrument and hence cannot be put through another coil in the hope of increasing the intensity of the spark. The magnets probably need recharging or there is a short-circuit through several of the coil windings. Do not attempt to repair this yourself unless you have full facilities for doing complicated electric work. Send it back to the factory and you will find it cheaper in the end.

Which Is Better Clutch Oil?

Editor THE AUTOMOBILE:—Would you kindly tell me which is the better oil for softening the leather on a cone clutch? I have heard that neatsfoot and castor oil are both good, but I would like to know which is the better.

Hackensack, N. J. READER.

—You will find that neatsfoot oil is a little better for softening purposes than the castor oil, although they are both very good for this purpose. The main point to remember is to be sure to let the oil stand on the face of the clutch for at least 24 hours before again using the clutch, for, if this is not done, the oil will not get beneath the surface of the leather and will be wiped off the surface before it has a chance to soak in. In case the leather has become much glazed, the best thing to do is to renew it, as it will never regain its old usefulness.

Recipe for Carbon Remover

Editor THE AUTOMOBILE:—I secured the following formula for removing carbon from a man who claims to be a Detroit expert on the subject, and wish to know what THE AUTOMOBILE thinks of it:

Gasoline	1-2 gallon
Kerosene	1-2 gallon
Salt	2 drams
Cooking soda	2 drams
Aqua ammonia	4 ounces
Eagle concentrated lye	1 pound

I have also noticed in THE AUTOMOBILE a mention of acetone in connection with kerosene. Could this be used in one cylinder while the other three are running? Please tell me how to use the latter decarbonizer.

Boonville, Miss. L. D. RINEHART.

—The formula you give seems good, as the ingredients should all be effective. As a matter of fact, however, the secret of keeping the cylinders free from carbon is to give them constant attention instead of only at intervals. Many automobilists make a point of injecting about a tablespoonful of kerosene into each cylinder after they have returned from a run. The motor, being warm, transforms the kerosene into a vapor, and while in this state it is a very strong carbon solvent. If this is done consistently there should be no carbon troubles. Buy good lubricating oil and use the kerosene as mentioned above and you will not have any trouble at all.

In using the mixture of kerosene and acetone it can be applied in the same way as the kerosene alone, or it can be poured into one cylinder while the other three are left alone until the cylinder in which the acetone is placed is cleaned out and is again ready to fire. Do not put in more than a tablespoonful at a time, as, if you do, it will run past the cylinders too rapidly and get down into the oil supply, ruining its lubricating properties. Of course, it will be impossible to put the mixture into the cylinder while the motor is running.

By far the better way, in using a decarbonizer, is to remember the rule that a little at a time is much better than an enormous quantity all at once. If you will keep your oil supply normal, buy the best possible oil, inject one tablespoonful of kerosene into each cylinder after a run; your cylinders will always be clean and bright.

Wants State Rules of Road

Editor THE AUTOMOBILE:—Would be pleased to have you give me the rules of the road and the provision of Article 11 of the highway law of the state of New York through the "Letters Answered and Discussed" columns.

Eaton, N. Y. SIDNEY B. WESTCOTT.

—The New York state law as regards signaling and rules of the road is as follows: A person operating or driving a motor vehicle shall, on signal by raising the hand, from a person riding, leading or driving a horse or horses or other draught animal, bring such motor vehicle immediately to a stop, and, if traveling in the opposite direction, remain stationary for so long as may be reasonable to allow such horse or animal to pass, and, if traveling in the same direction, use reasonable caution in the act of passing such horse or animal; provided that, if such horse or animal appears badly frightened or the person operating such motor vehicle is signaled so to do, such person shall cause the motor of such vehicle to cease running so long as shall be reasonably necessary to prevent accident and insure the safety of others. In approaching or passing a car of a street railway which has been stopped to allow passengers to alight or embark, the operator of every motor vehicle shall slow down and if it be necessary for the safety of the public he shall bring said vehicle to a full stop. Upon approaching a pedestrian who is upon the traveled part of any highway and not upon a sidewalk, and upon approaching an intersecting highway or a curve or a corner in a highway where the operator's view is obstructed, every person operating a motor vehicle shall slow down and give a timely signal with his call, horn or other device for signaling.

The rules of the road are: Whenever a person operating a motor vehicle shall meet on a public highway any other person riding or driving a horse or horses or other draught animals or any other vehicle, shall seasonably turn same to the right of the center of such highway so as to pass without interference. Any such person so operating a motor vehicle shall, on overtaking any such horse, draught animal or other vehicle, pass on the left side thereof, and the rider or driver of such horse, draught animal or other vehicle shall, as soon as practicable, turn to the right so as to allow free passage on the left. Any such person so operating a motor vehicle shall, at the intersection of public highways, keep to the right of the intersection of the centers of such highways when turning to the right and pass to the right of such intersection when turning to the left.

A full copy of the laws of the state may be secured by application to Edward Lazansky, Secretary of State, Albany, N. Y.

From Yazoo City to Dayton

Editor THE AUTOMOBILE:—I am contemplating an automobile trip from Yazoo City, Miss., to Dayton, Ohio, *via* Memphis, Tennessee and Louisville, Ky. Will THE AUTOMOBILE give me the best route through Tennessee and Kentucky?

Yazoo City, Miss. A. S. GARDNER.

—The best route to follow through Tennessee and Kentucky would be after you have reached Memphis to take a sharp turn over to Tuscumbia, Ala., and thence up through Nashville, Bowling Green, Ky., Louisville, Lexington and Dayton. The roads from Memphis to Tuscumbia are fair to bad, the best way to proceed being by local direction through the following towns, asking in each town for the best route to the next: Germantown, Collierville, Moscow, La Grange, Grand Junction, Saulsbury, Essary Springs, Corinth, Burnsville, Iuka, Cherokee, Barton, Tuscumbia. From Tuscumbia to Nashville the same directions apply, the best method being to inquire from one town to the next, as the roads are in doubtful condition and definite information is scarce. The towns passed through are: Tuscumbia, Sheffield, Ala., Florence, St. Florian, Green Hill, Loretto, Tenn., Pleasant Point, Dunn, Lawrenceburg, Crestview, Williamsville, Sandy Hook, Ridley, Columbia, Brentwood and Nashville. From Nashville to Bowling Green is a direct route through Goodlettsville and Franklin. Continue on to Louisville by aid of local direction. From Louisville to Lexington you are on good pike road all the way. It is an easy road to follow, leading through Shelbyville, Peytona, Frankfort and into Lexington. From Lexington to Dayton the route lies direct through Cincinnati. From Lexington to Cincinnati is nearly all good macadam through Georgetown, Corinth, Williamstown, Crittenden, Covington and Cincinnati. From Cincinnati to Dayton is over level country and excellent gravel pike roads. Pass through Reading, Sharon, Pisgah, Mason, Lebanon, Ridgeville, Centerville and Dayton.

The information on the first part of the route is to say the least hazy and should be followed up closely by local inquiry. The motoring clubs, garagemen, etc., along the route will no doubt be able to direct you from town to town. The towns themselves you will know from the above directions. The route you will cover on your trip will be largely the same as that taken on the Glidden tour of 1910, so that additional light on the trip may be had from the stories of this tour in the press of that time if you have access to a file. There has been little change in conditions since then. The latter part of the route is over good roads and should offer you no difficulties.

From Washington to Washington

Editor THE AUTOMOBILE:—Noticing that THE AUTOMOBILE furnishes information regarding routes, I wish to have the following question answered: I intend to leave Washington, N. C., for a pleasure trip to Washington, D. C. I am entirely in ignorance as to which of the several routes will be the best for automobile travel. I should leave here, going to Raleigh, N. C., then to Winston-Salem, N. C., Roanoke, Va., Staunton, Va., into Washington. Or, I could go by the way of Weldon, N. C., Petersburg, Va., Richmond, Va., Alexandria, Va., and thence into Washington, D. C. Which of these two routes is the better?

Also tell me what are the requirements for licenses in the states which I will pass through, that is, North Carolina, Virginia, Maryland and the District of Columbia.

Washington, N. C. WILLIAM KNIGHT.

—It is difficult to state which of the two routes would be better. If you go *via* Roanoke there will be some very dangerous spots which it would be inadvisable to tackle unless you have the utmost faith in your car, while in the route *via* Richmond you will be up against some very bad dirt roads and, in many cases, mud-holes. With a good strong car that could be depended upon, the route *via* Roanoke would be better. You would pass through Raleigh, Durham, Stokesdale, Martinsville, Roanoke, Lexington, Staunton, Winchester, Washington. Some very good stretches of stone road are mixed in with fair to poor dirt roads; the latter predominate.

The requirements of the states for an automobilist passing through them are as follows:

North Carolina.................No fee for tourist licensed in own state.
Virginia.......................No fee for less than 8 days, twice a year.
Maryland.......................No fee for less than 8 days, twice a year.
District of Columbia..No fee for tourists licensed in own state. Register with Secretary of the Automobile Board, Washington, D. C., within 24 hours.

When Is a Motor Carbonized?

Editor THE AUTOMOBILE:—When a motor is badly carbonized, how can you tell it? What are the symptoms of this trouble? In other words, how can it be ascertained that it is time to remove the carbon from the cylinders? What is the best way of doing it? Is a mixture of kerosene and acetone as effective as hand-scraping?

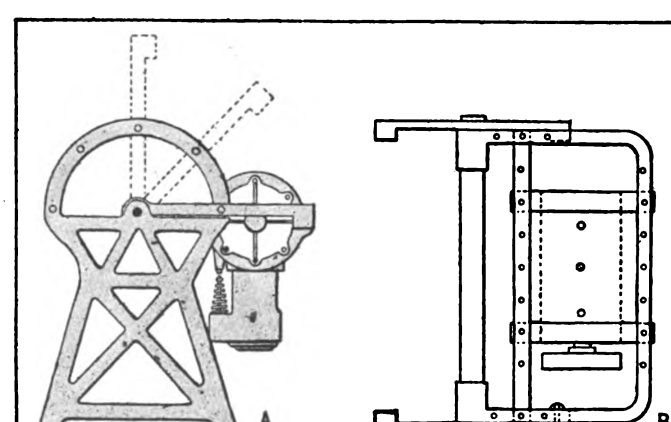

Fig. 1—Type of motor frame approved by repairman

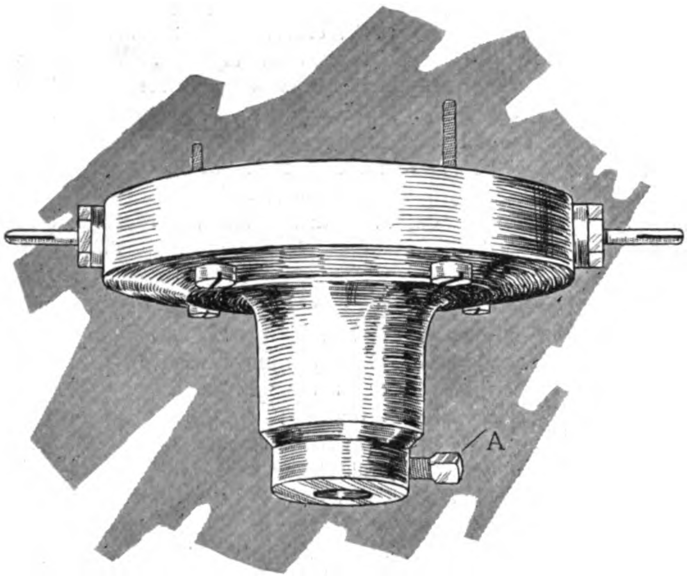

Fig. 2—La Coste timer, showing stud which holds shaft

(2) I have a rattle in my gearset which I think is caused by the teeth on one of the gears being slightly battered on one edge. Is there any way of remedying this without taking down the entire gearcase? My car is an Overland model 59.

(3) After my gas generator has been in operation a short time the gas tube fills up with water, causing the lights to flicker. What is a simple remedy for this?

East Canaan, Conn. D. C. Canfield.

—(1) Carbon troubles can be detected when they are far advanced by a knock in the motor due to preignition. A piece of glowing carbon will be hot enough to ignite the next charge when it is compressed to a degree less than that at which it is regularly fired. When ignited before dead center the charge will cause a knock, as it will act against the direction in which the piston is moving. A loss of compression is often caused by carbon. A flake of it will get under the seating of a valve and will not allow the valve to come down squarely on its seat and, as a result, a leak will be found. A decided falling off in power on the hills will indicate this condition. Misfiring is caused by carbon deposits on the electrodes of the spark-plugs. The current cannot jump the gap across the dirty points and, consequently, there is no spark. If the flake of carbon gets under the intake valve it will often cause backfiring into the intake manifold, which will be evidenced by the noise familiar to all automobilists. It is readily distinguished from the muffler explosion, as it is not nearly so loud. If the motor continues to run after the spark has been shut off you can be sure that your cylinder has a large deposit of carbon. The continued running of the motor, apparently without a spark, is from the same cause as the knock. That is, a glowing piece of carbon acts like an electric spark and causes the motor to keep on running. The most common method of dectecting advanced carbon troubles is by observing the knock and loss of power on hills due to reduced compression.

(2) This will depend on where the battered gear is and how it is battered. The probabilities are that there is something loose, as a bur would soon be worn off a tooth if it was causing a rattle. Lost motion between the teeth of two wheels will cause the trouble, as will also looseness on the shaft which holds the wheel. The gearset ought to be taken down and thoroughly examined, as it is very probable that the rattle is not the result of the battered tooth but of the same cause which made the tooth become battered. Look especially for worn bearing bushings.

(3) You are feeding too much water to your carbide. As you do not mention the make of the generator which you are using it is impossible to tell you how to cut down the amount of water. There is probably a key on the bottom of the generator with which you can accomplish this purpose. The jar of the moving car has probably loosened the key which controls the flow of water.

Another possibility is that you have a generator of the type in which some of the gas tubes pass through the water. If these tubes become leaky some of the gas gets into them, causing the trouble.

Suggests Asbestos for Winding

Editor The Automobile:—In your issue for January 15 I notice that you recommend a thin winding of hemp beneath the piston rings to tighten them when worn. Why not strips or threads of asbestos? I should think they would be better for this use, as there would be no danger of the hemp charring and burning under the heat of explosion. S. S. Ryan.

Fort DuPont, Del.

—The asbestos would undoubtedly be better for the purpose. The repair, however, is merely intended for use at such a time as when poor compression develops on a tour where it would be inconvenient to stop long enough to secure parts. Should the asbestos be at hand, it would be much better. Any thin gasket material would do if carefully applied.

Cylinders Fire Out of Time

Editor The Automobile:—Kindly shed some light upon the following matter: My ignition apparatus, a Kingston coil with La Coste timer, four-cylinder type, suddenly went wrong. The cylinders should fire 1-3-4-2. Instead, I suddenly found No. 2 cylinder firing while No. 1 vibrator spring was trembling, and so on with the other cylinders. Consequently the spark came one-quarter turn too late for each cylinder. The sparks did not occur when the piston had just reached the highest point but when it had gone, I judge, half-way. The motor stopped and ran feebly. What do you think is the matter with it?

Baltimore, Md. J. F. Ruppell.

—The trouble is that the timer has rotated on its shaft for a quarter turn, putting you one cylinder behind on your firing. As the piston is not in its correct position when the motor fires, hardly any power is developed. If you will look at the sketches of the La Coste timer shown in Figs. 2 and 3, it will be easy to understand the construction of the timer. A central shaft

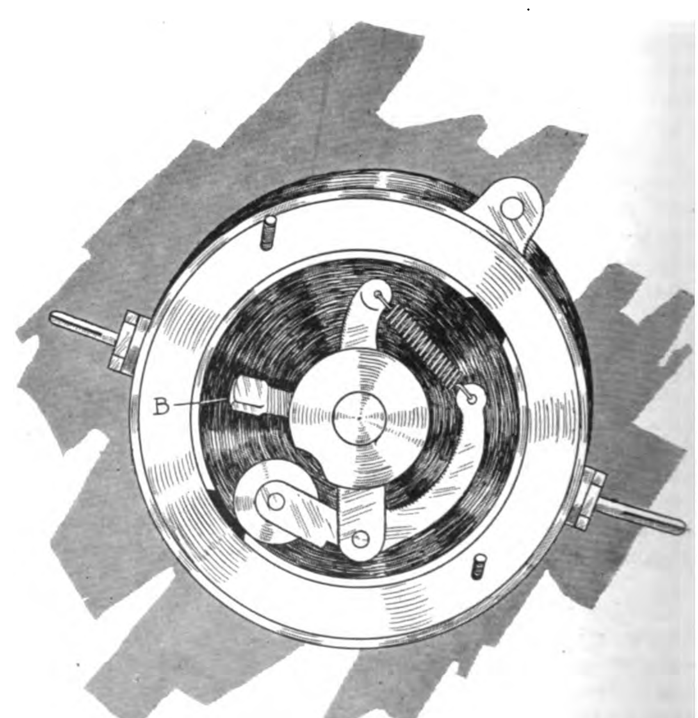

Fig. 3—Looking into La Coste timer with cover removed

runs through the timer casing and is held in its relative position to the sleeve of the casing by the setscrews A and B. The point at which the shaft has slipped around may be at either of these places, or it may be at both. Loosen the screws by turning them back to the left a full turn and turn the timer back in relation to the shaft until the roller will be in contact with the correct point when the vibrator is buzzing. It will probably be easy to find at which point the slip has taken place by trying both setscrews and determining which is the looser of the two. The looser one will show at which point the slip has occurred.

Has Trouble Meshing Gears

Editor THE AUTOMOBILE:—Would you kindly tell me why my car bothers me in the way of meshing gears? When running down-grade I often have to stop at the bottom of a hill before I can shift into low speed. My car is a Flanders 20 and has been run about 1,500 miles. FRED A. WOOD.

Burke, N. Y.

—That the trouble develops merely when going down-grade shows conclusively that in this case it is a matter of driving and not of any defect in the mechanism of the car. If you will accelerate your motor just a little before shifting you will have no trouble. The car, in going down-hill, has a tendency to go faster than the motor and, in order to get both gearwheels going at nearly the same speed, it is necessary to speed up the motor just before making the change. It is difficult to see any advantage in shifting to low speed at the bottom of a hill, but if you must, the above tip will help.

Wants License Information

Editor THE AUTOMOBILE:—Will you please let me know if a resident of Virginia is exempt from license in the states of Maryland, Pennsylvania, New York, Connecticut, Vermont, New Hampshire, Massachusetts, Delaware and Rhode Island?

I understand that New Jersey issues 8-day licenses for $1. Can these be obtained in New York City? S. W. H.

Norfolk, Va.

—As a licensed resident of Virginia you are free to pass through all the states that you mention above. In Delaware, Pennsylvania, Massachusetts and Rhode Island your time is limited, however, to a 10 days' stay, while in Maryland you may make two trips, neither of them to last more than 7 days.

You are mistaken regarding the New Jersey licenses. You can remain 15 days a year in New Jersey without taxation if you are licensed in Virginia. There are no more short-term licenses issued in New Jersey.

Lost Motion in the Rear Axle

Editor THE AUTOMOBILE:—I have an Overland 54 automobile and I want to know if it is practicable to take the lost motion out of the rear axle on the wheel end by closing the bearing sleeve and putting tin around it. The car has run 9,500 miles and the rear drive axles are worn pretty badly. I presume the sleeve and bearings are both worn. The bearings are Hyatt rollers. I would like to get the lost motion out without having to renew everything, drive axles, bearings and sleeves.

(2) Under proper use and normal lubrication, do you think that a rear axle which has been properly heat-treated should show any appreciable wear under 10,000 miles?

(3) How many pounds or ounces of soda should be put in the water to clean out a radiator on the above car? Or how much soda to each gallon of water? I have used a pound to each radiatorful. S. E. S.

Cobb, Ga.

—(1) There is no chance of making the repair good and lasting according to the method outlined by you. It is impracticable in the first place, because the bearings would be compelled to work in faulty alignment, which would soon cause them to wear worse than ever. The only thing you can do is to disassemble the parts and note which are worn and replace them by new ones.

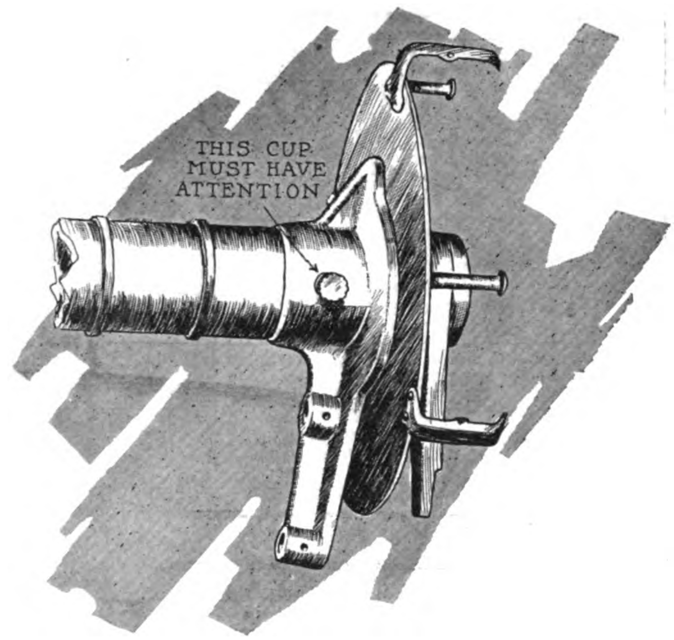

Fig. 4—Grease-cup on the Overland car axle

(2) A rear axle should not wear seriously in this length of time. The probabilities are that during the first thousand miles or so the lubrication was not as well taken care of as it should have been, and, as a result, the wear was started at that time. The grease-cup shown in Fig. 4 should be kept full of a good quality of lubricant and should be turned down every 200 miles. If this is neglected, wear on the parts you mention can be expected.

(3) You are using the correct amount of soda.

Wants to Make a Track Machine

Editor THE AUTOMOBILE:—I would like to know the name of a company which can furnish me with flanged wheels so as to convert an Oakland 40-horsepower car into a track machine. The gauge would have to be standard railroad gauge. Have you any data on a change of this kind?

Do you think it necessary to have a spring on steering rods so as to straighten wheels after rounding a curve?

Marble, Col. FRANK GERTIG.

—Such a wheel is made by Goodman & Company, of Bucyrus, O., who would be able to give you full data regarding the change. It would seem to be an advantage in having a spring to turn back the wheels after rounding a curve so that in case there is a tendency for one of the wheels to be out of line it would be corrected by the spring.

Gives a Tip on Vulcanizing

Editor THE AUTOMOBILE:—A good way of using an electric vulcanizer is to jack up the wheel, place the vulcanizer between the ground and the tire that is to be repaired and then slowly lower the jack until the desired pressure is obtained between the tire and the vulcanizer.

If the floor is of concrete it would be a good plan to place a board or some other insulator between the vulcanizer and the floor, because concrete conducts electricity and most electric light circuits are more or less grounded.

Allegheny, Pa. MURRY FAHNESTOCK.

—

[THE AUTOMOBILE is holding a few queries and communications which have been received unsigned. If a correspondent does not wish his name published it is merely necessary to state this fact in the letter and a *nom de plume* will be substituted. As an evidence of good faith, however, it is required that all communications be signed.—EDITOR.]

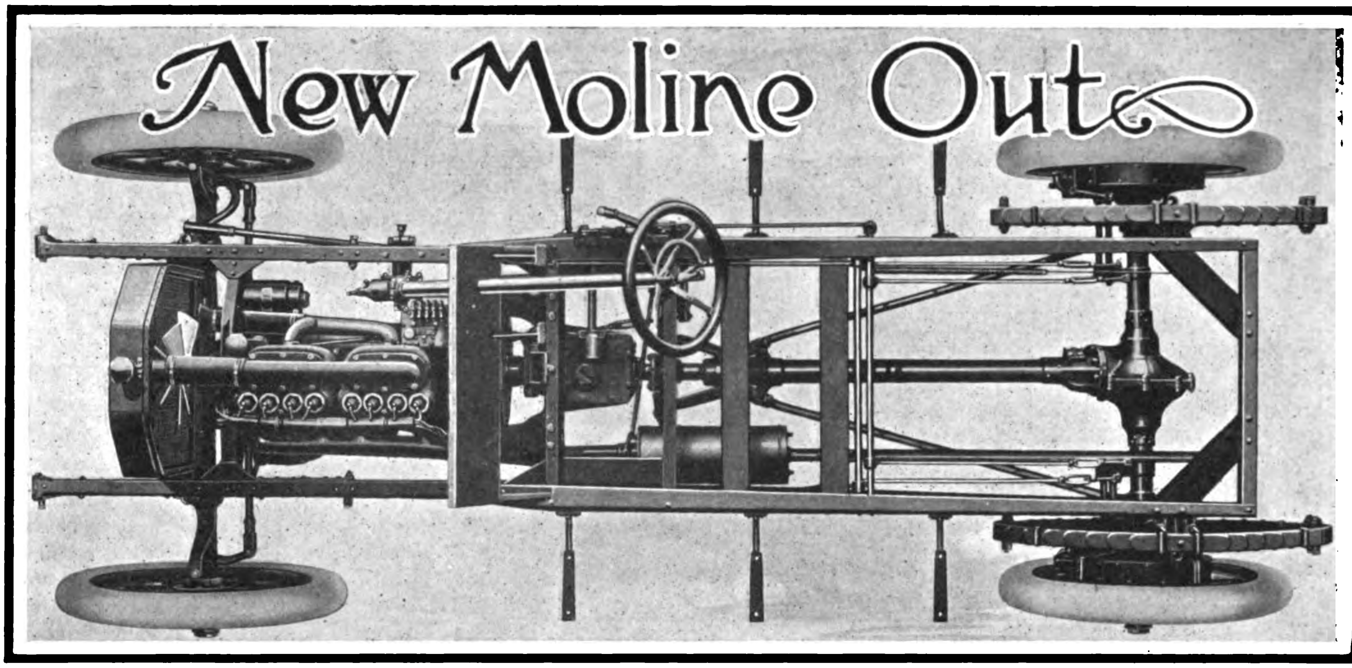

Fig. 1—Plan view of new Moline chassis, to be known as model M-40

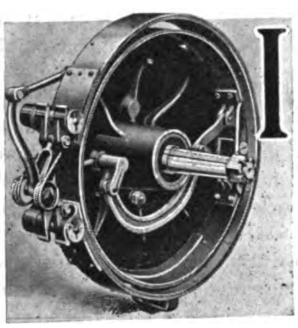

Fig. 2—Brake Interior

IN the 1913 Moline car, which is to be known as model M-40, there will be noted an increase in the bore of the cylinders, an increase in the wheelbase, a greater drop to the frame, gasoline tank placed on dash and the installation of the Ward-Leonard lighting system. These changes mark the introduction of the new model Moline. The car which has heretofore been distinguished by the fact that it had the greatest stroke-bore ratio of any of the American cars still remains among those having the greatest ratio, although it no longer has the highest.

The motor is rated by the makers at 40 horsepower, which should be conservative, considering the bore of 4 1-8 inches and the stroke of 6 inches. Last year the stroke was also 6 inches but the bore for the 1912 cars was only 4 inches, giving a stroke-bore ratio of 1.50 as against 1.45 for the 1913 cars. There are four cylinders cast in blocks of two each. The valves are all located on one side of the motor, the cylinder castings being of the L-head type. The valves, however, are fully inclosed. The motor is shown in Figs. 3 and 5. The inclosed valve construction is shown in Fig. 3, which illustrates the right side of the motor. The simple water manifold casting may also be seen in this view. In Fig. 5 the front and left side of the motor are shown. The carbureter is hung high, being 5 inches higher than last year, following the general 1913 practice in this respect that is tending to get everything where it may be reached by lifting the hood.

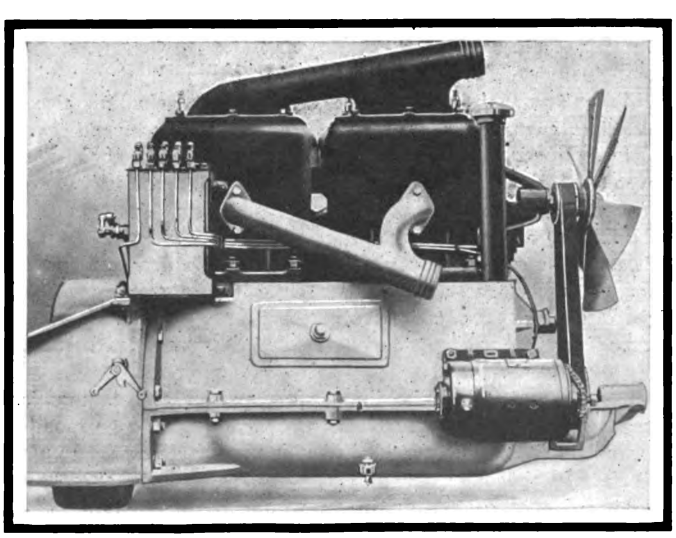

Fig. 3—Right side of the Moline long-stroke motor

Remarkably few projections are noted on the exterior of the crankcase, unit construction and what may be called a modified threepoint suspension being used. The front end of the motor is hung from a cross-frame which is bolted to arms at the top of the crankcase, as may be seen in the chassis view, Fig. 1. The rear of the crankcase is bolted to the clutch and gearset housing so securely that practically a single housing may be said to exist for the crankcase clutch and gearset. At the rear end of this housing a rigid connection is made to a heavy transverse sub-frame forming the other support for the motor as well as for the clutch and gearset.

The pistons are 4 3-4 inches in length and have four rings, the lowest of which is in the same plane as the center of the wrist pin. The other three rings are distributed evenly between the center of the wristpin and the top of the piston. From the center of the wristpin bearing to the center of the crank bearing the connecting-rods are 12 1-8 inches in length. The lower connecting-rod bearings are 2 1-4 inches in length and 1 3-4 inches in diameter. The wristpin bearings are 2 inches in length and 7-8 inch in diameter. There are three crankshaft bearings, all of which are babbitt-lined and of good length. At the flywheel end there is a 3-inch bearing. The diameter of the crankshaft is 1 3-4 inches.

Thermo-Syphon Cooling System

The cooling of the motor is effected by the thermo-syphon system. The manifolds are of large size and slope straight from the radiator to the waterjackets. The absence of a water pump leaves the designer free to place the magneto very close to the gear from which it is driven at the forward end of the motor. The magneto is of Splitdorf make, a double independent system of ignition being used. One set of spark-plugs is connected to this magneto while a second independent set of plugs is wired to a distributer, battery set and coil. Spark advance is controlled in the usual manner from a lever on a quadrant located on the steering wheel. Directly opposite the magneto on the other side of the motor is located the lighting dynamo. This is driven by a silent chain off the same wheel which drives the fan belt. The construction is shown in the front view of the motor, Fig. 5. As may be seen, there are no long shafts outside the crankcase, the absence of a water pump accounting for this. The installation of this dynamo is new this year and it has been accomplished in a way that takes but little room and has not altered the construction in any respect except to change the wheel from which the fan belt is driven. This should render it very easy for owners of previous Moline models to get the dynamo installed on their cars should they so desire. All six lights are taken care of by this installation.

The lubrication of the car is a combination of the force-feed and splash systems. The oil pump, which is driven from the camshaft, takes the oil from the crankcase reservoir and delivers it under pressure to the rear main bearing, the front main bearing, all four cylinders and the timing gears. After lubricating these points, the oil drains back to pans in the crankcase where the connecting-rods are allowed to dip in them for a very short distance, forming a spray which aids in the lubrication of the cylinders and also takes care of the central main bearing, the camshaft and the cam followers. After having reached a certain level in the crankcase the oil drains back into the lower part of the crankcase where the reservoir is located. There is a screen located between the reservoir proper and the oil pump through which all the oil passes on its course. None of the impurities gathered by the oil after having circulated through the system are allowed to pass into the pump.

Clutch Is Fitted with Cork Inserts

The clutch is a conventional leather-faced, cone type, situated in the flywheel, the diameter of which is 16 inches. In order to make the engagement easy and to safeguard the clutch against fierceness, cork inserts are used. The adjustment of the clutch spring is effected by means of a large nut located on the end of the shaft passing through the center of the male member of the clutch and also through the axis of the spring. Turning to the right increases the tension on this spring. Lubrication of the clutch is effected by a grease-cup located on the male member.

The gearset is of the three-speed type, working upon roller bearings throughout. The gearset housing is separated from the clutch housing by means of a stuffing-box; there being no passage of lubricant between the gearset and the clutch, thus guarding against oil reaching the face of the clutch and causing slipping. A similar stuffing-box with metallic packing is placed

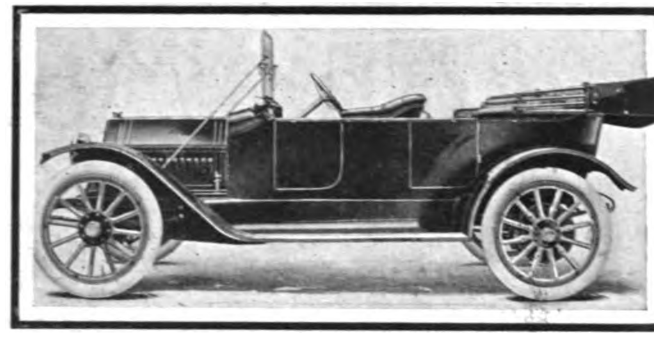

Fig. 4—The five-passenger touring Moline Dreadnought

at the other end of the gearset housing to prevent leakage in this direction.

The drive is taken up through a universal joint at the rear of the gearset and passes through a propeller shaft to the bevel gear rear axle which has been made larger. The front axle is of I-beam section and carries the wheels on large-size ball bearings. The brakes have been increased in size, being now 16 inches in diameter instead of 14 inches and the width is now 2 1-2 inches instead of 2 inches. The springs remain the same, being semi-elliptic front and scroll elliptic rear.

A radical change has been made in the gasoline system, two tanks being used The first is located in the dash and has a capacity of 8 gallons, while the other is under one of the front seats and has a capacity of 12 gallons. This arrangement allows the carbureter to be hung higher, as noted above.

Other features in this model which are worthy of note are: The marked increase in the wheelbase, 10 inches being added, which brings it up to 124 inches; to add to the easy riding qualities of the car, the upholstery has been deepened and Turkish back springs added; demountable rims are included in the regular equipment; right side control is retained but a change in the appearance of the car has been effected by leaving the toolbox off the runing-board and placing it under the floor of the tonneau.

Two styles of body are listed, a five-passenger touring car and a roadster. By making the tonneau of the five-passenger car very roomy it is made possible to fit auxiliary seats if desired. Both styles of body have fore-doors which are designed so that all of them can be opened. Any of the doors can be hooked ajar for purposes of ventilation.

In addition to the electric lighting system, comprising six lamps, dynamo and storage battery, the standard equipment includes a self-starter and a one-piece glass windshield.

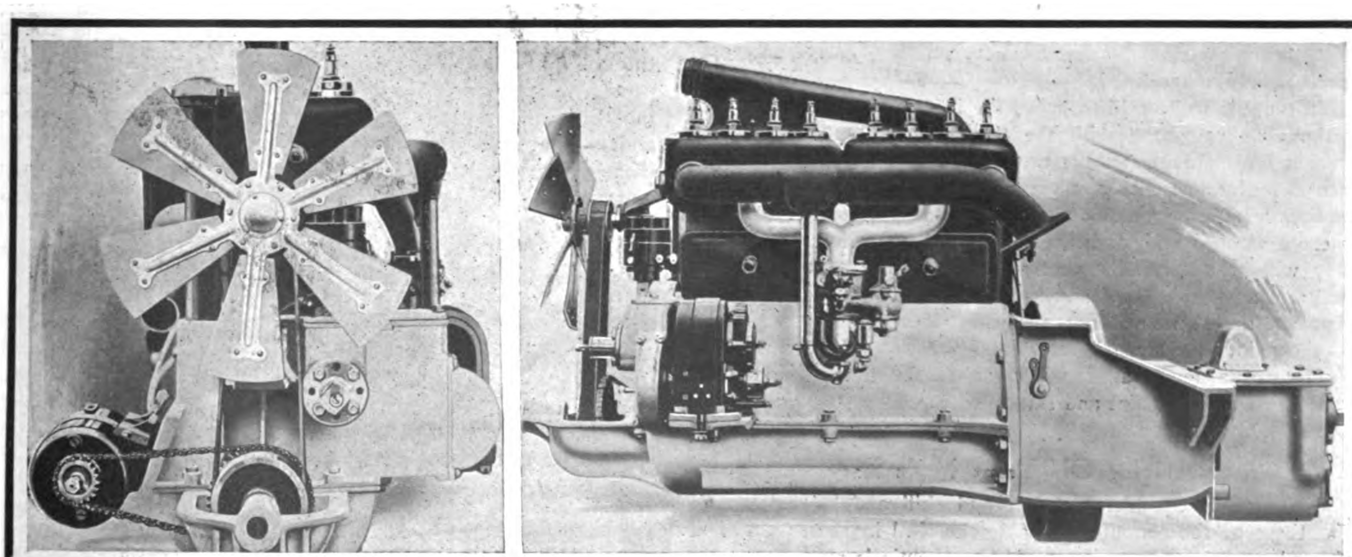

Fig. 5—Front and left view of motor employed in the Moline M-40 cars, showing lighting dynamo attached

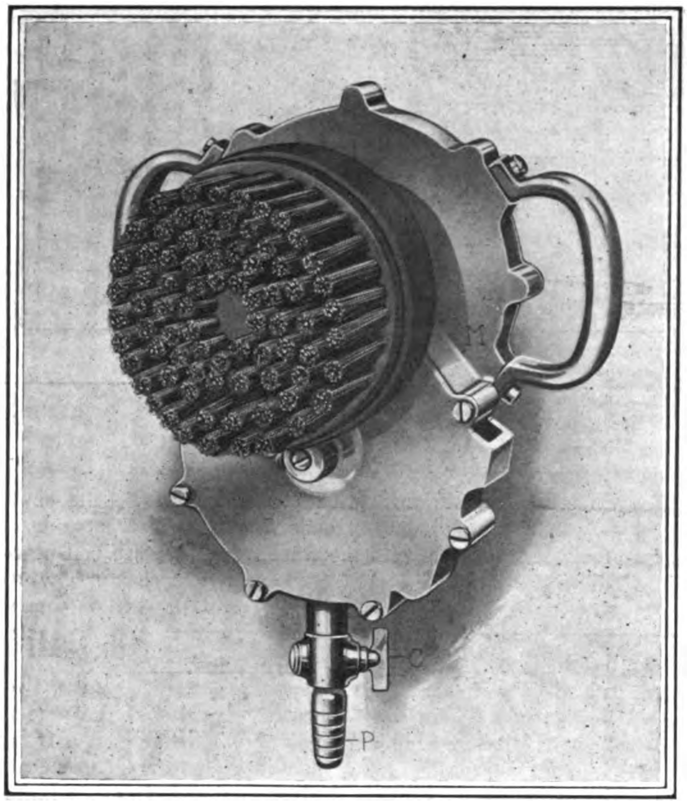

Fig. 1—Tough wire brush operated by compressed air motor

Removing Old Paint

Modern Practice Demonstrates Efficiency of Dissolving Coat With Chemicals Instead of Scraping or Burning

Liquid Can Be Applied by Compressed Air Method and Surface Cleaned by Vacuum Suction

CLEANING the body of the old paint before covering it with a new coat is a necessary and not too easy operation. There are several methods of accomplishing this end. These consist in either scratching or burning off the old paint, or removing it by the chemical action of a specially prepared paint-remover.

Little needs to be said to prove the inferiority of the first two methods as compared with the third one. The chance of a wooden body passing unhurt through the process of scratching, even if the utmost care is taken, is small. Burning off the paint requires a high degree of expertness on the part of the operator, where a wooden body is being worked upon, while even a metal body will be deformed except under adept treatment. Despite the great amount of care and skill required to do a good job by means of these two methods, the work of burning or scratching off the paint by no means completes the task of preparing the surface for a new coat, for it must still be cleaned of the remainder of the old paint and smoothed carefully so as to prepare it to take on a new coat.

Removing Old Paint Made Easy

All this takes considerable time and skill and by supplanting these by the action of suitable chemical ingredients a piece of hard work may be made easy. The chemicals must be able to dissolve the binder holding the paint to the surface coated with it, this binder consists, in practically all cases, of some sort of oil. Therefore, the chemical must dissolve the oil and thereby rob the color of its base, leaving it on the body surface "without a leg to stand on" and ready to be removed easily and quickly by suitable mechanical means.

One of the chemicals having the power of dissolving oil, and therefore of taking the paint off its base, is acetone. The principle of loosening the paint from the surface to which it was formerly applied is the same as that of loosening carbon deposits in cylinders from the walls to which they are held by baked products of decomposition of the cylinder oil.

Chemical varnish removal is a process which varies widely according to the appliances used in carrying it out. With suitable apparatus the work of cleaning surfaces can be done in a very short time and with an ease unknown to the great number of paint shop men.

Liquid Applied by Compressed Air

Among paint-removers, the product of the Wilson Remover Company, 30 Church street, New York, is characterized by its composition, which results, after application, in a thin and slippery mixture of solvent, paint, varnish and shellac. This does not stick to the surface, but may be easily removed therefrom. The remover comes in bottles and cans of various sizes and may be applied by hand where small articles are to be stripped of the paint covering them. In the case of large objects, such as automobile bodies, the automatic method illustrated in Fig. 2 will prove superior. This method uses a tank in which remover liquid is kept under the pressure of compressed air. A pipe, the open end of which is submerged in the remover liquid, extends through the wall of the vessel and there is fitted with a hose to the end of which a spray nozzle is attached. The compressed air may be supplied either from a tank or by pumping air into the vessel. If the valve governing the outflow of the liquid through the hose is opened, the air forces the remover through the hose and nozzle, where it is sprayed and mixed with air, the mist being directed against the surface to be cleaned of paint.

The remover striking the surface of the paint immediately begins to attack the oil which binds the color to the body sur-

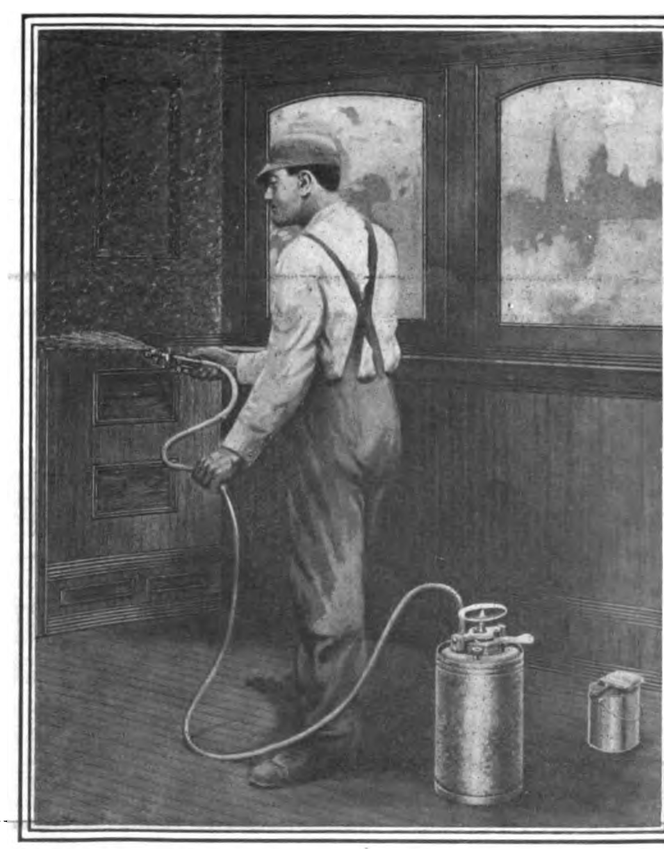

Fig. 2—Applying paint remover by compressed air through a nozzle

A car built for fording streams, when necessary, in the African colonies is tried out in a slip of the Seine

face and transforms it into a thin, jelly-like emulsion which may be removed by means of the motor brush, Fig. 2. The latter consists of a series of small wire brushes mounted on a holder which is carried by the shaft of a small compressed-air motor M. When compressed air is admitted through the pipe P, the pressure being regulated by means of the cock C, the brush holder is thrown into violent rotation and can be made to go as fast as 2,000 revolutions a minute. As the brush is rotated and moved along the surface which has been treated with the remover it sweeps off the gelatinous emulsion covering the body, rendering it ready for the immediate application of a new coat of paint.

Cleaning Surface by Vacuum Suction

Naturally, the use of paint remover and of the special accessories is not limited to the cleaning of automobile bodies; it may be used on any surfaces which are to be repainted, whether they are of wood, steel or aluminum. In some cases, especially where metal surfaces are being cleaned, the emulsion of remover, paint and varnish may be more advantageously taken off the surface by means of a vacuum suction cleaner, which is also operated by compressed air passing through a nozzle. This type of cleaner is specially suitable where a high-pressure air compressor is at hand and is even easier to manipulate than the brush, since it has no moving parts. Like the other appliances just described it is made by the Wilson Remover Company.

The process of paint and varnish removing described above marks one step toward the modernization of the painter's business, which has hitherto not been very up-to-date as far as standardization of effort and efficient, quick operations are concerned. As the tendency to get away from operations subject to the personal equation is growing in the automobile industry, there is hope that the paintshop, too, will be invaded by more efficient lines of practice and that, in not too remote a future, painting, like paint removing, will be done on a more or less machine-controlled basis.

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To Lighten Metallic Construction—In an exhaustive analysis of the means for constructing as lightly as possible, G. L. Gerard, while referring especially to civil engineering, emphasizes a simple general principle which applies to automobiles as well and is sometimes ignored. It may be expressd: Avoid any design involving the use of parts which are not loaded to the chosen safety limit. For practical reasons, the underloaded parts usually have to be of the same dimensions as if they supported their share of stresses. This rule excludes parts which are mainly under bending stress. In many instances a saving can also be effected through the observation that the maximum stresses of different kinds to which a part may be subjected are never simultaneous.—From *La Technique Moderne*, issue of June 1.

An Amphibious Car

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Charron Builds Automobile Specially Designed for Service in Africa Where Bridges Are Scarce

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Interesting Method of Keeping Motor Going While Under Water—Details of the Test

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IN THE European colonies in Africa bridges are not abundant, and the automobile which fords a little trickling stream in the sunlit morning is likely to find on its return trip in the afternoon a wide stretch of bottom land inundated with the drain from the adjacent veldt. It is for this condition, which may be duplicated in this country without going far away from the arteries of traffic, that the Charron firm of France has built a few vehicles capable of operating under water long enough to meet a travel-emergency. The illustration shows one of them emerging from the river Seine after a ducking. It is a shaft-driven car with only 10 inch clearance under the front axle, though chain-drive and more ample clearance would evidently be better for rough colonial travel. The provisions for keeping the motor going under water are more interesting, though it should be mentioned that the cone clutch has given no trouble. The exhaust pipe is prolonged by means of a hose and tube turned upward at the rear of the car and secured in that position, so as to have the burnt gases escape into air, as shown in the pictures. This extension pipe is only attached when needed. The magneto is enclosed in a tight steel casing. In the monobloc motor with valves on one side the spark plugs are screwed into the admission valve housings and are covered with an inverted sheet steel gutter secured by a tight joint to the cylinder block. A tube containing the wires connects the gutter with the magneto housing. The carbureter is encased in the same manner as the magneto, and a tube is raised from this casing to the atmosphere, extending to the height of the driver's face. The air vents of the crankcase are corked up when the car goes into water, and it has been found that this provision causes no inconvenience in the operation of a four-cylinder motor in which the volume of air space in the crankcase is not affected materially be the piston movements. On the other hand it has been found necessary that the compression should be irreproachable, so that no pressure from the burnt gases shall find its way to the crankcase and accumulate there.—From *La Vie Automobile*, June 22.

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The latest estimate as to the world's product of gasoline is at the rate of 2,000,000,000 gallons per year.

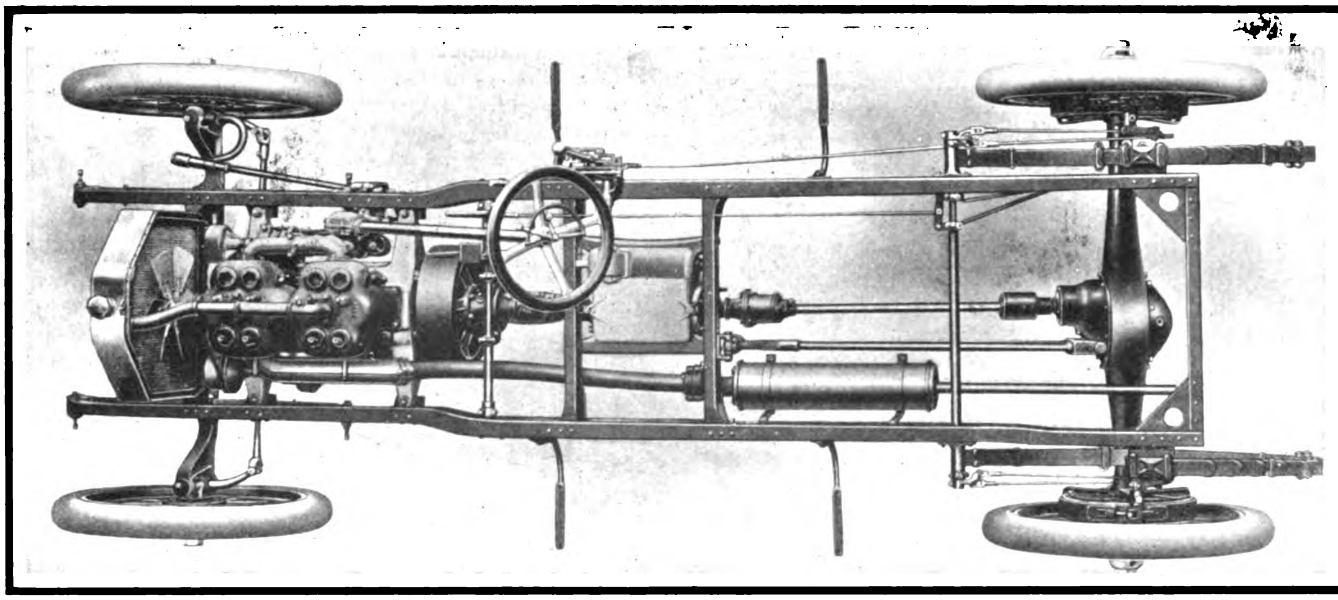
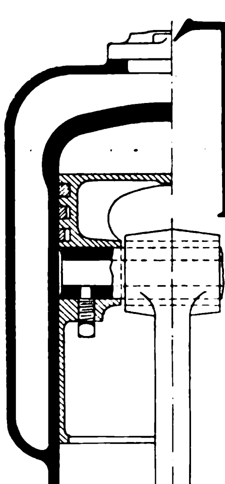


Fig. 1—Chassis of the Pullman model 4-44, embodying the improvements adopted on the 1913 line

Three Pullmans

Company's Line for 1913 Will Include Two Four-Cylinder and One Six-Cylinder Models

Easy-Riding Qualities Enhanced—Silence of Operation Secured by Superior Workmanship



Section through motor, 4-44

THREE models of Pullman automobiles will be on the market for 1913. They will be known as the 4-36, 4-44 and 6-66. The first number in each case refers to the number of cylinders, while the second refers to the rated horsepower. There were four models built under the 1912 date and these were known as models 4-30, 4-40, 4-50 and 6-60. The 4-50 has been dropped for 1913 as a regular model and the other three have been continued with modifications, but under the new names just mentioned. The principal changes which will be noted in the new line of cars seem to follow very closely along the lines of the trend in modern automobile engineering practice. Better materials and greater accuracy in manufacture are the keynotes, giving a product that each year takes a step in the direction of ultimate perfection. Greater comfort for the driver and the passengers is also made an aim, as is shown by the greater ease of control and increase in easy-riding qualities.

For all three models the following changes will be noted: Larger radiators, lighter wrist pins, dash carbureter primer for easy starting purposes, larger steering wheel and longer spings both front and rear. Besides these changes there are several others which have been made on the two larger cars only, that is the 4-44 and the 6-66. A new crankcase bottom pan has been added to these two models, giving an increased oil supply; an extra bearing has been added to the camshaft, pump and magneto shafts, giving a stiffer support and reducing wear. This has been accomplished by altering the shape of the timing gear case to make it support the extra bearing. An arrangement is added whereby the level of the oil in the crankcase is under the control of the driver from his seat, a regulating device having been placed on the dash. A larger flywheel has been placed on both these models, an increase of diameter of 2 inches having been made. The gearset has been entirely redesigned and an extra bearing added to the dog clutch. An electric lighting generator driven by chain is also a feature of both cars, while on the 6-66 alone there are embossed yokes on the rear wheels.

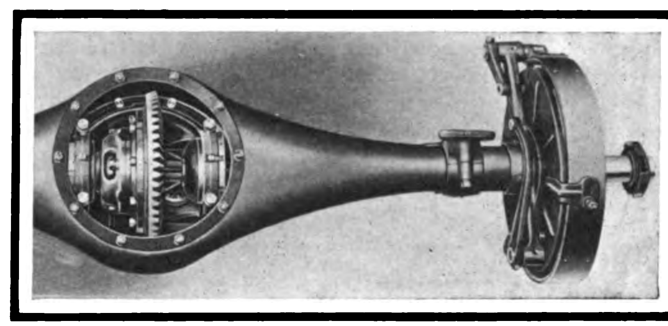


Fig. 2—Rear axle and brake with differential cover plate removed

Motor Parts Interchangeable

The motors on all cars have cylinders cast in blocks of two. The only difference between the six-cylinder car and the larger of the two four-cylinders is that the six-cylinder has an extra block of two cylinders and of course has the necessary added features of a six-cylinder car. The bore and stroke are the same, and throughout wherever it has been possible the parts of the two motors are interchangeable. This is true throughout the Pullman line. The interchangeability of parts has been made a feature, so that manufacturing costs, which are always high where several models are made, have been reduced to a minimum. The valves throughout all the motors for instance are the same both for the exhaust and intake sides. They are all 2 1-8 inches in diameter and have a lift of 5-16 inch. The bore and stroke of the 4-36 are 4 1-16 and 5 inches, respectively, and for the 4-44 and 6-66 the dimensions are 4 1-2 by 5 1-2 inches. The horsepower rating on all models is taken at 1300 revolutions per minute.

All motors are of the T-head type with the valves enclosed. Cover plates are fitted over the valve mechanism on the sides, preventing leakage of lubricant and giving a neat appearance. The material of the valves is nickel steel for the heads, while the stems are made from machine steel. The joint between the head and stem is made by the electric welding process. The pistons are made of the same grade of gray iron as the cylinders and are ground with a taper at the top, while from the lowest ring down they are straight-sided. The pistons and cylinders are hand-lapped after assembling on all models to secure the best possible fit. The compression on all models is about 60 pounds to the square inch. The connecting rods are I-beam in section and on the two larger models 11 3-4 inches in length.

Splash Lubrication Employed

The motors are lubricated by splash. On the two larger models the oil is delivered from an eccentric pump which is driven by spiral gears from the camshaft to the oil troughs and also to the timing gears in the front of the case. The oil is splashed to all the bearings by the lower end of the connecting rods, which dip far enough into the oil contained in the troughs below the throw of each to create a spray which pervades the entire crankcase and takes care of the cylinders as well as all the bearings contained within the crankcase. After the camshaft, crankshaft and timing gears have been lubricated, the excess oil flows back through drains into the oil reservoir, which is located in the bottom pan or lower part of the crankcase.

The dash adjustment feature, which is prominent on the 1913 Pullman cars, allows the driver to change the point at which the overflow from the upper to the lower part of the crankcase takes place. The oil pump continually delivers oil faster than it is used and the oil is kept up to the level of the hole in the drain. The part containing the drain hole can be raised and lowered by the device shown in Figs. 6 and 7, thus enabling the driver to supply more oil on a stiff pull than would be necessary on ordinary straight roads or city work. The redesigned crankcase of the 4-44 and the 6-66 has brought the oil-carrying capacities of these two up to 1 1-2 and 2 1-2 gallons, respectively. The oil capacity of the 4-36 is 2 gallons.

The oiling system of the 4-36 is very much the same as that employed on the two models just described. The oil overflow can be controlled, but not from the dash. The control in this case is effected by lifting the hood and manipulating the lever which is located on the upper side of the crankcase. Another distinction is that there is no oil lead to the timing gearcase on the 4-36. The timing gears are lubricated by grease in this model.

The cooling system remains unchanged since last year. On all models a centrifugal pump is employed which is positively driven by gear from the crankshaft. The width of the waterjacket is 5-8 inch around the cylinders and the thickness of the metal in the jacket is 3-16 inch. The metal in the cylinder is thickened at the combustion space so that an increased width in the waterjacket is necessitated by it. From 1-4 inch on the walls the thickness bulges out at the combustion chamber to 3-8 inch. This gives an added strength at this important part, but renders the cooling duties of the jacket more difficult, a situation which is met in the Pullman cars by a corresponding increase of sectional jacket area on the cylinder head.

Better material is a feature in the building of the engine. Instead of the ordinary chrome steel, nickel steel bolts are being used throughout the motor on the 1913 cars. All the shafts are ground with a limit of tolerance of .00025 inch. This limit is strictly adhered to in the case of all the shafts and pins, blocks and bearings of the universal joints. Formerly a plain finish was used on many of these parts, mere machine work being made to suffice where grinding is now required by the maker's specifications. Interchangeability here also finds a field, for the cam contours are the same for all models. A rounded form of cam is used, giving a fairly quick opening and closing without the shock, side thrust and consequent wear of the square-sided cam.

Accuracy to Insure Silence

No special means of insuring silence have been taken beyond good workmanship. It is the belief of the engineers of the company that where accurate workmanship is made a study, silence will come of itself. All the proven methods of construction have been incorporated. In the timing gearset spiral gears are used which are especially hardened through a heat-treating process given them at the Pullman factory. The gears are of the spiral type and are cut slightly below the finished pitch, the heat-treating process being of such a nature that after completion the gears have expanded slightly. In order that the

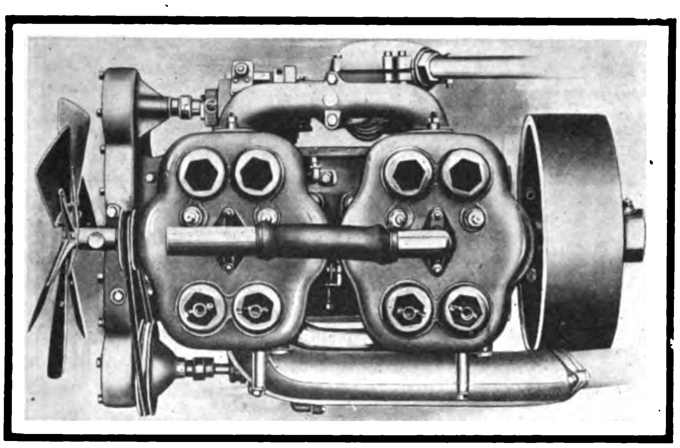


Fig. 3—Looking down on top of the 4-44 Pullman motor

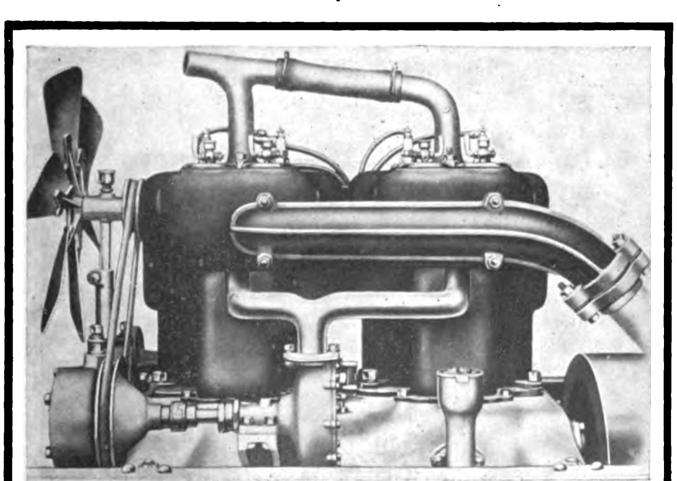


Fig. 4—Left side of motor, showing arrangement of manifolds

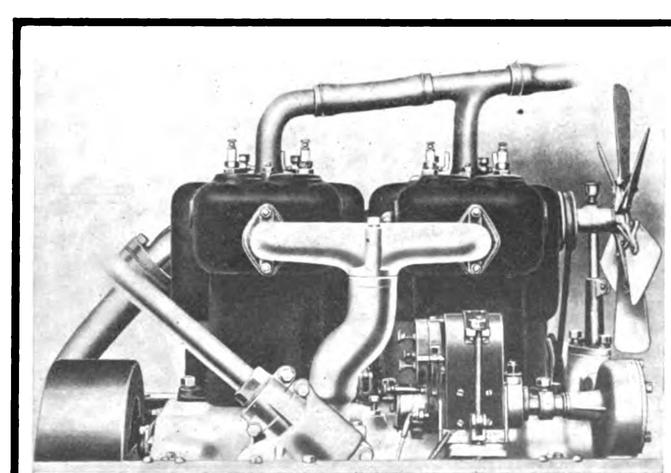


Fig. 5—Right side of the same motor, showing magneto and intake

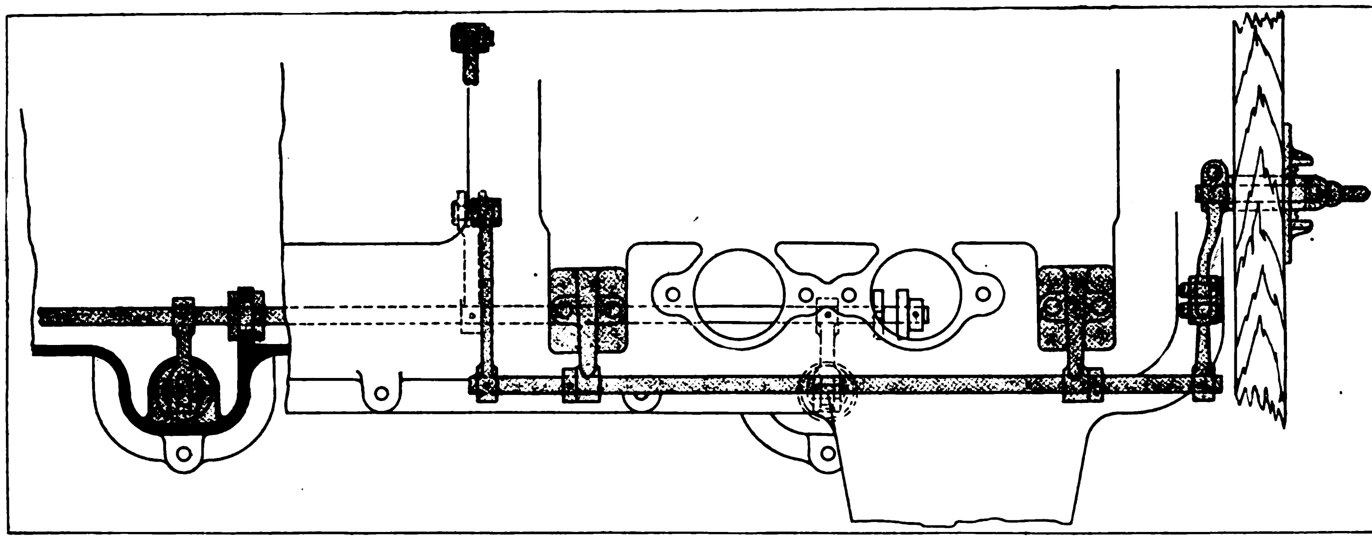


Fig. 6—Plan view of the new oil level adjusting device fitted to the model 4-44 and 6-66 Pullman cars for 1913

gears do not lose their shape while passing through the heat treatment they are packed in a sandy compound and enclosed in a cast iron air-tight case. They are given a permanent set in this treatment and can then be given the oil treatment without danger of warping under the internal stresses due to the heat.

The ignition system is the Bosch dual on all three models. The magnet is driven by a short independent shaft and is located on the opposite side of the motor from the water pump. The gasoline system remains the same as last year, there being no change in the tank capacities. The smallest car, the model 4-36, can carry 15 gallons of gasoline; the 4-44 has a capacity of 18 gallons and the 6-66 has a tank which will carry 25 gallons. Figures on fuel economy have not been compiled officially, but on a quick trip from the factory in York, Pa., to Washington, D. C., and back not long ago one of the factory testers averaged 12 miles to the gallon with the six-cylinder car. The other models would of course give a higher mileage to the gallon.

The clutch fitted on all models is the leather-faced cone type. It is not enclosed, as the aluminum crankcase of the motor stops at the flywheel. In order that there shall be no leakage of oil around the crankshaft bearing at the rear of the crankcase and no possibility of the clutch becoming oily from this source there is a ring on the end of the crankshaft which catches the oil and throws it by centrifugal force back into the lower part of the crankcase. Behind the ring there is a felt washer to still further protect the end bearing against a leakage of oil. The crankshaft ends in a broad flange to which is bolted the flywheel by means of nickel steel bolts with castellated nuts. The flywheel member of the clutch is of cast iron and has a diameter on the two larger models of 18 3-4 inches as against 16 3-4 inches last year. The engaging member of the clutch is of aluminum with a face width of 3 inches and a mean diameter around the center of the frustum of the cone of 15 3-4 inches. This gives a frictional area of approximately 144 square inches at the clutch and should be ample for any kind of service. Beneath the surface of the leather there is a series of spiral springs which have the feature of being adjustable, as they are fitted on a through bolt which is held at the rear by a nut and lock nut, as is shown in the sectional view of the clutch in Fig. 8. The main clutch spring is adjustable for tension and is contained in a housing surrounding the short shaft on the aluminum engaging member of the clutch. The adjustments for tension on the spring are made by taking up on a stud which enters the shaft fixed to the flywheel member of the clutch. A ball thrust relieves the washer on the end of this stud and permits of its being turned when it becomes necessary to make the adjustment. A drain plug is located on the lower part of the housing which surrounds the clutch spring. Should any oil collect in this housing it may be drained off without trouble by means of this plug.

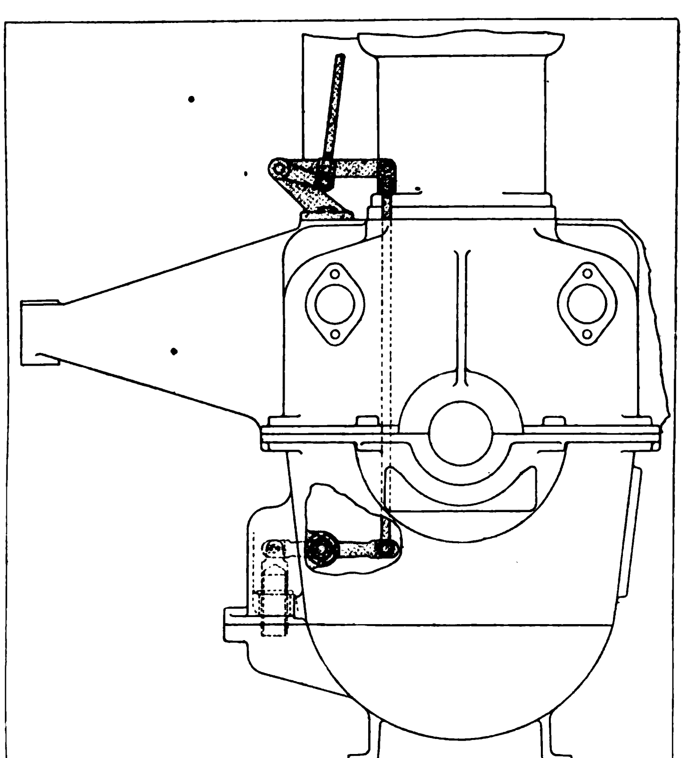


Fig. 7—End view of motor crankcase showing adjusting device

Details of the Transmission

The gearset of the 4-36 is capable of three forward speeds and one reverse, while the 4-44 and the 6-66 have four forward speeds and reverse with direct drive on third speed. The shifting shaft of the gearset is of the four spline type, while all the moving shafts are carried on annular ball bearings. A clearance of .005 inch is allowed in the gearset for easy meshing, but every part is carefully ground to size so that there is no lost motion in any part of the gearbox. Silence in this important part of the car has been striven for by the use of the best alloy steel and careful fitting. The distance between bearings in the 4-36 model from inside to inside is 7 1-2 inches, while in the 4-44 and the 6-66 this distance is 11 3-8 inches. The drive passes through a 3 1-2 per cent. nickel steel driving shaft into a Timken rear axle on the two larger models, while on the smaller model the axle is made by the Standard Roller Bearing Company. The gear reductions on the different models vary. On the model 4-36 the reduction is 3 1-4 to 3 3-4 to 1; on the 4-44 it is 3 to 3 3-4 to 1 and on the 6-66 it is 3 to 3 1-2 to 1. Pressed steel housings are used on the rear axle and the bearings are tapered roller in the case of the larger model and annular ball in the smaller.

The brakes consist of two separate sets on all three models. The outfit on the 4-36 is made up of a set of internal expanding metal-shod brakes and a set of external contracting brakes with a Thermoid lining. The brake drum is 14 inches in diameter and the width of the drum is 2 inches. The service brakes are operated by pedal and the emergency brakes in the usual manner by a lever at the side of the driver. The brakes on the 4-44 are exactly similar except that the dimensions of the brake drum are different, having a diameter of 16 inches and a face width of 2 1-4 inches. The brakes on the 6-66 are also of the above description, but have a 17-inch diameter and a 2 1-2-inch width of face.

The wheels on all the Pullman models are the ten-spoked artillery type all around. On the model 36 they are 34 inches in diameter, on the 4-44 and 6-66 they are 36 inches in diameter.

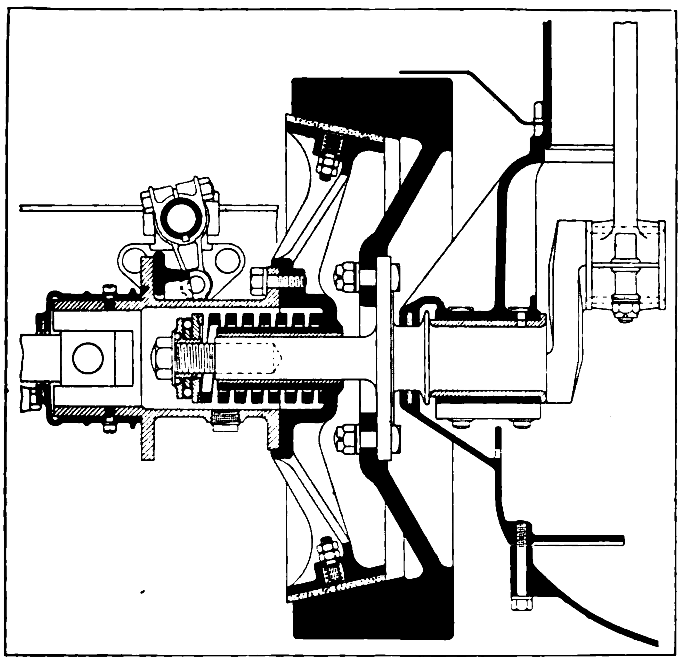


Fig. 8—Sectional view through the leather-faced cone clutch

They are all fitted with Universal quick detachable demountable rims and on the four-cylinder cars with 4-inch tires. On the six-cylinder car the tire equipment is 4 1-2 inches front and rear. The front wheels on the 4-36 run on ball bearings, while on the two larger cars the bearings of the front wheels are of the tapered roller type.

The steering gear and control are on the right side of the car.

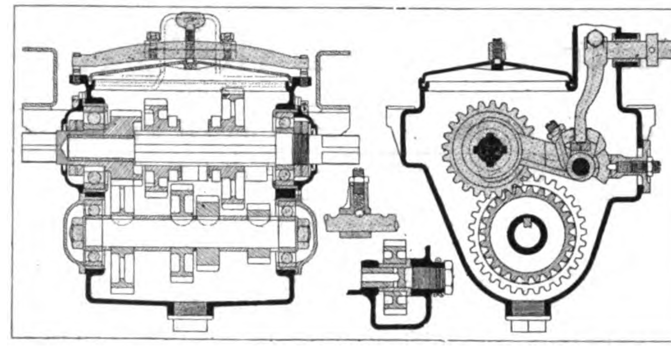


Fig. 9—Gearset of Pullman 4-36, transverse and longitudinal views

The Pullman company has not made any changes in this direction and all the cars are so equipped. The steering gear on all cars is a worm and sector of the semi-irreversible type. The steering knuckles are of the Elliott type. Another feature of all types of Pullman cars is the increased size of the steering wheels. They are now respectively 18 and 19 inches in diameter, the first figure applying to the two four-cylinder cars and the second relating to the six-cylinder.

Suspension, Body and Equipment

The frame is of channel section and is of pressed material. The motor is hung by four brackets which are deep enough to give the required stiffness. The springs are all semi-elliptic in front and 3-4 elliptic rear. The present length of these is considerably in excess of what it was in the 1912 models. The lengths are now as follows: On the 4-36, 40 inches front and 47 inches rear; 4-44, 40 inches front and 47 inches rear, and for the 6-66, 42 inches in front and 54 inches rear.

The bodies are also manufactured at the Pullman plant and are made of metal and wood. The regular body on the 4-36 is a five-passenger fore-door touring car, but on request any other type of body that the purchaser desires will be made and prices quoted on same. On the 4-44 the regular body is also a five-passenger fore-door touring car. The 6-66 has for its regular equipment a body of seven-passenger capacity, but it is also subject to the buyer's wishes in the matter of body style. The tread on all the cars is 56 inches and the wheelbases are 118, 122 and 138 inches for the 4-36, 4-44 and 6-66, respectively.

The equipment for the 6-66 model includes a self-starter which is generally of the Ever-Ready type, although other styles may be fitted by agreement with the manufacturers. A complete electric lighting outfit is also included, along with top, top boot, windshield, speedometer, horn, tools, tool box, robe, coat and foot rails, pump, jack, repair kit, portable electric vulcanizer, tire irons and quick detachable rims. For the 4-44 the same equipment minus the vulcanizer is offered, while for the 4-36 the lighting outfit is adapted for gas.

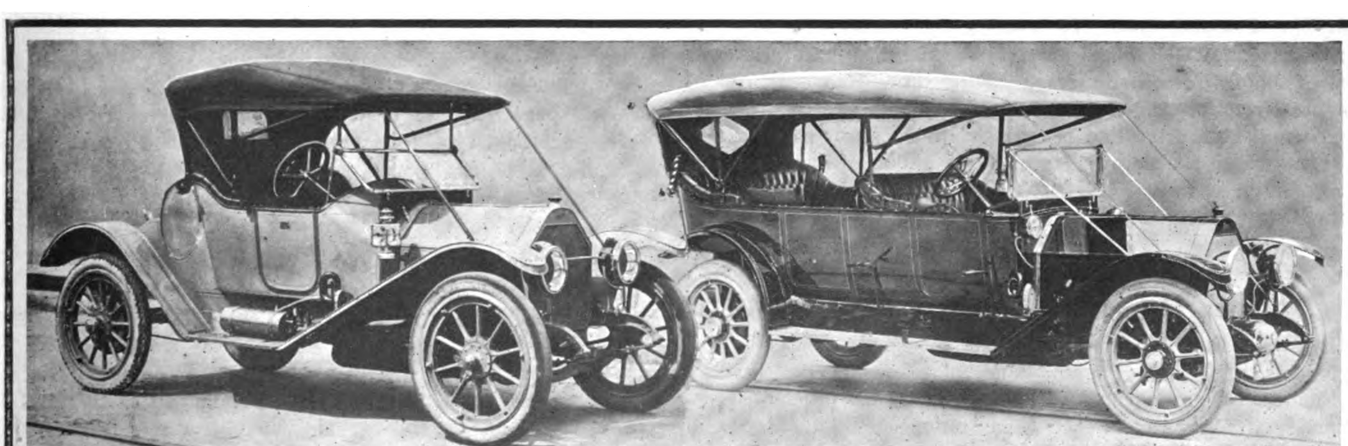


Fig. 10—Pullman Speedster 4-44 and the seven-passenger touring car which is standard on the 6-66 chassis

Late News of the Trade

Ford Company Has Purchased an Entire Block in San Francisco for Its Coast Factory

SAN FRANCISCO, July 13—A block in San Francisco has recently been purchased by the Ford Motor Car Company as a site for its Pacific Coast factory. The move is regarded as one of the most significant in local automobile circles in recent years as this is the first assembling plant of any auto company on the Coast.

As soon as practical a re-enforced concrete building of three or four stories will be erected for the factory. It is generally understood that the new plant will be used entirely for assembling, but it has been persistently rumored that the company intends to make this San Francisco branch as a distinct unit in the manufacturing of the Ford machine. A representative of the company in this city declares that the plant will be used solely as an auxiliary for the Eastern factory, which is already overtaxed, chiefly for the assembling and distributing of machines.

The site selected is one of the best in San Francisco taking in an entire block in the Mission section at Harrison and Twenty-first streets. The company will have sufficient spur track frontage to enable it to handle a trainload of machines at one time. It is understood that the investment represents a sum in excess of $125,000.

Convention of Lozier Dealers

DETROIT, MICH., July 15—Branch house managers and dealers of the Lozier Motor Company will assemble here next week for their second annual convention to be held July 17, 18 and 19. Lozier representatives in practically all the important cities and towns have been heard from and an unusually large attendance is expected. Since the 1911 convention the Lozier sales organization has increased rapidly and a big delegation of new dealers from all parts of the country will make their first inspection of the plant.

Plans for the coming year will be discussed at the conference and it is said that several announcements of more than usual interest to Lozier dealers will be made during the week.

Many of the dealers will probably remain over for a week to witness the ceremonies of Cadillaqua, Detroit's big celebration.

Foreign Makers Put Out Cheap Car

WASHINGTON, D. C., July 15—Consul Albert Halstead, Birmingham, England, says: "The success of the low-priced American automobiles in England has received the most careful attention of English manufacturers, with the result that one firm is now ready to put on the market an 800-pound car with wire wheels and gear drive that is expected to do about 40 miles an hour and to go a little over 30 miles per gallon of gasoline; the car complete is to sell for $650. One of the foremost French manufacturers is also prepared to put a car on the market to sell for the same price."

Slick Swindler at Work in West

ST. LOUIS, MO., July 13—A swindler who styles himself "Jay Deveroe" and combines a fine knowledge of motor cars with the names of prominent men in the trade, has attempted to obtain sundry sums from sales organizations in St. Louis.

Introducing himself as a "road service man" from one of the New England factories, he appeared at a St. Louis automobile salesroom recently and inquired for the factory sales manager, stating that the latter had left him in Indianapolis and instructed him to meet him in St. Louis.

"Deveroe" assumed that his knowledge of the sales manager's movements would forestall any demand for credentials. He became a zealous mechanic and for 3 days put in his time industriously. He appeared to be worried over the non-appearance of the sales manager, however, and produced what purported to be a telegram from him, stating that he has been delayed and would not reach St. Louis until the following Thursday, but instructing "Deveroe" to remain in St. Louis until he arrived. Claiming he had not received his expense check, he induced the bookkeeper to cash a personal check for $35. He also desired to send some money home, and in view of the fact that he had "about $150 coming to him for salary and expenses, which the sales manager would O. K.," he presented a check—drawn upon a trust company in the city where the factory is located—for $50. Telegraphic communication, however, brought back word that the checks were fradulent, but before this information reached St. Louis the "road service man" had disappeared.

New Line-Up for Cole Organization

INDIANAPOLIS, IND., July 15—With the absorbing of the Henderson Motor Sales Company by the Cole Motor Car Company, Charles P. Henderson, who was the head of the sales company, becomes the general sales manager of the Cole Motor Car Company. H. C. Lathrop, who was secretary and treasurer of the sales company, takes charge of the local branch of the Cole Motor Car Company with a large allotment of territory. Incidentally he has materially increased his holdings in the Cole Motor Car Company.

The organization which surrounded Mr. Henderson as head of the sales company goes bodily with the Cole Motor Car Company. Some advancements have been made. Ed. Harris, who was in charge of the promotion department, moves to the position of assistant sales manager; while Jay D. Riker, a new man coming from the Parry Buggy factory, takes the promotion department. John A. Murphy, cashier of the sales company, becomes assistant secretary of the Cole Motor Car Company. E. E. Rogers remains in his same post. Homer McKee holds down the job of advertising director; while H. C. Bradfield takes the road as traveling newspaper consultant.

Motorists Object to Gasoline Boost

PHILADELPHIA, July 11—Announcement by the Standard Oil Company of New Jersey today of an increase in the wholesale price of gasoline from 14 1-2 to 15 1-2 cents a gallon was immediately followed by a vigorous protest upon the part of dealers along Automobile Row. Notwithstanding the reasons advanced to support the contention of a necessity for the increase, local automobile dealers are a unit in declaring that the corporation, taking advantage of the large number of machines in use and realizing the indispensability of gasoline in their operation, is making the automobilist the "goat." As the individual owner is the one on whom the burden of the added cost will bear heaviest, dealers are apprehensive lest the discouraging prospect of still further advances which are claimed to be bound to occur will have the effect of decreasing the number of future sales.

Studebaker Bids for Canadian Trade

WALKERVILLE, ONT., July 13—An interesting development of the automobile situation in the Dominion is the formal entrance of the Studebaker Corporation as an active contender for the Canadian trade. The Studebaker interests are now in control of the Walkerville, Ont., plant, formerly known as the E-M-F Company of Canada, and are opening up an aggressive movement directed not only at the trade of the Dominion but also toward caring for the immense foreign automobile business which has been up to the present handled largely from the Detroit plant of the concern.

The Canadian business has been entirely reorganized and is now known to the world as the Studebaker Corporation of Canada, Ltd. A noteworthy feature in this connection is, however, the fact that in the reorganization the Canadian interests identified with the business from the beginning retain their holdings. A large part of the Dominion-owned stock is in the hands of the Walker family of Walkerville.

Willys to Take Over Garford August 1

TOLEDO, O., July 13—President John N. Willys, of the Willys-Overland Company, since his purchase of the Garford Company at Elyria, O., recently, will have complete charge of the Garford plant, though only in the capacity of general manager, until August 1, after which a reorganization will take place, when Mr. Garford and his officers will retire, giving way to President Willys and a new set of officials. The capital of the Garford company is $2,000,000, of which $1,500,000 is common, this latter amount representing Mr. Willys' purchase. The old selling arrangement between the Willys-Garford Sales Company and the Garford company does not terminate until the first of August, hence the reorganization date being set at that time. With the purchase of the Garford and the recent purchase of the Gramm company at Lima, O., the Overland dealers will have a complete line of pleasure cars and trucks to suit all tastes and purses. The Garford plant covers 23 acres and is unusually well equipped, but in the past things have combined to prevent the most being made of it facilities.

Boston to Have Two Shows Again

BOSTON, MASS., July 12—Boston will again have two shows in 1913. The pleasure car section under the auspices of the Boston Automobile Dealers' Association, Inc., will be held as usual in Mechanics' Building, March 8 to 15, inclusive, and the truck show held by the Boston Commercial Motor Vehicle Association, Inc., from March 19 to 26, inclusive.

The first exclusive truck show held last March was a great surprise to all—not only from the volume of business transacted but the general interest and attendance. Practically all the space was subscribed for, and a comparison with the other big shows was all in favor of Boston. From present indications and the applications for space the coming show will eclipse that of last year.

The pleasure car section will as usual prove the great magnet for entire New England—not only will every make of car be shown but elaborate preparations are under way for the usual unique decorative features.

Harking Back a Decade

FROM *The Automobile and Motor Review,* July 12, 1902:

Automobiles for carrying the Russian mails across the Caucasus are to supplant the present system of transporting it by relays of post horses with changes every 10 miles.

A glance at the interior of the tool-box will often give the observant critic a considerable insight into the character of the owner. The too-familiar cupboard, in which spanners, oil-cans, wire, loose nuts, and—too often—inner tubes as well, wallow in a marsh of split oil, grease and resin, sometimes has a variant in a clean and neatly kept receptacle, in which the orthodox set of tools reposes in place.

The Saxon Ministry has given its permission for the introduction of motor cabs in the more populous towns of Saxony, inasmuch as this new mode of locomotion will retain all the features of cab service as compared to other motor vehicles.

It is, of course, easily within the limits of national financiering and engineering to start at New York and build a model road west for 3,000 miles, but there is little likelihood of the road ever being completed in this manner. If the idea is ever realized, it will be an essential part, if not the culmination, of a general system of road improvement in which all the states will participate.—Editorial.

E. G. Walton, of Minneapolis, Minn., is the first to adopt the motor vehicle for showing real estate to prospective customers.

The F. B. Stearns Company, Cleveland, O., is planning another addition to its factory which is expected to more than double the capacity of the plant. Trouble in securing material has held the company back considerably of late, but it has managed to ship two or three machines each week.

It is now only a matter of weeks before the Winton Motor Carriage Company, Cleveland, O., will move from its birthplace in the old Brush plant to the fine group of buildings which looms up to the view of everyone entering the city from the west along the lake shore.

Nothing has been heard of late of the rotary motor which was in course of construction by Lieutenant Gaysdon, late of the United States Navy. A really practical rotary motor would upset present automobile practice to a terrible degree, but if quite reliable would undoubtedly advance the automobile movement by leaps and bounds in this country, where the uninitiated still talk of the noise, smell and vibration.

The 50-mile endurance run of the Automobile Club of Bridgeport, Conn., was a great success, with the exception that the road and weather conditions were too good, and the operators had such difficulty in holding the speed of their machines down to the legal and club limit of 14 miles an hour in the open sections and 8 miles in the towns, that a number have been disqualified and others are almost sure to be before the official report is published.

Calendar of Coming Events

What the Months Ahead Have in Store for the Automobilist—Shows, Conventions, Race Meets, Etc.

Shows, Conventions, Etc.

July 10-20.........Winnipeg, Man., Canadian Industrial Exhibition.
July 22-27.........Detroit, Mich., Cadillaqua Week.
Aug. 5-7.........San Francisco, Cal., Pacific Highway Convention.
Sept. 17-20........Denver, Col., Convention International Association of Fire Engineers.
Sept. 23-Oct. 3....New York City, Rubber Show, Grand Central Palace.
Dec. 7-22.........Paris, France, Paris Automobile Show, Grand Palais.
Jan. 4-11, 1913....New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 20-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Feb. 1-8..........Chicago, Ill., Annual Automobile Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 24-March 1.. St. Louis, Mo., Annual Automobile Show.
March 3-8.........Pittsburgh, Pa., Annual Automobile Show.
March 8-15........Boston, Mass., Annual Automobile Show.
March 17-22.......Buffalo, N. Y., Annual Automobile Show.
March 19-23.......Boston, Mass., Annual Truck Show.
March 24-29.......Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

July 21...........St. Louis, Mo., Track Meet.
July 22...........Dallas, Tex., Farm and Ranch Tour, Dallas Automobile Club.
Aug. 8-10.........Galveston, Tex., Beach Meet.
Aug. 30-31.........Elgin, Ill., Road Races, Chicago Automobile Club and Elgin Automobile Road Racing Association.
Sept. 17...........Milwaukee, Wis., Grand Prize Race.
Sept. 20...........Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.
Sept. 21...........Milwaukee, Wis., Vanderbilt Cup Race.
Sept. ....Chicago, Ill., Commercial Vehicle Reliability Run, Chicago Motor Club.
Sept. ....Washington, D. C., Reliability Run, Automobile Club of Washington.
Sept. ....St. Louis, Mo., Track Races, Universal Exposition Company.
Oct. 7-11..........Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 12............Salem, N. H., Track Meet, Rockingham Park.
Nov. 6.............Shreveport, La., Track Meet, Shreveport Automobile Club.

Foreign

Sept 26-Oct. 6.....Bourges, France, Agricultural Motor Car Exposition.
Nov. 8-16.........London, England, Olympia Automobile Show.
Jan. 11-22.........Brussels, Belgium, Annual Belgian Automobile Show. Centenary Palace.

THE AUTOMOBILE

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Starter Problem Unsettled

WITH the present pronounced trend to electric lighting, self-starting and more adequate motor lubrication there is a corresponding loss of simplicity in many motors and an added complexity of piping, wiring and lack of accessibility in parts which is regrettable, and which proves conclusively that with many engineers the self-starting arrangement is not a dynamic part of the design but merely an added accessory, an accessory not taken into consideration when the general plan of the motor was made, but one adopted at a time when the engineering corps decided on its adequacy.

The lack of systematic arrangement and almost entire absence of symmetry in motor appurtenance layout speaks plainly of the present unsettled state of the self-starting art and naturally of the lighting art, in that they go together with not a few systems. This does not mean that the maker of the self-starting or lighting equipment has not mastered the art up to its present stage, but rather that the car engineer is lagging a little, has not kept quite up with the pace and therefore is surrounded with an atmosphere of uncertainty and complexity. In many cases he is hesitating between two and sometimes three opinions. In not a few cases he is uncertain as to the merits of the different outfits on the market, not having given them the drastic test; and in not a few cases, particularly in the field of higher car prices, he did not take up the consideration of the various systems as energetically as the times demanded and when it finally came to the deciding moment he was not sufficiently informed on all points to make a definite and clear-cut decision.

One year ago saw the avalanche to self-starters and electric lighting precipitated, just at a time when not a few car makers were ready to make their 1912 announcements. These were delayed a matter of weeks and, in some cases, months until a starter was selected and ways and means devised for installation. It was but natural to expect that the present season would have developed a stage of greater preparedness, but in many cases it has not. The engineering department in more than one factory has experimented with a certain make of lighting or starting apparatus over a period of many months, only to develop minor defects after long use—defects of such moment, however, as not to warrant the installation of such a system without some form of alternative to fall back upon in an emergency. Because of this the present season has aready witnessed makers announcing one form of starting equipment, and scarcely a month after such announcement adopting a new policy and deciding to install an entirely different type. With such uncertainty it is impossible to expect other than a mussed-up motor condition, which is seen more this season than for the last 3 or 4 years.

But the difficulty of the present situation is not all confined to the lack of clean-cut appearance, but rather to the uncertainty of the direction of movement in present changes. In the starter field, one maker talks the compressed-air system; at the next factory it has been set aside and only the electric system credited with the mark of approval; at a third factory both of these have been discarded and the acetylene system installed; a fourth sets its mark of approval on the mechanical type at the expense of all others. The net result is that scarcely one of the engineers has given that depth and breadth of research into the situation which it demands. Many of the engineers acknowledge this by the alternatives and substitutes they have installed. There are several motor plants for next season installed with not fewer than three different systems of devices to facilitate starting. Thus you will find a complete self-starter system of air, acetylene, electricity or other form this is augmented by a priming system connected with the gasoline or acetylene line; and added to this is a compression release outfit in connection with the exhaust camshaft. Other designers have installed both the acetylene and electric systems, one to help the other out and either to serve alone if the exigency arises.

Some years ago the duplication of parts was a feature of motor design that came in for general criticism, even the entire double system of ignition and especially the installation of two magnetos drawing the biting remarks of the critics. It was expected that the memory of those days would suffice for all time, but the periodic stampede provoked in the self-starter and electric lighting field has resulted in a return of such conditions. The return is not a credit in every case; the installation of a last-minute selection is apparent the moment the hood is lifted, and it is to be hoped that the experimental departments will work overtime and that soon the self-starting and electric lighting systems will be integral parts of the motor design and not excrescences as many of them appear today. As soon as this comes the public will have renewed confidence, the makers will have cheaper production and the results will be more creditable.

Ocean-to-Ocean Highway

Los Angeles Transcontinental Road Boosters Arrive in New York—Good Work Accomplished

WILMINGTON, DEL., July 15—On the last leg of the Old Trail Ocean-to-Ocean National Highway project—the object of which is to have a good road constructed across the United States, from the Atlantic Ocean to the Pacific—the campaign committee of the national association which is promoting the project left Wilmington this morning, having spent the night at the Hotel Wilmington, with the expectation of arriving at its destination, the Waldorf-Astoria hotel, New York, this afternoon at 5 o'clock. On leaving Wilmington it was proposed to go to New York by way of Sea Girt, N. J., with the hope of having a conference with Governor Woodrow Wilson, of New Jersey, the Democratic nominee for President of the United States, relative to enlisting his cooperation in the project. The party spent Friday and Saturday in Washington, where they conferred with President Taft and Speaker Champ Clark of the House of Representatives.

The purpose is to secure national legislation whereby the Federal government will bear half the expense of an improved highway across the continent, the states through which it passes to bear the other half of the cost, the expectation being that if Congress agrees to do its part the states will fall in line. In the campaign which ends today, so far as this particular movement is concerned, the party has organized the movement in fifteen states and has secured the signatures of 276,314 persons to a petition advocating the legislation, which will be presented to Congress next December.

Each of the signers is contributing $1 to the cause, the fund thus raised to be used in defraying the expenses of delegations to take the matter up personally with Congress, which is expected to be necessary to have the matter fully understood. The expenses of the campaign which ends today are being borne by the Los Angeles *Times*. The party which left here today comprised Col. Del M. Potter, of Clifton, Ariz., national organizer of the association; Bert C. Smith, a member of the news staff of the Los Angeles *Times*, and John F. Zak, of Los Angeles. The party left Los Angeles May 15, 1912, and since that time have organized the movement in the following states: California, Arizona, New Mexico, Colorado, Kansas, Missouri, Illinois, Indiana, Ohio, West Virginia, Maryland, Delaware, Pennsylvania, New Jersey and the District of Columbia.

When the pathfinder car arrived at Brighton Beach on Tuesday, July 16, a large crowd gathered to greet it. A vessel containing water which had been taken from the Pacific Ocean was emptied into the Atlantic amid the cheers of the throng.

Jericho Turnpike Open for Travel

After having been closed for nearly two years at points east of Woodbury, the Jericho turnpike, which is the main highway of the north side of Long Island, was opened last Friday. The state, at a cost of more than $10,000 a mile, has transformed this famous old country road into an ideal motorway.

The new section is 14 miles long, extending from the Nassau County line to the bridge over the Nissequogue River at Smithtown. Eleven miles are of concrete foundation with tar and gravel coating and the last 3 miles are of asphalt-macadam.

The turnpike is reached from New York by way of the Hoffman boulevard and Hillside avenue. It runs from the village of Queens through Floral Park, East Williston, Jericho, Woodbury and Commack to Smithtown. Beyond Smithtown the country roads are in fair condition, enabling the tourist to reach St. James, Stony Brook, Port Jefferson and other towns.

Jeffreys Talks on Roads

At Banquet Tendered Him in Boston Road Congress Secretary Comments on English and American Practice

BOSTON, July 13—W. Rees Jeffreys, of London, Eng., honorary secretary the Permanent International Association of Road Congresses, is in Boston as the guest of Col. William D. Sohier, chairman of the Massachusetts Highway Commission, and President Lewis R. Speare, of the Massachusetts State A. A.

He is the honorable secretary of the Third International Road Congress to be held in London, July, 1913, when highways and roads will be discussed by the most prominent men from all over the world. Mr. Jeffreys was a guest of honor at a dinner tendered him at the Union Club, Thursday night, by Col. W. D. Sohier, which was attended by Governor Foss.

In discussing his visit to this country Mr. Jeffreys said: "At Washington I appeared before a joint committee of the Senate and House of Representatives and outlined the importance of the road improvement movement throughout the world and I believe that this country will become a member of the congress.

"There is much in the English methods and practices that would prove useful to American engineers, for they would have an opportunity to learn from our mistakes and experiences and not repeat these mistakes over here. One thing in which the English experience would be most helpful is our practice in England of continuous maintenance.

"From the moment it is made a road requires attention. By our system a length of road of certain mileage is put under what is termed a lengthman. His duty is to attend to the small repairs, to patch a hole as soon as it appears, keep the water course clear and trim the sides of the road. As soon as the surface shows signs of wear along comes the steam-roller gang and a new top coat is placed in the highway. As a result of this the main structure is never cut into by heavy traffic. The roads in the United States that I have seen are well made, but they are not maintained properly. The result is that the sub-crust or foundation is gradually being destroyed and the capital expended is largely wasted.

"I believe that the United States through the Federal Government and the State authorities can well afford to concentrate on continuous lengths of road between various centers of population. For instance you have no good road from New York to Philadelphia; no good road from Philadelphia to Washington; from Washington to Pittsburg and from Pittsburg to Chicago. These roads when once constructed should be properly maintained, of course.

"There are three methods by which the highways are kept dustless. One is the application of tar every year, a second to surface them with tar macadam, and a third to put down a surface and grout it in with pitch and asphalt. These various methods would be interesting to American road engineers.

Automobile Bus Railway Feeder

SOUTH BEND, IND., July 13—Direct communication between South Bend and Buchanan was made possible when arrangements were completed with the Southern Michigan Railway to connect with an automobile service at Niles, Mich. Direct connection will be made with every other train in both directions. Through tickets will be sold to all points on the Northern Indiana and Southern Michigan systems. The deal was made with E. B. Clark, president of the Celfor Tool Company, of Buchanan, who contracted for a 15-passenger automobile bus, which is to be delivered within a month, and the service will be established immediately. A fare of 25 cents a trip will be charged between Niles and Buchanan.

Cole representatives in New York City and automobile writers of metropolitan dailies after a luncheon to President Cole

GATHERING of New York Cole Men—Following the informal luncheon of the New York City representatives of the Cole car and the automobile writers of the various metropolitan newspapers, during President J. J. Cole's Eastern trip, a part of the gathering were photographed, the group being shown in the above illustration.

Ford Sails for Europe—Henry Ford and family left Detroit, Mich., recently for a pleasure trip to Europe.

Club for Moundsville—The Moundsville, W. Va., Automobile Association has been organized with T. S. Riggs president.

Bus Line Is a Success—The Troy-Canton-Towanda, N. Y., motor bus passenger and freight line opened recently, proving a great success.

Everitt Opens in Columbus—The Everitt Auto Sales Company, recently incorporated in Columbus, O., for $30,000, has opened a place of business at 307-309 Mt. Vernon avenue, Columbus.

McBride Wins Promotion—D. K. McBride has been promoted from office manager of the Universal Motor Truck Company, Detroit, Mich., to the position of factory manager of the company.

Langhorn Leaves Packard—J. T. Langhorn has resigned as manager of the truck department of the Packard Motor Car Company, Detroit, Mich. Up to the present time he has made no plans for the future.

Bus Line Opened—An automobile passenger service has been opened between Gang Mills and Painted Post, N. Y., a Reo five-passenger machine being used. Later the service will be extended to Lake Lehcka.

Winter Now with Universal—H. L. Winter, formerly sales manager of the Federal Motor Truck Company, has taken the position of general sales manager with the Universal Motor Truck Company, Detroit, Mich.

Wilson Goes to Des Moines—Orrin S. Wilson, formerly manager of the Studebaker's Rocky Mountain branch at Denver, Col., has taken charge of the Iowa factory branch of the Studebaker Corporation in Des Moines.

Warehouse in San Antonio—Carl Harris, South Texas representative of the Studebaker corporation, is establishing a large warehouse in San Antonio, Tex., for the purpose of making that city the distributing center for South Texas.

Michigan's Show Promising—All the available space for the Michigan state fair automobile show has been taken, forty-one automobile firms having engaged booths. Electric, gasoline and commercial vehicle manufacturers are represented.

After the Cutout—An ordinance is pending in the City Council of Columbus, O., to stop all of the muffler noises on automobiles and motorcycles and it is believed the measure will become a law. The ordinance provides for fines from $10 to $50 for its violation.

Has Two Service Stations—The Imperial Motor Car Company, Cincinnati, O., representatives for Cole and Stearns cars, have moved into a new service building and salesroom at 1609 Madison road. They will also retain their old location at Peebles corners.

Lane a Railroad Director—M. H. Lane has been elected to membership in the directorate of the Grand Trunk Railroad to succeed E. H. Fitzhugh, who resigned to take the presidency of the Central Vermont Railroad. Mr. Lane is president of the Michigan Buggy Company, Kalamazoo, Mich., builder of the Michigan car.

Specializing on Supplies—The Jones Auto Company, Oakland, Cal., has given up the selling of automobiles, as its accessory business has increased to such an extent that it requires the company's entire attention. The two large stores of the company have been converted into one in order to centralize the business.

Stutz Agent Moves—The Stutz Motor Car Company, Boston, Mass., has moved into its new salesrooms, 895 Boylston street.

Discontinue Their Agency—J. C. and E. A. Kimmel, Columbus, O., who have been central Ohio distributors for the Speedwell, have discontinued business.

Bids Wanted in Columbus—The Columbus, O., Board of Health will receive bids July 25 for two 2-passenger, 4-cylinder, 20-horsepower automobiles for use in the health department.

Big Parade at Hornell—More than one hundred gorgeously decorated automobiles were in line in the parade held recently in Hornell, N. Y., in connection with the Old Home Week celebration.

Smith Is Sales Manager—Arthur T. Smith, formerly of the Packard Motor Car Company, has been appointed sales manager of the A. Elliott Ranney Company, New York City, distributors of the Hudson.

Evans in Charge of Trucks—H. W. Evans, who has been connected with the San Francisco branch of the Locomobile Company for the last 2 years, has been put in charge of the truck business of the company on the Pacific Coast.

Forestville Climb Postponed—Inability of the committee in charge of the third annual hill climb to secure sufficient entries for the various events was the cause for postponing the Forestville, N. Y., annual hill climb until next July.

Three Cars for Buffalo—The councilmanic board of Buffalo, N. Y., has granted permission to the public works department to purchase three automobiles, each to be uniform in color and the name of the department to be imprinted on each machine.

Formed to Handle Lincoln—The Baldwin Smith Motor Truck Company, Wichita, Kan., has been organized for the purpose of handling commercial motor trucks in Wichita and vicinity. They have become distributing agents for the Lincoln light delivery wagons.

For Automobile Regulation—The advisory commission to Mayor Shank has recommended that there be introduced in the Indianapolis, Ind., city council an ordinance forbidding motor cars to pass a street car while the latter is receiving or discharging passengers.

Line Between Elmira and Troy—A motor truck service for the shipment of freight and express consignments is soon to be conducted between Elmira and Troy, N. Y. The trucks will make daily trips between these points, receiving consignments along the route.

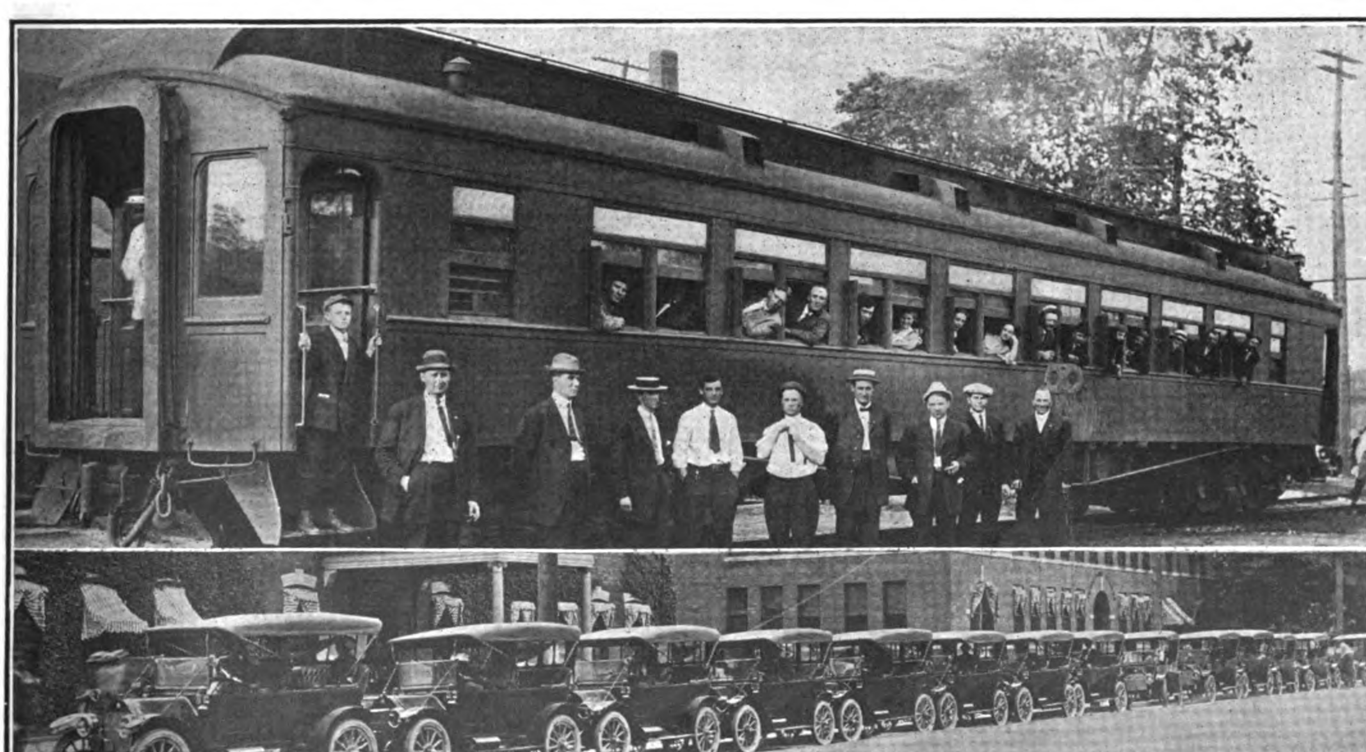
Radford Now Factory Manager—W. H. Radford has been promoted to the position of factory manager of the Warren Motor Car Company, Detroit, Mich. His former position as designing engineer and chief of the engineering department has been taken by W. H. Knowles.

Enlarge in Winnipeg—In order to meet the demands of business Joseph Maw & Company, Winnipeg, Man., are extending their premises. The firm has leased the ground floor of the adjoining Monarch Life Assurance Company building, which they intend using for exhibition purposes.

Orphans Entertained at Hamilton—Orphans' Day, which was held in Hamilton, Ont., recently, proved a great success. About thirty-five automobile owners donated their machines for the use of the orphans, who were driven to Grimsby Beach, where races featured the afternoon's entertainment.

Ground Broken for Building—Work has already started on the new building for the United States Tire Company at the junction of Beacon street and Commonwealth avenue, Boston, Mass., and the foundation will be finished shortly. It is expected that the new structure will be ready for occupancy by January 1.

Reo Tourists Arrested—Thirty enthusiastic automobilists from Fort Dodge, Ia., including five ladies, recently left the Reo factory at Lansing, Mich., in their newly-purchased Reo cars for Fort Dodge—a 600-mile trip. They displayed Iowa license tags on their cars and the Lansing police, misunderstanding the provisions of the state law regarding non-residents, arrested the entire party. The matter was straightened out and the tour was continued.



Upper picture shows the specially chartered Pullman in which thirty enthusiastic automobilists traveled from Fort Dodge, Ia., to the Reo factory at Lansing, Mich. Lower picture shows the fifteen new Reos in which the party returned to Fort Dodge

Special Cole of the Princess Victoria, showing coupé body small enough for the little lady

Culp Financial Manager—George P. Culp has been appointed financial manager of the automobile business of A. M. Zimbrich, Rochester, N. Y.

May Use Automobiles—The International Railway Company of Buffalo, N. Y., is considering the advisability of installing automobile wagons in the emergency department.

Reed Wins Promotion—F. L. Reed has been promoted to the general managership of the Schacht Motor Car Company of Canada, with general office and factory in Hamilton, Ont.

Branch in Nashville—The Oakland Motor Company is installing a factory branch at Nashville, Tenn., in charge of M. D. Stone. A repair shop of considerable size will be equipped.

Stewart Is Manager—J. O. Stewart is the newly appointed manager of the Spokane, Wash., branch of the Diamond Rubber Company. Mr. Stewart succeeds W. J. Voit, who removed to Los Angeles.

Back to San Francisco—In the recent readjustment of the Pioneer Automobile Company, of San Francisco, Cal., A. C. Wheelock, the former Fresno manager, returns to San Francisco as assistant manager of the main office.

Monson General Manager—M. J. Monson has been appointed general manager of the Wisconsin and upper peninsular branch of the Buick Motor Company, with headquarters at the district branch house in Milwaukee.

Essenkay in Boston—The Essenkay Company, Chicago, Ill., has leased the quarters in the Motor Mart, Boston, Mass., formerly used by the Alvan T. Fuller Company, agent for the Packard, and will be ready to do business soon.

Sell Out Interests—Christopher F. Whitney and Charles H. Barney have sold out their interest in the Whitney-Barney Company, Boston, Mass., to Frank B. Wilcox. The latter and Fred P. Lucas will probably carry on the business.

Philadelphia Sells Horses—Director Cooke, of the Philadelphia department of public works, has ordered the sale on Friday, July 19, of the horses and carriages heretofore used by the local Highway Bureau inspectors. Automobiles will be used in their stead.

New Ordinance in Dayton—A new police traffic ordinance has gone into effect at Dayton, O., the chief provisions of which relate to the keeping on the right side of the street, backing up automobiles or other agents of transportation to the curb and paying strict attention to the orders of the police on the subject of traffic.

Quits Brokerage for Motor Business—M. E. A. Stoddard, one of the largest stockholders of the Stoddard Motor Car Company, Springfield, Mass., has resigned as manager of the Springfield branch of T. G. Coombe & Company, members of the New York stock exchange, to give his entire time to the management of the motor agency.

Distributes Copies of State Law—In order to bring about a better understanding of the laws of the road and to minimize the danger from accidents the Automobile Club of Vermont has had printed a large number of small fliers in which that section of the state law governing the mode of travel on the highways is covered. These are being distributed to motorists and owners of horse-drawn vehicles.

Big Rambler Convention—The annual convention and school of instruction for Rambler representatives was held at the factory of the Thomas B. Jeffery Company, Kenosha, Wis., July 9, 10 and 11. More than 100 branch managers, sales managers and agents were present to inspect the next issue of Rambler cars and attend the experience meetings.

Sheboygan Elects Officers—The Sheboygan Machine Company, Sheyboygan, Wis., organized several months ago by former associates in the Falls Machine Company, of Sheboygan Falls, Wis., has elected the following officers: President, Frederick Karste, Jr.; vice-president, Albert Teffen, Jr.; secretary, Charles Kummers; treasurer, Lester Nelson. The company is capitalized at $10,000 and is engaged in the manufacture of gasoline motors and other machinery.

State Officials at Bretton Woods—Motorists from other states who go touring through the White Mountains of New Hampshire this summer, and who wish to stay more than the allotted 10 days in the state, can get a 3-month registration now at reduced rates. Those who tour through from the North and visit Bretton Woods will not need to go to Concord to the office of the secretary of state, for that official has appointed a deputy with headquarters at the Mt. Washington Hotel to issue registrations.

Princess Victoria Coupé—The Princess Victoria, called the Miniature Melba of the footlights, is a stage curiosity. In order to make her appeal more strongly to the public her manager uses a white-enameled Cole and a giant liveried footman as features in traveling about the country. The car is a regular stock machine except that a coupé body is mounted in the rear of the roadster seats, the gasoline tank having been placed under the body.

Automobile Incorporations

AUTOMOBILES AND PARTS

Brooklyn, N. Y.—Dunham Auto Company; capital, $15,000; to deal in automobiles. Incorporators: D. Dunham, L. Carmadella, C. L. Apfel.

Camden, N. J.—Auto Distributers Limited Company; capital, $200,000; to manufacture, buy and sell automobiles and other vehicles. Incorporators: Frank R. Hansell, J. C. Clow, John A. McPeak.

Chicago, Ill.—Dearborn Automobile Company; capital, $10,000; to manufacture automobiles and accessories. Incorporators: Sidney Oppenheim, Author Rosenthal, John C. Ahrensfeld.

Cleveland, O.—Clutch Company of Cleveland, capital, $200,000; to manufacture and sell friction clutches and lubricating devices. Incorporators: J. W. Thorman, O. W. Carpenter, H. F. Meyer, C. C. Clelland, B. W. Ten Eyck.

Columbus, O.—Ideal Motor Car Company; caiptal, $200,000; to manufacture automobiles.

Goshen, N. Y.—Coates Commercial Car Company; capital, $250,000; to manufacture freight automobiles. Incorporators: Robert Gibson, Jr.; L. Barton Case, Powell Crichton.

Grand Rapids, Mich.—Austin Automobile Company; capital, $500,000; to manufacture automobiles. Incorporators: James E. Austin, Walter S. Austin, George H. Davidson.

Muncie, Ind.—Miko Machinery & Supply Company; capital, $1,000; to deal in machinery and material for the manufacture of automobiles. Incorporators: Carl D. Fisher, J. M. Heron, O. B. Bannister.

Newark, N. J.—W. S. Motor Company; capital, $300,000; to manufacture automobiles. Incorporators: J. M. Woods, C. H. Tebbets, L. F. Fetser.

New York City.—Munsing Tractor Company; capital, $600,000; to manufacture and deal in automobiles. Incorporators: Basil Mager, Robert H. Allen, Herman C. Kluse.

New York City.—Stationery & Marine Motor & Supply Company; capital, $50,000; to manufacture motors and supplies. Incorporators: Thomas Lillis, Ralph A. Corely, Frederick W. Knipscher.

Portland, Me.—Universal Motor Truck Company; capital, $10,000; to manufacture and deal in automobiles. Incorporators: Clarence E. Eaton, T. L. Croteau, James E. Manter.

Rochester, N. Y.—Shafer-Decker Company; capital, $50,000; to manufacture and deal in automobiles. Incorporators: C. P. Hugo Schoellkopf, Charles B. Shafer, Frederick J. Decker.

Syracuse, N. Y.—New York Motor Company, Incorporated; capital, $10,000; to manufacture motors. Incorporators: Ernest W. Lawton, Theodore Young, Charles S. Lawton.

Syracuse Orphans Ride—The Automobile Club of Syracuse gave the inmates of the Onondaga Orphans' Home their annual ride recently, fifty automobiles being filled to capacity.

Fosdick Resigns from Stevens-Duryea—Harry Fosdick, sales manager of the Stevens-Duryea Company, Chicopee Falls, Mass., has resigned from his position with the company.

New Seattle Hudson Agent—James C. Murray, formerly representative of the Hudson company in Seattle, Wash., will be succeeded by G. L. Rodd, who will head the Pacific Motor Car Company.

Peoria Cadillac Crew Parades—The first annual gathering and parade of Peoria, Ill., Cadillac owners was held in that city a few days ago. There were 160 cars in line, which paraded through the city.

Fire Protection Installed—A complete fire protection system has been installed in the Mitchell Garage, Racine, Wis., at a cost of $5,000. The garage is now regarded as a model from the safety standpoint.

Moves to Detroit—J. A. Thorsen, advertising manager of the Lion Motor Car Company, Adrian, Mich., has transferred the advertising headquarters of the company to Detroit, where he will be located hereafter.

Tuttle Quits Dayton Management—Harry Tuttle has announced that on August 1 he will sever his connection with the Dayton Motor Car Company, Dayton, O., for which he has acted as service manager for some time.

Automobile Street Car Service—The thriving town of Dayton, Ore., located 33 miles southwest of Portland, has recently established the first automobile street car service in the state of Oregon. M. G. Miller is the owner.

Promotion for Windholz—R. L. Windholz has been made the head of the recently established Detroit office of the Sloan & Chace Manufacturing Company, Newark, N. J., manufacturers of precision machinery and special tools for the automobile trade.

Visits Detroit Company.—A. Boulade, general manager of the French Societé du Carbureteur Zenith, recently visited the factory of the Zenith Carbureter Company, Detroit, Mich. The capital of this company has lately been increased from $10,000 to $50,000.

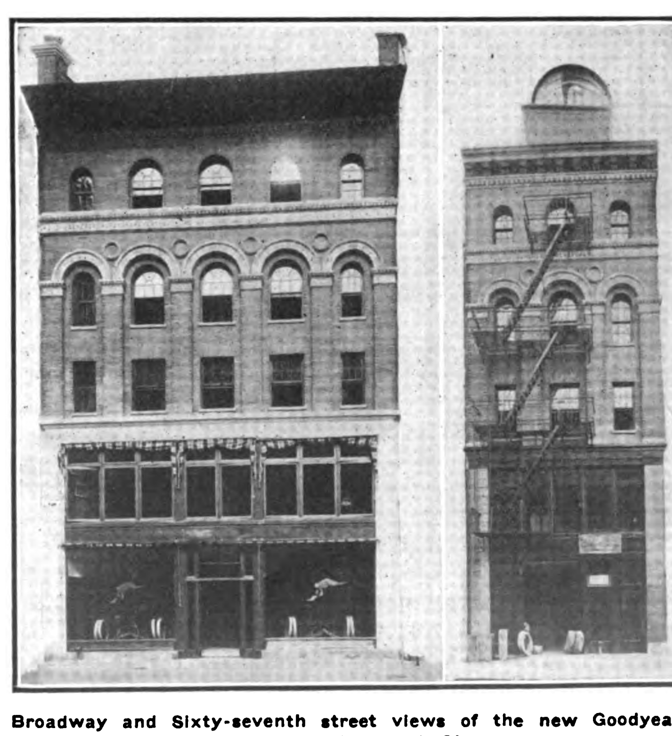
'Bus Company Reduces Fares—What is believed to be the lowest tariff of fares charged in the country by a motor 'bus company has just been placed in effect by the Rapid Motor-transit Company, Indianapolis Ind., which is now selling six tickets for 25 cents and twenty-five tickets for $1. This reduction has been made to meet the fares charged by the street railway company.

Kansas City Agencies Discontinued—There will be many changes in the managements of agencies and branches of Kansas City, Mo., in the near future. The Albertson-Boyd Motor Car Company, former agents for Marmon and Hudson products, have discontinued these lines and both manufacturers will institute factory branches. The Everitt and Franklin factories have also installed factory branches.

Columbus Seal Red and Blue—The Columbus Automobile Club, Columbus, O., has adopted a red and blue flag bearing the seal of the state of Ohio as a pennant, to be carried on all cars of the members. The purpose is to advertise the coming state centennial celebration. On the night of August 26, the members of the club will join in a big automobile parade which will be preliminary to the centennial celebration.

New Goodyear Building—The Goodyear Tire & Rubber Company of New York has moved into its new building at Broadway and Sixty-seventh street, New York City. The structure is an L, five stories and basement, with 20,000 square feet of floor space. The company has also purchased 2 acres of land in Long Island City and will erect thereon a six-story warehouse of 96,800 square feet of floor space. This warehouse will be ready for occupancy by January 1, 1913.

Wesco Now Wholesale—The Wesco Supply Company, St. Louis, Mo., manufacturers and jobbers of electrical supplies, have recently taken up the handling of automobile accessories at wholesale. They have warehouses in Fort Worth, Tex., and Birmingham, Ala., in addition to their large building at Seventh street and Clark avenue, St. Louis, Mo., and have twenty-five salesmen on the road. The automobile accessories department has been placed in charge of A. E. Rosenberg.



Broadway and Sixty-seventh street views of the new Goodyear building in New York City

Automobile Incorporations

Grand Rapids, Mich.—Simpson Automobile Supply Company; capital $35,000; to buy and sell automobiles, supplies and accessories. Incorporators: E. W. Simpson, E. R. Corbin, F. J. Goders.

GARAGES AND ACCESSORIES

Cincinnati, O.—Acme Motor Delivery Company; capital, $15,000; to haul and deliver goods by automobiles. Incorporators: William Ernst Minor, Fred L. Allen, Stuart B. Sutphin, David Washman, James Bradford Minor.

Cleveland, O.—Saunders Auto Supply Company; capital, $20,000; to manufacture and sell automobile lever locks and other accessories. Incorporators: C. J. Robinson, S. W. Sparks, J. A. Blakely, B. V. Selby, Ishen F. Allen.

Grand Rapids, Mich.—Grand Rapids Motor Realty Company; capital, $50,000; to conduct the affairs of the Grand Rapids Automobile Club. Incorporators: Charles A. Phelps, Alvah W. Brown, M. T. Van Den Bosch, Elmer Kinsey, G. A. Hendricks, O. H. L. Wernicke, R. E. Tietsert, Harold V. M. Tuthill, C. H. Walker.

New York City.—Circle Taxicab Company; capital, $2,800; to engage in the taxicab business. Incorporators: John Hefferon, Margaret T. Hefferon, John F. Kavanagh, Catherine J. Kavanagh.

New York City.—Resident Punctureless Tire Company; capital, $200,000; to manufacture a punctureless tire. Incorporators: Flossie M. McGrady, Seth H. Sheldon, LeRoy McGrady.

New York City.—Tanney Rubber Company; capital, $10,000; to manufacture rubber goods and tires. Incorporators: Harry Tannerbaum, Jacob Tannerbaum, Philip F. Tannerbaum.

New York City.—William C. Reynolds, Inc.; capital, $3,000; to deal in automobile supplies. Incorporators: Charles W. Reynolds, Rene Dequet, Otto Schiller.

Syracuse, N. Y.—Jefferson Garage Company; capital, $30,000; to conduct a garage and repair business. Incorporators: A. Metzen, C. J. Rochm, C. J. Blaumer.

CHANGES OF CAPITAL

Akron, O.—Akron Rubber Mold & Machine Company; capital increased from $10,000 to $30,000.

Augusta, Me.—Universal Motor Truck Company; capital increased from $10,000 to $500,000.

Bridgeport, Conn.—Locomobile Company of America; capital increased from $5,000,000 to $6,500,000.

Detroit, Mich.—Zenith Carbureter Company; capital increased from $10,000 to $30,000.

Mrs. E. A. Blaney, of Cincinnati, O., in her Ohio car

Cincinnati Has Woman Tourist—Mrs. E. A. Blaney, Cincinnati, O., has acquired a considerable reputation as a cross-country driver. The accompanying illustration shows Mrs. Blaney in her Ohio roadster.

New Frisco Oldsmobile Manager—George S. Morrow, formerly factory representative of the Oldsmobile Company, has been made retail sales manager of the San Francisco, Cal., branch.

Ford Western Agent Moves—The Alkire-Smith Auto Company, Utah, Western Wyoming and Southern Idaho agents for the Ford car, has moved to its new quarters at 67 West Fourth street, Salt Lake City.

Marmon Considers Another Branch—The Nordyke & Marmon Company, Indianapolis, Ind., is considering the establishment of a branch in Kansas City, Mo. Fred Clinton is looking for a suitable site for the factory.

Diamond Los Angeles Change—F. O. Nelson, manager of the Los Angeles branch of the Diamond Tire Company, will be succeeded in that position August 1 by W. J. Voit, now branch manager at Spokane, Wash.

St. Louis Buys Cars—The city of St. Louis, Mo., has bought fifteen Ford roadsters for use of the inspectors in the street and other departments. Touring cars for the heads of the several departments are also to be purchased, bids having been called for furnishing them. The city will also buy two 5-ton trucks, a 2-ton truck and a 1,500-pound motor wagon.

Motors Usurping Hand Cars' Place—The Toledo & Ohio Central has adopted gasoline motor cars for track work and inspection. Five modern type gasoline cars have been placed at the disposal of section men operating from Bellefontaine, O., and intervening points. Old-time hand-cars are disappearing from all the railroads.

Gets New Landlord—The property at 754 Main street, Buffalo, N. Y., which is occupied by the Pierce-Arrow Company's sales department and garage was sold this week by William H. Hotchkiss to Walter L. Schoellkopf for $250,000. The purchase was made solely as an investment and the Pierce-Arrow Company will remain in the building.

Klose Made Branch Manager—O. W. Klose has been made manager of the United Motor Minneapolis Company, Minneapolis, Minn., to succeed E. B. Stimson. Appointment was made by S. D. Porter of Kansas City, western supervisor. Mr. Klose has sold Maxwell cars for 8 years. He is the youngest branch manager with the company.

Foss-Hughes Buys in Providence—The Foss-Hughes Automobile Company, which has the agency for the Pierce-Arrow car for Providence, R. I., Philadelphia and other cities, has purchased 35,000 square feet of land at the corner of Wesleyan avenue and Plenty street, Providence, R. I., for the purpose of erecting a modern brick salesroom and service depot. Work on the new building will be started at once.

New Automobile Agencies

PLEASURE CARS

Place	Car	Agent
Amsterdam, N. Y.	Cole	William M. McCaffrey.
Aurora, Ill	R-C-H	C. C. Hinckley.
Baltimore, Md.	Detroiter	L. S. Nock.
Baltimore, Md.	R-C-H	Shaffer Mfg. Co.
Bay City, Mich	R-C-H	Miller Auto Co.
Bethany, Mo	R-C-H	Bert L. Layson.
Breymer, Mo	R-C-H	A. Wells & Co.
Bristol, Vt.	Ford	W. A. Lawrence.
Camden, N. J	R-C-H	Yale Motor Co.
Canby, Minn	Cole	C. M. Anderson.
Castle, N. Y	R-C-H	Cook Bors.
Chicago, Ill	R-C-H	Victor F. Michelson.
Cincinnati, O.	R-C-H	Olds-Oakland Motor Co.
Conneautville, O.	R-C-H	Penn Auto Co.
Cornell, Ill.	R-C-H	J. H. Reichardt & Co.
Dansville, N. Y	R-C-H	Willard Morris.
Des Moines, Ia	Empire	Cartercar Iowa Company.
Des Moines, Ia	Chalmers	Iowa Auto & Supply Co.
Des Moines, Ia	R-C-H	Sears Automobile Co.
Drayton, N. D.	R-C-H	Drayton Auto Co.
Duluth, Minn	R-C-H	Woods Bros.
Dunkirk, N. Y	R-C-H	Henry Schafer.
Elmira, N. Y	R-C-H	F. E. Wickwire.
Fargo, N. D.	Cole	John Wyman.
Frederick, Okla	R-C-H	Morris & McHugh.
Freeport, Ill	R-C-H	H. Ohlendorf.
Galveston, Tex.	Correja	R. S. Carter.
Goldsboro, N. C.	R-C-H	W. A. Blackburn & Co.
Guilford, Conn	Ford	S. B. Hull.
Hamburg, Ia	Cole	George Grape.
Hartford, Conn	R-C-H	Walter J. Connelly.
Hazelton, Pa.	R-C-H	Smith Motor Car Co.
Hiram, O.	R-C-H	Vincent & Hurd.
Hornell, N. Y	R-C-H	Peters & Kittell.
Houston, Tex.	R-C-H	Worthrup & Clark.
Jackson, Mich.	R-C-H	J. E. Weber.
Jamestown, N. Y	R-C-H	Slawson & Lounsberry.
Kansas City, Mo	R-C-H	E. E. Guthrie & Henry Win
Lexington, Ky	Cole	R. E. Graybill.
Lynchburg, Va	R-C-H	Model Garage.
Marine City, Mich	R-C-H	W. H. Mannell.
Maple Park, Ill	R-C-H	A. A. Marvin Sons & Co.
Malta Bend, Mo.	R-C-H	Cole Bros.
Manila, P. I.	Cole	R. N. Clark.
Medina, N. Y	Cole	Charles Dye.
Mendota, Ill	Franklin	Their & Gehant.
Minneapolis, Minn	Havers	A. F. Chase & Co.
Moose Jaw, Sask	Cole	Percy D. Shand.

News of the Garages

Largest in State—The garage being built for W. A. Kirk New Haven will be the largest one in the state, a cording to the builders, the structure being four stories hi with 40,000 square feet, with a capacity for 250 cars. A ton elevator will be installed to carry the cars up and down.

New Garage at Groveland—H. L. MacDonald, who has t agency for the Kissell Kars at Groveland, Mass., has ju completed a large brick garage.

Sells McClure Garage—J. M. Connolly has sold the M Clure Garage, located at McClure, O., to John Harmon f $2,500.

Service Station for Everitt—A new garage and service s tion four stories high and about 90 by 50 ft. is being erect in Boston, Mass., for the local agency for the Everitt car.

To Build in Louisville—The Clark Motor Company, Lou ville, Ky., has acquired a 10-year lease on a site on Bro way, where the company proposes to erect a $15,000 buildi

To Build in Albany—John Croissant has completed pl for the construction of a large automobile garage at Washington avenue, Albany, N. Y. The building will three stories in height.

New Ford Service Station—The Ford Motor Company pects to occupy its new service garage in Winnipeg, M during the latter part of July and will set apart space for accommodation of the Minneapolis and St. Paul tourists ing their tour to Winnipeg.

Almost Ready in Winnipeg—The Tudhope Anderson C pany will soon take over its new garage in Winnipeg, M and will have a complete service plant for the benefit of T hope car owners. This is the same car as the Amer Everitt, but sold under the Tudhope name in Canada.

New Automobile Agencies

PLEASURE CARS

Place	Car	Agent
Moro, Ore	Cole	W. H. Moore.
Morris, Minn	R-C-H	Olson-Hemming Auto Co.
Mount Pleasant, Mich	R-C-H	B. E. Graham & Co.
New Philadelphia, O	R-C-H	O. W. Smith.
Newport, Pa	R-C-H	W. L. Reisinger.
Nehawka, Neb	Cole	V. P. Sheldon.
New York City	R-C-H	Central Motor Car Co.
Niles Center, Ill	R-C-H	Niles Center Garage Co.
Norwich, Conn	Franklin	F. O. Cunningham.
Omaha, Neb	Apperson	Apperson Jack Rabbit Co.
Omaha, Neb	Cole	Cole Motor Car Company.
Omaha, Neb	Packard	Orr Motor Sales Co.
Omaha, Neb	R-C-H	Lininger Implement Co.
Palatine, Ill	R-C-H	Heckbarth & Shering.
Pasadena, Cal	R-C-H	Muncie Motor Co.
Raleigh, N. C	R-C-H	Capitol Motor Car Co.
Rensselaer, Ind	R-C-H	John M. Knapp.
Revere, Mass	Ford	Walter T. White.
Richmond, N. Y	R-C-H	I. A. Silvie, Jr.
Southampton, N. Y	R-C-H	William H. Hedges.
Springfield, Mass	Henderson	Forest City Garage.
Sterling, Ill	R-C-H	E. L. Warneke.
St. Paul, Minn	R-C-H	White Bear Auto Co.
Traverse, Minn	R-C-H	John A. Johnson.
Troy, N. Y	R-C-H	James N. Bussey.
Viola, Ill	R-C-H	Worley & Terry.
Walla Walla, Wash	Cole	Moore Automobile Co.
Wareham, Mass	Ford	B. Burleigh Sisson.
Washington, D. C	R-C-H	Dailey Motor Co.
Westpoint, Neb	Cole	W. H. Kehoran.
Whitakers, N. C	R-C-H	W. T. Hearne.
Wilmington, N. C	R-C-H	Wilmington Auto Repair Co.
York, Pa	Cutting	York Rubber Tire Co.
York, Pa	Hudson	Auto & Truck Sales Co.
York, Pa	R-C-H	York Garage & Supply Co.

ELECTRIC CARS

Boston, Mass	Grinnell	A. P. Underhill.

COMMERCIAL VEHICLES

Columbus, O	Alco	M. P. Murnan.
Portland, Me	Universal	Universal Motor Truck Co.
Providence, R. I	Veerac	Motor Service Co.
Wichita, Kan	Lincoln	Baldwin-Smith Motor Truck Co.

Addition to Paulding—The Paulding Auto Company, Paulding, O., is building an addition to its present establishment.

To Open in Riverton—C. A. Thuman is building a garage in Riverton, Ia., where he will engage in the automobile business.

New Garage in Omaha—Andrew Murphy & Son, Omaha, Neb., have started work on a new garage next to their present building.

Change in Punxsutawney—P. O. Freas has disposed of his garage in Punxsutawney, Pa., to T. M. Kurtz, who will continue the business.

To Conduct Garage—The West Allis Machinery & Auto Company has been formed in West Allis, Wis., to conduct a garage and machine shop.

Packard Building Garage—A one-story garage, 137 by 69 ft., is being constructed in Philadelphia for the Packard Motor Car Company. The building will cost $12,000.

Eureka Company Builds Addition—The Eureka Motor Car Company is preparing for the construction of an addition to their garage on Adams avenue, Scranton, Pa.

Bosworth Makes Extensive Addition—An extensive addition is being made to the automobile plant and garage of E. G. Bosworth & Company in Birmingham, Ala.

Building in Baltimore—The Colonial Motor Company, Baltimore, Md., is having a new garage built. It will be two stories high, of ornamental concrete and brick.

Another $12,000 Garage—Edward Cunningham is building a one-story garage at Twenty-second and Race streets, Philadelphia, Pa., for the Pennsylvania Galvanizing Company, to cost $12,000.

Garage for Plymouth—Torke Brothers are erecting a three-story building of fireproof construction, 50 by 120 feet, in Plymouth, Wis., to be used for garage and machine shop purposes. It will cost $30,000.

Completed in Shreveport—A new fireproof garage has been completed for the Orme Motor Car Company, Shreveport, La. The new building cost $8,000. The Orme company handles the Moon.

$12,000 Garage for New York—Otto Freyer will build a one-story brick garage, on the south side of 155th street, New York City. Plans filed by Architects Horunburger & Bardes place the cost at $12,000.

To Open in Buffalo—An automobile association known as the "Auveco," recently formed in Buffalo, N. Y., is completing arrangements for the opening of a commercial and pleasure vehicle garage and salesroom.

Adopt Garage Amendment—Following a hearing in the board room of the District Building recently the Commissioners adopted an amendment to the building regulations, providing for the colonization of public garages in Washington, D. C.

Franklin in Milwaukee Enlarging—The Franklin Automobile & Supply Company, Milwaukee, Wis., local dealers in Franklin automobiles, are enlarging their quarters to include a frontage from 321 to 327 Fourth street. Every modern facility is being provided to make this garage and salesroom one of the best equipped in the Middle West.

Celebrates National Victory—After Joe Dawson's National won the 500-mile race at the Indianapolis Speedway various agencies for that car celebrated the victory by decorating their showrooms. Among these was the Howard Auto Company, Portland, Ore., whose salesroom is shown in the accompanying illustration.

Largest Company in Northwest—By taking over the Conge Motor Company garage, St. Paul, Minn., the White Bear Automobile Company, A. J. Diamon, president, lays claim to being the largest automobile company in the Northwest. The company plans service garages in all parts of the city. It occupies one building in St. Paul, another at White Bear Lake and a third building is being erected, and a contract will be let soon for an electric station.

Bangor Garage Burned—The garage of the S. L. Crosby Company of Bangor, Me., was destroyed by fire recently and about 40 cars were either destroyed or badly damaged. The fire was caused by the ignition of a gasoline tank on a brazier and spread so quickly it was impossible to check it or remove the cars. Roger H. Swan, one of the employes, was badly burned about the face and body and two others were slightly burned before they managed to get out. The loss on the building was $15,000, but the loss on the cars could not be estimated.

National agent in Portland, Ore., celebrating victory

Motor Fire Apparatus

To Buy a Fire Truck—The Grand Island, Neb., city council is considering the purchase of an automobile for fire-fighting purposes. It is thought that a $6,000 car will be necessary for the requirements of the city.

Another for Peoria—The city of Peoria, Ill., will be the owner of five automobiles when the machine recently authorized by the city council for the fire department is purchased.

Columbus Council Approves—The city council has approved an ordinance for the establishment of a fire engine house in the hill-top section of Columbus, O., to be equipped with motor-driven fire apparatus.

West Chester Wants Apparatus—West Chester, Pa., is contemplating the holding of a special election to determine whether the town council shall be authorized to borrow $25,000 for the purpose of purchasing motor fire engines.

Portsmouth Adopts Fire Wagon—The Pope Hartford Motor Car Company delivered a motor fire wagon to the city officials at Portsmouth, N. H., recently, the vehicle being driven over the road from the factory to Hartford. It was put into service at once.

Rike Kumler Company Cars—The fleet of cars shown in the illustration comprises the delivery equipment and private cars of the Rike Kumler Company, Dayton, O. All are equipped with Aplco electric lighting systems. The delivery cars are Speedwells.

Beverly Trying Out Fire Wagons—The city officials of Beverly, Mass., have been testing out various makes of motor apparatus to be added to its fire equipment, and it is expected that a decision will be reached shortly and at least one will be added to the department.

Fire Wagon Meets Requirements—The Minneapolis, Minn., council committee has recommended for purchase a Nott Fire Engine Company gasoline pumping engine, contracted for in March at $6,500, providing the machine filled the efficiency requirements. Tests thus far have produced results above specifications.

Motorizing Houston Department—Fire Commissioner Colehause of Houston, Tex., has placed orders with the American-La France Fire Engine Company, for a 65-foot aerial truck, one motor water tower and a triple combination auto engine. The aim of the Houston fire officials is to motorize the entire department in that city.

Philadelphia in Difficulty—As the bids submitted to the Philadelphia department of public safety for motorized fire equipment exceeded the $35,000 available for that purpose, there is serious question as to whether the present horse-drawn equipment will be superseded in the near future, and the preliminary establishment of a "flying squadron" has been indefinitely postponed.

Cincinnati in the Market—Safety Director Cash of Cincinnati, O., will soon advertise for bids to furnsh the city fire department with automobiles as follows: One runabout for the fire alarm superintendent; one runabout for the mechanical superintendent, and one runabout for each of the two fire marshals. The runabouts should have 20 to 40 horsepower. The city will also buy two combination pumping engine and hose wagons of 70 horsepower each and four combination chemical engines and hose wagons of 50 horsepower each.

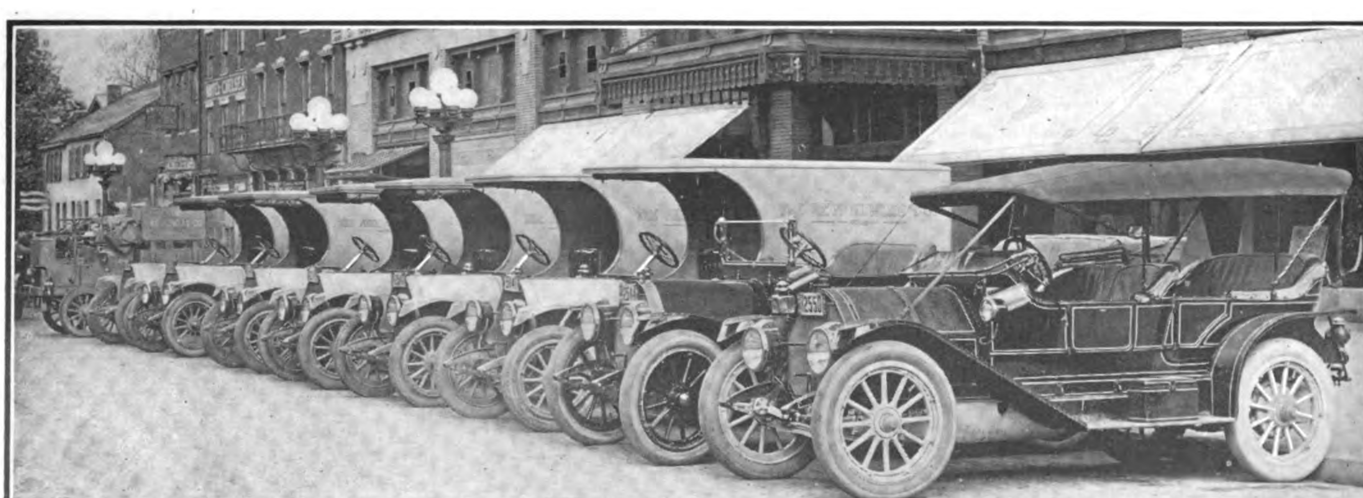
Penn Yan Buys Apparatus—The Ellsworth Hose Company of Penn Yan, N. Y., has placed an order with the Eureka Fire Hose Company, Syracuse, N. Y., for one 32-horsepower combination motor truck and chemical engine made by the Seagraves Manufacturing Company, Columbus, O. The apparatus weighs 3 tons, carries 1,000 feet of fire hose, 150 feet of chemical hose, one 40-gallon tank for chemicals, one 21-foot extension ladder, one 12-foot straight ladder, will travel 25 miles per hour and costs $2,400.

District Service to Be Motorized

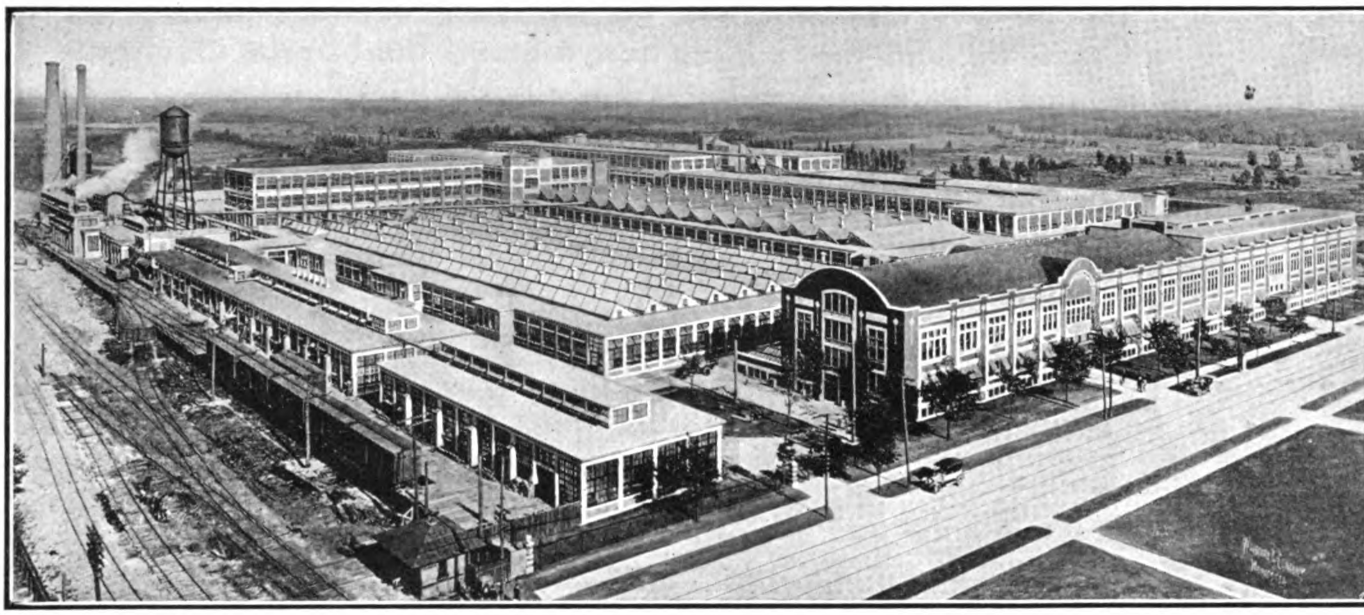
WASHINGTON, D. C., July 14—Motor cars are rapidly replacing horses in the municipal service of the District of Columbia. Included in the district appropriation bill just enacted by congress are appropriations for the purchase of motor vehicles for the use of the building inspector, superintendent of sewers, electrical engineer and superintendent of street cleaning. A number of other district officials are already provided with machines for their official duties.

Experience has demonstrated, according to district officials, that motor cars give a greater measure of service than the horse-drawn vehicles and are operated at less cost. The policy of the district commissioners is to gradually replace the horse-drawn fire apparatus with motor-propelled engines, hose wagons and trucks.

The District of Columbia at present is the owner of two pieces of motor-driven apparatus, a fire engine and a combination fire engine and hose wagon. Provision is made in the district appropriation bill for the purchase of another combination fire engine and hose wagon at a cost not to exceed $9,000. Bids for the purchase of this apparatus will be called for in the next few weeks.



Delivery and private cars used by the Rike Kumler Company, Dayton, O. All are equipped with Aplco electric lighting systems



Birdseye view of the handsome factory buildings of the Pierce-Arrow Motor Car Company, 1695 Elmwood avenue, Buffalo, N. Y.

IMPERIAL Enlarges Plant—The Imperial Automobile Company is now owner of the factory buildings in Jackson, Mich., where the Buick Motor Company has been manufacturing automobile trucks. The Buick will transfer its Jackson business to the main plant at Flint. The buildings in Jackson cover 7 acres and the company will enlarge its output from about 1,700 to upward of 5,000 vehicles.

R-C-H Uses Tents—The plant of the R-C-H Corporation at Detroit, Mich., being in need of more room for the production of 1913 cars, is using three large tents for the purpose.

Grant Factory Moved—The Grant Motor Car Company, manufacturer of the Grant Six, is now moving into its new factory at One Hundred and Fifty-second street and St. Clair avenue, Collingwood, O.

Lewis Company Growing—The Lewis Spring and Axle Company will enlarge its Jackson, Mich., plant and probably will build automobile trucks of 9 tons capacity. The company has been experimenting with cars of this type for some time and one of them has proved satisfactory.

Stewart Company Leases Plant—The newly-organized Stewart Motor Corporation, Buffalo, N. Y., capitalized at $250,000, has leased the factory of the Niagara Machine & Tool Works at Jefferson, Superior and Randall streets. The company will manufacture light-capacity freight automobiles.

Work Resumed at Fremont—Building operations which have been delayed for some little time at the Lauth-Juergens plant at Fremont, O., have been resumed since the arrival of the steel for the framework of the new addition. Sales-manager H. S. Diller announces that the building will be completed within the next 30 days.

Cole Factory Expands Again—President Cole of the Cole Motor Car Company, Indianapolis, Ind., has announced that arrangements have been made to construct another addition in the form of a wing to the Cole factory. The new wing will be adjacent to the one built a short time ago and will be erected at an approximate cost of $100,000.

To Build Light Trucks—The Ideal Motor Car Company, Columbus, O., has been incorporated with a capital of $20,000 by C. G. Amendt, J. C. Reichart, D. N. Postlewaite, T. J. Shaffer and E. Braugnier. The object of the company, which is composed mostly of Detroit capitalists, is to establish a plant for the manufacture of light delivery trucks.

To Manufacture in Rochester—With the discontinuance of the Jenkins Motor Car Company, Rochester, N. Y., in the manufacture of pleasure gasoline vehicles, the Cole Rochester representatives have taken over the entire plant of the Jenkins company in the eastern section of the city. They have acquired new capital and will manufacture and sell automobiles under the name of the Shafer-Decker Company.

Addition for Kinsey Plant—A five-story brick addition is being built to the Kinsey Manufacturing Company's plant, Toledo, O., and will be ready for occupancy in the early winter. The dimensions of the new building will be 125 by 100 feet. It is designed solely for manufacturing purposes and will necessitate the employment of 300 more men. The Kinsey is one of the Willys-Overland group of automobile concerns.

Goodyear Makes Big Addition—The Goodyear Tire & Rubber Company, Akron, O., has commenced work on another new building to be added to its present group. It will be 400 feet long, 80 feet wide and six stories high. The new building will be of brick and stone and will be fireproof. The same company has let contracts for two-story additions to two of its present large buildings. When completed the Goodyear company will have a plant containing 266,000 square feet of floor space. The enlarged factory will have a capacity of 8,000 tires a day and will give employment to 2,000 additional men.

Refreshment Basket for Touring; Tire Pump Driven by the Engine; Acetylene Lighting System Controlled from the Driver's Seat; Channel Steel Spring Bumper; Tire Holder for Attaching Extra Tires to the Back of a Car

Hawkeye Refrigerator Basket

JULY touring has charms which are easily marred by a lack of general comfort. The carrying of fresh and cool eatables and drinks greatly increases the pleasure of summer motoring, and to assist the automobilists in this direction, the Burlington Basket Company, Burlington, Ia., manufactures the Hawkeye refrigerator basket, Fig. 1. The latter is made of sheet metal covered with wickerwork to afford better insulation against exterior heat. The basket is divided into several compartments, one for ice, one for fluids and one for other refreshments.

Dewey Engine-Driven Pump

A new type of tire pump which fits into the spark-plug hole of the engine cylinders and which is operated by the engine suction and compression,. is the Dewey pump, Fig. 2. It consists of a pump cylinder 1 foot long and 2 inches in diameter, the bottom plate of which is equipped with a pipe connection threaded to fit into a 7-8-inch opening. Inside the cylinder is a piston which may be moved in the cylinder by air pressure against one of its sides and which is not fitted with any connecting-rod. Tightness against the cylinder walls is insured by a packing ring. The upper cylinder plate is perforated with a central hole and several holes disposed in a ring around the former. All holes serve as seats for check valves, the central one seating when the piston is drawn toward the engine cylinder by suction, while the other check valves seat when engine compression pushes the pump piston upward. This construction admits fresh air into the pump chamber above the piston on the engine-suction stroke and expels it through the central check valve and the tubing attached thereto by a compression coupling during the compression stroke. The compressed air forced out of the pump is transported through a flexible tube wound with a fabric to the tire valve. With this pump a flat 28 by 3-inch tire can be inflated to 60 pounds in about 3 minutes. This automatic tire pump is made by the Dewey-Anderson Company, Toledo, O., and is sold in the East by the Lowe Motor Supplies Company, Fifty-fifth street and Broadway, New York City.

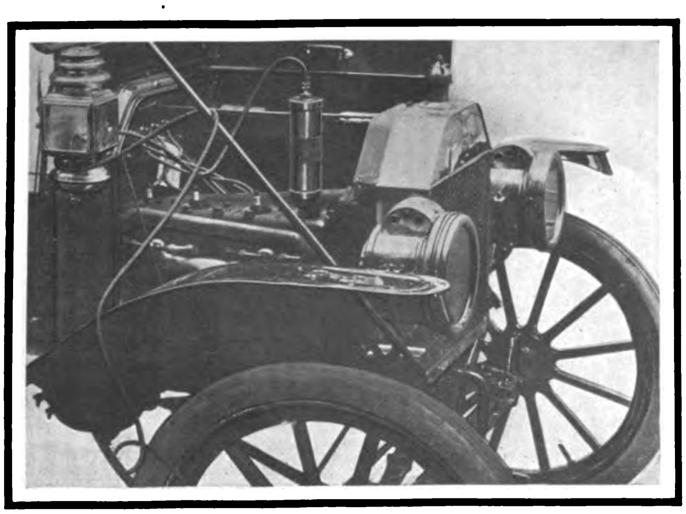


Fig. 2—Showing method of attaching Dewey tire pump

Mondex Acetylene Lighting

Most recent among the additions to the lighting-system field is the Mondex outfit of the Aristos Company, 250 West Fifty-fourth street, New York City. This system is of the acetylene type and is entirely controlled from the driver's seat, the turning of a knob admitting gas to the lamps and that of a small crank switch producing a series of sparks between the igniter points over the lamp burners. As Fig. 3 shows, the outfit consists of the dash fixture D which combines the office of acetylene admission valve and switch, of a reducing valve V which is attached to the gas tank, of a spark coil and of one igniter above each of the burners. The magneto may be used in place of battery and spark coil.

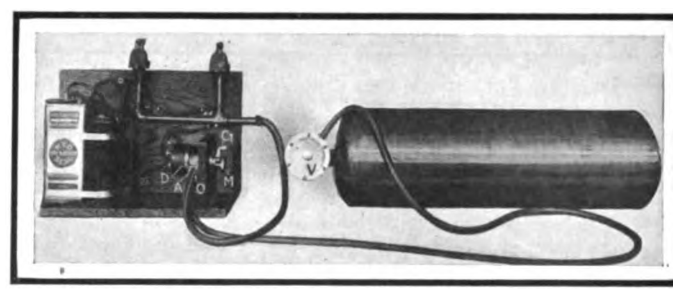


Fig. 3—Tank and control of Mondex lighting system

The construction of the component parts is illustrated in Fig. 4. V1 is the half of the regulator valve which is connected to the tank outlet and V2 is the other half. The mechanism contained inside the shells V1 and V2 consists of the grooved needle N, the levers L1 and L2, the circular fabric F and brass plate B, and the spring S which rests in the central recess of the part V2. The needle N seats in the central opening N1 of V1 which is attached to the outlet of the gas tank and its flat end bears against the lever L1 which is hooked to L2, the latter being attached to the plate B. The spring S presses against the other side of the plate B and its tension is regulated by the knurled screw K on V2. As the gas comes out of the tank and lifts the valve, the pressure inside V rises and tends to press the brass diaphragm against V2, being resisted to a degree varying with the adjustment of the spring S. At the same time, as the diaphragm moves away from V1, it draws with it L2 and thereby presses the pivoted lever toward V1, tending to press the needle N against its seat and limiting the quantity of gas leaving the tank to the amount determined by the adjustment.

The dashboard fixture of the system is shown in detail in Fig. 4. The gas-valve part consists of a steel needle bearing against a brass seat and ending in the knob M, Fig. 3, where A shows the admission, and O the outlet port, of the acetylene passing through the dashboard fixture. The electric part of this device is the switch S1, Fig. 4, which consists of a connector piece C, mounted on an insulation and turnable by means of the small crank C1, Fig. 3. The connections for directing a spark to the igniters at the burners may be made so that either the battery or the magneto serves as a source of current. If the battery is to be used, the wire leading from the battery is connected to the terminal marked 1 and the igniter is connected to the terminal marked 3, the negative battery and igniter terminals being grounded. With this wiring, if the switch is turned the piece C is brought to a horizontal position and closes the circuit with the coil in line and produces a series of sparks at the igniters. When the current for the sparks is to be taken from the magneto, 2 is connected to the spark-plug of one cylinder, the current normally passing through 1, the piece C and 2. If the crank C1 is turned, the magneto current is sent through the igniters instead of the spark-plug it normally serves; in this case no induction coil is used. The igniters I are simple in construction, the wires entering at the bottom of the insulator B1.

A New Eclipse Channel Bumper

The Emil Grossman Company, 250 West Fifty-fourth street, New York City, has brought out a new type of spring bumper,

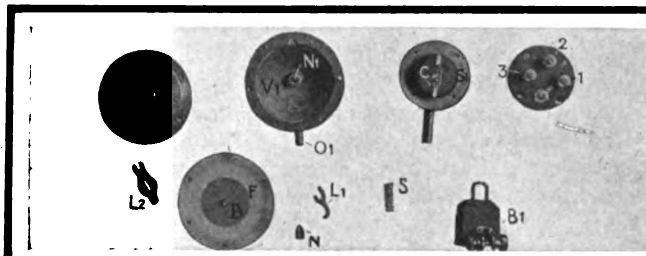


Fig. 4—Detail of Mondex dash control and switch

named the Eclipse. The bumper is made of steel throughout, the bar being of 2-inch solid stock and shaped as in Fig. 5. The attaching pieces are of stamped steel. The latter parts consist each of a short connecting bar support C, one end of

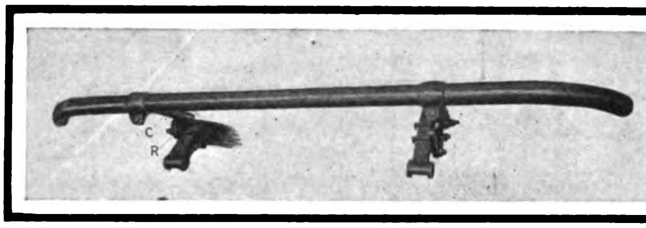


Fig. 5—New type of Eclipse steel spring bumper

which is attached to the bumper bar while the other is formed as a triangular plate with one edge shaped with ratchet serrations R which engage similar serrations on another triangular plate. Both plates are slotted to permit of passing through them three bent steel bars which are bolt-threaded at their outer ends. These bolts grip the channel of the frame side member with their bent ends, while nuts are placed on the bolt ends and there are so tightened as to give rigidity.

The Glover Rear Tire Holder

To make possible the attachment of tires to the rear of such cars as are not designed with provisions for this end, the Glover Manufacturing Company, 250 West Fifty-fourth street, New York City, has designed the tire holder, Figs. 6, 7 and 8. This tire holder is made of steel bars and is attached to the rear cross-member of the chassis frame by means of four bolts. In order to hold the tire in position on the car the holder arms A1 and A2 are fixed to each other by the supports penetrating the triangles T, one of which is riveted to each A1 and A2. The supports are attached to the chassis. The third arm A3 slides between the triangles attached to A1 and A2. A passage is cut out along most of its length, this passage being formed by a series of circles having part of one another's area in common. A bolt B passes through a hole in each triangle and through one of the circles of the passage cut in A3; one end of the bolt carries a head while the other is bored with a hole through which the hook of a padlock is passed. The four supports S1, S2, S3 and S4 are both fixed to the triangles and the chassis member by nuts holding the whole system tight. To prevent rattling at the points of attachment to the chassis, the ends fixed to that member are threaded in two ways, right-handed at the end and left-handed a small distance from it. On each support end a nut is fixed in front and one in back of the chassis channel, being spaced by an iron sleeve and prevented from coming loose by recesses inside the nuts. Owing to the movability of A3, any size of tire may be carried.

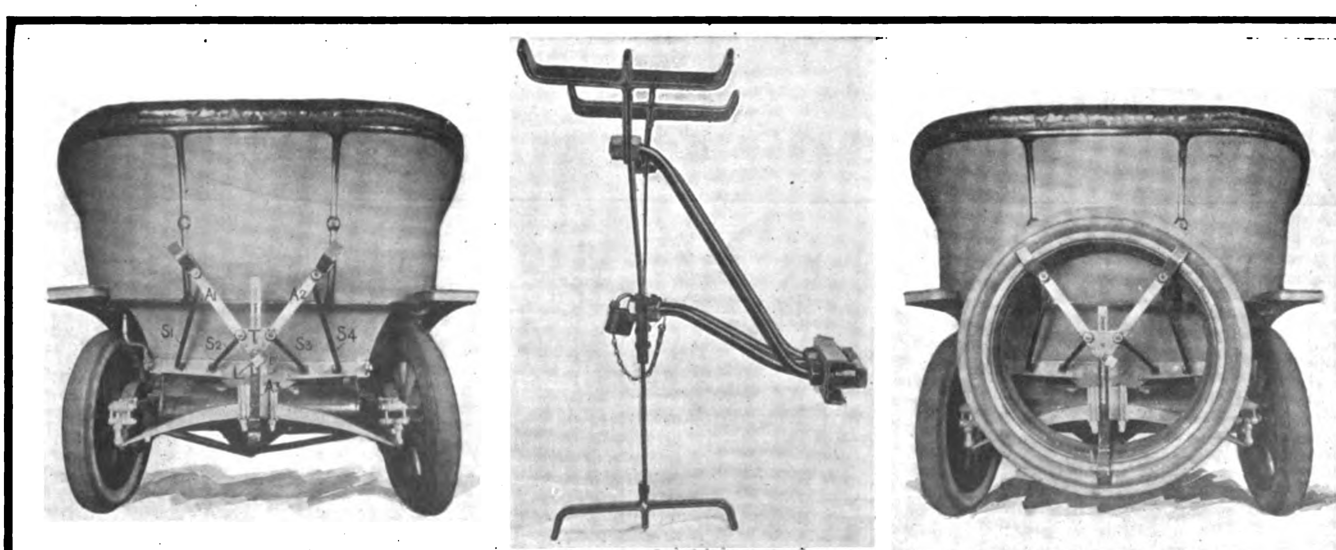


Fig. 6—Detail of Glover rear tire holder. Fig. 7—Side view, showing method of attaching. Fig. 8—Holder in place

HEADLIGHT Adjuster for Automobiles—Comprising connecting-rods and leverage whereby the headlights are always turned in the direction of the front wheels. This patent relates to a mechanism as shown in Fig. 1, where G is the cross-rod of the steering gear. Two lamps are carried by the supports S S. The connection between the lamp supports and the steering equipment is by means of the lever L which, at its middle portion, is connected to the front axle, and at one end to the steering apparatus, while its other end is linked to the rocker arm R. The lamp supports are connected by a rod C. and a rod R1 has one end secured to the rod C, and the other to the second end of the rocker arm.

No. 1,032,309—to Pembroke N. Squires, Cañon City, Col. Granted July 9, 1912; filed August 5, 1911.

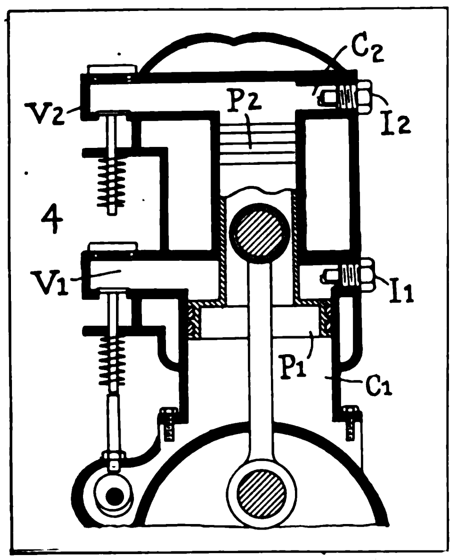


Fig. 4—Moertzsch's internal combustion motor

Differential Gearing Construction—In which the connection between gear casing and axle sections may be broken by the movement of a lever system controllable by the driver.

This patent describes a differential gearing, Fig 2, which operates in combination with a divided axle and which includes a casing D provided with teeth at its ends. Collars C are slidably mounted on the axle section A1 and A2 and their ends are provided with teeth adapted to engage those on the casing D. Keys fixed to the axle sections engage the collars, and slidably mounted pins P carry depending arms which engage the collars. Means B are provided for moving the pins within the supports and thereby engage or disengage the teeth on the casing D with those on the collars. To the casing D a gear wheel G is fixed which is driven by a pinion P1.

No. 1,032,261—to Elmo L. Wright and Thomas M. Biossat, Jr., Lafayette, Ind. Granted July 9, 1912; filed October 20, 1911.

Vehicle Supporting Device—Comprising rods and guides therefor which permit a suitable way of mounting pneumatic suspension members on the running-gear.

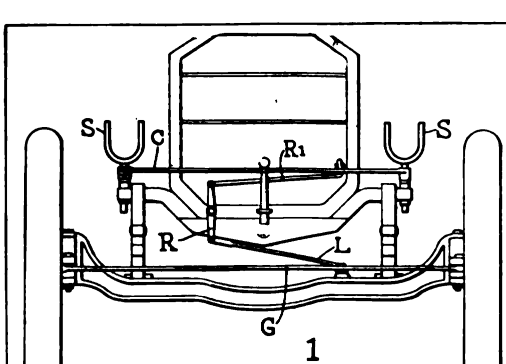
In Fig. 3 is illustrated the subject of this patent which refers to the combination of a body-frame, an axle and a pair of running-stress transmitting devices. One of these devices is located at each side of the body-frame and is interposed between the same and the axle. Each device consists of a pair of rods R held in alignment by guides G, the latter being connected by yokes Y. Body-supporting pneumatic cylinders C are pivotally connected to the yokes, being interposed between the yokes and the axle. One of the running-stress transmitting devices is pivotally connected to the axle in such a way that endwise movement of the axle relative to the frame is prevented, while the other device is so connected to the axle as to be capable of lengthwise movement relative to the same, permitting of free endwise tilting of the axle.

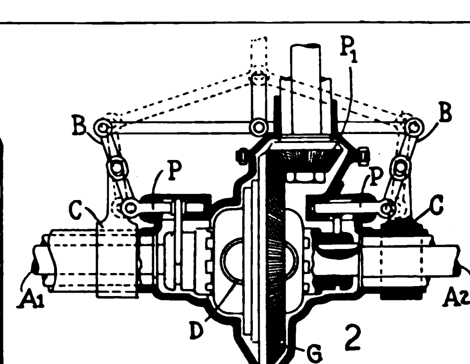
No. 1,031,759—to George Westinghouse, Pittsburgh, Pa. Granted July 9, 1909; filed October 15, 1910.

Internal-Combustion Motor—Cylinder and piston are worked with two portions of different diameters, permitting of alternate explosions in the cylinder portions.

The subject matter of this patent is an internal-combustion motor, Fig. 4, the cylinder of which has a wider and a narrower portion C1 and C2, into which fit piston portions P1 and P2. Above the end of each cylinder portion the cylinder expands into a lateral chamber in which the valve chambers V1 and V2 are contained, each being equipped with an inlet and an exhaust valve. Communicating with the lateral chambers are ignition devices I1 and I2. Means are provided whereby the sets of valves are operated alternately, and whereby alternate explosions in the combustion chambers C1 and C2 may be produced. This design and the mode of operation made possible by it results in twice as many power strokes on each crankpin as if an ordinary engine design were used. The consequence is that the running of the motor using cylinders of this design is equalized.

No. 1,031,809—to Hans Moertzsch, Detroit, Mich. Granted July 9, 1912; filed May 9, 1908.





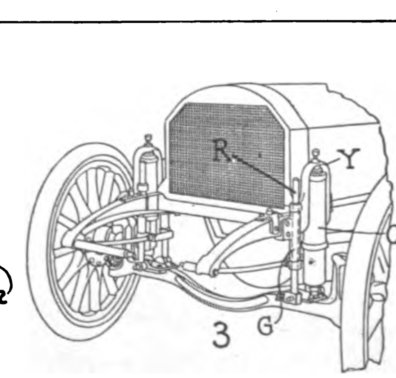


Fig. 1—Squires headlight adjuster Fig. 2—Wright-Boissat differential Fig. 3—Westinghouse's pneumatic suspension

Vol. XXVII New York—Thursday, July 25, 1912—Chicago No. 4

The Automobile

Wonderful Growth of the Industry

First 6 Months of 1912 Witness Remarkable Increase in Number of Cars Turned Out by American Factories, Especially in the Low-Priced Class—Registrations Grow Proportionately—Exports Also Gain

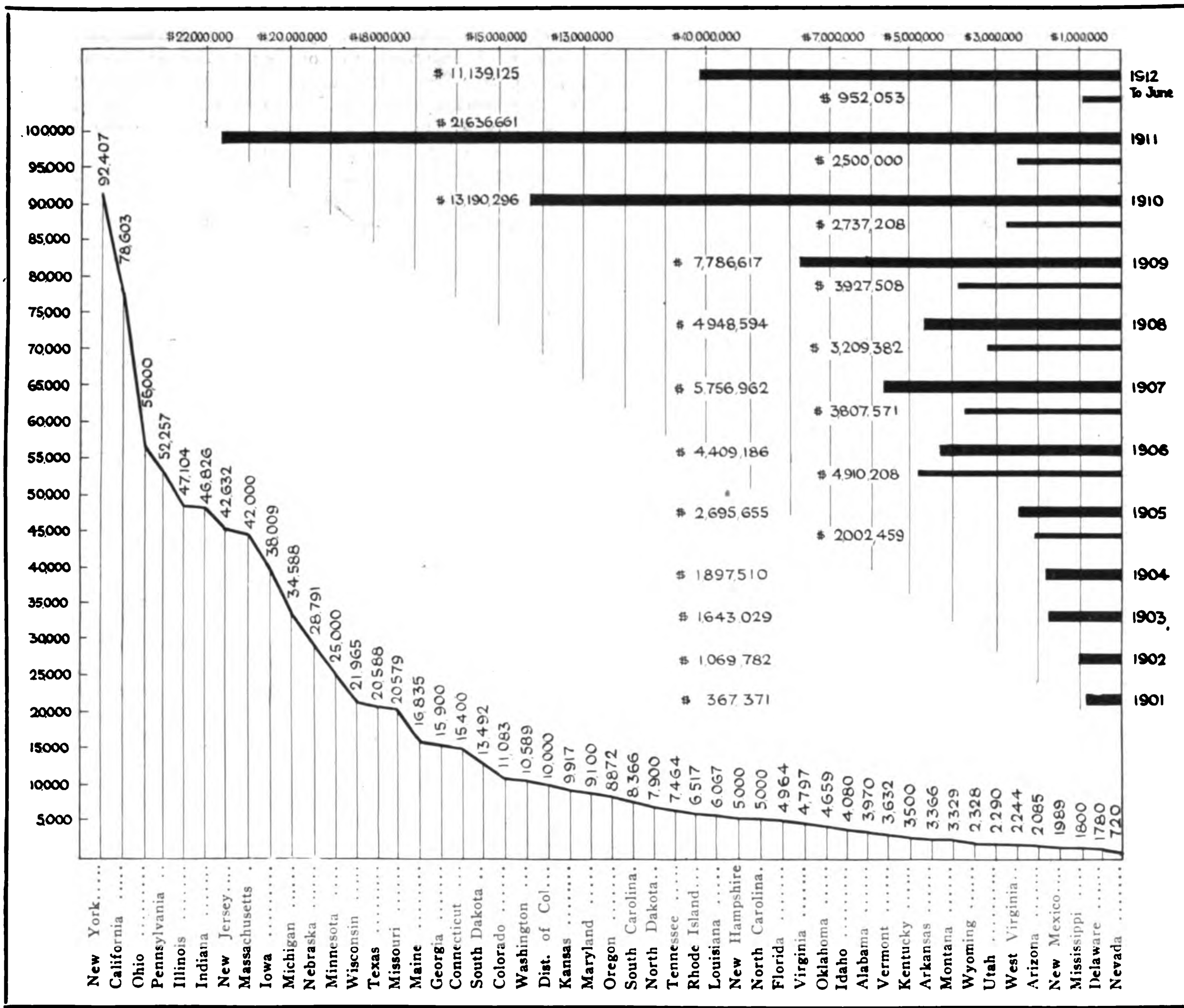
Total Registration, January 1 to July 1	859,858
Per Cent. Increase Over Entire Year 1911	18.8
Truck Registration, January 1 to July 1	31,574
Per Cent. Increase Over Entire Year 1911	24.0
Total Amount Received in Fees, Etc.	$4,769,873.29
Per Cent. Increase Over Entire Year 1911	19.6
Average Population Per Car in United States	110
Car Output, July 1, 1911, to July 1, 1912	252,569
Per Cent. Increase Over Calendar Year 1911	20.7
Value of 1912 Automobile Exports to June 1	$11,139,125
Per Cent. Increase Over 5 Months of 1911	23.5
Value of 1912 Automobile Imports to June 1	$952,053
Per Cent. Decrease from 5 Months of 1911	8.6
Automobile Companies Incorporated in 1912	801
Total Capitalization of New Companies	$136,956,740

EVER since the automobile became a common, everyday sight, and especially during the last few years when machines have come into general use in great numbers, people have indulged in more or less speculation as to the total number in operation on the streets and roads of the United States. Various guesses were hazarded, some of which turned out to be fairly accurate, while others were far below the figures given in The Automobile last winter after a careful and accurate census of the number of cars registered in every state in the Union. Everyone recognizes the fact that the automobile industry increased tremendously this spring, so The Automobile, in order to ascertain the output of American factories and the resultant sales, together with the registration figures during the past 6 months, has again taken a census of the manufacturers and of the state registration bureaus. The information resulting shows that American automobile makers built 252,569 cars of all sorts from July 1, 1911, to July 1, 1912, while the registrations have jumped to the amazing total of 859,988.

Since the conversion of New Jersey to reciprocity in exempting automobilists residing in other states from registration, the number of duplicate registrations, that is, the number of cars registered in more than one state, has been reduced to a very small number, so that it would be ultra-conservative to state that there are at present in use in the United States proper 850,000 automobiles, leaving 9,858 as the number of duplicate registrations. A table of the states, on page 161, alphabetically arranged, gives the number of registrations in each state up to July 1, together with the figures in each for the year 1911 and the number of new registrations. The table also gives the number of commercial vehicles registered at the present time, the number of electric pleasure vehicles and the total amount of revenue accruing to each state from automobile registration and chauffeurs' fees during the first 6 months of 1912. Special conditions obtaining in certain states, such as new automobile laws, lack of laws covering the registration and regulation of motor vehicles, perennial registration and local registration are mentioned as well.

In compiling this table nearly all the figures used in enumerating the pleasure cars were those given by the secretaries of state or other official in charge of the registration of automobiles, except in the case of those states in which there is at present no provision for automobile registration. In these instances it was necessary to estimate, and each estimate was made only after considerable research with references to the local conditions, population and the character of the business done by the car dealers during the past six months, care being taken to make each estimate reasonably conservative in view of the tremendous increase in the business reported from all parts of the country.

As shown by the chart on page 160, there is still a wide range of difference in the number of cars registered in the various states, New York retaining the lead with 92,407, having gained 8,438 cars since January 1, 1912. California, the next in line, shows a tremendous increase, jumping from 59,202 at the beginning of the year to 78,603 by July 1, a gain of 19,401. On account of her change of policy in regard to the registration of non-residents, New Jersey has dropped from third place to seventh with respect to the number of cars registered, Ohio moving up into her place from fourth place last winter, having increased 10,212 cars in the meantime, making her total registration 56,000. Pennsylvania has moved up one place in the line since last January, being fourth with a registration of 52,257 and showing an increase of 7,985 machines. Massachusetts, fifth in order last winter, has dropped to eighth place, being superseded by Illinois, with a registration of 47,104, a gain of 9,000. Indiana, with 46,826 cars, having gained 10,000, and New Jersey, which dropped from third place by decreasing in the number of cars registered from 48,266 to 42,632, showing that over



(Lower)—Curve representing total automobile registrations in the several states up to July 1. (Upper)—Values of automobile exports and imports from 1900 to June, 1912. The heavy lines indicating the exports and the lighter lines showing the imports

5,628 cars belonging to non-residents were not registered this year. There was an increase in the number of machines owned by residents of New Jersey as the dealers in that state report that business is good, so the number of non-residents taking advantage of the new conditions in the state must have been considerably in excess of the 5,628 decrease. Massachusetts follows New Jersey in eighth place with a registration of 42,000, showing a gain of 3,093 cars as compared with last winter's figures, while Iowa retains ninth place with 38,009 cars and an increase of 10,000, and Michigan is tenth again with 34,588 and a gain of 6,792. The other thirty-nine states and territories stand as shown in the illustration, the curve representing the number of cars registered sloping downward from Michigan's 34,588 to Nevada's 720. A number of the states have moved up the line in the past 6 months, passing others which have dropped to inferior places.

A very interesting feature of the situation with regard to the registration is the per cent. of increase in the various states. This is given in the table at the bottom of the left column on page 164 and is graphically illustrated in the chart at the top of the same page, showing the curve which represents the per cent. of gain in each state. A study of this will serve to discover a number of surprising facts with regard to the ratio of increase in the different states, and also giving an illuminating sidelight on the degree of the growth in prosperity of the states.

The average per cent. of increase in the registration of cars in the United States for the past 6 months was 24.6 as compared with 39.6 for the entire year of 1911 over 1910.

Maine's Increase Most Rapid

To the surprise of many, Maine leads the whole country in per cent. of increase in automobile registration, having added 67.5 per cent. since January 1, 1912. These figures substantiate the reports made during the spring as to the farmers buying cars with the proceeds of their potato crops. Five other states, Oregon, Mississippi, New Mexico, Delaware and Arizona, show increases of over 40 per cent., while nine more have added over 30 per cent. to their registration. The only state showing a decrease is New Jersey, which lost 11.7 per cent. in registration, or 5,268 machines, including over sixty trucks, in all probability those of the big New York and Philadelphia department stores, which, as non-residents, were not obliged to register under the new law. One of the surprising features of the study of the per cent. of increase is its regularity, as shown in the curve on page 164, Maine being the only state having a gain of over 50 per cent.

Another absorbing phase of the registration is the ratio of the number of cars registered in a state to the population. In this respect, the average obtaining throughout the country is one car to every 110 of the population. The standing of the states and territories with reference to this ratio is given in the table at the bottom of the right column on page 164 and is illustrated in the curve at the top of page 165. As shown in both the table and diagram, the District of Columbia stands first with one car to every thirty-five of the population. Nebraska and South Dakota come next with forty-five people per car, followed by Indiana, Iowa, Maine and New Jersey with sixty persons per car, and so on down the line, sixteen of the states having less than 180 people for each automobile, while twenty-one others have between 100 and 200 population for every car. The curve begins to sky-rocket right here, ending with Mississippi, which has 1,000 people for every automobile. The salient point about the curve is that it is so uniform throughout a large part of its length, pointing to a more even distribution of cars in proportion to the population than the registration by states would seem to indicate.

Trucks Show a Decided Gain

Commercial vehicles have increased considerably in number as was widely predicted last winter, the country's total jumping from 25,451 in December, 1911, to 31,574 by July 1, 1912. As in the case of the pleasure cars, New York State leads with a total registration of 7,977, as shown in the table on page 161. California keeps up her reputation by falling into second place with 3,180, while Massachusetts is a close third with 3,170. Then there is a big drop to Pennsylvania's 2,215 and the 2,100 trucks used in Illinois. Indiana and Michigan come next in line with 1,492 and 1,300 trucks, respectively. Then follow Ohio with 1,250, Iowa with 1,195 and Minnesota with 1,015.

In the electric pleasure car field, which comprises a total of 32,000 vehicles, New York is still the leading state, having approximately 6,000 of them in use. Ohio proudly bids for second place with 2,917 and Massachusetts shows her standing as an electric car state by displaying a total of 2,800, while California and Pennsylvania tie for fourth place with 2,500 apiece. Michigan and New Jersey tie for the next place at 1,500, followed by Indiana with 1,400, Minnesota with 1,200 and Wisconsin with 1,000. Thus it goes all the way down to New Mexico, which is credited with only ten electric pleasure cars.

The total revenue of the states from fees, etc., for the past 6 months was $4,769,873.29. The state making the most out of its automobile department since the first of the year is, of course, New York, whose revenue from this source totaled $941,347.25. Pennsylvania stands second, as shown in the table, with $525,679.43, while Massachusetts is third with $513,201.67 and New Jersey stands fourth in line with $369,062.04. Illinois automobilists have enriched her treasury to the extent of $305,520 in the same time, entitling her to fifth place in this respect. Ohio is sixth with $280,000, while Connecticut ranks seventh, having acquired $233,000 from her automobilists since January 1, 1912. Then there is a big drop to Minnesota, which is only $125,000 the richer for the automobiles within her borders, and to Michigan in ninth place with $119,000. Wisconsin stands tenth with revenues from her motorists to the extent of $109,825. The other states show revenues from the automobilists from $99,677 of Missouri to the $940 of Utah. Those states having no regulation for the registration of automobiles have no revenue from this source, of course, while those states in which the registration is a local matter are similarly situated, the fees generally going toward the improvement of the roads in the county in which the automobilist is resident. As the fees are usually devoted to the same end, however, in the states in which they go to swell the income of the state treasury, the result is practically the same. The states having no provision

Automobile Registrations in the United States for 6 Months of 1912, Together with the Amount of Fees Collected.

State or Territory	Total Registration	New Registration 1912	Registration up to 1912	Commercial Vehicle Registration	Electric Car Registration	Registration Fees for 1912	Remarks
Alabama	3,970	1,114	2,856	25	50	$62,500.50	New law
Arizona†	2,085	600	1,485	27	40	10,425.00	New law
Arkansas	3,366	500	2,866	30	35	16,830.00	
California	78,603	19,401	59,202	3,180	2,500	38,801.00	
Colorado†	11,083	1,600	9,483	25	150	55,415.00	Local registration
Connecticut*	15,400	1,400	14,000	500	450	233,000.00	
Delaware	1,780	529	1,251	84	75	15,425.00	
District of Columbia*	10,000	1,678	8,322	125	250	3,356.00	Perennial registratoin
Florida	4,964	1,075	3,889	105	60	2,150.00	Perennial registration
Georgia	15,900	3,532	12,368	170	300	7,064.00	
Idaho†	4,080	800	3,280	40	50	....	No state registration
Illinois	47,104	9,000	38,104	2,100	1,800	305,520.00	
Indiana	46,826	10,000	36,826	1,492	1,400	46,826.00	
Iowa	38,009	10,000	28,009	1,195	1,100	232,440.49	
Kansas†	9,917	1,600	8,317	150	125	....	No state registration
Kentucky	3,500	632	2,886	124	40	20,000.00	
Louisiana†	6,067	1,200	4,867	50	48	30,335.00	Local registration
Maine	16,835	6,790	10,045	284	200	84,076.00	Perennial registration
Maryland*	9,100	1,000	8,100	570	250	80,160.53	
Massachusetts	42,000	3,093	38,907	3,170	2,800	513,201.67	
Michigan	34,588	6,792	27,796	1,300	1,500	119,000.00	
Minnesota	25,000	5,725	19,275	1,015	1,200	125,000.00	
Mississippi	1,800	560	1,240	41	20	13,000.00	
Missouri	20,579	4,413	16,166	472	900	99,677.00	
Montana†	3,329	600	2,729	40	50	....	No state registration
Nebraska	28,791	5,697	23,094	528	700	11,394.00	
Nevada†	720	200	520	25	15	....	No state registration
New Hampshire	5,000	500	4,500	82	75	94,626.00	
New Jersey	42,632	Decrease	48,260	1,000	1,500	369,062.04	New law
New Mexico†	1,989	600	1,389	30	10	....	No state registration
New York	92,407	8,438	83,969	7,977	6,000	941,347.25	
North Carolina	5,000	1,272	3,728	88	75	25,000.00	
North Dakota	7,900	680	7,220	50	85	23,700.00	
Ohio	56,000	10,212	45,788	1,250	2,917	280,000.00	
Oklahoma	4,659	1,200	3,459	40	60	23,295.00	
Oregon	8,872	2,865	6,007	150	200	37,210.00	
Pennsylvania*	52,257	7,985	44,272	2,215	2,500	525,679.43	
Rhode Island	6,517	500	6,017	185	150	65,170.00	
South Carolina†	8,366	1,300	7,066	120	75	41,830.00	Local registration
South Dakota	13,492	2,250	11,242	122	150	2,250.00	Perennial registration
Tennessee	7,464	1,000	6,464	125	85	7,464.00	
Texas†	20,588	5,000	15,588	450	700	2,500.00	Local registration
Utah	2,290	470	1,820	38	40	940.00	
Vermont	3,632	378	3,254	80	100	66,789.38	
Virginia	4,797	777	4,020	134	150	37,500.00	
Washington	10,589	2,000	8,589	175	125	21,178.00	
West Virginia	2,244	143	2,091	54	25	22,440.00	Perennial registration
Wisconsin	21,965	6,134	15,831	610	1,000	109,825.00	New law
Wyoming†	2,328	600	1,728	34	20	11,640.00	Local registration
Totals	859,858	135,335	712,168	31,574	32,000	$4,769,873.29	

*Including non-residents. †Estimated on basis of population with reference to location and sectional registration.

EXPORTS OF AUTOMOBILES AND PARTS FOR 1909, 1910 AND 1911, AND FOR 6 MONTHS IN 1912

	1909		1910		1911		1912 to June	
	Number	Values.	Number	Values	Number	Values	Number	Values
AUTOMOBILES	4,686	$6,889,031	8,443	$11,210,295	15,807	$15,924,361	9,516	$9,351,140
Exported to								
United Kingdom	....	2,059,210	....	2,755,592	4,021	3,380,266	2,340	2,476 917
France	....	846,136	....	753,204	420	449,757	284	212,094
Germany	....	181,087	....	331,754	115	124,615	187	132,663
Italy	....	224,068	....	377,750	176	199,986	85	93,772
Other Europe	....	335,675	....	764,463	795	718,360	609	491,937
Canada	....	2,437,042	....	5,021,043	4,987	5,549,998	3,233	3,766,163
Mexico	....	494,238	....	689,903	298	492,974	76	115,130
West Indies and Bermuda	....	337,414	....	412,588	300	343,281	124	121,882
South America	....	240,453	....	519,160	1,116	1,356,445	581	704,417
British Oceania	....	303,452	....	748,983	2,476	2,217,762	1,345	1,286,264
Asia and other Oceania	....	191,448	....	599,756	813	795,576	455	476,929
Other countries	....	136,394	....	216,150	280	295,341	197	171,956
Parts of (except tires)	....	897,586	....	1,980,001	....	3,254,123	....	1,791,974
Total	....	$7,786,617	....	$13,190,296	....	$19,178,484	....	$11,139,125

as yet for registration and regulation of automobiles, namely, Idaho, Kansas, Montana, Nevada and New Mexico, are coming to recognize the value to the people of imposing a slight tax on automobiles in this manner, creating as it does a considerable sum each year for the betterment of the existing roads throughout the state and the building of new roads as the need arises. It will not be very long, in all probability, before these states will pass laws bringing about a state of things very similar to that now existing in other states in this respect. The automobilists will not object, even though it puts them to a slight increase of expense to be figured in the yearly upkeep of their cars, for they know that such a condition of affairs points to better roads and more roads throughout the state, which, for them, means increased pleasure and comfort as well as a wider radius for short tours. Those states which at present have laws which do not provide for yearly registration, that is, where a single registration suffices for all time, show some indications of preferring the yearly registration system with its accompanying increase of revenue and corresponding improvement of the highways, so that they, as well as the states which do not register cars at present, will conform to the more general practice.

Registration Increase, 19.7 Per Cent

To increase the registration throughout the United States in such a marked degree as the figures indicate, the sale of automobiles must have been enormous in the past 6 months. And, naturally, in the logical course of reasoning, this means a greatly increased production of cars. In order to determine the extent of the output of automobiles by American factories during the year ending July 1, 1912, THE AUTOMOBILE sent letters to every automobile manufacturer in the country, requesting information as to the number of pleasure cars and the number of commercial vehicles turned out by him during that period. Nearly all of them answered, giving the desired information, and in the cases of the others, agents and dealers were able to give approximate information as to the total production for that time. When the figures thus secured were totaled, it appeared that American manufacturers produced 252,569 self-propelled vehicles from July 1, 1911, to July 1, 1912. These consisted approximately of the following:

Gasoline pleasure cars	228,369
Gasoline trucks	16,500
Motor fire apparatus	700
Electric pleasure cars	6,000
Electric trucks	1,000
Total	252,569

At first glance, this number may seem tremendous, but, when compared with the output of American-built cars in the year 1911—209,957 cars—it seems well within reason, the makers having predicted an output of 247,427 for the year 1912. The 252,569 represents half of 1911 and half of 1912, so it looks as if the makers are keeping their promise, though, of course, that cannot be determined until the end of the year.

An interesting side to the output total is the fact that a larger percentage of it than ever is made up of small, low-priced machines, two companies alone turning out over 80,000 cars during the year from July 1, 1911, to July 1, 1912. This also has another effect on the situation, that is, with reference to the average price of the American-built car. As shown in the chart on page 165, this has been steadily declining ever since 1907, the year in which it attained its highest level, $2,137.56. Last year it was $1,245.99, and this year it has dropped to $1,083.10. The small cars form the bulk of the automobile exports of the country, the average price of the cars exported during the past 6 months being $977.98. The difference in the average price caused by the wide use of the higher-priced cars in the United States is significant.

The enormous output of the small machines as compared to the larger ones points out another interesting fact. This is the

IMPORTS OF AUTOMOBILES AND PARTS FOR 1909, 1910 AND 1911, AND FOR 6 MONTHS IN 1912

	1909		1910		1911		1912 to June	
	Number	Values.	Number	Values	Number	Values	Number	Values
AUTOMOBILES	1,645	$3,071,002	1,024	$2,080,555	972	$2,098,481	361	$826,123
Imported from—								
United Kingdom	101	233,383	94	212,969	173	403,506	76	183,271
France	928	1,670,900	556	1,066,356	341	770,643	195	471,703
Germany	127	321,033	129	314,577	160	350,239	27	60,222
Italy	418	689,454	169	312,478	131	203,733	35	333,118
Other countries	71	156,232	76	174,175	167	370,360	23	57,440
Parts of (except tires)	....	865,506	....	656,653	....	347,767	....	125,930
Total automobiles, and parts of	....	$3,936,508	....	$2,737,208	....	$2,446,248	....	$952,053

degree to which the American automobile factories have become organized, systematized and standardized so that everything works along smoothly, resulting in a large output, which, however, is not of a spasmodic character, in spite of its magnitude.

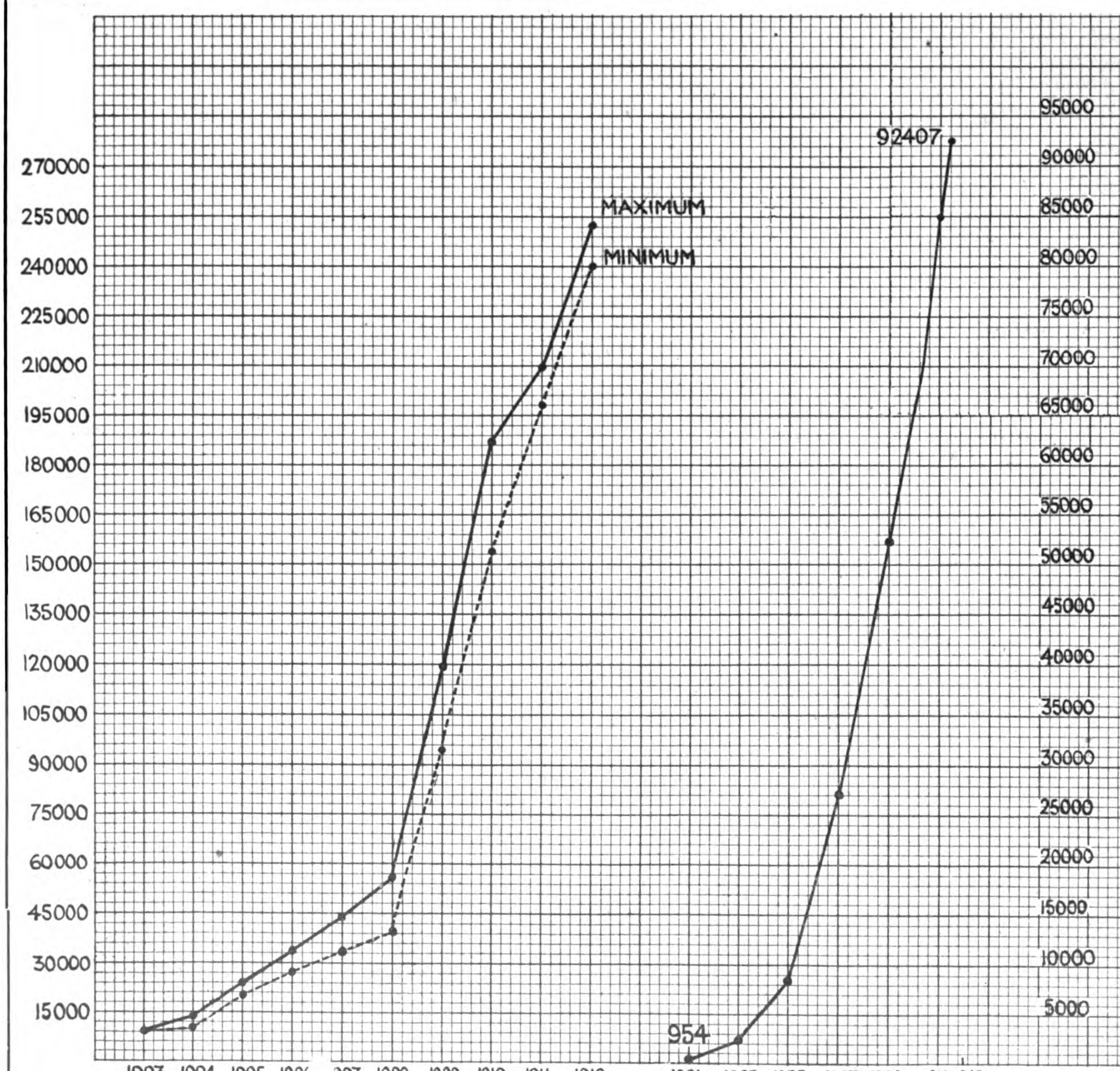
The last 6 months have been very busy ones for the industry, almost every factory in the field doing something with a view to either increasing its capacity or bettering its appointments and equipment. A great many of them have been putting up additions, some large enough to double the former capacity of the establishment, while others have built or leased new factories, finding their previous quarters too small for their rapidly increasing business.

Many Companies Incorporated

The number of companies incorporated in the last 6 months for the purpose of manufacturing and selling automobiles and parts and for renting automobiles, running motor truck and bus lines, conducting garages and repair shops and manufacturing and selling accessories—801—gives a fair idea of the activity in the field since the first of the year. The total number of those incorporated during this period as intending to manufacture and sell automobiles and parts is 449, while the others amount to 352. The total capitalization of these companies is $136,956,740, the capital of those formed to make and deal in cars and parts aggregating $70,291,700, while that of the other concerns is $66,665,040. It is interesting to note the variation in the incorporations from month to month, as shown in the following tabulation:

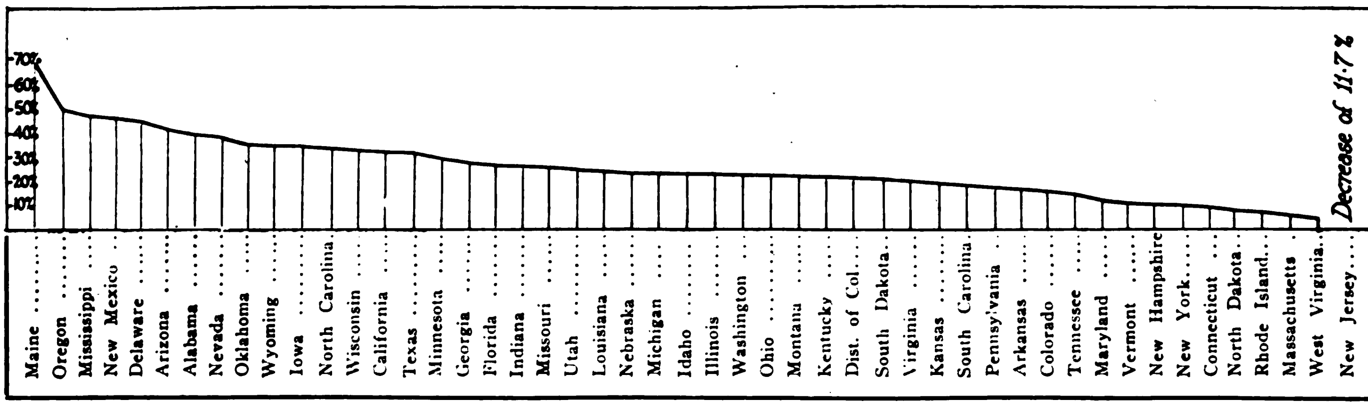
Month	Automobiles and parts	Capital	Garages etc.	Capital
January	71	$8,856,500	38	$2,578,500
February	90	9,231,500	75	4,613,000
March	59	9,258,100	55	2,966,500
April	79	11,902,600	72	4,593,000
May	89	21,224,000	75	50,134,600
June	61	9,819,009	37	1,779,440
Total	449	$70,291,700	352	$66,665,040

This gives an average of 134 incorporations per month, with an average capitalization of $170,982.19. Of these, seventy-five companies were incorporated a month on the average to make



Curve representing annual output of American cars from 1902 to date

Growth of New York State registration since 1900



Curve indicating percentage of increase in automobile registration in each state from January 1, 1912, to July 1

and sell automobiles and parts, with an average capital of $156,551.67, together with an average of fifty-nine other companies connected with the automobile industry having an average capitalization of $189,389.31

The United States has settled into first place as the leading automobile-exporting nation of the world, the value of the exports of automobiles and parts from our shores to foreign countries steadily increasing, while the value of the imports is correspondingly decreasing. As shown in the chart on page 160 and in the tables on page 162, the value of the exports for the first 5 months of the year 1912 was $11,139,125 and the value of the imports for the same period $952,053. In comparison with the figures for the entire year of 1911 the above figures show a large increase, as the total valuation of the exports in that year was $21,636,661. The value of the imports for 1911 was $2,500,000, which, when contrasted with the figures for the first 5 months of this year, given above, plainly show the rapid rate at which importation is decreasing. If this present rate of decrease continues, and there is no reason why it should not, the total value of the imports at the end of the year 1912 will be $600,000 less than at the end of the year 1911. On the other hand, the value of the exports will probably touch $25,000,000.

Great Britain Takes Many Cars

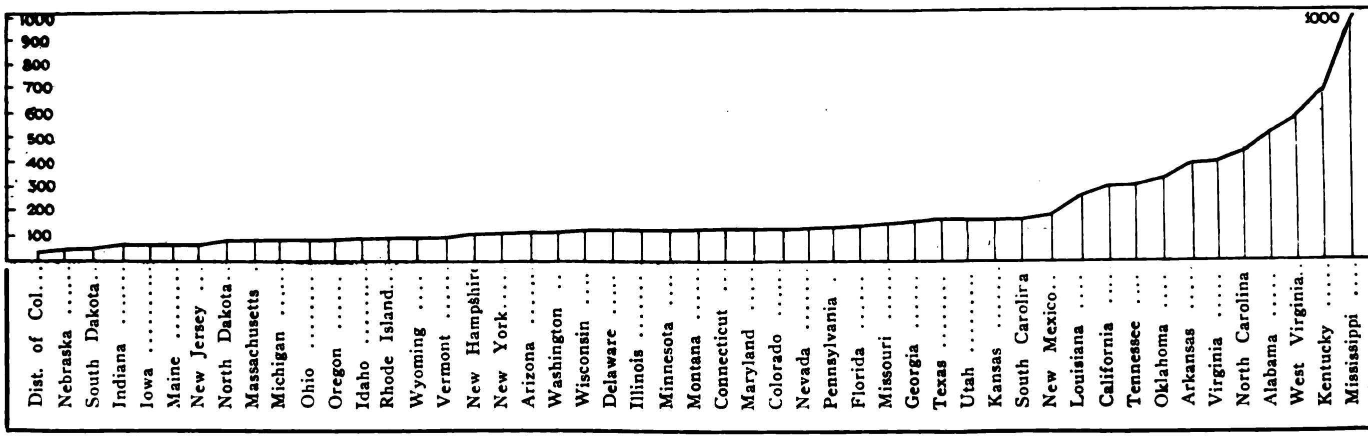
As shown in the tables on page 162, the value of the exports to the United Kingdom for 1912 up to June 1 is $2,476,917 against $3,380,266 for the entire year of 1911. The value of the imports from the United Kingdom amounts to $183,271 for the first 5 months of 1912, while they amounted to $403,506 for the whole 12 months of 1911.

PERCENTAGE OF INCREASE IN REGISTRATION SINCE JANUARY 1, 1912

STATE OR TERRITORY	PER CENT. INCREASE
Maine	67.5
Oregon	47.8
Mississippi	45.2
New Mexico	43.2
Delaware	42.5
Arizona	40.5
Alabama	39.8
Nevada	38.5
Oklahoma	34.8
Wyoming	34.8
Iowa	34.6
North Carolina	34.1
Wisconsin	33.8
California	32.7
Texas	32.2
Minnesota	29.7
Georgia	27.8
Florida	27.5
Indiana	27.2
Missouri	27.1
Utah	26
Louisiana	24.7
Nebraska	24.6
Michigan	24.5
Idaho	24.4
Illinois	23.5
Washington	23.3
Ohio	22.4
Montana	22
Kentucky	21.8
District of Columbia	20
South Dakota	20
Virginia	19.6
Kansas	19.2
South Carolina	18.4
Pennsylvania	17.7
Arkansas	17.4
Colorado	16.9
Tennessee	15.5
Maryland	12.4
Vermont	11.6
New Hampshire	11.1
New York	10.3
Connecticut	10
North Dakota	9.4
Rhode Island	8.3
Massachusetts	7.9
West Virginia	6.8
New Jersey ... Decrease..	11.7

PER CAPITA DISTRIBUTION OF AUTOMOBILES IN THE SEVERAL STATES

STATE OR TERRITORY	POPULATION PER CAR REGISTERED
District of Columbia	35
Nebraska	45
South Dakota	45
Indiana	60
Iowa	60
Maine	60
New Jersey	60
North Dakota	75
Massachusetts	85
Michigan	85
Ohio	85
Oregon	85
Idaho	90
Rhode Island	90
Wyoming	90
Vermont	94
New Hampshire	100
New York	100
Arizona	110
Washington	110
Wisconsin	115
Delaware	120
Illinois	120
Minnesota	120
Montana	125
Connecticut	130
Maryland	130
Colorado	135
Nevada	145
Pennsylvania	150
Florida	160
Missouri	165
Georgia	175
Texas	180
Utah	180
Kansas	185
South Carolina	185
New Mexico	200
Louisiana	285
California	315
Tennessee	315
Oklahoma	350
Arkansas	415
Virginia	420
North Carolina	450
Alabama	520
West Virginia	570
Kentucky	685
Mississippi	1,000



Curve indicating ratio of population in the several states to the number of automobiles registered up to July 1

During the first 5 months of this year the value of the automobiles exported to France was $212,094 up to June 1, and the figure for 1911 was $449,757. More cars are imported to the United States from France than from any other country, it being the only country besides Italy whose imports have increased proportionately in the first 5 months of 1912 to the entire year 1911. The value of the imports from France up to June 1 of this year was $471,703 as compared with $770,643 in the whole of 1911. The most remarkable increase in our exportation has been made in our commerce with Germany, to which country automobiles valued at $132,663 have been exported during the first 5 months of 1912, while the exports to that country during the 12 months of 1911 were valued at only $124,615, an increase of $8,048. A comparison of the number of cars shipped to Germany during the first 5 months of 1912 and the 12 months of 1911 show plainly that the lower-priced American cars are finding a growing market in Germany, as the number of automobiles exported in 1911 was 115 and up to June 1, 1912, there were 187 cars, an increase of 72. Correspondingly, the importation of automobiles from Germany show a great falling off, the value of the cars imported up to June 1 of this year being $60,222 and the number of cars being 27, while in 1911 the entire importation amounted to $350,239 and the number of cars was 160.

Canada Gets Bulk of Our Exports

The exports to Italy up to June 1 amounted to $93,772 and for 1911 they were valued at $199,986. The imports from Italy in 1912 up to June 1, however, have increased by $129,385 over the total imports from that country in 1911, as the valuation of this year's importation is $333.118 and in 1911 it was $203,733 for the entire year.

Canada maintains the lead of foreign countries using American cars and the value of our exports to that country for the first 5 months of this year falls short of the figures for the entire year of 1911 by only $1,783,825. Our exports to Canada during 1911 were valued at $5.549.998 and in the first 5 months of this year the value of the automobile exports was $3,766,163.

In 1912, $704,417 worth of machines built in the United States were exported to South America up to June 1, while, in the whole year of 1911, $1,356,445 was invested by the people of that continent in our motor cars.

It is the lower-priced American cars that have the largest foreign market, because, as a general thing, the foreigner who can afford to buy a higher-priced car is satisfied with the product of his own country. Recently the lower-priced American automobile has been gaining favor abroad, as is evidenced by the fact that the average price of the exported cars has dropped from $1,000.70 in 1911 to $977.98 in the first 5 months of 1912.

The value of the tires exported from this country increased from $1,838,482 in June, 1911, to $2.335.920 in May, 1912, or $497,438.

That American-made automobiles have established themselves firmly on foreign soil is clearly shown by the tremendous increase in the value of the cars exported from this country in the past 10 years. As will be seen upon referring to the upper right of the chart on page 160, the value of the cars and parts exported in 1901 was only $367,371, while in 1905 this business amounted to $2,695,655. In 1905, which is the first year for which any importation records are available, they were valued at $2,002,459. In the following year they reached their highest point at $4,910,208, and the exports for that year were $4,409,186. After 1905 the imports fluctuated very much, but the exports continued to gain steadily. In 1909, the exports reached $7,786,-617 and the imports touched their second highest figure, $3,927.508, but one year later the imports had lost almost 100 per cent., while the exports had gained almost the same amount. In 1911 the imports dropped to $2,500,000 and the exports jumped to $21,636,661. Up to June 1, 1912, the value of the exports was $11,139.125 and the imports were valued at $952,053. With 7 months of this year left after these figures were compiled, in which to carry on business, it is safe to predict that the value of the exports for 1912 will reach $25,000,000.

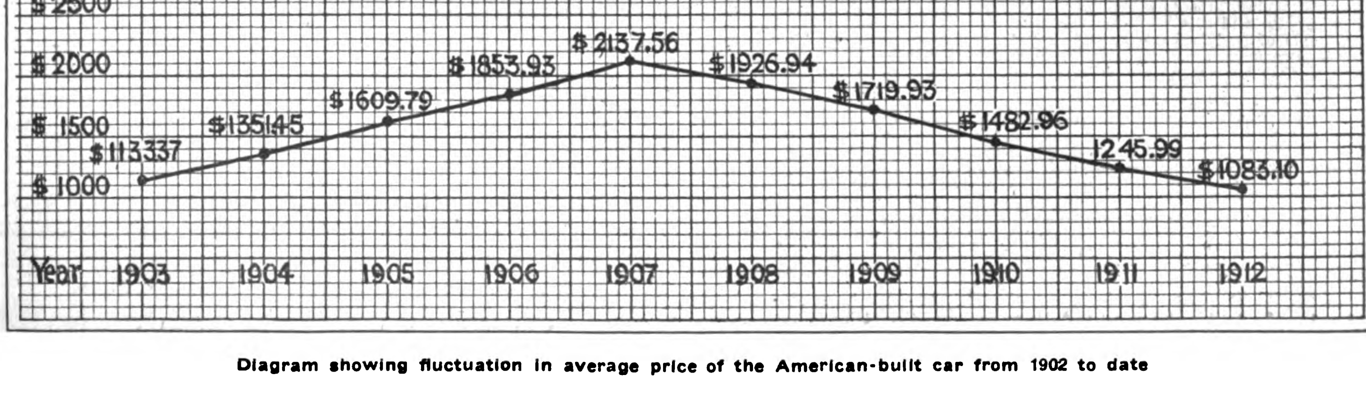


Diagram showing fluctuation in average price of the American-built car from 1902 to date

Legal News of the Week

Enterprize Automobile Company Wins Suit in Which Infringement Against Dyer Patents Was Claimed

Bergdoll Appeals $104,000 Judgment in Favor of Westinghouse—Ford Enjoins Price Cutters

LETTERS patent 921,963 and forty claims set forth in letters patent 885,986 were sustained and declared to be valid and infringed in the suit brought by the Enterprize Automobile Company of Hoboken, N. J., against Albert Solvay, a Brooklyn liveryman, owner of two Darracq cars by Judge Van Vechten Veeder in the United States District Court for the Eastern District of New York.

The patents in suit were the Dyer patents covering an automobile vehicle and a selective type of transmission.

Proof of the patent was made and a defense was filed on behalf of Solvay. The final argument was made June 10 and the matter has been in the hands of the court since that day.

The interlocutory decree awarding an injunction, accounting and damages is as follows:

At a Stated Term of the United States District Court for the Eastern District of New York, held in the Post Office Building, Borough of Brooklyn, on this 19th day of July, 1912.
Present:

HON. VAN VECHTEN VEEDER, UNITED STATES JUDGE.

ENTERPRIZE AUTOMOBILE COMPANY, Complainant,
vs. } In Equity.
ALBERT SOLVAY, Defendant.

INTERLOCUTORY DECREE.

This cause having come on for final hearing on the pleadings and proofs herein, now, on consideration thereof and after hearing John Robert Taylor, Esq., of counsel for the Complainant, and on motion of Dyer, Dyer & Taylor, Solicitors for the Complainant, it is

ORDERED, ADJUDGED and DECREED as follows, to wit:

1. That United States Letters Patent No. 885,986, granted April 28. 1908, to Leonard H. Dyer, for Transmission Gear for Motor Vehicles, and United States Letters Patent No. 921,963, granted May 18, 1909, to Enterprize Automobile Company on the application of Leonard H. Dyer, for Automobile Vehicle, said patents being the Letters Patent in suit, are good and valid Letters Patent; that the said Leonard H. Dyer was the original and first inventor of the inventions described in said Letters Patent; that the Complainant, Enterprize Automobile Company, above named, is now, and continuously since the 18th day of May, 1909, has been possessed of the entire legal right, title and interest in and to the said Letters Patent 921,963, and in and to the inventions covered thereby, and is now, and continuously since the 21st day of September, 1908, has been possessed of the entire legal right, title and interest in and to the said Letters Patent 885,986, and in and to the inventions covered thereby.

2. That the Defendant, Albert Solvay, has infringed upon each and both of said Letters Patent, and upon the exclusive rights of the Complainant under the same, by using and selling automobile vehicles constructed in accordance with the inventions of said Letters Patent 921,963 and all three claims thereof, and transmission gears for motor vehicles constructed in accordance with the inventions of said Letters Patent 885,986 and claims 1 to 17 inclusive, 20 to 31 inclusive, 46, and 48 to 57 inclusive thereof.

3. That the Complainant recover from the Defendant, Albert Solvay, the profits, gains and advantages which the said Defendant has received or made, or which have arisen or accrued to him by reason of any infringement of each and both of the said Letters Patent, together with the damages which the Complainant has sustained by reason of such infringement.

4. That this cause be referred to .... specially appointed as Master by this Court by reason of his experience in such matters, to ascertain and take and report to the Court an account of the said profits, and also the amount of damages sustained by the said Complainant from said infringement; that the Complainant upon said accounting have the right to cause an examination of the Defendant, Albert Solvay, and his servants, agents, attorneys, employees, workmen and confederates, *ore tenus*, or otherwise and also to cause the production of the books, vouchers and documents of said Defendant, and that the said Defendant and his servants, agents, attorneys, employees, workmen and confederates attend for the purpose of such accounting before said Master, from time to time, as he shall direct.

5. That a perpetual injunction be issued herein against the said Defendant, Albert Solvay, and his servants, agents, attorneys, employees, workmen and confederates, and each and every of them, enjoining and restraining them and each and every of them from directly or indirectly making, constructing, using, vending, delivering, working or putting into operation or use, motor vehicles like or similar to those which the said Defendant has heretofore made or used, or sold, in infringement of either or both of the aforesaid Letters Patent, and from directly or indirectly in any manner counterfeiting or imitating the inventions of Letters Patent No. 921,963, and claims 1 to 17, inclusive, 20 to 31, inclusive, 46, and 48 to 57, inclusive, of Letters Patent No. 885,986, or upon the rights of the Complainant under the same.

6. That the Complainant recover of the Defendant its costs, charges and disbursements in this suit to be taxed, and that the Complainant have execution therefor forthwith.

VAN VECHTEN VEEDER,
United States Judge.

The seventeen claims of patent 885,986 which were not covered, or which were not mentioned in the decree are as follows: Claim 18 covers a phase of reduced speed gearing that is disconnected when not in use. Claim 19 is the same except that includes a reversing gear. Claims 32 to 45 deal with details of operation, 47 is for a means for directly connecting the driving and driven shafts with all intermediate gears at rest. The seventeen claims were not in issue so far as appears on the record.

While the court went to considerable length in considering the case, the defense that is promised when the same patents are tried out in the basic suits against the Maxwell, Winton, Locomobile and Saurer companies will be much more elaborate and detailed.

Bergdoll Appeals Big Judgment

PHILADELPHIA, July 22—Judgment of $104,000 in favor of the Westinghouse Machine Company rendered last week by Judge Audenried in Common Pleas Court in a suit against the Louis J. Bergdoll Motor Company, has been appealed by the latter.

The dispute arose over differences regarding the terms of a contract entered into about 3 years ago for the manufacture and delivery of 1000 motors by the Westinghouse Company, to be delivered within a specified time to the Bergdoll Company.

Officials of the Bergdoll Company today outlined their side of the case substantially as follows: Back in 1910, shortly after the organization of the Louis J. Bergdoll Motor Company, a contract was entered into with the Westinghouse Machine Company for the furnishing of 1000 gasoline motors to be used in the building of the Bergdoll 30. These motors were to be furnished in specified allotments as required. Over half the number were manufactured and delivered before the trouble began. Then the defendant company contends that a hitch occurred in the delivery of the balance—about 450—around which the suit revolves. In this contention the Bergdoll Company complains that it lost money in unfilled orders owing to the failure of the plaintiff to furnish the motors with which to equip the cars, the company being unable to keep pace with sales. In the meantime to avoid future complications the Bergdoll Company established a shop and began the manufacture of its own motors, not only for the 30, but also all other models and refused to accept the 450 when completed, claiming justification for the refusal on the grounds that the machine company had not delivered the remainder of the motors at the agreed-upon time. This contention was decided as being without merit by the Court.

Judge Audenried in rendering decision said that the Westinghouse Company was not bound to find a market for the motors the Bergdoll Company refused to take, and awarded the former concern the amount due on the balance of unaccepted motors.

Injunctions Against Price-Cutters

BUFFALO, N. Y., July 22—Judge Hazel late this afternoon granted a temporary injunction to the Ford Motor Car Company restraining the International Automobile League of Buffalo, composed of John H. Tranter, Alfred C. Bidwell, William Priess and John C. Hurley, from selling Ford automobiles at less than the standard price, infringing on Ford patents and from federating with the dealers to procure machines at less than cost. The officials of the International Automobile League of Buffalo are ordered by Judge Hazel to appear in court on Tuesday, July 30, to show cause why the injunction should not be made permanent and also to appear before him the first Monday in September in reply to the bill of complaint.

A perpetual injunction has been granted by the United States District Court against Bloomingdale Brothers, a New York department store, forbidding the company to sell Mosler sparkplugs at less than list price.

A suit of the same general character as the above has been entered on behalf of A. R. Mosler & Company against the Auto Surplus Stock Syndicate and William Wooster, its president.

Thropp Patent Is Invalid

Court Holds Tire-Making Machine Was Anticipated by Fisk Device—Mais in Receiver's Hands

Case Companies in Peculiar Legal Tangle—DeTamble Creditors File Bankruptcy Petition

BOSTON, July 20—Judge Brown of the United States District Court of Massachusetts has given his decision in the case brought against the Fisk Rubber Company of Chicopee by the De Laski & Thropp Circular Woven Tire Company, in which he dismissed the bill brought by the latter company. The opinion was rendered July 16 at the Federal building in Boston. The judge in his opinion says:

The bill alleges infringement of claims 1 and 2 of letters patent No. 822,561 to P. D. Thropp for apparatus for manufacturing wheel tires. Application was filed November 1, 1905; the patent is dated June 5, 1906. The invention relates especially to apparatus for holding a clencher tire in position during the vlcanizing process.

1. Tire forming apparatus comprising an annular core or mandrel, annular pressure rings arranged to engage the clencher edges of the tire, leaving the outer body portion of the tire exposed and means for forcing the pressure rings into a predetermined position with respect to the core or mandrel.

2. Tire forming apparatus, comprising an annular core or mandrel provided with an inwardly extending rib, pressure rings arranged to engage the clencher edges of the tire on opposite sides of said rib, leaving the outer body portion of the tire exposed and means for forcing the pressure rings against the opposite sides of the rib.

Complainants say the invention lies in the apparatus for molding and giving pressure to tire casing during the vulcanization; that the apparatus is adapted for use in producing automobile tire casings by what is called the "one cure, wrapped tread method," in which the inner casing, including the tread, is built upon a core or mandrel at one time of green or unvulcanized stock. The side pressure rings are then applied, which inclose the inner or clencher part of the tire, leaving the outer body portion unenclosed. The whole is then spirally wrapped with a porous tape, and so is submitted to a vulcanizing heat, after which the wrapping, pressure rings and mandrel or core are removed and the casing is entirely completed. Complainants state that many advantages result from the use of this apparatus, both in the quality of the product through the avoidance of pinching or of buckling, which is said to attend the use of the full or closed mold of the prior art, by reason of the difficulty in estimating accurately the amount of rubber necessary for the proper filling of the closed mold, and in the ease, speed and lessened cost of manufacture. It is claimed that the patent in suit is basic, being the first apparatus adapted for the manufacture of one cure, open cure, wrapped tread tire casings, in which substantially the inner half of the casing (that is, the clencher part) is molded, and the outer half open cured.

The utility of the apparatus is shown by the testimony to the effect that by July of the year 1910 nineteen manufacturers of automobile tire casings used this device and paid royalties therefor to the complainants. The most important defense is that of invalidity of the patent in view of prior patents and of the prior unpatented art. The defendant states that the Thropp patent shows an open mold as distinguished from a closed mold, and that an open mold is in all respects like a closed mold except that the outer edges of the mold sections are cut away to expose a part of the sheath. In both forms the mold must enclose and engage the clencher part of the sheath. The defendant has introduced a large amount of testimony as to devices of the prior art preceding Thropp's date of invention. Thropp claims as his date of conception February 1, 1905. In interference proceedings the patentee, Thropp, on March 2, 1907, filed a sworn preliminary statement in the patent office to the effect that he conceived the invention and first made a drawing or sketch of it about Feburary 1, 1905 that a full-sized working model was first disclosed to others on or about March 1, 1905; that a full-sized working model of the invention was made on or about July 15, 1905, and that he first reduced his invention to practice on or about July 20, 1905.

The defendant has produced voluminous evidence, called the Akron evidence, as to the making of designs for molds by the B. F. Goodrich Company, the manufacture of molds, and the use of these molds in January, 1905, for the manufacture of single-open cure wrapped tread automobile tires. It has also proved that the first four of these tires were delivered to the Baker Electric Vehicle Company, of Cleveland, Ohio, January 10, 1905. Drawings for an open heat mold dated December 22, 1904, are produced, which show a mold comprising a mandrel and annular pressure rings arranged to engage the clencher edges of the tire, leaving the outer body portion of the tire exposed; also open-heat molds for a fillet to be used in connection with the pressure rings.

In the patent in suit it is said:

"The outer edges of the pressure rings are made quite thick, as shown at 11 and 12, in order to make them firm."

Also the following:

"In operation, the several elements of the tire having been placed in position, on the core and the pressure rings forced into position by bolts 8, filling rings 17-18 of wedge shape in cross-section are placed against the sides of the tire above the thick edges 11 and 12 of the pressure rings, and the whole is wound with a wrapping of tape, the filling pieces 17-18 serving to impart the pressure of the winding tape to the sides of the tire to hold the latter in position during the vulcanizing process."

The fillet molds shown in the Akron evidence are for producing filling pieces corresponding to those shown in the patent in suit. The filling rings are elements of claim 3, but are not elements of claims 1 and 2. The omission of these wedged-shaped filling pieces from the apparatus of the patent in suit would leave a portion of the outer tread at a considerable distance from the winding tape, so that the winding tape would no exert its pressure upon parts of the outer portion of the tire. Nevertheless, the defendant has shown a device which in all substantial particulars is an anticipation of what is shown in the drawings of the patent in the suit, and which is doubtless apparatus for holding a clencher tire in position during the vulcanizing process in connection with a winding tape. If the claims in suit can be distinguished by the omission of the fillets, and cover apparatus in which the outer edges of the pressure rings are made sharper and longer so as to dispense with the use of fillets, this must be regarded as merely a difference in form which does not meet the defense that the prior art shows rigid mold section for the clencher or inner part of the tire adapted to be used with a cross wrapper for the curing of tire casings in open heat. * * *

It seems unnecessary upon the question of anticipation to refer specifically to devices other than the devices proved in the Akron defense further than to say that they thoroughly establish the fact that the single cure wrapped tread process was familiar in the art, and therefore that the patent in the suit cannot be construed with the breath that would be given to it if it were for the first apparatus which embodied this method of curing tires. It may, however, be properly considered upon the evidence in the case as for apparatus which comprehends rigid molds for the inner part of the tire, capable of exerting considerable pressure at that point, while leaving the outer part of the casing free for the open cure wrapped tread process. So considered I am of the opinion that it is anticipated by the production and use of substantially similar apparatus by the Goodrich Manufacturing Company, and that anticipation is not avoided by the fact that in the claims in suit the fillets are omitted. The lengthening of the edges of the pressure rings so as to obviate the use of fillets is not indicated in the specification of the patent in suit; and if the omission of fillets from claims 1 and 2 is sufficient to support the inference that the patentee had in mind a structure of other form than that shown in the drawings and described in the specification, it must be upon the view that such change was obvious. There is described in the patent in suit nothing patentable over the prior Goodrich structure, even if the claimant's pressure rings were so constructed as to obviate the use of fillets.

I am of the opinion that claims 1 and 2 of the patent in suit are invalid by reason of anticipation.

The bill will be dismissed.

Receiver for Mais Truck Company

INDIANAPOLIS, IND., July 22—On a suit brought in the superior court by Edwin King, Judge Collier has appointer Franklin Vonnegut receiver for the Mais Motor Truck Company. It is probable that steps directed toward the sale of company's property will be taken within the next 30 days.

King is a contracting builder who built a factory building for the company at a cost of $5,050 on which he has received $2,800. The suit was brought to protect a mechanics' lien against the property. King alleges the company is in danger of insolvency and has no money with which to conduct its business. He does not charge, however, that the company is insolvent at the present time.

At Odds Over Delivery of Mails

RACINE, WIS., July 22—The J. I. Case Threshing Machine Company, manufacturing Case cars, and the J. I. Case Company, the sales end of the J. I. Case Plow Works, of Racine, Wis., are engaged in a legal battle over the right to the delivery of mail. The threshing machine company has for many years received all mail addressed J. I. Case Company and when the plow works recently organized a subsidiary under the style of J. I. Case Company the matter was presented to the postoffice department which ruled that the delivery of all Case mail to the threshing machine and motor car company was proper and should be continued. The matter is now in the Circuit Court at Racine.

Receiver Named for De Tamble

ANDERSON, IND., July 22—John C. Teegarden, an attorney of this city, has been appointed receiver for the De Tamble Motor Company. The action was taken on a petition brought in the federal court in Indianapolis, alleging that the company is insolvent and has been paying certain creditors, thereby making their claims preferred. The creditors filing the involuntary bankruptcy petition were the Class Journal Company, Michelin Tire Company and St. Louis Screw Company, whose claims aggregate $5,476.32.

READING, PA., July 22—Final distribution to the creditors of the Duryea Power Company of this city has been made. The sum involved was $1,156, the principal claims being by Joseph Middleby and H. M. Sternburgh.

The United States Supreme Court heretofore decided that the claim of the Berks County Trust Company against Mr. Sternburgh for $26,000 on stock subscriptions was invalid and the aforesaid claim was the chief asset of the defunct company.

Part of the tour halting after climbing out of the Ohio River valley, opposite Wheeling, W. Va.

Business Results from The Four-States Tour

Novel Trip of the Indiana Manufacturers Brings Prospectives in Close Touch With Hoosier Product

On the bridge over Big Sandy

HUNTINGTON, W. VA., July 21—Afloat upon the Ohio River to-night are eight Indiana motor cars participating in the Four-States tour of the Hoosier manufacturers. At 3 o'clock to-morrow morning in tow of the old stern-wheeler "Tacoma," they will start down the muddy river to Maysville, Ky., a distance of about 100 miles.

There have been many interesting incidents in the week's sojourn in Ohio and the entrance into the country below the Mason and Dixon line. For example, there was the pleasantry in Newark when the tourists were arrested successively for throwing confetti, making undue noise and blockading the streets, followed by their leaving the city with much hilarity; there was the cloudburst between Circleville and Chillicothe, when the cars on ordinary roads ran through water up to their frames; then there was the experience of a red fire parade, with over 150 motor cars in line, in Portsmouth.

And as a climax to the week there was the passage through three sections of three states in the course of as many hours on Saturday, in running from Portsmouth to this city.

A week in eastern and southern Ohio brought to the Hoosiers much of business and at the same time numerous situations of unusual interest. It so happened that upon the day the Four-Staters arrived in Columbus there was the convention of the Federation of American Motorcyclists occurring, and for miles surrounding the Buckeye state capital the two-wheeled devotees were running. Over the old national pike from the east the Indiana automobiles and the New York, Pennsylvania and Maryland motorcyclists toured together.

During this run the tourists keenly felt the negligence of some authorities in permitting the fine old National Pike to disintegrate into the roughest roads experienced on the tour up to that point.

From Wheeling to Columbus the National road was a heart-breaker. It was only the skill of the Hoosier drivers that prevented a flock of broken springs. After the tour left Wheeling until it arrived in Zanesville there was not a half mile that was not punctuated with abrupt breakwaters. After the tourists left Zanesville they detoured to Newark from the National road at Mount Hebron and returned to it at Ætna. Between Ætna and Reynoldsburg there are 6 miles of road that even the far southwestern Indiana trails would put to shame. This road will not admit of a speed of over 5 miles an hour and is one chuck-hole after another about 6 to 18 inches in depth.

For the first time in the history of organized touring of motor cars a tour was abruptly ordered out of a city by one of its uniformed officers. When the confetti car Great Western rolled into this little Ohio city the pilot of the tour, W. D. Edenburn, was placed under arrest for strewing clean confetti over the seldom-swept brick streets of that city.

The pilot was released after some little detention in the city offices with a reprimand. Hurrying to the square, he warned the arriving tourists that arrest would follow the distribution of advertising matter, and the bluecoat, who so officiously arrested the pilot, then ordered the tour to move on as the cars were blocking the nearly deserted streets.

With the exception of this semi-humorous incident the hearty welcomes gladdened the hearts of the tourists. The Columbus club gave the tourists guests' cards and royally entertained them during their sojourn. Chillicothe, the old state capital, turned out en masse to see the cars parked on the public square. It was estimated by Portsmouth officials that more than 10,000 persons stood along the line of march during the red light parade. On arriving in Huntington the Mayor turned over the city to the Hoosiers and a banquet at the Guyandotte Club in the evening was preceded by a band concert in front of the official hotel.

The cars were loaded on three large barges this afternoon. The Indiana Automobile Manufacturers' Association built a trestle 70 feet in length to reach the barges and the cars were driven on. They will be unloaded at Maysville in the order of the line of march and proceed to Lexington

The dealers in the cities through which the tour has passed in the last 7 days have been much more interested than those on the first leg of the journey. The manufacturers are building up a wealth of prospective business and closing with several dealers. The dealers are bringing their prospects from miles around and the tour instead of losing ground is gaining as it nears the home stretch.

The tourists will leave Louisville at 9 o'clock July 24 and run to Columbus, where they will remain until 1:30 the next day, arriving in Indianapolis at 4:30. The cars will all be parked in the Circle around the Soldiers and Sailors' monument until 7:30, when the tourists, clad in their road costumes, will form and parade to the German House, where the festal board will be spread.

Wisconsin Reliability Had Dozen Starters

All But Two Finished With Perfect Scores—Business Features of the Run Not Very Successful

MILWAUKEE, WIS., July 22—Lack of interest, which might almost be called antipathy, on the part of motor car dealers in Milwaukee with regard to the third annual Wisconsin reliability tour of the Wisconsin State Automobile Association, which was run from July 15 to 19 inclusive, has probably ended the efforts of the state organization of motorists to promote endurance or reliability runs in the interest of the tradesmen. Yet in spite of the lack of interest, which resulted in a small entry list, the 1912 tour is regarded by the participating dealers as one of the best business promotion stunts they have ever experienced, and satisfaction is expressed all along the line. The twelve distinct makes of cars which covered the tour have made many new acquaintances among dealers and prospective buyers, and they have injected new enthusiasm into present owners, the three forces being important vertebræ in the backbone of the motor industry.

Ten out of twelve starters in the competition for the sweepstakes trophy, The Milwaukee *Sentinel* cup, finished with perfect scores; one carried a demerit of 39 points for a minor repair, while the other was withdrawn because of trouble which while not serious would have loaded a heavy penalty on the car because of the point-per-minute demerit rule for work on the road. Both contenders for the Emil Schandein cup, for private owners, finished with clean slates.

The penalty of 39 points on No. 3 King was imposed for work on the water manifold. Driver Hanneman had difficulty in keeping water in his radiator and on investigation found that the packing had slipped out of place. He consumed 39 minutes in making a repair that he was sure would last.

The Flanders roadster was forced to drop out at Shawano, Wis., on the fourth day because of bearing trouble in the differential. Its team-mate, a Flanders touring car, came through with a clean score, although its load weighed 665 pounds.

Only once did the tourists strike rain. On leaving Oshkosh on July 18, a drizzling rain set in, which turned to a heavy shower by the time Appleton was reached. Five miles west of Appleton the sun was shining and no more rain was encountered.

The main purpose of the tour was business. But no tour with such a purpose could possibly hope to induce the interest without the competitive feature, for people nowadays know motor cars when they see them and they will not walk a few steps to look at an outside car unless it is decorated with a contestant's number, a bunch of pennants and banners, and contains a party of tourists.

The principal argument used by the executive committee of the W. S. A. A. when it sought entries was that it had laid out regulations which would permit of demonstrations in the various towns and cities, conferences with dealers during the short stops between controls, and time to book orders in case an enthusiast was ripe for this important proceeding. It can be said that while the association made good on its promises, the contestants did not nearly take advantage of the opportunities afforded. A careful watch of the contestants during the 5 days revealed the fact that only 50 per cent. of them cared to take advantage of the possibilities. Talks with the other half indicate that they did just as much promotion work as they intended to at the start, so everybody seems satisfied.

R. D. Rockstead, of Milwaukee, state agent for the little Paige car, utilized the opportunity for business to the full. He contracted for nearly fifty Paige cars.

A few of the contestants did elaborate advertising by means of souvenirs, pennants or other novelties. The Marion distributed several thousand mirrors; the Case distributed 5,000 stickpins of the famous Case eagle; the Paige pinned 1,500 small pennants on as many people. The Milwaukee *Sentinel*, donor of the sweepstakes prize, distributed 5,000 small pennants and 1,000 large pennants bearing the words, "Milwaukee Sentinel Trophy Tour 1912." The Rambler people, who furnished the press car, gave away 5,000 neat badges of brass and enamel. Approximately 75,000 dodgers advertising the Grand Prix, Vanderbilt and other road races at Milwaukee, September 17 and 21, were distributed over the route. The promoter of the speed carnival, the Milwaukee Automobile Dealers' Association, was represented in the tour by two members.

Dealers in all towns and cities are enthusiastic. Prosperity simply bristles everywhere. The garages that two years ago were dilapidated barns and sheds are to-day fine concrete or brick business houses—real garages. These men are confident of the future and can see nothing in the situation to discourage them in the least. More than half of the dealers with whom conversations were held said they could have sold more cars during the closing season if the state agents or factories could have supplied them. They have increased their 1913 demands all the way from 15 to 35 per cent. and feel now that at the end of the season they will be saying the same thing about short allotments.

The medium-priced and so-called cheap cars are doing the business in the sections visited by the tourists. Except in the cities the high-priced cars were a rarity. Farmers are buying cars, and lots of them, but they are not putting all of their eggs in one basket. Following is the summary:

1	Buick	Emil Hokanson	0	0	0	0	0	0
2	Case	Jake Hanson	0	0	0	0	0	0
3	King	H. M. Hanneman	0	0	39	0	0	39
4	K-R-I-T	James Holmes	0	0	0	0	0	0
5	Hupmobile	Jay E. Morehouse	0	0	0	0	0	0
6	Ford	W. H. Diener	0	0	0	0	0	0
7	Flanders "20"	Thomas R. Bell	0	0	0	1000	Withdrawn	
8	Flanders "20"	W. H. Soules	0	0	0	0	0	0
9	Oakland	Chas. F. Spooner	0	0	0	0	0	0
10	Paige	R. D. Rockstead	0	0	0	0	0	0
11	Marion	H. R. Gallun	0	0	0	0	0	0
12	White	Richard Weber	0	0	0	0	0	0
21	White	H. O. Stenzel	0	0	0	0	0	0
22	Franklin	J. D. Babcock	0	0	0	0	0	0

Ferrying cars across the Ohio from Coal Grove to Ashland

Cloudburst turns road into a creek, near Chillicothe, O.

Watson cup run contestants checking in at Trenton Falls

Part of parking space at Trenton Falls checking station

Porter's Overland Wins Watson Cup

18-Year-Old Girl Wins Woman's Cup in a Ford—Farm and Ranch Tour on the Way

Flanders Electric Will Blaze Way for A.A.A. Tour—Milwaukee Raising Money for Races

SYRACUSE, N. Y., July 24—Twenty-five cars competed in the the third annual run held by The Automobile Club of Syracuse for the B. E. Watson trophy cup, held Saturday, to Trenton Falls and return, a distance of 143 miles. The run out was made *via* Rome and the return *via* Utica.

The weather conditions were ideal. A short stay was made for dinner at the Trenton Falls Hotel and the cars checked in on the return at about 7 o'clock, the start having been made at 9 a. m. Trenton Falls is in the Adirondack foothills 20 miles north of Utica.

R. E. Porter, driving an Overland, was declared the winner, he having come nearest the secret time allowance based upon the speed regulations of the general state law and the various towns and villages traversed. Mr. Porter made the trip in 7:54:12, coming within 2 minutes of the secret time, which was 7:51:18. J. L. Youman's Mitchell car was second with 7:47:32 and C. Badgeley was third with 7:56:17. He drove a Franklin.

Miss Pearl E. Cheshire, 18 years old, won the woman's cup with a Ford, her time being 7:28:54. The trophy was offered by the club. Mrs. L. C. Whitbeck was the only other woman driver. She covered the distance in 6:53:40.

President H. W. Smith and Secretary Forman Wilkinson, of the club are in favor of substituting for the annual Watson cup run a contest of a similar nature but for a cup to be awarded by the club.

Farm and Ranch Tour Starts

DALLAS, TEX., July 22—The automobile tour of the Farm and Ranch Publishing Company, of Dallas, started from Dallas this morning and will end next Saturday night. The tour is being participated in wholly by farmers and ranchmen of Texas. Each driver of the car owns his own machine.

The entries include the following cars and owners: Buicks—W. G. Maze, of Moody; T. O. Williams, of Irving; H. L. Perkins, of Ennis; N. B. Feagans, of Ennis; G. J. Merritt, of San Marcos; C. P. McKensie, of Mexia; Albert Marrs, of Moody, and H. V. Kendrick, of Moody. Fords—C. C. Gipe, of Moody; W. R. Newton, of Hillsboro; Wm. F. Ramming, of Iowa Park; G. E. McDaniel, of Hillsboro; R. G. Roach, of Dallas. Cases—W. H. Anderson, of Kerens; T. L. Swink, of Dawson; W. C. Armstrong, of Plano. Mitchells—J. N. Colwick, of Norse; R. B. Dunn, of Bryan. Overlands—O. L. Sims, of Paint Rock; Verge Coleman, of Kerens, W. R. Garland, Annona. Hupmobiles—E. B. St. Clair, Tague; Paul G. Lundell, of Taylor; S. J. Hall, of Malakpoff; W. A. Hamilton, of Dallas, and D. B. Currie, of Kerens. E-M-Fs—J. M. Howe, of Forney, and W. Bean, of Howe. Reo—W. G. Camp, of San Gabriel. Cadillac—W. C. Kingsley, of Garland. Regal—E. C. Clark, of Plano. Maxwells—D. W. Rutherford, of Waxahachie; L. B. Blain, of Alvaroado, and Taylor McGinnis, of Terrell. Franklins—A. J. Poulter, of Waxahachie; W. B. Gregg, of Denton, and W. R. Bishop, of Carrollton. Chalmers—W. B. Mickle, of Plano. Oaklands—B. F. Wilkinson, of Ferris, and B. H. Matthews, of Mart. Hudson—J. Mantel, of Dallas. Knox—Henry Hosford, of Waxahachie. Brush—W. C. Chiristian, of Elm Mott.

Flanders Electric A.A.A. Pathfinders

The A. A. A. National Reliability Tour officials met on July 16 and awarded the pathfinding privilege to the Flanders Manufacturing Company, of Pontiac, Mich. The method of doing this most important work will be unique, in that a Flanders Electric will be utilized. The car will probably start on its trip within a week and special arrangements are being made for recharging the car along the entire route.

The greatest interest will attend the performance of the pathfinder throughout the journey from Detroit to New Orleans.

Milwaukee's Big Races Financed

MILWAUKEE, WIS., July 23—The international road racing carnival to be held at Milwaukee on September 17, 20 and 21 has been entirely financed by the business interests of the city, and a mail order seat and parking space sale of better than $15,000 has already been recorded.

There will be 75 to 80 cars on the Milwaukee course in the four events, the contests for the Grand Prix, Vanderbilt Cup, Pabst Blue Ribbon and Wisconsin Challenge trophies.

The tentative entry of three Peugeot cars, including the Boillot Peugeot which won the French Grand Prix on the Dieppe course, has been delivered to Manager Ruddle. H. E. Hewlitt, of Los Angeles, has mailed the entries of three Fiats, which will be piloted by Tetzlaff, Caleb Bragg and Bruce-Brown. It is likely that the Fiat which Bruce-Brown drove in the French classic will be brought to America, making a team of four Fiats.

Contracts were signed on Monday for the services of 1,000 members of the Wisconsin National Guard to police the course. Sheriff William Arnold, of Milwaukee county has arranged to appoint 200 deputy sheriffs and Chief of Police John T. Janssen expects to have 100 patrolmen and a dozen or more plain clothes men on duty during the three days of racing.

Why a Car Looks Dingy, and How to Prevent It

Hurried Finishing, Improper Washing, Impure Air and Insufficient Light Are Some of the Causes

Plenty of Pure Cold Water, Properly Applied, Is the Greatest Panacea for Varnish Ills

TO CARE for the automobile intelligently the owner should first have a knowledge of the causes and reasons for the things which he desires to avoid. Especially in the care of the paint and varnish, and notably the latter, it is essential to know what produces certain disastrous manifestations, what are the most efficient methods of prevention as well as an outline of possible remedies for cure.

Naturally, varnish comes in for the major share of attention. It is the beautifier and the protector of the colors, and of all the pigments going before the colors. That it cannot very well have an excess of care lavished upon it is self-evident. It costs considerable to prepare the way for it. It is expensive to apply, both in the matter of labor and material cost, and while a material of sturdy life, this may be cut off prematurely.

Loss of the intense brilliancy that is characteristic of varnish, is due to a number of causes concerning which the owner of the car should be well informed. It may, of course, be due to old age, for, like everything else, varnish grows old, and in the natural order of perishable things loses its vigor and its power to retain the freshness of youth. Loss of luster often is due to mud splashes and smears having been left to dry upon the surface. Hurried processes of painting are not infrequently responsible for the premature loss of luster—of "going dead," as it is technically termed. Porous undercoats which absorb an excess of the oil of the varnish also cause loss of luster.

As it is the natural destiny of varnish to grow old, in like manner it is the destiny of this precious material to crack and splinter, and, ultimately, to fall to pieces in the form of fine powder. Whenever varnish loses its elasticity and becomes brittle it is practically certain to chip off, When it does this the fissures and cracks run in every direction, criss-crossing each other, and showing blocks of every conceivable size and shape.

Cracks Due to Road Shocks

The automobile usually has a display of "force" cracks due to the strains of the body while on the road. Force cracks appear upon the panels of the car doors, streaking in wavy outlines across the door, starting usually near to the door handle along the edge of the door. These cracks come from slamming the door shut, causing a strain and a vibration which even the highest class varnish cannot withstand. A little more care in opening and shutting the car door will result in prolonging intact the body of varnish placed upon it. Insufficiently stiffened or "backed up" panels usually show a profusion of "force" cracks. There is scarcely any remedy for this trouble except revarnishing in case the surface has not been chopped into too deeply. If the force or other cracks have burrowed into the surface beyond choking up with a fresh supply of varnish, then the only direct and sure way is to burn off the old paint and finish and fetch the work along from the bottom up. In case the force checks appear to have been merely bitten slightly into the surface, the car should go around to the shop and have the surface rubbed lightly and revarnished.

Of course varnish sweats, just as man sweats, but the results are usually more expensive. It all depends upon conditions. The principal reason for the sweating of varnish is that of rubbing the surface with water and pumice stone and letting it stand around for some hours before varnishing. Apply varnish over color coats not thoroughly dry, and it is prone to sweat. Instruct your painter against the practice of varnishing over sweaty surfaces. About the only known remedy for this sort of trouble is to give the varnish, in due time, an easy rub over with pulverized pumice stone and water, clear up, and revarnish.

The newly varnished car if run out and left to stand under the direct rays of the hot sun is likely to deaden out by sheer intensity of heat. This form of sweating out can be cured only through the medium of a new coat of varnish applied after the sweaty coat has dried and been given a rub down with water and pumice flour. Even a high-class varnish left to stand in a garage wherein a damp, fetid atmosphere prevails, or in which are confined certain actively poisonous gases, will sweat and take on a scum fatal to good looks. This trouble should be guarded against by introducing thorough ventilation into the garage. Fresh, pure air, and plenty of soft, subdued light will prevent bad conditions in the garage.

Causes of Varnish Spotting

Spotting of varnish is an altogether too common incident in the history of varnish use. Under certain conditions, it may as well be admitted at the outset, all varnish will spot, notwithstanding the fact that some varnishes spot more easily than others. For example, a highly elastic varnish, by reason of the greater percentage of oil which it contains, will spot more quickly and with less cause than a harder drying varnish containing a smaller proportion of oil. Again, some varnishes in the early days of their life upon the surface just naturally show an extremely sensitive streak and fairly "spot on sight."

Concerning these spots let it be said that they develop through the forced extraction of the oil and some portion of the gum constituent, from the varnish. Fresh accumulations of mud, and especially the mud and dust of city streets, and the mud of lime districts, act quickly and powerfully upon varnish recently applied to the surface. Therefore this injunction: Wash the car as soon as it is brought in from the muddy or dusty highway. Thereby save the gloss of the varnish and give it renewed strength to stand the stress of service.

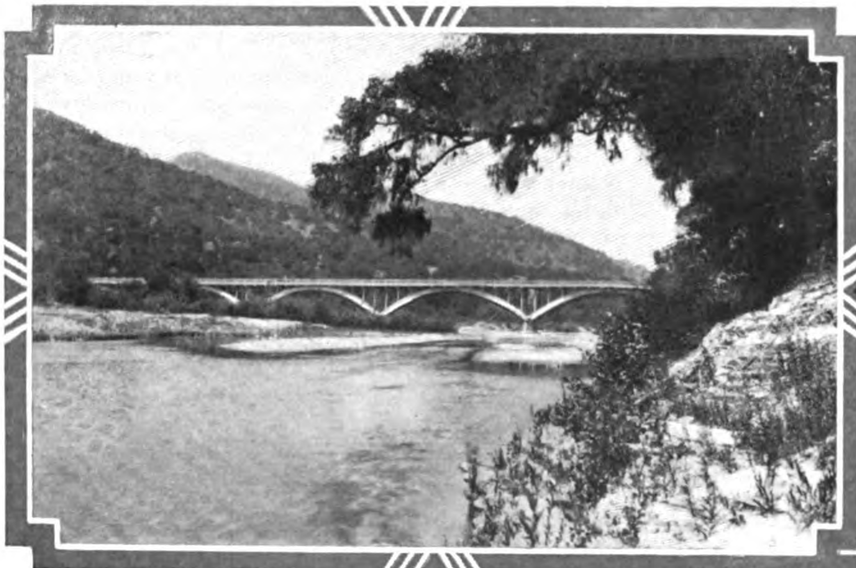
Other causes of varnish spotting which a car owner should be aware of consist of soapy or dirty water, and a prolific brood of gases, these latter casting a blight over the face of the varnish well-nigh beyond effacement. Spotting from coal or other gases develops in the shape of round, lifeless spots overcast with a blur of greasiness, and they transform the car into a patchwork picture. The only remedy for this sort of deviltry is to rub the surface off with water and pumice flour and flow on a new coat of varnish. Soapy or dirty water spots, if caught in time, may be washed off slick and clean with clear water.

The prevention of varnish spotting may be summed up in this way: Wash the car often with clean cold water, which treatment not only hardens the varnish, and increases its brilliancy, but prevents it from being acted upon by the manifold accumulations.

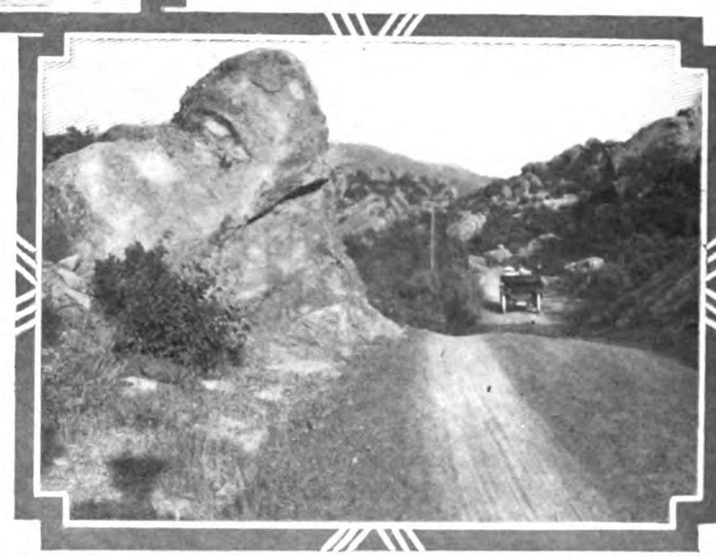
Another phase of varnish care-taking with which the car owner should familiarize himself is greening. This is a discoloration of varnish, or, rather, a discoloration of the color field, through which the varnish takes on or appears to take on an objectionable greenish cast. This trouble may be developed by applying successive coats of clear rubbing varnish over a black or very dark colored field of pigment, but under the prevailing practice it is not likely to.

The common cause of the greening of newly-finished surfaces is the storage of the car in dark garages, in which little or practically no natural light is allowed to enter. To prevent this discoloration give the garage or repository plenty of good light.

Varnished surfaces which, when exposed to a damp atmosphere or to certain gases, take on a metallic-like film, cloudy or smoky, are said, in technical parlance, to have bloomed. It is an objectionable manifestation. Washing the surface with clean, cold water will often restore the original brilliancy of the varnish. This remedy failing, rub down the surface and revarnish.



New San Lucas bridge, looking down stream



Party of motorists inspecting the new bridge

Crossing the divide on the San Marcos Pass

Bridge for Automobilists

Takes the Place of a Ford Over the Santa Ynez River, Where Many Lives Have Been Lost

Forms Portion of the Coast Route Over the Wildly Picturesque San Marcos Pass

SANTA BARBARA, CAL., July 12—To the automobile alone is due the new $40,000 concrete bridge, which was formally opened July 4, by a gathering which included motorists from the most distant points of the country, many of them coming 50 and 75 miles to attend the celebration.

Located virtually in the wilderness, several miles from any settlement or railroad, the opening of the bridge was considered of such importance that the event was attended by 2,000 persons. Being in the Santa Ynez valley territory, the ranchers of that section arranged the barbecue, and five beeves and other gastronomic delights were consumed during the day. In other words, it was a ton of beef that was required for a festival that savored much of early-day Spanish hospitality.

Bridge-Opening a Festivity

Alonzo Crabb, a prominent citizen of the valley, was the moving spirit of the celebration, and he secured the donations of beef and other victuals, so that everything was free to all who attended. Mr. Crabb curtly explained how he secured the beef: "Supervisor Al Conover and Ed Donahue each contributed a beef, and I stole the other three."

The new bridge is located 35 miles from Santa Barbara, and a quarter of a mile down the Santa Ynez river from the old ford. This is the only place where it was necessary to ford the stream on the way south to Santa Barbara, and thousands of automobilists in various parts of the country who have toured California, and gone down the Coast by way of the San Marcos pass, will recognize the spot. It is about 5 miles east of the old Santa Ynez mission, near which place one chooses either the San Marcos or Gaviota pass for proceeding southward.

But the San Marcos was the original stage road, prior to the days of railroads in this country. During the rainy season the Santa Ynez river, which has its course in a wild and rugged mountain section, all of which is included in the Santa Barbara National Forest, becomes a raging torrent. In summer it is a mere stream and in most places having the proportions of a creek. But the winter rains rapidly swell it, and floodtides sweep down, and many persons have been caught at the ford and lost their lives. This is the only dangerous part of the road from the old town of Santa Ynez to Santa Barbara, although careful driving is required to make the San Marcos pass at all times of the year. The pass will never be a race course.

Conditions at the ford were at times so aggravating that the board of supervisors more than a year ago instructed Frank F. Flournoy, the county surveyor, to prepare the plans. The work was started last fall and finished in time for the grand opening. The bridge is of five spans and has a total length of 700 feet.

Santa Barbara Improving Roads

Had the automobile never come there would be no bridge at the San Lucas crossing. Santa Barbara county is at present in the midst of good roads activity, brought on, not so much by the growth of the automobile class here, but from a realization that it must provide for a rapidly increasing tourist traffic. Because of its roads this county was severely criticised in the past, and a few years ago a spirit of improvement took possession of the people and more than $500,000 has been expended on permanent roads in the county, and particularly on those leading out of the city of Santa Barbara. This will surely compare favorably with other communities of the country when it is known that the entire population of the county is only about 20,000. But the county is a prosperous one. Pauperism is virtually unknown except in rare cases, and they can largely be attributed to the infirmities of age.

Of all portions along the Coast highway from San Francisco to San Diego the tourists have marveled most over the San Marcos pass. The total length of the pass is about 15 miles, and it starts through the mountains 10 miles west of this city, then continues along tortuously, the greater part of the road being unimproved as far as paving goes. The pass has its history. In 1847, when word was received in Santa Barbara that John C. Fremont was on his way south to capture the city, a force was sent out to meet him. The Mexicans placed themselves in the rocks over a narrow cut in the Gaviota pass, prepared to hurl rocks down on the American soldiers when they passed beneath. But Fremont came by the San Marcos pass, entered Santa Barbara quietly and the city was taken without any bloodshed. Since then it has been an American possession.

Scenic Beauty of San Marcos

Starting at sea level, the pass mounts to a height of 2200 feet. Some of the views are sublime. One has far glimpses of other ranges than the one through which one is passing, at times with deep-cut canyons that probably never have been thoroughly explored by man. Most of the land is of little value, but seems to have been hurled together by the Creator solely for scenic purposes. And scenically much of this will in the future be presented by moving pictures the world over. It was only a couple of days after the opening of the bridge that the players of a film manufacturing company moved on Santa Barbara as quietly as did Fremont, the pathfinder; but unlike him, however, they have decided to make this their permanent home, and in the near future scenery of the range through which the San Marcos passes will serve for its stories. The film people consider they have discovered a scenic nugget, and are now wondering why it lay here untouched so long.

It can be stated that while the bridge just completed is the finest of its kind between San Francisco and Los Angeles, it will soon have its equal. In THE AUTOMOBILE recently reference was made to the Rincon causeways. An important part of the sea-level road improvement south of Santa Barbara will be a concrete bridge over the Ventura river, which will cost $50,000. It will be about 900 feet long and the money is being realized by a special tax levy in Ventura county. Its design will be similar to that at San Lucas.

At the barbecue referred to there was an interesting character present in John Waugh, who started to drive stage over the San Marcos in 1860 and was on that job for 40 years. He had been engaged in similar work in various parts of the state, and when he came here had three notches in his revolver, representing the demise of as many robbers who at various times had tried to hold up his stage. He stated that when he first came here the only bridge between Santa Barbara and Soledad, 150 miles apart, was an old corduroy span over Arroyo Burro, a few miles west of this city. The stage coach went into disuse about the time the first automobile was seen in these parts. Waugh is now 70 years old and without a job. But, then, he is not in the pauper class. He delights to talk of the old stage coach days, and on the day the bridge was opened he was in his element.

Pennsylvania After Toll Turnpikes

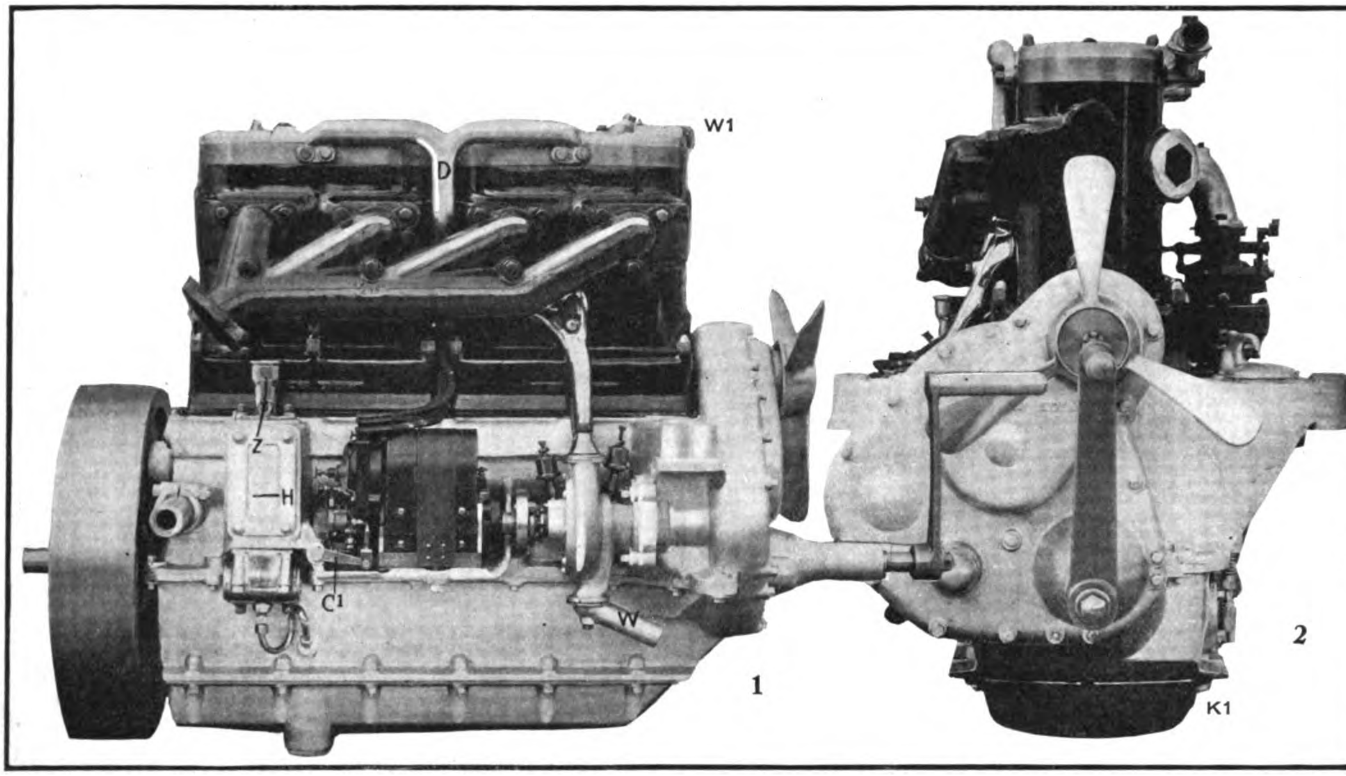
HARRISBURG, PA., July 20—State Highway Commissioner Bigelow has announced that he would inaugurate the first of the proceedings by the state to obtain roads which are included in main highway routes, but are owned by turnpike companies. The first action will be brought to condemn the toll road between Chambersburg and the Bedford county line, which crosses portions of Franklin and Fulton counties. Later on proceedings will be undertaken to condemn turnpikes in the vicinity of Philadelphia and other cities, where such roads are on main routes. The actions will be in charge of Attorney-General Bell. It is the idea to take over the turnpikes as needed to improve main highways and energetic action is expected.

Looking down on Santa Ynez basin

Crossing ford before bridge was built

Entering Cold Springs Canyon on the San Marcos Pass

Road on other side of canyon is 1000 feet higher



Figs. 1 and 2—Exhaust side and front view of Atlas-Knight sleeve-valve motor

1913 Atlas Motor

Many Improvements Incorporated in the Latest Model of Knight Double-Sleeve Engine

Pressure-Feed Lubrication, Longer Sleeve Travel and New Design of Cylinder Castings Are Among the Features

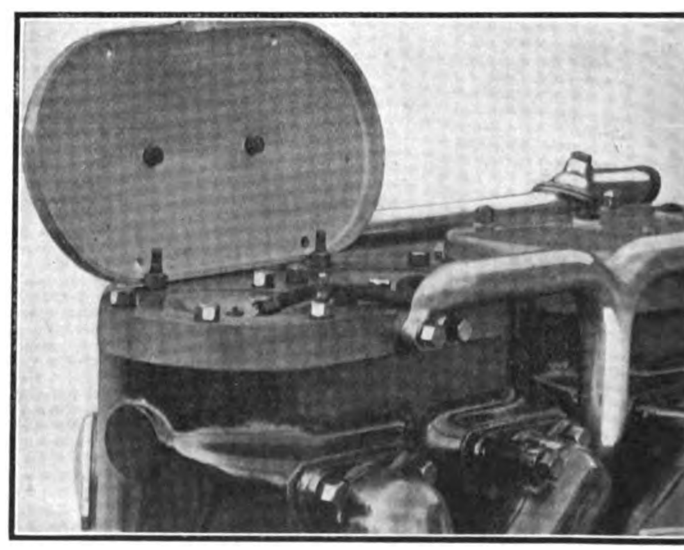


Fig. 3—Spark-plug cover plates on Atlas motor

THE Knight double-sleeve motor has entered on a new phase of activity in America by the recent announcement of the Atlas Engine Works, Indianapolis, Ind., that it has completed development of this motor and it is now in the manufacturing stage. This concern over a year ago signed with Knight & Kilbourne securing the sole right to build these motors in America for sale to automobile concerns. Since that time its engineers have been busied on working over many parts of the motor so that in its final presentation to the American public it possesses several features not heretofore adopted by the standard Knight types in Europe and as used on several of the Knight types built in America. In this connection it might be stated that the trough oiling system has been eliminated and a pressure feed non-splash system installed; the eccentric shaft driving the sleeves has been mounted on the right side, leaving the left side of the motor practically clear excepting for the carbureter and adapting it for cars with the steering pillar mounted on the left side, at the same time giving room for the column on the right if desired; the sleeve travel is made longer than in any other makes of this motor and since its introduction this longer travel has been taken up by other Knight licensees. The cylinder castings are entirely altered so far as external appearance is concerned, and not a few other details incorporated.

For the present the Atlas has but one model, a four-cylinder one, with 4.5-inch bore and 5.5-inch stroke which has a formula rating of 32.4 horsepower, but when tested on the block at the speed of 1,090 revolutions it generates 47 horsepower, or over 44 per cent. above the standard rating. At 1,875 crankshaft revolutions the block test is 69.5 horsepower and at 1,900 the test shows 70.5 horsepower—a piston speed of 1,740 feet per minute.

In designing its initial motor the company has set a high mark in compactness of design, in symmetry of lines and in accessibility of parts, modern practices having been followed out wherever possible. There has not been any aim at the radical but rather the accepting of all that has stood the test of years in motor building. The aim has been to produce the best, so far as design, materials and workmanship go. Fig. 6 shows the intake side with the manifolds A cast integrally with each twin casting, thus reducing the intake to a small three-arm connection which unites by hexagon nuts with the manifolds and by flange with the carbureter. This side contains little else than the oil filler cap G, which is so interconnected with an overflow cock G1 that when the filler cap is off the overflow is opened, thereby furnishing a very ready test as to when the oil is filled to the desired level, and a float glass G2. The transverse control arm C is made a corporate part of the motor and connects at the opposite side through the arm C1, Fig. 1, with the magneto breaker box arm.

The exhaust side is neatly arranged, the centrifugal water-pump being mounted immediately back of the forward motor arm, with its shaft continued to drive the magneto. Back of the magneto are the two pumps, air pump Z, for pressure on the gasoline, and oil pump carried in a detachable housing H. The ejector type of exhaust manifold is carried well up and conceals beneath it the water manifold. A neat job is made of the wiring by the conduit D, which effect is accentuated by using aluminum cover plates, one covering the entire head of each twin casting and concealing the spark-plugs, thereby proofing the ignition system against water. Fig. 3 shows one of these plates removed and having in it two grounding plugs, one above each spark-plug. Finger pressure on either plug brings it onto its respective spark plug and so short circuits it, furnishing an easy way of testing for fouled or injured plugs without having to remove the cover plates.

All Manifolds Simplified

Water piping has been minimized, water entering by an intake W under the front motor arm and discharging through a short pipe which connects with the cylinder heads. In this, as in all other Knight motors, the head is a separate casting, and, like the cylinder, is water jacketed, calling for transfer passages from the cylinder jacket spaces to the head jacket spaces.

The crankcase is a three-part casting, the upper portion carrying the five bearings of the shaft as well as magneto, carbureter, oil pump, air pump, oil filler, etc.; the lower part is an oil reservoir, and the middle portion is merely a uniting section furnishing adequate room for the lower ends of the connecting rods. The novelty of the case consists in entirely insulating the bottom portion from the middle portion by an air space, this space extending from end to end and insuring cooler oil and so better viscosity and better lubricating qualities. The middle portion is divided in halves by a central transverse bridge and in each half the floor slopes to the center, where it forms a drain into the oil reservoir. The oiling system is entirely pressure feed to every bearing, and to all the pistons and sleeves.

Fig. 7, an end section, shows many of the important features. The twin-cylinder castings have an enlarged base part K, made to accommodate the enlarged lower ends of the sleeves and the sleeve connecting rods, and by this enlargement being on the cylinder instead of on the crankcase it makes the lower part

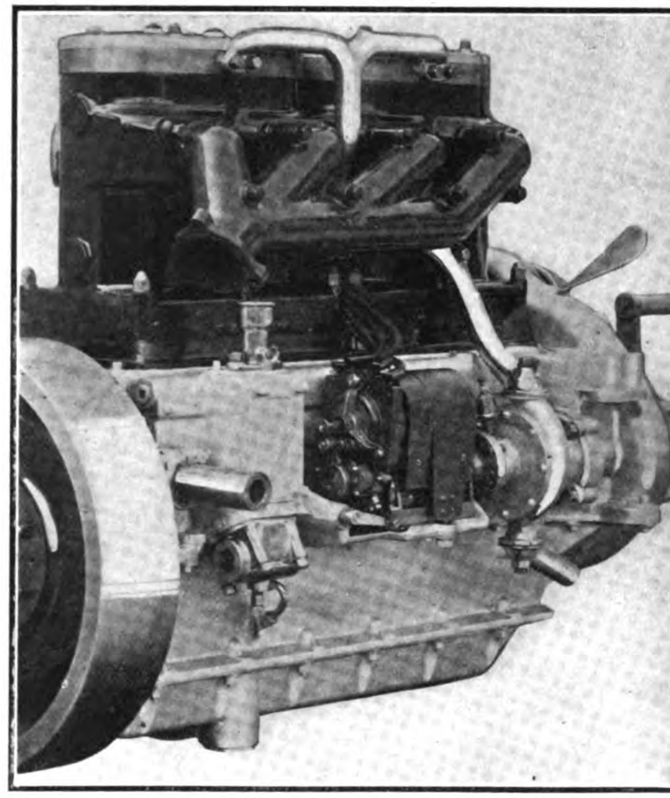
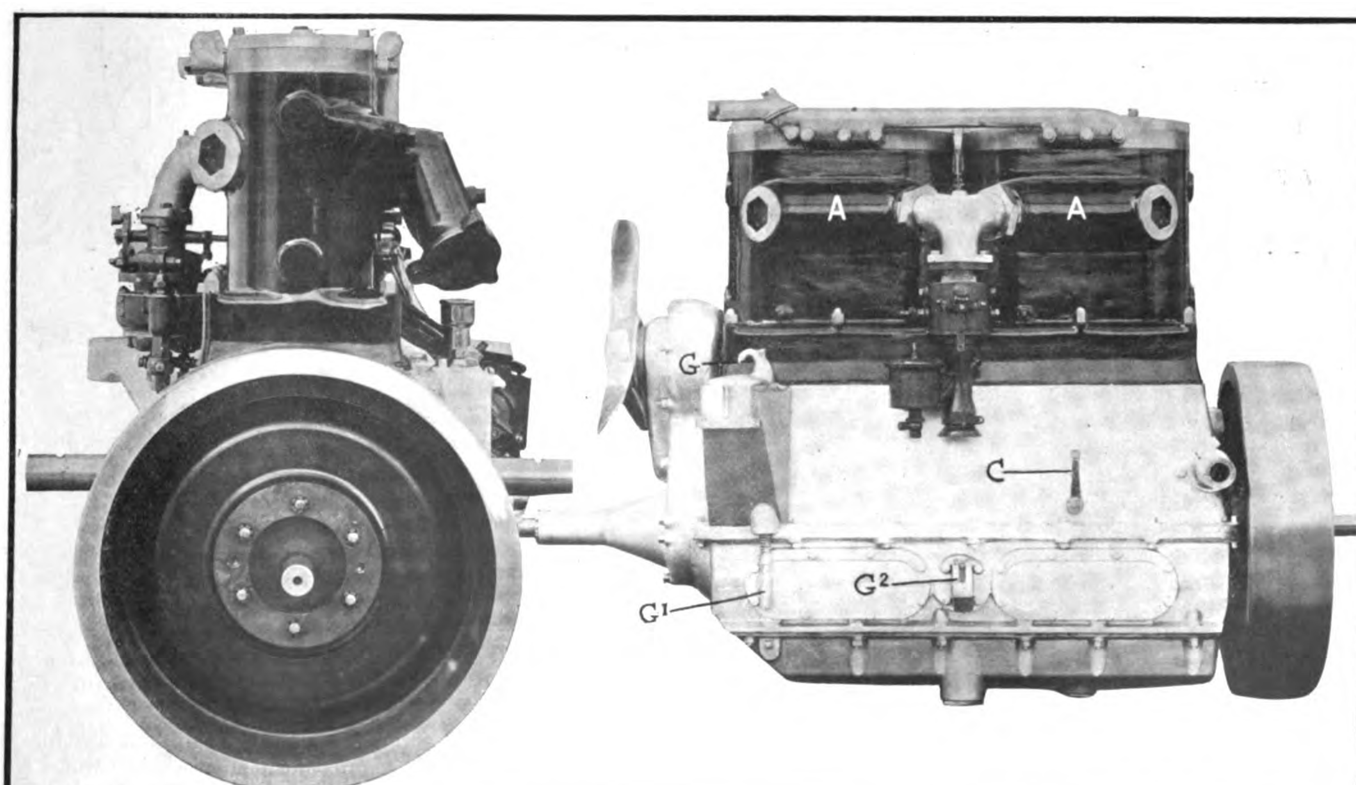


Fig. 4—Accessibility of motor parts in Atlas engine



Figs. 5 and 6—Rear end and intake side of Atlas sleeve-valve motor

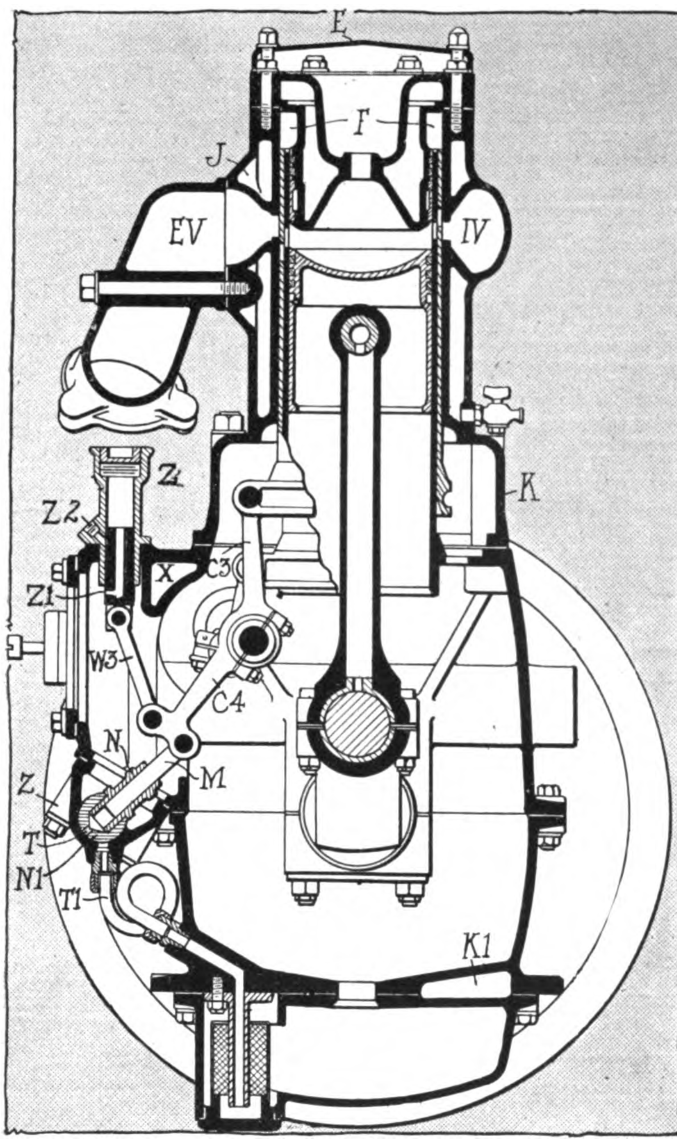


Fig. 7—End section of Atlas-Knight motor

of the sleeve and the top bearings of the sleeve connecting rods entirely accessible when the casting is removed. The water jacketing J completely surrounds the exhaust port EV at top and bottom, and is extended to the end of the flange. On the opposite side the intake manifold, cast integrally with the cylinders, is also water jacketed. This tends to prevent condensation and improves carburetion.

The new pressure-feed oiling system centers around a single plunger pump driven from the eccentric shaft and forcing oil to the five eccentric shaft bearings, the five crankshaft bearings, the eight lower bearings of sleeve connecting rods, the eight upper bearings of these rods and the upper and lower bearings of the large connecting rods which work the pistons. In addition this pump oils the silent chain which drives the eccentric shaft, the magneto, water pump and fan. The use of hollow connecting rods aids in the work. The oil pump is a plunger M working in a cylinder N. The plunger is driven through the arm C4, which is a part of the sleeve connecting rod C3. This arm also drives the air pump Z. In operation the oil pump cylinder N, which is rigid with a short horizontal cylinder N1, is oscillated by the large arc through which the end of the arm C4 works. The oil port T registers with the intake pipe T1 from the reservoir on the up or suction stroke and on the down or pumping stroke the port T has been oscillated out of register and into register with a pipe leading to the tubular passage X in the crankcase. From this passage branches lead to each of the five eccentric shaft bearings. The oil flows through these bearings and through the drilled throws of the eccentric shaft to the lower sleeve connecting rod bearings. These rods are hollow and fill with oil and so feed their upper bearings or where they attach to the sleeves. From the eccentric shaft bearings oil passes through drilled openings to the main bearings of the crankshaft and through the drilled shaft to the lower main connecting rod bearings, and up the hollow rods to the wrist pin or piston pin bearings. From these the oil flows through the hollow wrist pin against the sleeve walls and works down into the crankcase whence it is filtered back to the reservoir, ready for re-circulation.

The air pump for air pressure on the gasoline is a two-cycle one, the plunger having but a single port Z1, which leads from the side near the base up through its center to the top. Air enters and leaves by this port or opening. When the plunger

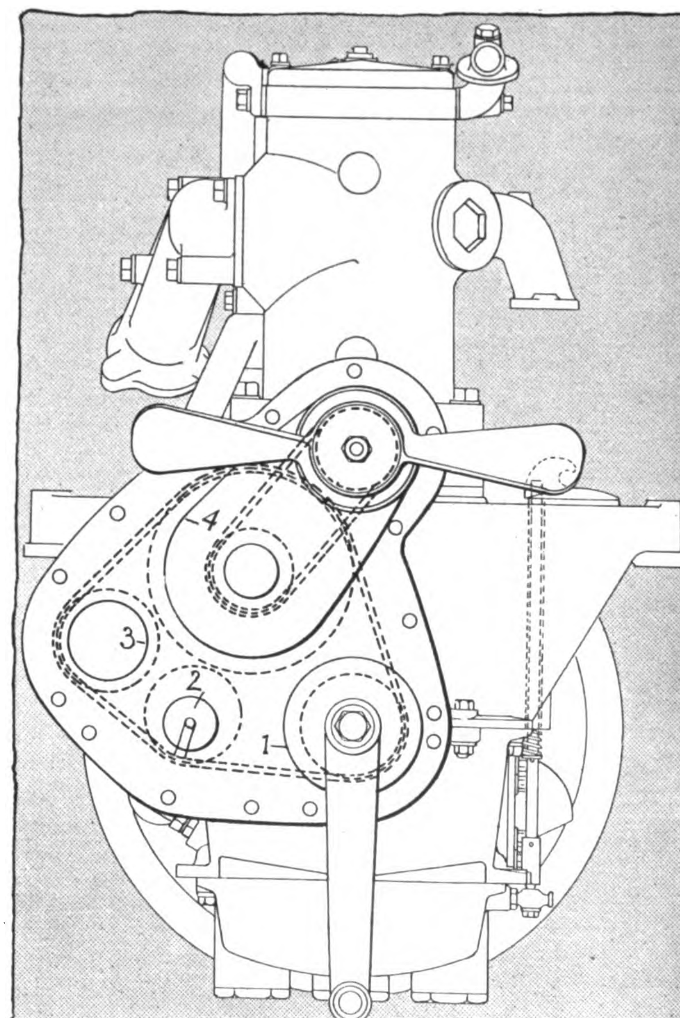


Fig. 8—Silent-chain drive for Atlas motor

is down air rushes into the port to fill the partial vacuum created above the plunger. On the up stroke the port Z1 is closed by the cylinder wall and remains closed until it registers with the exit port Z2, the air in the meantime being compressed above the piston and as soon as released passes to the gasoline tank. With this pump ball or other types of check valves are not needed. The pump plunger operates through the arm W3 hinged to the same crosshead that works the oil pump.

Both the oil and air pumps are unusually accessible. The oil pump cylinder is carried in the housing H held to the top part of the crankcase by four studs and connected with the oil reservoir by a pipe T1. The pump can be detached, leaving the plunger M connected with its crosshead, the work calling for but a very few minutes. An improvement in this motor which aids in lubricating is the use of an annular expansion chamber F at the top of the sleeves, which collects oil working up past the sleeves and also partially fills with air which when compressed forces the oil downward between the sleeves, insuring the presence of a film of oil at all times.

The use of two silent chains to drive the various motor parts is shown in Fig. 8, in which the main chain passes over four wheels or pulleys No. 1 on the crankshaft, No. 2 an idler, No. 3 the pump and magneto and No. 4 on the eccentric shaft. This chain is 1.5-inch wide and of .5-inch pitch. The four wheels over which it runs have teeth as follows: No. 1 crankshaft, twenty-three; No. 2, idler, twenty-two; No. 3, pump, twenty-three, and No. 4, eccentric, forty-six. The second chain driving the fan from the eccentric shaft is narrower, but of the same pitch and drives over seventeen-tooth pulleys. In oiling the main chain the shaft of the idler pulley No. 2 is drilled and the pulley also drilled, so that when these drillings register as illustrated the entire pump pressure forces oil into the inside of the chain and it works through the chain to its entire surface, assisted by centrifugal force. By mounting the idler eccentrically on its shaft the chain tension can be corrected at will.

Friction-Driven, Two-Blade Fan

Fig 9 shows the two-blade aeroplane type of propeller fan. The fan is not rigidly connected to its shaft, but friction driven through a combination metal and fibre disk clutch with spring engagement. A steel disk L, Fig. 9, is keyed to the shaft and between it and the fan hub L1 is a fiber disk L2. The coil spring forces the hub and fiber disk against the steel disk with sufficient pressure to drive the fan, but with delicacy to allow slipping when suddenly starting and stopping. This illustration shows the general use of hollow connecting rods for the piston and both sleeves. Fig. 10 shows one rod C, a chrome nickel forging of round section and with a drilled hole from end to end 7/8 inch in diameter, leaving a metal wall 1/8 inch thick. The tubular part is of uniform diameter, excepting at a point one-third, or thereabouts, from the lower end, where it is slightly increased, this being the point of maximum strain. The tubular portion expands with a generous fillet into the large lower end, which takes a cap secured by four chrome nickel steel bolts. The use of a tubular section has reduced the weight of a connecting rod to 3 pounds 15 ounces without the bushings. The rod is 12.5 inches center to center, which is 1.5 inch more than double the piston travel.

Fig. 10 also shows the use of tubular rods of the same design for both sets of sleeves. The external appearance of the entire set of rods is shown in Fig. 10, a photographic reproduction of the regular stock product.

The Atlas sleeves are of their own manufacture the same as all of the other castings. Each sleeve is 5/32 inch thick. It has been customary with the foreign Knight licensees to make the outer sleeve thinner than the inner, the latter having to take care of the piston side thrust. This practice has been changed by the Atlas by making both alike, the claim being that the outer sleeve moves against the piston on its working strokes and calls for additional strength. Each sleeve has its intake slot V at the right top and the exhaust slot EV opposite. The exhaust slots measure 4 9/16 inches circumferentially and are 11/16 high. They give a total opening equal to a rectangle 3 31/32 inches by 5/8 inch, with a total area of 2.47 square inches. The intake slots measure 4 9/16 inches circumferentially and 3/16, respectively 15/32 inches high. They give a total opening of 1.98 square inches. The sleeve reciprocation is such that a quick opening and closing are obtained. The intake is opened by the inner sleeve practically standing still and the outer sleeve

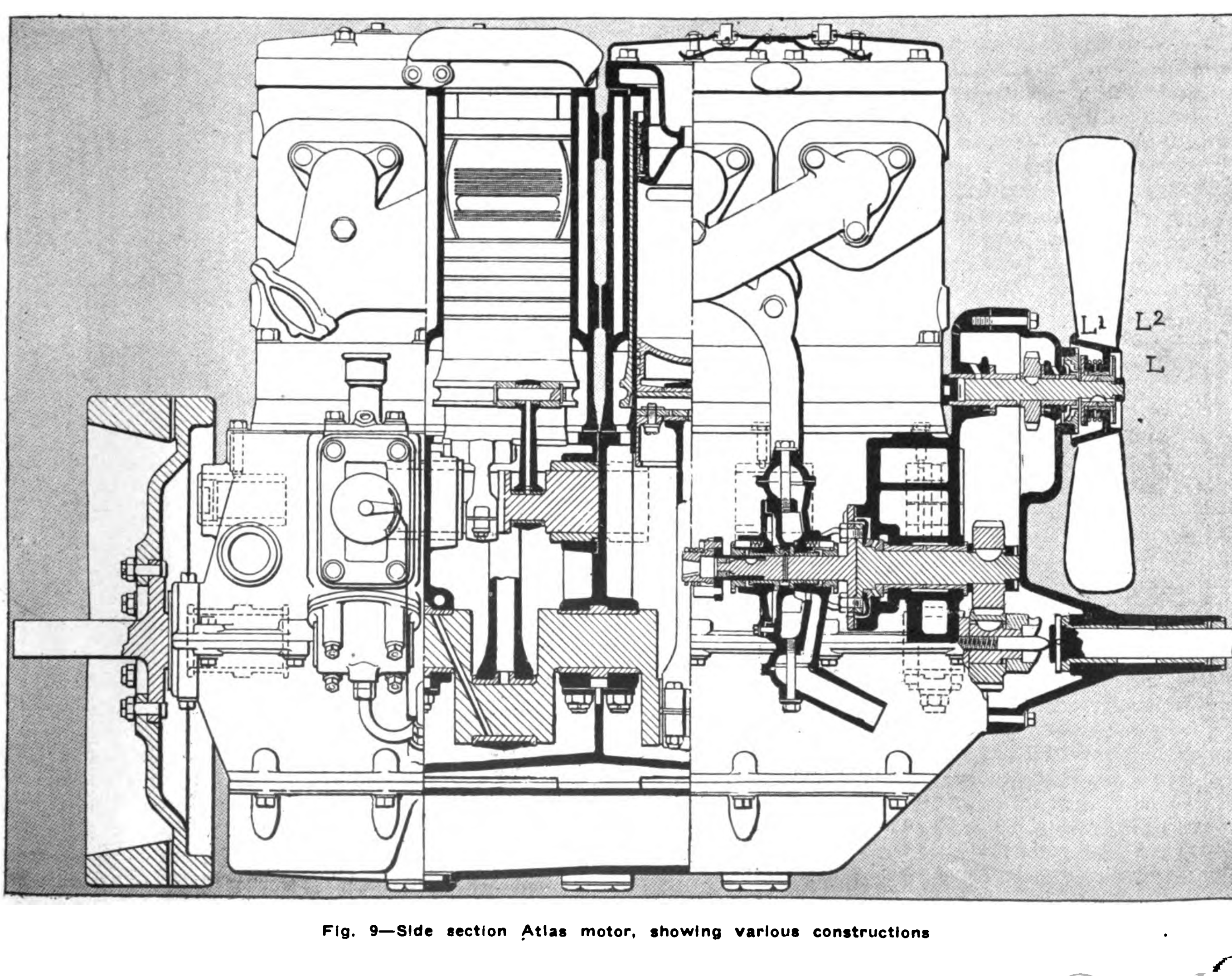


Fig. 9—Side section Atlas motor, showing various constructions

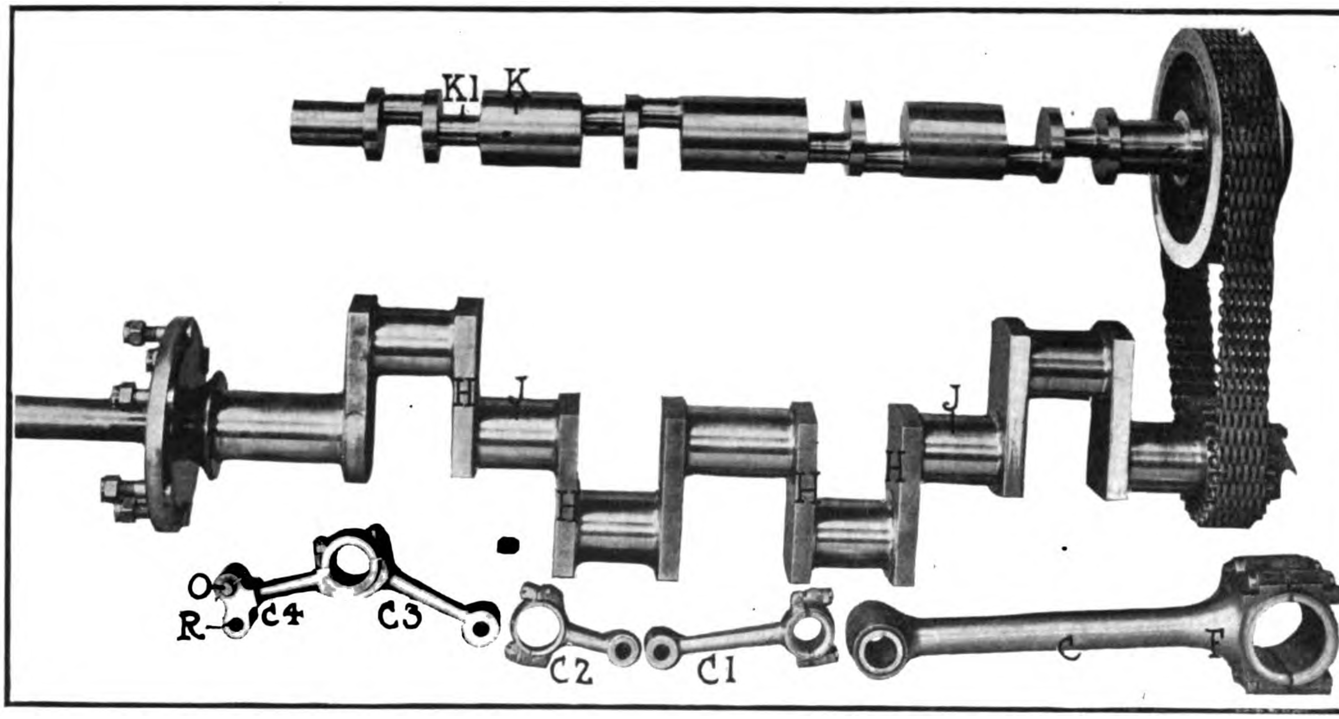


Fig. 10—Hollow piston and sleeve connecting-rods on the new Atlas motor

moving down into register, so that while the valve remains open for 205 degrees of the cycle only 105 degrees of these are required for the intake slot to open, and it remains at the point of maximum opening for 14 degrees and requires 86 degrees for closing. With the exhaust valve the port remains open for 245 degrees on the cycle and reaches its maximum opening in 120 degrees, remains at its maximum opening for 10 degrees and requires 115 degrees in closing.

A longer travel is used than on previous Knight types, namely, 1.25 inch, as compared with 1 inch on Daimler motors and 1⅛ inch on Stearns, Stoddard and others. Using longer travel gives a greater flexibility in timing and valve opening and closing. It also aids in sealing, that is, guarding against the loss of compression through the ports on compression and firing strokes.

In the Knight motor valve timing is done by the amount of lead the inner sleeve is given over the outer one. In the Atlas this lead is 65 degrees. This gives the intake opening at 15 degrees after top dead center and closing 40 degrees after bottom dead center. The exhaust port opens 60 degrees before bottom dead center and closes 5 degrees after top dead center.

Longer Sleeve Travel

With sleeve travel of 1.25 inch there is sleeve speed in feet per minute of 208 at 1,000 crankshaft revolutions and at 1,900 crankshaft revolutions the speed is but 395 feet per minute, a speed which makes lubrication a particularly easy problem.

The sleeves are gray iron castings, a special grade of metal being used which takes a drawing test of 32,000 to 36,000 pounds to the square inch. In manufacture the sleeves are given internal and external cuts at the same time—two of each, a roughing one first and the finishing one afterwards. This done, they are ground on the inside and also on the outside. When ground internally they are held in a water-cooled holder and when ground externally are held in an expanding arbor which extends from end to end and prevents sleeve distortion. The usual circumferential oil grooves are used, with numerous oil holes. The clearance between the piston and the inner sleeve is .004 to .005 inch; between the inner and outer sleeves .002 inch, and between the outer sleeve and the cylinder wall is .002 inch. In tests the motors have been run on the block with a clearance of but .0005 inch between sleeves without any symptoms of seizing, so that the clearance of .002 inch, or four times that amount, is ample.

Pistons, Fig. 11, are gray iron castings carrying three compression rings at the top and well above the wristpin bosses. Each ring is ground on its upper and under faces, but finished by turning on its outer face. A diagonal split is used. Below the three rings is a deep wide oil groove almost as large as those

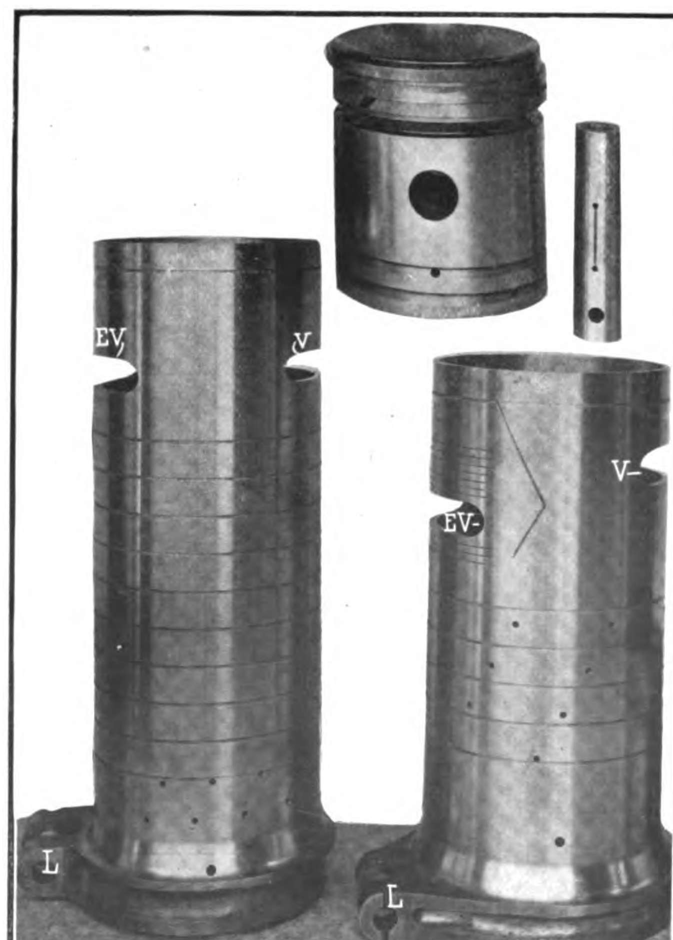


Fig. 11—Atlas sleeves, piston and wristpin

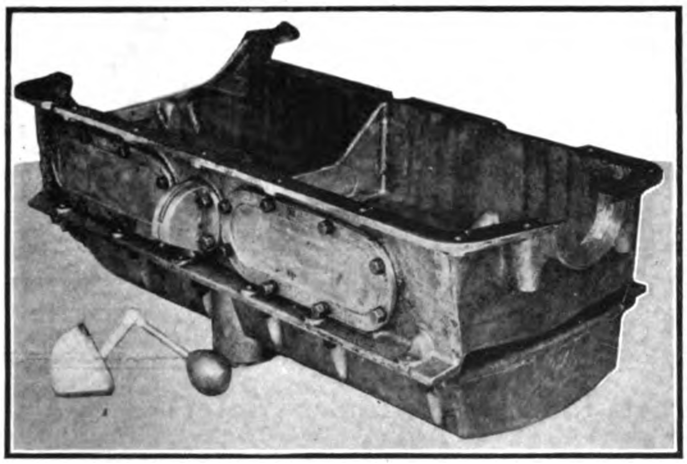


Fig. 12—Air-insulated oil reservoir

grooves taking the rings. In this groove are oil holes leading through the piston wall, their service being to drain the surplus oil between the piston and inner sleeve with low throttle and preventing oil being sucked up past the piston and causing smoking. At the base of the piston skirt are two other oil grooves with holes leading through the piston walls. Each piston head is slightly concaved.

Stout Crankcase Construction

Using a five-bearing crankshaft is conventional with four-cylinder Knight models. Fig. 12 shows the Atlas case with a solid integral web extending from side to side of the case for each bearing. Each web carries a crankshaft bearing and also an eccentric shaft bearing, and is webbed diagonally to take the strain, the diagonal web being in line with the strain on the down stroke and also on the up stroke. Four studs, chrome nickel steel, anchor the bearing caps at the flywheel end for the long center bearing and two studs for each of the other three. The crankshaft, a chrome nickel steel forging, has a bearing diameter of 2.5 inches and a total bearing length of 15.25 inches, divided as follows: 4.5 inches at the flywheel, 3.25 inches in the center bearing, and 2.5 for the front and the middle bearing in each twin cylinder casting. The eccentric shaft has five bearings.

The rigid crankcase has called for a more or less flexible four-point support on the main frame, accomplished as illustrated in Fig. 13. At the forward end are two rigid crankshaft arms each having two vertical stud holes which take bolts to anchor to the bracket S carried in the frame side members. This support permits of a certain frame twisting without transferring it to the motor base. At the rear end the support is by a transverse tube clamped at each end in a split stub cylinder S1, in turn held to the frame by a pair of horizontal bolts passing through a wood block within the frame channel. This illustration gives the various motor dimensions as needed for putting in a frame.

Among the New Books

PRACTICAL APPLIED ELECTRICITY, by David Penn Morton, B. S., E. E., Associate Professor of Electrical Engineering at Armour Institute of Technology and member of several electrical societies. Published by the Reilly & Britton Company, Chicago. 438 pages, 4 by 7 inches, with 323 figures and diagrammatic illustrations. Flexible cloth binding, $1.50.

Although the work is not in itself a text book, it could well be used as such for those who are somewhat rusty in their electrical knowledge and who wish to brush up a little on uncertain points. It could be very well used as a handbook by those who are occasonally confronted by electrical problems although who are not regular electricians. As a school text book it would not be valuable unless aided by other works on the same subject, as in many instances the descriptions are not sufficiently elementary for a beginner. A valuable feature of the work is the use of numerous examples which tend to make the subject matter more firmly fixed in the minds of the student.

RUBBER HAND STAMPS AND THE MANIPULATION OF INDIA RUBBER, by T. O'Conor Sloane, A. M., E. M., Ph. D., author of The Arithmetic of Electricity, Electricity Simplified, Standard Electrical Dictionary, etc. Published by the Norman W. Henley Publishing Company, New York.

Every one who drives an automobile is surely interested in the qualities and working methods in use with rubber. The book is largely taken up with the manufacture of rubber stamps and other similar small articles, but the method of handling it after it leaves the tree is the same as that which is used in the manufacture of tires and other articles of everyday use to the automobilist. The progress of the rubber from the time it leaves the tree as a sap until it becomes the finished article is followed step by step. Vulcanizing is explained and the properties of vulcanized rubber are also taken up. In connection with the chapter on rubber tires the methods of chemical or cold vulcanizing are discussed.

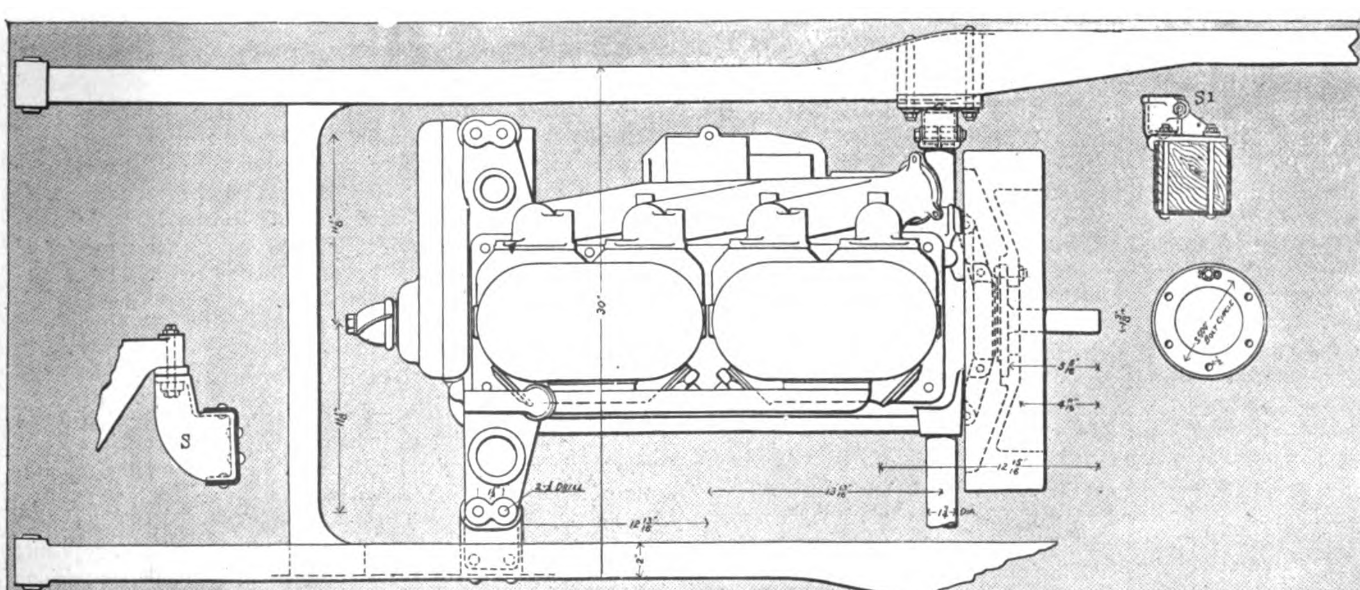


Fig. 13—Atlas motor supports on frame and dimensions

Wants Horse Vehicles to Carry Lights; Discussion on Kerosene Carbureters; State Requirements of Tourists; Spark-Plug Insulation Cracks; Further Argument on Uncooled Motor; Types of Crankshaft for Four-Cylinder Motors

Protests Against Light Law

EDITOR THE AUTOMOBILE:—Is there any law which compels horse-drawn vehicles to show two white lights with red to rear at night? With conditions as they now exist the automobilist must look out for himself at night and the other fellow as well and still get into trouble? Isn't this idea of making the other fellow carry lights a good one?

I am also sending a photograph of a bad road (Fig. 1). The road is very much traveled as it leads to a creamery, store and railroad station. I have a Buick car and when I go out anywhere I must go over this road, as I live alongside of it. Two state roads are being built to the north and south of it so that by fall it will connect them. As for automobiles traveling over it, there are about fifteen of them in this vicinity and we have been asking the supervisor to repair it, but with no results.

Birdell, Pa. J. NORWIN HATFIELD.

Best Route to Honesdale, Pa.

Editor THE AUTOMOBILE:—Please tell me through THE AUTOMOBILE the best route from Bridgeport, Conn., to Honesdale, Pa., by way of Port Jervis and Newburgh, N. Y. Also please give me the route from Honesdale to Philadelphia. J. H. C.

Bridgeport, Conn.

—This is a very good tour as the roads are fairly good for the whole length of the route. Go out Fairfield avenue from Bridgeport, turn into Clinton avenue, then Brooklawn avenue and into Plattsville. The route from there on is clear, following the lines of main travel through Easton, Redding Ridge, Bethel and thence into Danbury. Go out West street straight on past Mill Plain Post Office and follow main road to Brewster, passing through Tilly Foster Mines and reaching Carmel, going along Lake Glenida through Cole's Mills, Mead's Corners, Stormville and along the line of main travel to Clove. Turn left at Clove to Hopewell junction, Fishkill Village and Fishkill Landing.

Cross the Hudson by ferry here to Newburgh on what may be taken as the second lap of the journey. This part is characterized by comparatively rough roads but beautiful scenery. Go out West on Broadway through Coldenham and into Montgomery. Follow the main road to Goshen. Go on through Denton, Slate Hill, South Centerville through Pike street and into Port Jervis. From Port Jervis the roads are rather doubtful and the best method is to proceed by local direction through Hawley and thence to Honesville.

To get to Philadelphia, run back to Port Jervis and then to Matamoras, Pa. Go by way of Broad street to Milford and through Dingman's to Bushkill and thence on to the Delaware Water Gap. From the gap there is a trunk line route which will take you to Portland if you follow the river. Then go through Centerville, Richmond, Three Churches and into Easton. There is a route to Philadelphia from here which is bad in wet weather but otherwise fair. It lies through Riegelsville, Durham Furnace, Plumsteadville, Doyleston, through Willow Grove, and straight on into Philadelphia.

A Point for Discussion

Editor THE AUTOMOBILE:—I noticed in a recent issue of THE AUTOMOBILE a reprint of an article entitled "Carbureters for Kerosene," which had been published in a foreign paper. This seems to be regarded as pretty near an impossibility, but there is a design of easy and cheap construction that will readily permit of burning kerosene alone without any hot-air or hot-water appliances for its vaporization, with the engine developing decidedly more power than it would with an equal amount of gasoline. I have had such a carbureter in use for over 2 years and it is not as complicated as the average gasoline carbureter but will readily vaporize gasoline, benzine, alcohol, turpentine, kerosene, etc. With this carbureter, one of the fuels can be used after the other without any adjustment save a slight alteration of the needle valve. Alcohol requires a larger opening than gasoline, benzine, turpentine or kerosene, having more heat units per unit of volume. While I have not been able to start with kerosene on a cold engine, it only requires gasoline for the first two or three revolutions and will then fire with kerosene, whether the cylinders are warm or cold. With gasoline, it starts even in zero weather. With a mixture of one-fourth gasoline and three-fourths kerosene it starts without trouble even at a temperature considerably below the freezing point of water.

But now the question is this: Of what use would such a carbureter be to the average automobilist? Those who use kerosene vaporized by a special carbureter say that it fouls the cylinders, thereby diminishing the efficiency of the engine. THE AUTOMOBILE recently stated that the S. A. E., in a discussion of carbon deposits, brought out the statement that "the carbureter did not furnish enough oxygen for all the fuel and the sub-oxidized product was deposited." I would not like to contradict that, but it is, in my opinion, more the fault of the engine design which retains a portion of the smoke of the previous explosion in the combustion chamber which ultimately causes a deposit, as I have an engine in which an air current passes through the cylinder after each explosion, completely scavenging the cylinder of all foul gas. In over 2 years' service, I have had no deposit, though often using only kerosene for fuel and the cheapest grades of machine oil as a lubricant. I would like to see a further discussion of this point by others who have had experience.

Bradenville, Pa. JOSEPH MUNDEN.

Concerning State Touring Laws

Editor THE AUTOMOBILE:—I intend to make a tour through Arkansas, Missouri, Illinois, Indiana, Ohio, Michigan, New York, Pennsylvania and Maryland and would like to know the requirements of each state as regards tourists.

Paragould, Ark. J. R. BERTIG.

—Inferring that you mean the requirements of non-residents passing through each of the states you mention, the provisions are as follows:

Arkansas—Non-residents exempt from license fees provided that they are properly registered in their own state.

Illinois—Non-residents may tour in the state for 60 days each year without further registration than in home state. That is, home registration suffices.

Indiana—Non-residents exempt from registration.

Maryland—Two periods of 7 days each are allowed.

Michigan—Reciprocal with home state. You need not register to tour through the state.

Missouri—Nineteen days allowed per year without registration.

New York—Reciprocal arrangement. You need not register.

Ohio—Non-residents are exempt from registration.

Pennsylvania—Ten days are allowed per year.

You can, therefore, tour through all the above states provided you are registered at home, without paying any other license fees. The rules of the road are practically the same in all, although the speed limits differ in the various states. They are as follows, in miles per hour: Arkansas, 20; Illinois, 25; Indiana, 20; Maryland, 25; Michigan, 25; Missouri, 25; New York, 30; Ohio, 20; Pennsylvania, 25.

Trouble with His Spark-Plugs

Editor THE AUTOMOBILE:—I am having trouble with the spark-plugs on my automobile. Almost every trip I take the engine will begin to misfire after I have run between 2 and 50 miles. On every occasion I find on examination that a broken porcelain is the cause of the trouble. I have used several makes of plugs, but all give the same results. My engine does not heat up very much, not so much as a great many others I know of that never have any spark-plug troubles at all. Will THE AUTOMOBILE tell me what to do to avoid the trouble? The car is a 1910 Patterson touring.

Boonville, Ind. W. L. MARTS.

—You are probably putting the plugs in too tightly and then, when the motor heats up, the porcelains crack. This and overheating are the only two reasons that cause plugs to crack while in the cylinders. There is a great possibility that the spark-plug apertures have not been tapped large enough so that it requires a great amount of force to get the plugs into the cylinders. If you run a tap of the correct size into the hole in the cylinder and then apply the plugs without using a great amount of force there is no doubt that your trouble will disappear.

Has Firm Belief in His Motor

Editor THE AUTOMOBILE:—Your cry for a little less toothache will go thundering down the ages as a modern classic. A little less radiator when you could do without one!

Reader has not read my letter; at least I do not see where he has pointed out "obvious answers to many of my arguments from daily practice." "Why citing the Franklin car?" when I had stated that the engine was designed for city gas and ran now with waterjacket empty. "Why referring to the elaborate cooling means of another?" when I do not complain but of not enough heat. As to the engine: It had run about 10 years before it came into my hands, using tube ignition. I have never given the bore and stroke any consideration since it did not interest me. It is a so-called stationary engine of the horizontal type and very heavily built, the inlet valve being automatic and both valves in the head. A waterjacket encloses almost the entire cylinder, excepting about 2 inches in front. I took out the hot tube and put in 2 plugs in series, a system I have found excellent for 3 years.

For what reason does Reader expect oiling difficulties when I have injected water with the fuel into the engine and have seen it come out as water instead of steam, as alleged by some? Then I was entitled to take the step and raise the temperature of the engine; then I am entitled to double this temperature in the near future. I had thought I could turn water into steam and thereby get a steam-engine effect, an extended push, but I failed. I had much rather have a definite reply than mere generalities. Why have I failed, where others have succeeded? Under what conditions have they accomplished it? I had a serious setback 3 years ago when I took water into a four-cycle gasoline engine by means of a second carbureter. The engine came to an abrupt stop in about 5 minutes and a 6-foot lever would not move it. Examination the next day showed the water in pools, the oil no longer forming an unbroken film, and each pool full of rust. I do not know to this day what really did take place. I mean I have not the slightest hint as to the causes. If anyone has any such an experience, or can form any conclusion from what I have said here, I would be pleased to hear from him. Water injection for cooling purposes is entirely feasible and works very well. It is less cumbersome than the radiator, but as the motor is ordinarily arranged it would not be advisable to use this system unless provisions are made so that the fuel ceases with the water. I mean, should the water fail, the engine might get damaged and the failure of the one must cause the other to be cut off. This, of course, the average man cannot readily accomplish.

The pious wish of Reader to have radiators investigated tempts me to believe him a layman Simon-pure. Investigations are handled thus (so I am entitled to say from answers I received from universities and similar institutions): A university professor is privately engaged (the institution as such never makes tests) to make a certain test. The professor, then after the price has been agreed upon, uses the quasi-public apparatus of the institution as if it were his own and gives a report as favorable as possible towards his employer. I gave a gasp of surprise when I got those answers. The sooner such a system is abolished, the better. I ask with Pilatus, the governor of the conquered province Judea, "What is the truth?" I believe with him that truth is like the fleeting hour, a mere mark, a token—but we should eliminate the human factor and induce the institutions, as such only, to make tests.

But, dear Reader, what will the professor accomplish whose all too trained mind permits him to see but a very narrow horizon and whose helpers, the students, are but in the forming periods of life? He will do as all those before have done; he will report that he has followed the trail blazed by the—well, must I say the hated word?—inventor, and that he found it of such a length and counted so many landmarks! If not truth, but the better vision, lay but an inch to one side of that road, how could he see it? He can but follow the trail—science has always done that. To cite an instance: It had been mathematically proven that flight by mechanical means is and always would be impossible. I believe "science" one of our most inefficient branches of human endeavor.

The question of radiator is safer thrashed out here. But what I thought would happen did happen: The men who ought to take this question up, the designers, do not consider the art. They consider themselves. But, with shame, we must confess that practically all progress is imported. It is of no use and of still less sense to meet such a statement with the usual: "Hurray for

Fig. 1—The roads that a Birdell, Pa., man has to contend with

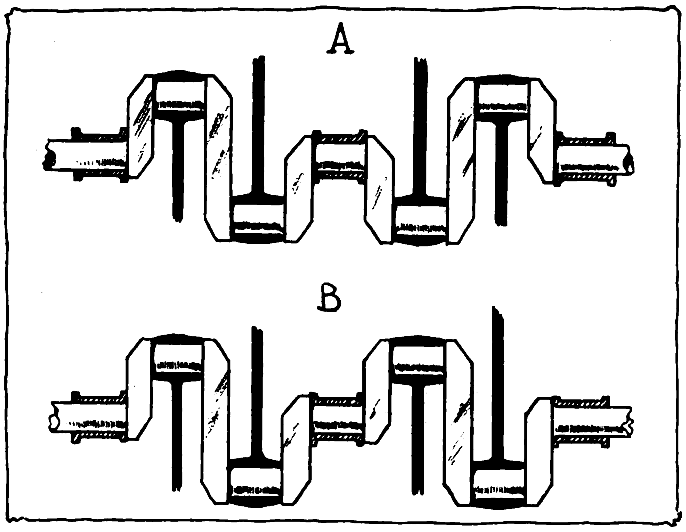


Fig. 2—Two types of crankshaft suggested for four-cylinder opposed motor

the red, white and blue." Successes in the United States are won by brute strength and at the expense of an enormous waste of human material, a parallel of the gas engine with an efficiency of 25 per cent. Although considering at all times that we can get but a mere fraction of a return for our efforts, it behooves us to reach out for the light in the distance, however small. When I speak of an engine as I did, I naturally speak of things as they are. But it may be a mere isolated instance; it may be of no significance; it may be entirely impossible to duplicate it with an engine of different bore and stroke. The engine now runs on any old thing. I have tried about all the fuels I could get, some of them of great difficulty to procure—crude oil, for example. But an engine differing but little may not do this. If so, it is worth knowing.

Great doctors in the past have disagreed. An English designer of reputation, in his latest book, says that he is right now, as he was then, and Mr. Otto was wrong. Otto held the layer theory; the other refutes it. Let me add to the gayety of nations by saying that the truth lies nearer between them: The mixture at the time of the firing has several zones which are not as easily definable as Otto would have us think. If I am led to think, by the failure of water to turn to steam, that water at once clusters in uneven films on the cylinder walls when entering the cylinder, would you then call my trend of thought unreasonable? Have I not the good reason that only the hugging of the water to the iron can permit the water to survive the high temperature of the firing? How am I going to explain the fact that when starting the engine from cold, feeding it crude oil, that it will fire but every sixteenth revolution, the crude oil passing out of the exhaust, unburned? How am I going to explain the fact, that with a hot engine, I may souse the cylinder with crude oil, then shut off the supply and have engine run for a while and it takes each fire, firing in orderly manner as much of liquid as it requires, leaving the rest unburned? But one conclusion I see at this writing: That the walls of the engine have a protecting sphere of influence. Whether this definition has any better chance to make things clear it has helped me to conclude. When I pointed out that the maximum wave of compression does not coincide with the rear end position of the piston, I hoped that some one would point to the Diesel engine. That engine, because of its function, cannot have this defect. To what an extent has that helped the general efficiency of that engine? I may be entirely wrong when I surmise that an improvement in engines is bound to follow with its circumvention. One but has to look over the efforts to improve engines by more perfect scavenging and the failure of those efforts to look askance at an attempt towards improvement in that direction.

That the spent gases are not as detrimental as generally conceded, my own investigation has permitted me to conclude, and at a later day I will gladly take up that question, going into it fully. I found it a very interesting study, permitting improvements in engines in a direction perhaps but little considered. I can frankly say that, although at times I thought I knew about all there was to be known of gas engines, the deeper I got into it, the deeper I found the waters. I had hoped for a fight and what do I find: Those who know nothing of the subject say nothing. Those who do know fear to part with their knowledge—a deplorable admission of poverty.

New York City. P. G. TISMER.

Which Is the Better Crankshaft?

Editor THE AUTOMOBILE:—I am sending you two sketches of a crankshaft for a four-cylinder, horizontal opposed engine, Fig. 2, A. and B. I would be very much obliged if you would advise me of your opinion of these two with reference to which is the better balanced and any other features that you may know regarding the relative operation of the two.

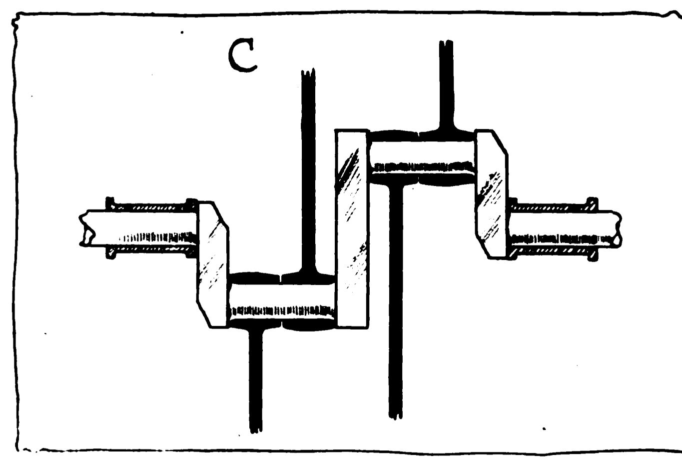


Fig. 3—More compact form of crankshaft which could be used for opposed motor

Hanover, Pa. R. M.

—Neither of these two rigs would be very good from an engineering standpoint, although the one shown at B with the two cylinders alternating would be better, because you would have the same distance between the cylinders. If you used the other crankshaft shown at A, you would have a wide space between one pair of cylinders while the other two would be close together. This would give a very peculiar-looking construction and would not produce very good results. The best way would be to arrange the crankshaft as shown at C. The engine would take up less room, the same casting would suffice for both pairs of cylinders, the construction of the waterjackets would be simpler and a much more satisfactory engine all around would result.

The firing order could be practically as you desire only that alternate cylinders would have to fire after each other. The firing could be 1-2-3-4 or any other way that the builder chooses, depending on the arrangement of the cylinders. The cylinders could be readily cast in pairs and the cost of the engine reduced considerably, while the simplicity would be much greater than if each cylinder were cast singly.

Brake Horsepower Not Known

Editor THE AUTOMOBILE:—Please tell me through THE AUTOMOBILE the actual brake horsepower of a four-cylinder motor of 3 1-4 inches bore and 5 inches stroke?

(2) Is a two-bearing crankshaft as good as a three-bearing shaft?

(3) What are the advantages of a floating rear axle over a semi-floating?

Wyandotte, Okla. C. R. SCOTT.

—(1) It is impossible to tell by formula or any such means the actual brake horsepower of a motor. The brake horsepower is the amount of power measured on a brake such as the Prony or any of the other forms which are in use in testing plants. The brake horsepower of such a motor as you describe may vary in such wide limits that it is impossible to state what the brake horsepower would be at any given number of revolutions per minute.

(2) Two-bearing crankshafts are used on light cars and have the disadvantage that great strength is necessary so that there is no whipping action in the crankshaft. In good cars this is taken care of by a generous bearing width in the two bearings. The simplicity of construction required with the two-bearing shaft is a great point in its favor.

(3) This is a matter which is still being thrashed out among the car manufacturers. Prominent manufacturers are using both and it is impossible at this time to state which is better. The floating type has the advantage, however, that it is possible to get at the driveshafts much easier. All that it is necessary to do in this type is to remove the hub cap and withdraw the axle shafts and the weight is entirely removed from the driving mechanism, being taken altogether by the housing of the rear system.

Suggests a Repair Shop Kink

Editor THE AUTOMOBILE:—I would offer a little tip for repairmen who do a great amount of work on crankshafts. This part is very clumsy to handle on the bench and may be damaged if a vise is used carelessly. I have rigged up a little bracket which I place in front of the bench as shown in Fig. 4. It is bolted to the floor and the crankshaft is held fast by means of

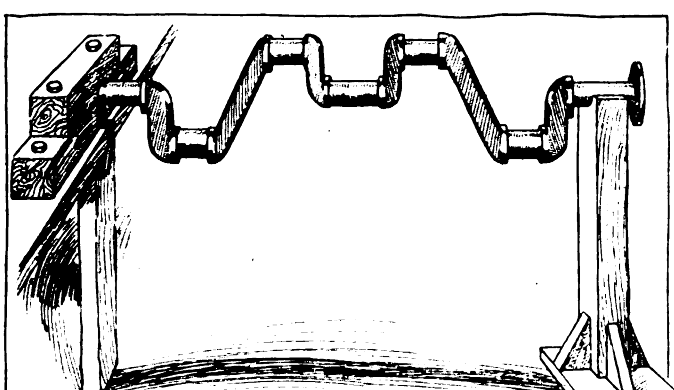


Fig. 4—Handy method of holding crankshaft suggested by Beloit repairman

the bolts which pass through the blocks on the bench. In this way, fitting and measuring can be done very conveniently and without danger of doing any harm to the part. The shaft can be revolved at will and is in a convenient waist-high position.

Beloit, Wis. REPAIRMAN.

Device for Piston Oil Groove

Editor THE AUTOMOBILE:—The cut of the groove for preventing oil working past the piston rings which you gave in your issue of June 27 does not show the best form of the device.

My experience has been that, in most cases, a groove of about the dimensions shown in Fig. 5 is sufficient without the holes leading to the interior of the piston. The essential feature is the exposure of the lower edge of the ring, the sharp edge of which scrapes the excess oil off the cylinder wall on the down stroke into the storage space provided by the groove. At the bottom of the stroke the inertia of the oil and the upward movement of the piston crowd the oil into the sharp lower part of the groove, where it tends to distribute itself upon the cylinder wall as the piston moves upward.

There is a ratchet-like action, tending to work the oil away from the combustion chamber but not removing the oil from the cylinder wall, where it is wanted both for lubrication and as a packing. A very gradual approach between the piston surface and cylinder wall at the bottom of the groove is the secret of success with this device and it is well to round off the junction line of the piston with a file.

In those exceptional cases where this form of groove does not take care of all the oil, diagonal holes may be added as shown in the second sketch. It is not necessary to add a ring at the bottom of the piston as the groove can be, and usually is, applied to the ring next to the wristpin. These grooves are broadly covered in my patents numbers 908,569 and 908,570, and, while I do not wish to be taken as authorizing their general use in manufacture I should be glad to have individual owners avail themselves of this improvement while overhauling their cars as I think it well worth while.

Akron, O. F. D. HOWE.

Advantage of Hand Air Control

Editor THE AUTOMOBILE:—Please tell me through THE AUTOMOBILE if it would be advisable for the sake of economy to put a hand control for extra air supply on the carbureter of a model T Ford, 1912.

Buffalo, N. Y. H. J. DOYLE.

—It would not be economical because the carbureter now on your car is sufficient for all touring purposes and if you desire to use it for racing you would have to buy a larger waterjacketed carbureter in the first place, and would have to make a number of other adjustments outside of the carbureter as well in order to put on such an arrangement.

Likes Interconnected Oil Device

Editor THE AUTOMOBILE:—I think that every one should heartily indorse the idea which seems to be coming to the front now in the automobile field of interconnecting the throttle with the oiling device. That is, should the car be running slowly there will not be nearly so much oil fed to the cylinders as when running rapidly. Little things like this must mean a lot of difference in the expense at the end of the season. In going uphill also with the throttle open wide and the motor running slow more oil will be fed, which will be just what is desired.

Milwaukee, Wis. READER.

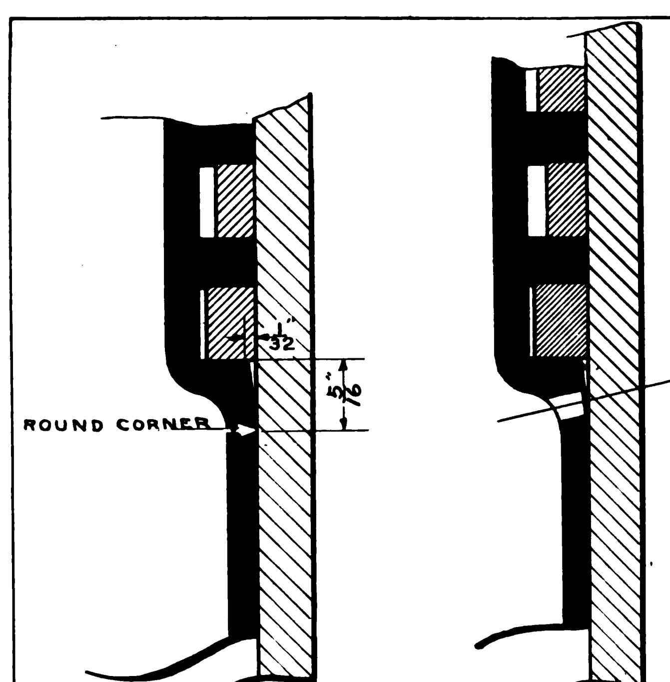
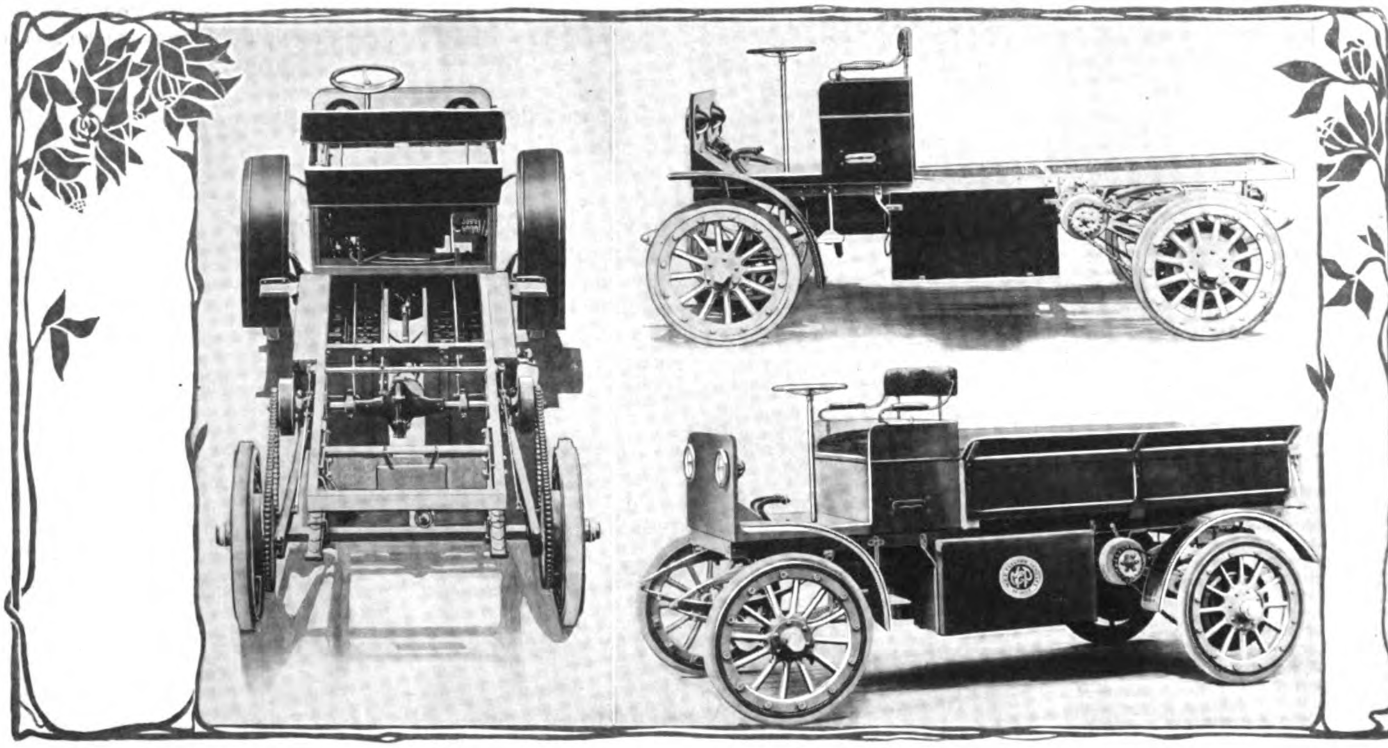


Fig. 5—A device for preventing oil from working upward past the piston rings



Rear and side views of the new 1-ton M. & P. electric truck. Express style of body mounted on chassis

M. & P. Electric Truck

Detroit Concern Has Added 1-Ton Vehicle to Its Line—Will Continue 1000-Pound Wagon

General Lines Similar to Those of the Latter—Traveling Radius 50 Miles Under Normal Conditions

THE M. & P. ELECTRIC VEHICLE COMPANY, Detroit, Mich., will be in a position to make deliveries on a new truck within a month. Up to the present time the company has confined its energies to the making of a single model, a 1-2-ton type, but its plans are all complete for the manufacture of a 1-ton design in addition to this earlier model.

The new truck will maintain the general features of the lighter model, although it will be longer, will have a larger battery and other parts will be correspondingly altered to be consistent with the greater carrying capacity.

The motor of the new truck will be a Westinghouse, type V-50, the voltage being 80 and the amperage 30. The speed of this motor is rated at 1,500 revolutions per minute under normal conditions. It is mounted forward, under the seat, the shaft from it to the jackshaft passing back between the two battery boxes which are located amidships under the frame. This construction is the same as that employed in the 1-2-ton truck. The controller, which is also placed under the seat, is of Westinghouse make, type 501-F. It is designed to give continuous torque, there being four speeds forward and two reverse.

As in the smaller truck of this make, the battery is of Gould manufacture, having forty cells, with thirteen T. H. plates per cell. The connectors are of the L type. The mileage per hour with this battery and fully loaded truck is 9 miles, while that on a charge is given as 50 miles, under normal service conditions.

The drive has already been partially mentioned. The first reduction is to the jackshaft, the propeller shaft from the motor being of large proportions. It is of square section, 1 1-4 inches in size. Two universal joints are used with this shaft, one being placed just to the rear of the motor and the other at the differential. As in the usual construction, two side chains transmit the power from the jackshaft to the rear axles, the gear reduction between sprockets and pinions being twelve to one.

The jackshaft is of the live type of Weston-Mott make. Ball bearings are used on the third-arms, which are also of this concern's manufacture. On the sprocket ends Hyatt roller bearings are used. The parts of the shaft, differential, brake rods and holders, as well as the battery, are easily reached on removal of the floorboards. Grease-cups, however, for lubricating the shaft bearings are reached from the outside of the machine, as the chassis view shows.

Both axles are of Weston-Mott make, the rear one being of square section of the dead type, 1 3-4 inches square with spindles 1 3-4 inches in diameter. Side radius rods of substantial proportions pass from the jackshaft mountings between the service brake drums and the frame members to the rear axle. The front axle is of I-beam section, 2 1-2 by 1 1-2 inches, the spindles being 1 5-8 inches in diameter.

Elliptic Springs Are Used

Springs are elliptic, the front being 36 inches in length with a width of 2 inches. In the rear they are 40 inches long and have the same width as the front springs. These rear springs rest on the axle and are fastened to it in the usual way with clips. They are fixed to the frame at their upper sides in special adjusting supports which allow them to slide back and forth to take up jars due to unevenness of the road. At the same time the radius rods at each side maintain the alignment and relative distance between jackshaft and rear axle.

There are two sets of brakes, the emergency and service brakes. The service types expand in drums at the outer ends of the jackshaft between the frame members and the chain sprockets. They measure 10 inches in diameter and have a width of 2 inches. The emergency brakes are also of the expanding type, measure 14 inches by 2 inches and are located in drums mounted on the rear wheels. The operation of both sets is by means of pedals which are located on the floor forward of the steering column.

The frame is of standard 4-inch steel, channel section, having a length of 147 inches and a width of 32 inches. The cross-members, of which there are three, one at either end and one just forward of the jackshaft, are also of 4-inch, channel-sectional steel, hot-riveted to the side-members.

The wheels are of the artillery type, having twelve spokes, 1 3-4 inches in diameter. The bearings are of Weston-Mott construction. Wheels are made according to S. A. E. specifications, both front and rear being 34 inches in diameter. Tires are of Firestone solid type, 34 by 4 inches, mounted on demountable rims.

The wheelbase is 112 inches, a 2-inch increase over that of the 1-2-ton truck of the M. & P. make. Tread is 56 inches and the road clearance 11 inches.

While the over-all dimensions of the truck will vary somewhat, depending upon the type of body mounted on the chassis, with the standard type of delivery body the over-all length is 158 inches and the width 68 inches. The over-all height from the ground is 91 inches. The loading space back of the seat is 100 inches in length, 45 inches in width and has a height of 58 inches. These dimensions apply to the clear space within the body.

The total weight of the new truck is 3,800 pounds when equipped with the standard type of body.

Wear and Tear of Armored Tires

How the high speed, fast turns and abrupt accelerations and retardations of a race make short work of destroying a tire armor—and a road surface—is revealed by an inspection of the accompanying illustration representing the wheels removed from the victorious Boillot's car during the recent two-day Grand Prix race over the Dieppe circuit in France, covering a distance of 1,550 kilometers or 960 miles. On some of the stretches the speed frequently reached up toward 100 miles an hour, and the enormous pull which such going exerts upon the anti-skid rivets is in evidence especially on the second and third tires from the right. One of these, the third, went through 12 of the 20 laps, or a distance of about 576 miles, and more rivets are missing in it than in any other. It shows both wear and violence. It is evident that the rivets are very rarely yanked out by the traction pull until after they have first been worn down and wiggled loose. The big rivets are worn almost to the size of the small ones, but a certain irregularity in this matter shows that the traction-thrust of the rivet heads against the stones of the road after all have more to do with the havoc wrought than the steady wear and the mileage; in other words, that the pulling out of rivets in anti-skid tires is distinctly a racing result which need not be feared in travel at ordinary speeds until much higher mileages have been covered. The smooth front tire is to the left, which was used only on the first day before the rain had set in and made the road slippery, seems to have made as good a showing with regard to surface abrasion as the armored front tire to the right, the last to be exchanged.

Switzerland seems never to be in such a happy mood as when she is bringing the iron fist down upon the automobilist. By the acts of her public officials one might be led to infer that as much as Switzerland depends upon tourists for her pin-money she really does not want them if they insist upon fetching along their motor-cars. It was only a few months ago that certain Cantons arose *en masse* and with a loud voice shouted for automobilists to keep out, because the dust stirred up by their machines was flying into the fields and ruining the blossoms on the fruit-trees and filling the grass so full of grit that the cattle refused to chew their cuds. This time Switzerland's officials purpose taxing the cars of tourists.

Chances for Foreign Trade

Items Culled from Consular Reports Showing Where Opportunities for Business Exist Abroad

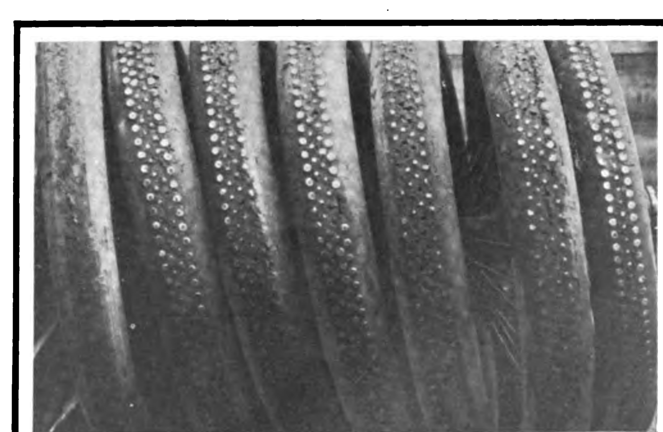
Germans Want to Import $1,000 Car—Low-Priced Automobiles in Demand—Opening for Commercials

Automobiles for Germany—An American company, which recently established an automobile agency in Germany, sold 10 cars during the first 3 months. Most of the machines sold were for pleasure purposes, but one is being used as a taxicab. An American consul writes that there are persons in his district who are willing to form a $50,000 company for importing American cars, but they desire the general agency for Germany or for all Europe, if possible. They are looking for a four-seated car that could be sold for about $1,000. American firms interested in this proposition may secure information by writing the consulate in question. File No. 9195.

Low-Priced Automobiles—An American consular officer in a European country has forwarded a copy of a letter received from a business firm in his district, requesting certain information in regard to low-priced American automobiles, and containing particulars regarding the automobiles which he wishes to handle and the conditions upon which he desires to obtain the same. This firm is anxious to hear from factories making large quantities of low-priced cars, that will do much advertising, and with which business can be done for some years to come. Copy of the letter, giving further details, will be sent to interested firms by the Bureau of Manufactures. File No. 9204.

More Low-priced Automobiles—A business in a Mediterranean country informs an American consular officer that he desires to enter into communication with American firms manufacturing low-priced automobiles, with a view to representing as agent and importing this class of machines. As the territory in which the machines will be used is hilly and mountainous, the engines must be good. Electric automobiles are not wanted. References will be furnished, and correspondence should be in Italian, French or English. File No. 9199.

Automobiles—A report from an American consular officer in a Latin-American country states that a resident of his district desires catalogues and prices for the purchase of two sixteen-passenger trucks, to be delivered in November. These trucks are to be used for passenger service that is to be established between two cities upon the completion of a boulevard now under construction. Another resident of his district desires catalogues and prices for a five-passenger touring car, to be delivered at once. Price of this car should not exceed $1,500. File No. 8,940.



How high speed pulled the rivets from Boillot's tires

Simple and Economical Motor Fire Engines Coming Fast in Germany—Construction and Equipment of Winning Racing Cars—Clutch Which Yields When Seizing —Misleading Averages in Grand Prix—Preheating of Thick Flame Welds

MODERN Fire Engines—For all accustomed to associate the idea of a fire engine with the aspect of a large steam plant on wheels shining with brass and nickel plate and spilling fire from the grate as it lumbers along the street, drawn by laboring and panting horses whose power is largely wasted in sending their own heavy bodies up and down, the simple outlines of a modern complete motor fire engine, as shown in the small accompanying illustration, Fig. 2, must be surprising. But also in comparison with chemical or steam engine equipments which are propelled by motor power, the simplification presented in the illustration is startling. The type shown in this outline has been developed at the Daimler works at Marienfelde near Berlin, on the basis of the experience gained in a number of long-distance trials of fire service vehicles conducted in Germany during 1911. Two of them are now under construction. They are intended mainly for long-distance work, as the needs of central Berlin are as yet served with electric-battery-driven vehicles in which the steam pumps are only gradually being replaced by rotary gear pumps, but similar fire engines of the pure gasoline-motor type, for powering the hose work as well as the propulsion, are being developed at other automobile factories, such as the Adler and the N. A. G. works. In the Adler engine a centrifugal pump is used, which has the advantage over the rotary gear pump or *Rundlaufpumpe* (described in THE AUTOMOBILE of July 4) that it is not positive and cannot burst the hose, when nozzles are closed or frozen, but on the other hand, necessitates the carrying of a small water supply in the vehicle to start it going, if it is to be used where no water pressure is available, since it cannot draw water from a lower level through an air space.

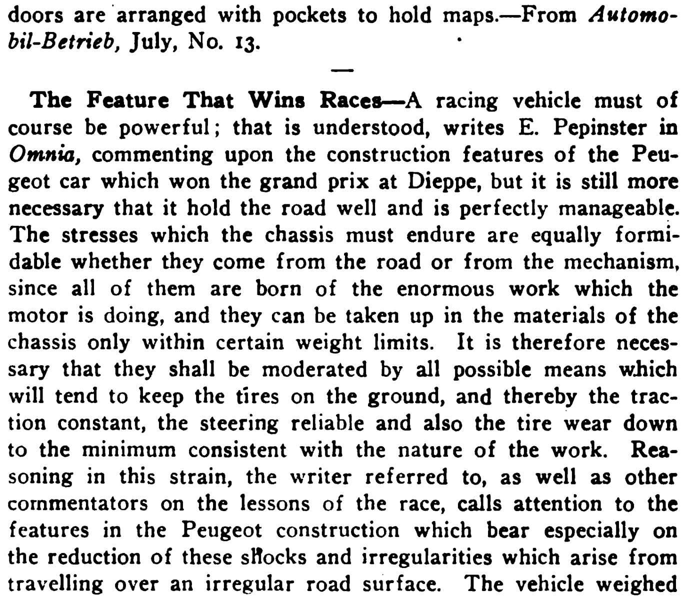
DATA OF CONSTRUCTION

The Daimler vehicles are being fitted with the positive rotary gear pump which throws 1,500 liters of water per minute. This pump is located in the rear, midway between the frame reaches and below the level of their lower edge. The rotary piston can conveniently be pulled out from the rear and cleaned of sand or other impurities which may have been drawn in with the water. Struts brace the pump against both suction and pressure thrusts and stop valve levers are mounted on the pressure struts. The driving shaft of the pump is provided with a universal joint and takes its power through the change-gear box of the vehicle, by a separate shaft, so that different pressures are available with unchanged motor speed. Other construction data are given as follows:

The motor develops 50 horsepower at 900 revolutions per minute and 60 at 1,100. It has double ignition. Auxiliary cooling of the motor (since the hose work is stationary and gives the motor no benefit, for cooling purposes, from movement through the atmosphere) is effected by leading a portion of the cooling-water around the pump while the latter is working. The vehicle speed is limited to 40 kilometers per hour by a governor acting on the third and fourth speeds.

Solid rubber tires are used on all four wheels, which are of the same size. Those on the rear wheels are of the twin type. The wheel base is 3,500 mm., the length of the chassis 5,300 mm. and the height of the chassis 760 mm. to the top of reaches. The drive is by chains. The rear girders are so arranged as to leave room between the frame reaches for ladders. The exhaust gas may be applied to thawing out the pump and its pressure-meter in winter. The lighting equipment, of especial importance for directing the work properly at night, includes acetylene searchlights in front, orientation lanterns provided with benzine gas jets and also with electric incandescent bulbs which may be switched on while the vehicle is moving, electric tail lamp, electric lamps with push contacts in the interior of the vehicle and benzine gas lamp for throwing light on the pump manometer. A Klaxon is used in addition to the customary alarm bell. The insides of the doors are arranged with pockets to hold maps.—From *Automobil-Betrieb*, July, No. 13.

The Feature That Wins Races—A racing vehicle must of course be powerful; that is understood, writes E. Pepinster in *Omnia*, commenting upon the construction features of the Peugeot car which won the grand prix at Dieppe, but it is still more necessary that it hold the road well and is perfectly manageable. The stresses which the chassis must endure are equally formidable whether they come from the road or from the mechanism, since all of them are born of the enormous work which the motor is doing, and they can be taken up in the materials of the chassis only within certain weight limits. It is therefore necessary that they shall be moderated by all possible means which will tend to keep the tires on the ground, and thereby the traction constant, the steering reliable and also the tire wear down to the minimum consistent with the nature of the work. Reasoning in this strain, the writer referred to, as well as other commentators on the lessons of the race, calls attention to the features in the Peugeot construction which bear especially on the reduction of these shocks and irregularities which arise from travelling over an irregular road surface. The vehicle weighed only 980 kilograms and was capable of going at the rate of 187 kilometers per hour on level ground. The slender frame would naturally twist more or less at humps and turns. So the motor was mounted in a false frame and the latter suspended in the



Long-distance motor fire engine with rotary pump, short ladders and hose for water supply connection main frame on three lubricated rollers with grease cups. The weight of the rear axle, with differential and Rudge-Whitworth wire wheels, was reduced to 104 kilograms, partly by the use of aluminum. Both axles were provided with shock-absorbers acting on the extension of the vehicle springs, and two leather straps moreover prevented the rear axle from exceeding a certain distance from the chassis. All the driving strain as well as torsion between the driving axle and the frame was transmitted through the vehicle springs, no torsion rods or drive struts being used, and this represents a return to early design for shaft-drive cars. [But the dimensions of the vehicle springs must naturally have been much larger than in early cars.—Ed.] The two universal joints of the drive shaft were mounted on ball-bearings. The wheel brakes (rear only) were automatically centered on the hubs and could be regulated from the driver's seat.

It is noted that, while the Peugeot car was equipped with wire wheels, the Sunbeam team of cars which won the cup for regularity in both classes and the speed cup in the race for small cars with limited cylinder volume, were mounted on Sankey wheels, which look almost like wood wheels but are composed of two molded sheet-steel shapes joined by autogenous welding. They gave no trouble.

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Lessons of Grand Prix in France—Advocates of the style of race in which the cylinder volume of the motors in the contesting vehicles is limited have claimed as one of the advantages of this plan that it would push designers into the study of light vehicle construction, writes Henri Feron, but it is, on the contrary, the motor in which small cylinder volume is combined with high power (the pushed motor so-called) which makes for heavy construction per unit of horsepower. In the recent race on the Dieppe circuit, the powers and weights, in so far as they have been certified by the builders, were as follows:

	Horsepower.	Kilograms.
Excelsior six-cylinder car..........	170	1,600
Lorraine-Dietrich cars..............	160	1,600
Peugeot car, the winner............	175	1,400
Calthorpe, in 3-liter class...........	68	1,100
Schneider	80	1,150
Sunbeam	72	1,090
Vinot-Deguingand	50	1,100

For the three first-mentioned vehicles, which were in the class not subject to restriction of cylinder volume, the weights per horsepower were thus 9.4 kilograms for the Excelsior, 10 kilograms for the Dietrichs and 8 kilograms for the Peugeot, while, on the other hand, the weights in the limited class were 16 kilograms for the Calthorpe, 14.4 for the Schneider, 15 for the Sunbeam and 22 for the Vinot-Deguingand. The average in the free class was thus 9.15, against 17 for the limited. [The argument of the writer seems much weakened by the fact that the Peugeot motor is classed by everybody as a very much pushed motor, as it can be operated under maximum load at a speed of 2,200 revolutions per minute, a piston speed of 14.66 meters per second and a mean effective piston pressure of nearly 10 kilograms per square centimeter, and it should, of course, also be considered, with regard to the 3-liter cars, that there are very important constant elements in the weight of a car which by no means can be scaled down in proportion to the motor power. —Ed.]

From the standpoint of reliability the vehicles in the limited class also showed themselves very inferior, continues the writer. On the first day of the race 33 vehicles in the limited class and 14 in the free class were started. Those which finished were 14 in the 3-liter class, with pushed motors, and 9 in the free class, making 64 per cent. for the latter and only 42½ for the former. The second day saw the 9 in the free class reduced to 6, but the 14 in the limited were reduced to 7. Counting both days, it is thus seen that 43 per cent. of the vehicles with big motors came through, but only 21 per cent. of the vehicles with 3-liter cylinder volume. The conclusion to be drawn is therefore very plain, namely, that in order to produce a light, reliable and economical vehicle, the use of pushed motors should be shunned. —From *Omnia*, July 6.

[While the facts mentioned are of interest by showing that the small high-speed motor has not yet in all places been developed so as to equal the older type in reliability, the averages offered by the writer in *Omnia* are evidently completely misleading, as a single case of perfect reliability in a pushed small-size motor, such as presented in the case of the Sunbeam team of three cars and in the winning Peugeot car, goes much farther to show what may eventually be accomplished by all than the negative evidence of a dozen failures. Considering that all cars which finished in the Dieppe race ran for two days and over a distance of 1540 kilometers without any more attention or grooming than each driver with his mechanic could give at a sacrifice of his running time, the pushed motor may be said to have demonstrated its technical worth, as a type which will surely remain in the market on its merits, even though its commercial future may not be immediate owing to the uncertainty, in the matter of mastering the requirements in its construction, which must prevail for some time in any factory taking it up.—Ed.]

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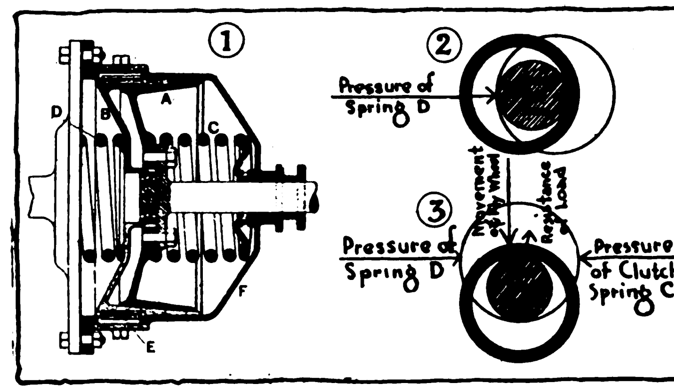

Fig. 1—Cross-sectional view and diagrams showing the operation of the Ionides gradual cone clutch

Gradual Cone Clutch Engagement—According to *Automotor Journal*, A. G. Ionides has developed for the Polyrhoe Carburetters, Ltd., a clutch design in which an entirely new principle has been applied to effect an automatic softening of engagement and disengagement. The interior surface of the flywheel is formed with a number of circular recesses, and the circumferential surface of the female cone B, which is a separate member in this design and not integral with or formed in the flywheel, is also formed with circular recesses corresponding in number and diameter to those in the flywheel. Disks E of smaller diameter, but of a thickness equaling the combined depth of two recesses, are introduced, one in each pair of recesses. [It is not explained how the flywheel and the hollow cone member can be assembled with the disks in their places, but possibly the recesses in the flywheel are made as through perforations which are plugged from the outside after the disks have been introduced.—Ed.] A spring D, which is stronger than the ordinary clutch spring C, presses the female cone to the rear, producing an eccentric relation between the recesses in the flywheel and those in the cone, as indicated under (2) in Fig. 1, the intervening disk E limiting the relation. Now, if the clutch cone is let in before the motor is started, this relation will not be disturbed, as the clutch spring is the weaker of the two. Also, if the motor is started without the clutch being engaged, the relation will remain unchanged, as there is no load-resistance to change it, save only the inertia of the female cone. But, on the other hand, if the motor is started and the clutch cone A is let in, the movement of the flywheel tends to leave the load, which acts through the disks E, behind, and this tendency assists the clutch spring C in gradually forcing the female cone toward or into a position, as indicated under (3), in Fig. 1, in which the disks E will be accommodated farther back in the recesses of the flywheel than they were at the start. As this movement constitutes a drag of the female cone in relation to the flywheel, the effect of any abrupt seizing of the clutch cones is thereby obviated; and it is evident that any sudden accelerations or retardations of the motor or the load during the operation of the vehicle will also be accompanied by a see-saw movement between the clutch spring C and the resistance spring D and a corresponding twisting around of the disks, in the recesses. It is not stated whether the chafing of spring D which must take place at one of its abutments when B drags or advances in relation to the flywheel, is taken into account in some manner, or whether it is obviated by allowing a slight torsion of this spring to take place whenever the device is acting, as referred to, in accordance with its purpose.—Partly from *Omnia*, No. 339.

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The Next French Grand Prix—To the proposition advanced by both *La Vie Automobile* and *Omnia* to the effect that the next annual Grand Prix race in France shall be run under rules by which the cost of the speed, as expressed in the fuel consumption, shall determine the winner, Henri Petit in *La Vie au Grand Air* adds the suggestion that each vehicle shall carry four spare tires and shall finish the course without any other tire replacements. He believes a provision of this nature would stimulate tire makers to new efforts. The proposition relating to the fuel consumption has been tacitly amended by its authors so as to provide for a maximum fuel consumption which the winner must not exceed, the amendment indicating that the evident flaw in the first proposition has been promptly discovered. Owing to the progressive increase of atmospheric resistance which accompanies an increase of speed, the fastest car overcomes a total resistance which is disproportionately larger than that overcome by a slower car and naturally has to consume a disproportionately large amount of fuel in doing so. A rule determining the winner on the basis of speed divided by fuel consumption would therefore inevitably lead to the adoption of a much reduced speed, and this would rob the race of interest, both from the spectacular viewpoint and as a test of robust construction.

In *Allgemeine Deutsche Automobil Zeitung* it is stated by Edouard Pontié, the correspondent of this journal at the Dieppe race, that Benz, Mercedes and Opel cars will surely take part in the next French Grand Prix, provided the large French firms, Panhard, Renault, Brasier, Darracq and Berliet, do not themselves boycott the event as all of them did this year. All their cars must be ready 3 months ahead of the racing date, and the rules must be published very soon by the Automobile Club of France, he says, if universal participation shall be expected.

La Vie au Grand Air ascribes the poor attendance at the Dieppe race, especially on the first day, to the unbusinesslike conflict of the date with the established dates for the most important annual horse-racing events, where the fashionable world insists upon going to see and be seen. The ladies would not risk their complexions by a midsummer automobile ride to Dieppe and back immediately in advance of these hallowed functions.

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Limitations in Use of Autogenous Welding.—Only twenty years ago soldering and brazing were the only methods in practical use for uniting two metallic parts without a mechanical joint, and the rapidity with which since then other methods have found adoption in the industries has spread the name of at least one of these modern processes far and wide. They are popularly looked upon as among the wonder-achievements of the age. The calcium light, used for theatrical effects and for throwing pictures on a screen for stereopticon lectures, had familiarized the public with the power of the oxy-hydrogen flame, and this also came into use in a limited way for cutting metals. Burglars employed it for melting out the locks of ordinary steel safes, noiselessly and therefore with safety to themselves. But, after all, this flame was not quite hot enough for expeditious work. Then acetylene gas came upon the scene, widely introduced to notice through the bicycle lamp. This gas, mixed with oxygen, doubled the heat heretofore attained by gas. The oxy-acetylene flame rivaled the electric arc with regard to the intense heat it could produce at any chosen spot and was much more manageable. Though itself made from calcium carbide and thus indirectly a product of the electric furnace, where calcium carbide is fused, acetylene gave immediate competition to electricity, both as a source of light and as a means for either cutting or uniting metal parts by fusion. Welding by the electric arc had been practiced for some time. The new competition helped to bring out electric welding by the resistance method, which was handier and better adapted to varied forms of work than the arc method. Probably the recent development of the electric furnace of the resistance type owes something to the same stimulus. For the cutting of metals the oxy-acetylene flame was from the start and still remains immensely superior to electricity. Having started to lick out a crevice it continues, without stop for adjustment, darting its hot tongue deeper and deeper as the destructive work progresses. In the work of sundering even the most refractory material it does a clean job, whether employed for crime or for industry. When it is used for fusing at the same time two pieces of metal, for the purpose of allowing the molten metal from one of the lips to mingle with that from the other, both of them to cool and harden together, the process has been designated as autogenous welding, and it is chiefly around this name, though it is very misleading, that popular interest in all the processes of kindred purpose has grouped itself. All the things which are accomplished by electric welding or by the proprietary but no less wonderful Goldschmidt "thermit" method are widely classed together with autogenous welding, giving a somewhat exaggerated idea of its wonders.

THICK WELDS TO BE PREHEATED

In reality neither electric nor autogenous welding is welding at all, since welding is a hammering process for uniting two metal parts which are very hot but not fused, and, as the term autogenous is meant to imply that no solder or spelter is used for combining the two parts, electric welding is just as autogenous as the uniting done by means of a gas flame. In recent practice, moreover, a separate weld-metal is commonly employed to assist in effecting a joint in difficult jobs of electric as well as of flame welding, and, unless this weld-metal is of exactly the same nature and chemical composition as the parts to be united, the process comes in either case nearer to brazing than to welding. Flame-cutting and flame-fusing would be more expressive terms for the work methods in which superhot gas flames are employed. While there can be only admiration for the excellent cutting that may be accomplished by this agency, it is doubtful whether for the purpose of effecting a strong joint it is superior to brazing when there is question of joining iron or steel parts whose physical properties have been improved by rolling or forging or both. The autogenous joint is always a cast-metal joint. The complete fusion of the lips destroys any properties due to a close texture, leaving after cooling only a coarse crystalline structure. If the parts to be joined are thin, the volume of heat generated by the flame is usually sufficient to effect a complete fusion of all the metal which should be engaged in the joint so rapidly that no portion of the metal will get time to harden in advance of any other with which it should be integral, but if the meeting edges are thick it is necessary that both parts should be brought first to a red heat before the flame is applied, as otherwise the exterior lips will harden and set, while the interior portions are not yet fused, and in that case the strength of the joint will be that of the fused portions only; and this precaution of preheating is often neglected. If it is observed, however, flame-welding, especially by the hot and rapid working oxy-acetylene flame, may be said to be an excellent method for joining cast iron, bronze and aluminum—these being materials which the fused weld-metal can equal in strength—but as applied to articles made from steel, especially high-carbon or alloy steel, the method is still in its experimental stage.—Partly from *La Pratique Automobile*, June.

Communications from The Manufacturer

Proper Method of Washing Automobiles with Soap—None but the Best Soap Should Be Used—Temperature of Water Important—Wood Wheel Maker Objects

THE proper washing of automobile bodies is a very important work and one which has been almost entirely overlooked in many sections of the country so far as giving instructions to chauffeurs as to how this work should be done. Often if the issuing of instructions were left to the car owner it would be out of the question, as he is not sufficiently familiar with the best methods to issue instructions.

It is safe to say that the operation of washing a car is least understood of all work in car maintenance. The proper performance least appreciated of any work in car maintenance, yet it is, so far as maintaining a good appearance of the car is concerned, the most important work on the car.

The use of soap in washing an automobile is unnecessary and ill-advised where the washer thoroughly understands his business. As it is common practice to use soap in washing automobiles and as it is not the intention of this article to advocate washing automobiles without soap, the article will discuss washing with soap.

Easiest Method Not the Best

It is common practice to adopt the easiest method of removing dirt. The easiest method is to purchase a good strong soap. This, with the use of water, at times almost hot, removes the dirt in the easiest manner. It has the drawback, however, of removing the varnish. One washing of this character will not remove the varnish, but a dozen washings will dull it and a few months will remove it, so far as the luster is concerned. A continuance of this practice will actually remove the body of the varnish in a few months more and in extreme cases of use and abuse following this practice it has been known to remove the paint itself, as some of the ingredients, acids and alkali, in the strong soap are employed in various mixtures, used for removing paint for the purpose of refinishing a car.

The use of the best imported castile is recommended. Laundry and toilet soaps are to be avoided. Automobile soaps, some good, some bad, are made expressly for washing cars. They are made in both the soft and the hard soap variety. The proper soap, principal ingredients of which are pure potash and oil, will properly clean a car, and will have no bad effect on the luster of the car. Soap that contains alkali should not be used. Any of the alkalis, either sodium or potassium hydrate or sodium carbonate or potassium carbonate, are naturally bad for varnish. Many owners have access to the services of a chemist. in which case it is very little trouble to analyze the soap. Those who do not have access had best stick to the imported castile that a high-grade dealer sells for a soap free of objectionable ingredients.

The temperature of the water used is most important. Hot or even warm water should not be used; neither should extremely cold water be used. Proper temperature is from 60 to 70 degrees Fahr. Where a hose is used, care should be taken that the force of the water is only sufficient to carry the stream 6 or 8 inches beyond the end of the hose. The use of a fast-running stream drives the grit, dust and dirt into the varnish. The use of the sponge and chamois following, picks up the grit and scratches result. In selecting sponges be careful to select the best and only those guaranteed free from grit, sand and particles of shell.

Having determined the proper soap to use, temperature of water and selection of sponge, the operation of washing should have careful consideration, as even with good soap, correct temperature and sponge, the car may be damaged by improper washing.

To properly wash a car with soap, first dissolve in a pail of water sufficient soap to make a good suds. Then in the washing operation use the suds, sopping it on from the sponge instead of rubbing the soap on a wet sponge, or, what is worse, rubbing it on the surface of the car. Before applying the suds the car should be rinsed thoroughly with water, using a gentle stream. This is important, as all particles of grit and dirt must be removed from the surface before applying the sponge. Apply the suds liberally where the parts are dirty; then rinse off with clear water and a fresh sponge, flowing the water below the sponge to insure that any grit and dirt that may be left on the surface is washed away before the sponge has a chance to pick it up and scratch the surface. After the final sponging the surface should be dried with a clean, wet chamois.

In washing the chassis, the same method is in order, except that it may be necessary to use stronger suds. Where cars are in use over oily or muddy roads frequent washing is necessary, and this washing should be done as soon as possible after the car leaves the road, as when this oil or mud dries on the car it is very difficult to remove and will damage the varnish, it being impossible under certain oil and mud conditions to remove all the stains. In this connection it is important that neither the bonnet nor radiator is washed while it is hot, as to do so will dull the luster, ruining it in a very short time.

Another point which should be given attention is that the same sponge should not be used for washing both the body and the chassis. Both sponges should be of the best quality, care being taken at all times to keep them clean and in proper condition. Owners who keep their cars in public garages will have difficulty in having their cars washed before the mud has had a chance to dry, as in most garages the washing is left until night and then put through with a large number of other cars. This method cannot be followed and have a fine-looking car.

EUGENE F. RUSSELL,
Factory Manager Locomobile Company of America.

Wood Wheels Not Specially Built

DEAR MR. EDITOR—In your issue of June 13 we notice the article headed "Testing Wheel Strength." Especially was our attention attracted by the clause about "American wheels," in which you say: "There is every reason to believe that at least the American hickory wheels ordered were the best of such kind because they were especially ordered and their purpose expressed to the maker." We think that we made the wheels in question for the Rudge Whitworth Company, Ltd., Coventry, England: but their order came to us as follows: "One wheel like blue print: order received in February." And in May, a cable saying: "Send four (4) wheels like the sample wheel."

We knew nothing of any test to be made, so there were no extra pains taken with the timber, the wheels being made in the regular way throughout. If we had known that a test was to be applied, we would have taken extra care in the selection of the wood used.

We merely mention this, as your article might give a wrong impression, detrimental to the American wood wheel as against the steel wheel.

Without doubt, the wire wheels were especially made up to withstand any test of the nature made.

HENRY P. JONES, of Phineas Jones & Co.

SAN JOSE DE COSTA RICA, July 9—Motor trucks will be assessed duty at the rate of 1.87 cents on entering this republic, according to a ruling from the treasury department.

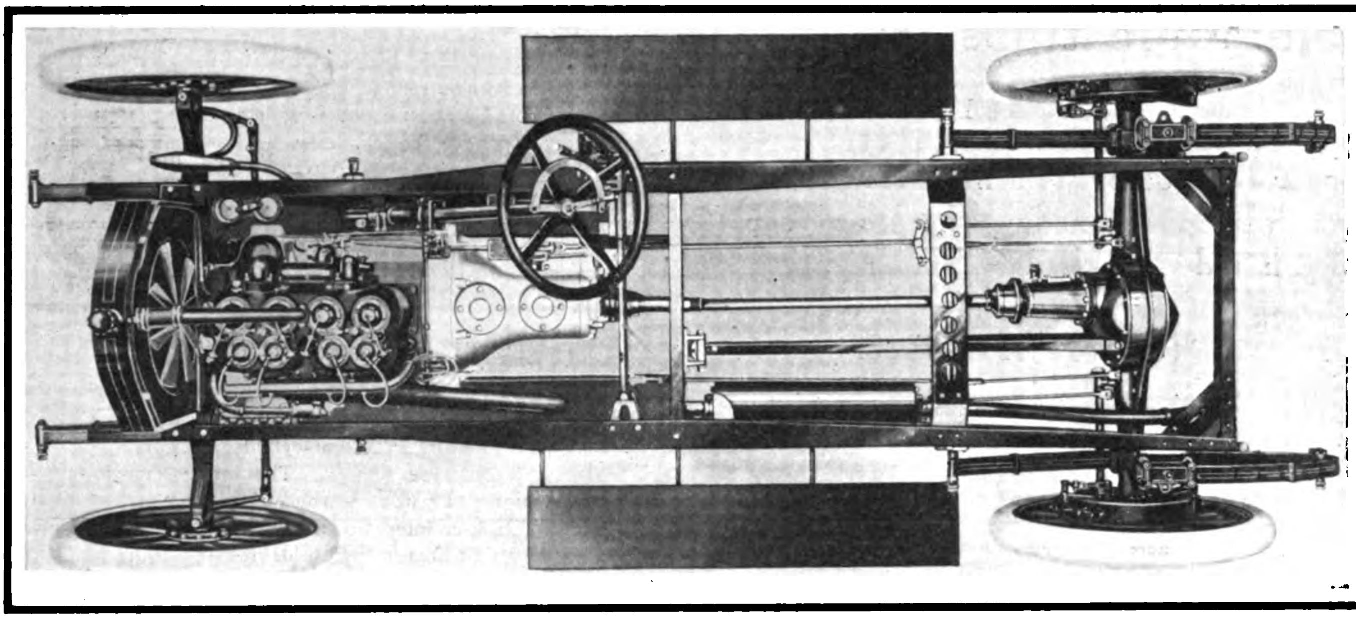


Fig. 1—Plan view of the chassis of Chalmers Model 17, 36-horsepower, four cylinders

'13 Chalmers Out

Line Will Include Two Four-Cylinder Models and One Six. Few Alterations from 1912

Reduction of Price of Six From $3,250 to $2,300 Made Possible by Standardization

CHALMERS cars for 1913 are in three models, as for the previous selling season. These are the two four-cylinder types, rated at 30 and 36 horsepower, and the six-cylinder type having a horsepower of 54. They are known as models 16, 17 and 18, respectively. The motor sizes of these cars remain the same as last year, and no alterations of their features of design have been made. In general, it may be said that the new Chalmers cars show no innovations in mechanical construction. Tried-out principles are adhered to throughout, though many refinements are to be noted.

The price of the six-cylinder, model 18, has been reduced from $3,250, the 1912 figure, to $2,300, this reduction being largely chargeable to the standardization of parts. The material enlargement of the Chalmers factory within the past year has made greater quantity production possible, and this, together with the standardization and interchangeability feature of the parts of the six-cylinder and the 36 models, has had much to do with the lowering of the price of the company's largest machine.

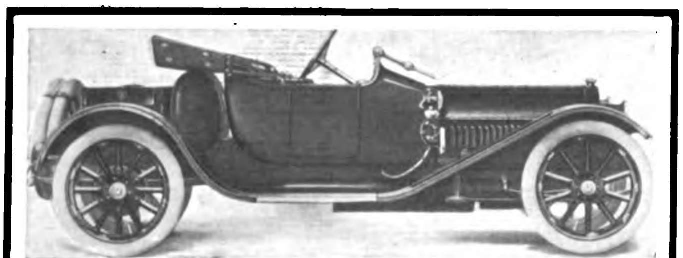


Fig. 2—Six roadster has good baggage-carrying facilities

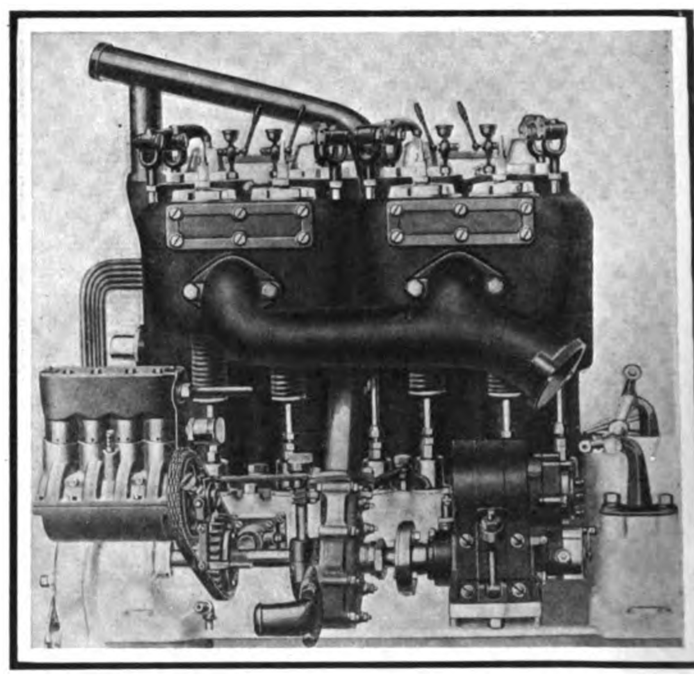


Fig. 3—Exhaust side of Chalmers 36 four-cylinder motor

The price of the larger of the four-cylinder types is fixed at $1,850 and that of the 30 remains at $1,500.

Three inches have been added to the wheelbase of the 36, increasing it from 115 inches to 118 inches. The dimension of the other two models has not been altered, that of the 30 being 115 inches and that of the six 130 inches.

No Change in Cylinder Sizes

Chalmers motors all present the same design characteristics. Cylinders of L-head type, intake valves in cylinder heads, exhaust valves at the sides, motors suspended at four points, two brackets being placed at the forward end of the crankcase and two at the rear end; intake manifolds on the right sides, exhausts on the left, pump and magneto shafts on the left, integral gear boxes, inclosed flywheels and clutches—these are features which will be found on the power plants of all three models.

The cylinder sizes of all three models remain the same as in 1912, the bore and stroke in the six and 36 being alike, but the 30

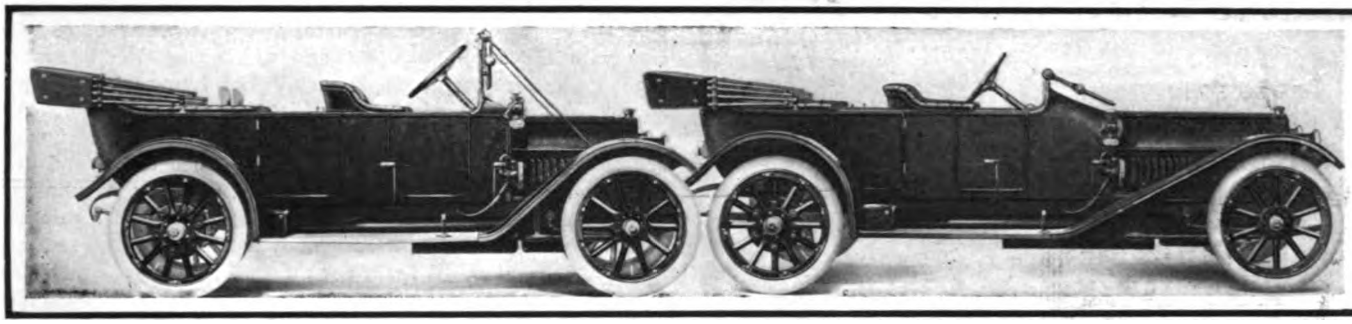


Fig. 4—Straight-line touring body features Chalmers 36

Fig. 5—Chalmers Six torpedo body with cowl dash

with different sizes. In the matter of stroke-bore ratio the Chalmers design takes a middle course between the square motor on the one hand and the long-stroke design on the other, the ratio on the six and the 36 being 1 to 1.23 and on the 30 1 to 1.12. The cylinder sizes with piston displacement are:

Model	Bore	Stroke	Ratio	Horse-power	Piston displacement
Six	4.25	5.25	1.23	43.35	446.7
36	4.25	5.25	1.23	28.9	297.8
30	4	4.5	1.12	24.80	226.2

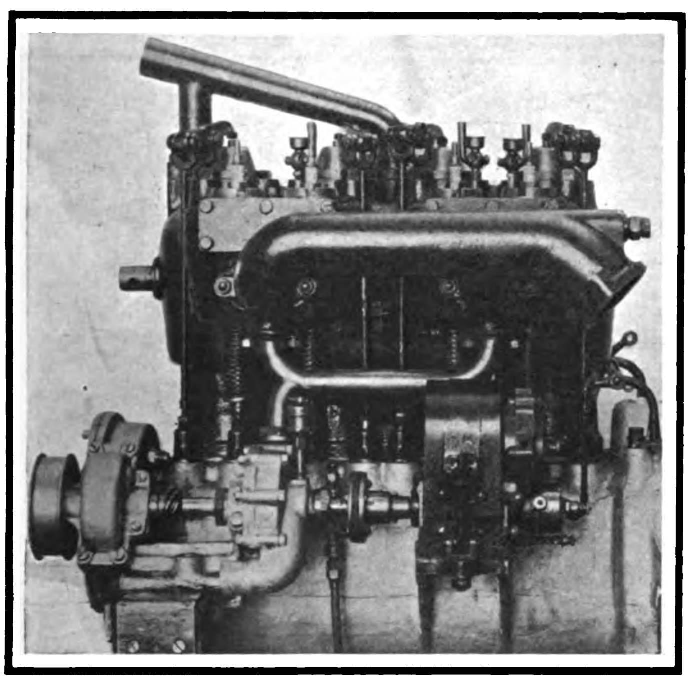


Fig. 6—Exhaust side of Chalmers 30 four-cylinder motor

Both fours use mono-block casting and the six uses groups of three. There are two intake manifold connections with the cylinders for each of the four-cylinder motors, and four for the six-cylinder type, Fig. 7. The intake manifolding of the latter is unique. From the carbureter the mixture is led into two branches, and is later divided into four before reaching the six cylinders. Exhaust manifolds for the fours are alike, there being two connections, one for each two cylinders, Fig.3. With the six there is a connection with each cylinder, Fig. 7.

Intake valves located in the cylinder heads are of larger diameter than the exhausts located in offset chambers. Nickel steel is used for the inlets, as compared with cast iron for the exhausts. Their sizes are:

Valve	Diam.	Lift
Inlet	2.25 inches	5-16 inch
Exhaust	2 inches	5-16 inch

The inlet valve springs are housed in all models and are wound conically and are operated through rocker arms pivoted on motor studs and mounted diagonally, Fig. 12. They measure 2 1-8 inch center to center. The exhausts are operated by conventional tappets and provisions are made on the intake and exhaust tappets for take up due to wear.

Liberal Crankshaft Bearings

The crankshafts of all the motors are mounted on annular ball bearings. The six-cylinder is provided with three bearings, the others having two each. On the six the ball-bearing sizes are numbered 411, 219 and 316 for the front, center and rear mountings, respectively. These bearings have dimensions as follows:

Number	Bore, Inches	Outside Diameter, Inches	Width, Inches
411	2.1653	5.5118	1.2992
316	3.1496	6.6929	1.5354
219	3.7402	6.6929	1.2598

The two four-cylinder motors have the front ends of their crankshafts mounted on No. 411 and the rear ends on No. 316.

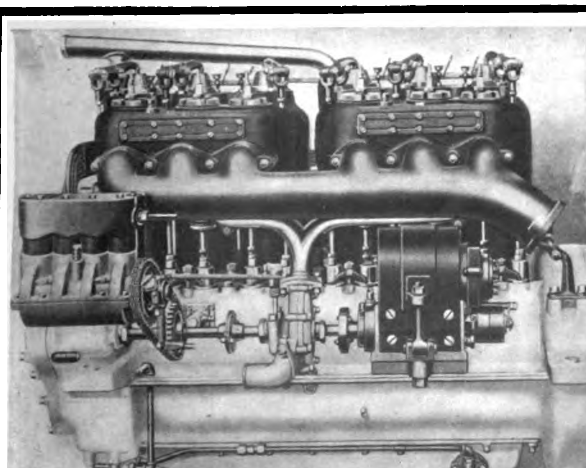


Fig. 7—Exhaust side of Six motor, showing Kellogg air pump

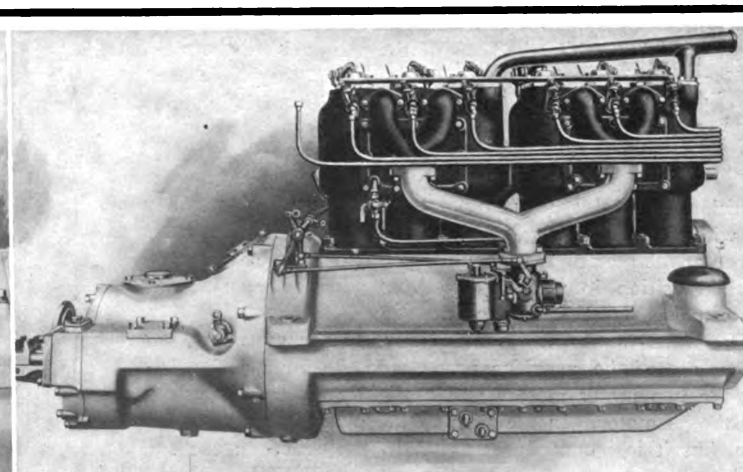


Fig. 8—Intake side of six-cylinder motor with integral gearbox

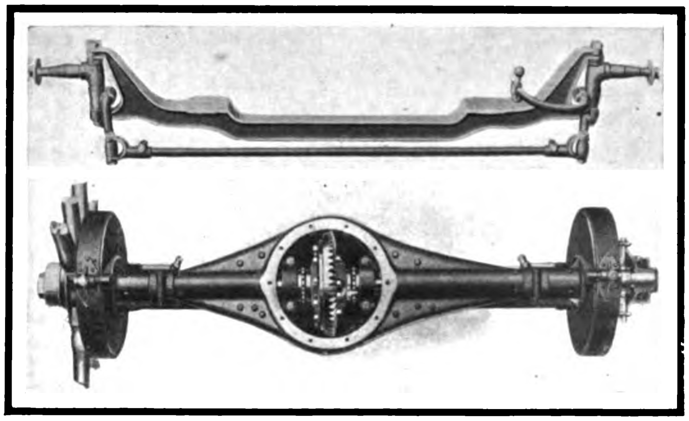


Fig. 9—Front and rear axles of 1913 Chalmers cars

The remainder of the motor bearings in all three types are plain bearings. The lower connecting-rod bearings are the same size in all motors, 2 1-4 in diameter and 2 3-8 inches in length. At the wrist-pin ends they measure 1 1-8 in diameter by 2 3-8 inches in length, and they are also uniform throughout all three motors.

Camshafts with integral cams are mounted on four plain bearings. With the shafts on the six and 36 1 1-8-inch in diameter and on the 30 7-8 inch. The bearing lengths are as follows:

Front cam shaft bearing	1 5/8 inches
Two center bearings	2 1/4 inches
Rear bearing	1 3/16 inches

Camshaft and magneto and pumpshaft gears are at the front of the motors. They are of the spur type, all inclosed by removable cover plates. The Rayfield carbureters are mounted at the right side. For adjusting the gasoline supply valve the cars are fitted with dash levers. Fuel is fed to the carbureters by pressure, the tanks being carried under front seats in touring cars, limousines and demi-tonneaus, and at the rear of the seats in the roadsters. The touring cars and limousines all carry 19-gallon tanks and the torpedoes have a tank capacity of 15 gallons. The 36 when it is fitted with roadster or coupé body carries a 35-gallon tank. This also applies to the same bodies when mounted on the six-cylinder chassis.

Lubrication of all motors is by constant-level splash system. This is of the usual form. There is an individual oil trough in the sub-base of the crankcase for each connecting-rod end. The overflow from these troughs runs into the bottom of the crankcase to a well, where it is strained, then forced by gear pump through a sight feed on the dash and back to the troughs. On the 30, 1 gallon of lubricating oil is carried in a separate tank, while on the 36 and six roadsters and coupés there are also special reserve tanks for oil. The lubricant is put into the motors through the combined funnels and breathers, mounted on the right front supporting arms. Standardization is evidenced by the fact that, while the sizes of these funnel-breathers on the two larger cars are the came as in 1912 cars, they have been increased on the 30 to the same size. A section of it is shown in Fig. 13.

Ignition Apparatus Accessible

Ignition of dual type, using one set of spark-plugs, is used, with storage battery employed for starting. The magneto, placed at the rear of the magneto-pump shaft, is easily accessible in this position from the side. A coupling between it and the pump makes its removal simple.

The water-pumps are mounted next to the magnetos. These pumps are of the centrifugal type, and the same design is used for the two larger motors and a slightly different construction for the 30 motor. In the former, the pump has a central position, but it is mounted somewhat to the front on the smaller engine.

In the Chalmers starting system silent-chain-driven, four-cylinder air pumps are located at the front end of the motor. These pumps are of the Kellogg make and they replace the cylinder check valves which were heretofore used in connection with the starting system, and which were the means of sending the air to the supply tank. The four-cylinder pumps now used pump air under pressure into the air tanks, which are placed at the right sides of the frames, opposite the running board. From the storage tank the air is piped to a distributer and from it there is a pipe leading to each of the cylinders. When the starter controller on the dash is pulled, air is admitted from the tank to the distributer, which in turn sends it to the cylinder which is ready for the working stroke. Its piston is driven down, thus revolving the crankshaft. This operation continues until the cylinders are sufficiently charged and ignition takes place.

Gearbox, clutch and flywheel are made a unit with the motor by housing them within the case which bolts to the flywheel cover. This is true of all Chalmers models. Two cover plates allow access to gears and clutch, which is of the multiple-disk type on all models. The plates are hardened and ground saw-tooth steel and they run in oil, which feature makes for easy engagement and silent running.

Of the two larger models, the four-speed transmission which

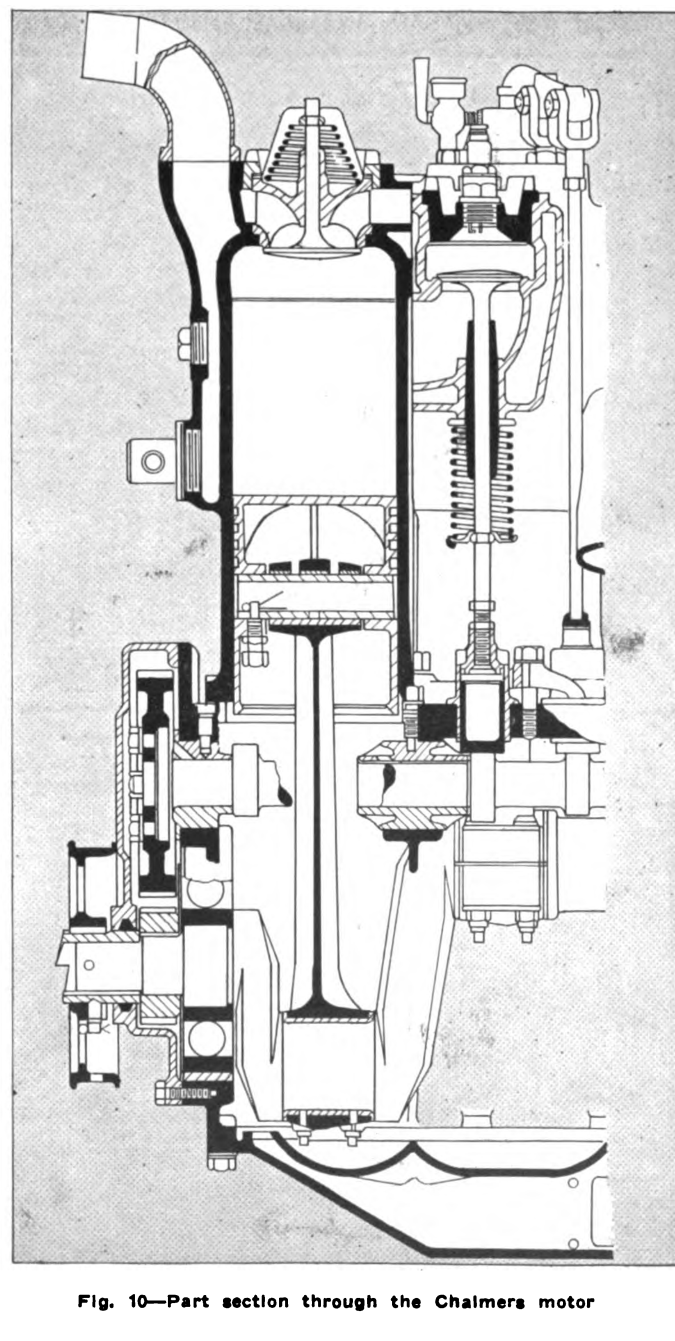


Fig. 10—Part section through the Chalmers motor

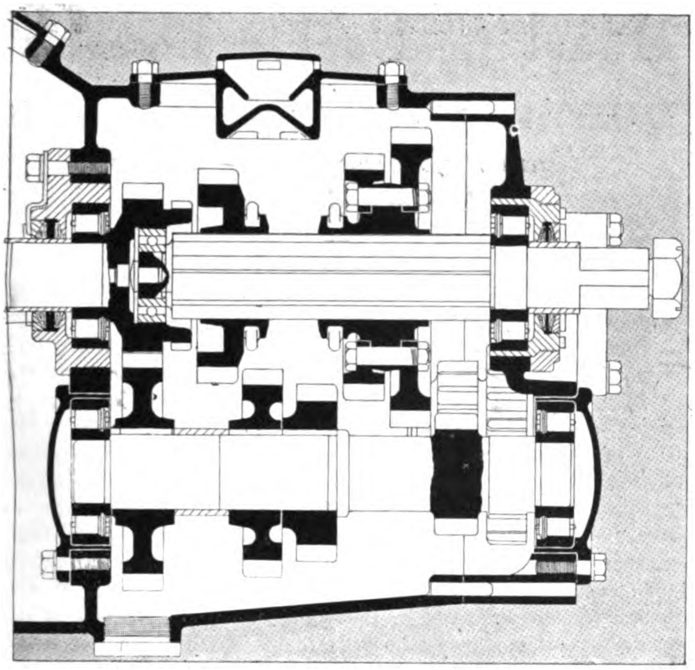


Fig. 11—Sectional view of Chalmers four-speed gearset

was inaugurated on these two types for 1912 has been continued. The 30 retains its three-speed type, also. Both roller and ball bearings are used in the gearset, the former being found at most of the points.

Power is transmitted to the rear axles of all models through shafts of ample size, which are fitted with two universal joints. One of these is mounted just back of the gearcase and the other at the differential. Pressed steel torque arms run parallel to the propeller shafts from a cross member of the frame a little to the rear of the gearbox to the differential housing. These torque arms taper so that their largest sections are at the rear, while they are swivel-connected to the cross-arms at their forward ends. This construction is carried through all models.

The rear axle is of the same construction for the three cars, a view of this member being shown in Fig. 9. It is of the floating type; that is, all the car weight is borne by the axle housing and not by the shafts. Housing is of pressed steel, heat treated. Drive shafts are of nickel steel, also heat treated, and mounted on Timken roller bearings. A cover plate at the rear permits of access to the differential.

The front axles are not of the same size of section for all the models, but they present the same design features. They are of single-piece, drop forged, I-beam construction. A view of the type with steering knuckles and cross-rod is given in Fig. 9. There is a slight drop at the center, but on the whole the Chalmers axle presents a comparatively straight appearance. The wheel spindles are fitted with Timken roller bearings. The gear ratio is 3 3-4 to 1 on all models.

Brakes are both on the rear wheels on all 1913 Chalmers models. This was true of the larger cars this season, but the 30 was equipped with service transmission brake. On the four-cylinder models the service brakes are contracting, 14 3-8 inches in diameter with a 2-inch face. The emergency expanding brakes are 14 inches in diameter with face of the same width. On the six-cylinder machine the service brakes are also external contracting, 16 3-8 inches in diameter, 2 1-2 inches in face width. The emergency internal expanding brakes have a diameter of 16 inches and the same width. All brakes are lined with a heat-proof asbestos composition and are made easily adjustable. For the fours, this brake size gives a total braking surface of 362.6 square inches per car for a total weight of 3,500 pounds without passengers. For the six these figures are 505.6 square inches surface and 4,000 pounds total weight.

Details of Frames and Springs

Chalmers frames are pressed steel channel section, the metal being 5-32 inch in thickness. They are inswept at the front ends to allow for a greater turning radius. There is a drop a little to the rear of the midway point between the centers of the front and rear wheels. Continuing to the rear, the frames have a kick-up so as to clear the rear axles. Three cross members brace the frame substantially. One of these is located just back of the gearbox, the second is placed half-way between it and the rear end of the frame, while the third braces at the rear. Triangular gusset plates reinforce this rear cross member, making it doubly strong.

Springs on all models are semi-elliptic in front and three-

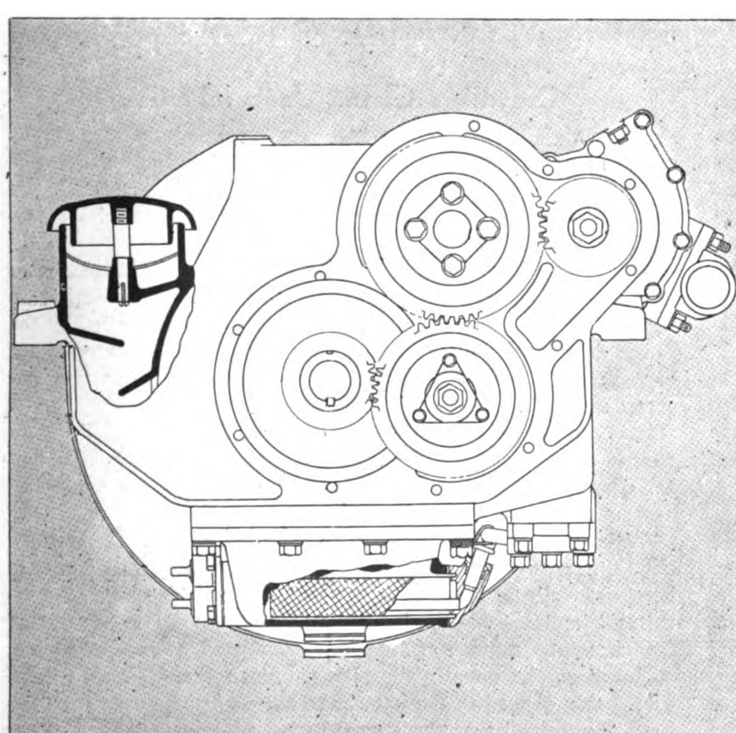


Fig. 12—End view of crankcase, showing details of oil filler opening

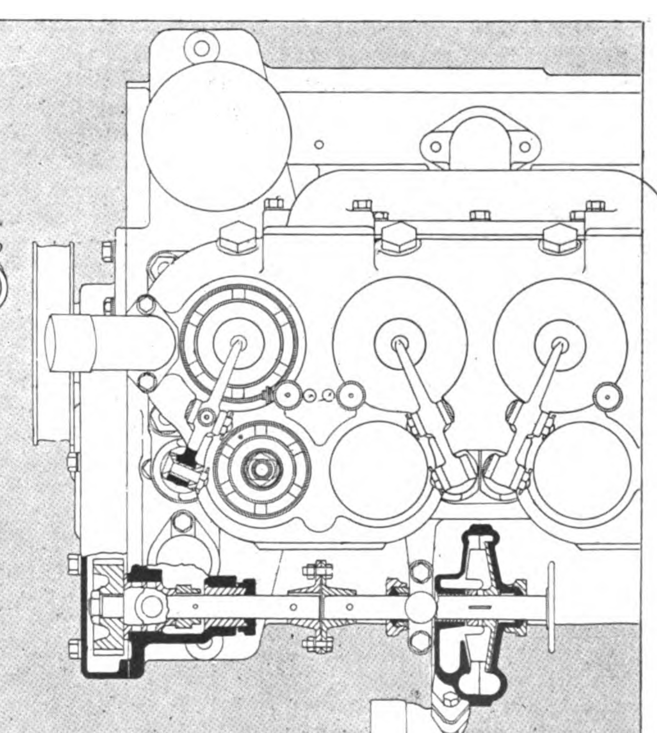


Fig. 13—Partial plan view of Chalmers motor, with water pump

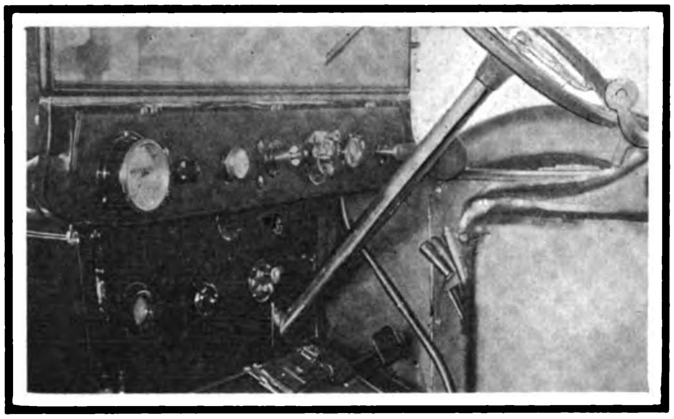


Fig. 14—Showing dashboard equipment of 1913 Chalmers cars

quarter elliptic in the rear. They are the same size on the two four-cylinder models, the front being 39 inches long and 2 inches wide, and the rear of the same width and 45 inches long. On the six, front springs have a length of 39 inches and a width of 2 1-4 inches, while in the rear they measure 53 inches in length and 2 1-4 inches in width.

Steering gears are of the worm-and-gear type, the columns being very substantial and fully inclosed. The fours have 18-inch steering wheels and the six 20-inch.

Wheels are 36 inches in diameter on the two larger cars, and 34 inches on the 30. They are of heavy-spoked artillery type, made of second-growth hickory. The hub flanges are also of ample proportions of steel. Rear wheels are flange-driven, the spokes being bolted to brake drums. On the six-cylinder type the spokes have a diameter of 1 3-4 inches. Rims are all of the quick detachable, demountable type, one extra rim being furnished. Tires for the model 16 are 34 by 4 inches all around; for model 17, 36 by 4 inches all around except on limousines and seven-passenger touring cars, which take 36 by 4 1-2-inch tires. The six-cylinder cars are equipped with the 36 by 4 1-2-inch size all around for all body types.

Much can be said as to the changes and improvements which have been made in the body designs. For the model 16 only two body types can be had, these being the five-passenger fore-door touring and the four-passenger torpedo designs. For the other two models, any style of body is furnished. Reference to the illustrations of the several body types, Figs. 2, 4 and 5, will serve to show how the Chalmers Company has worked out its designs for the 1913 trade. Bodies are all of sheet steel over wood frames, with the exception of the coupés and limousines, which are constructed of aluminum over wood frames. Easy riding and pleasing body lines have been striven for. Doors have been made wide for easy access, upholstery has been specially considered. Seats are given a pitch of 2 inches for comfortable riding. Leather is pebble-grained, blue-black, dull finished and stuffed with hair. Turkish cushions having a depth of 11 inches are used, making the seats exceedingly soft and comfortable.

The roadster designs are especially attractive, if any distinction can be made. The gasoline tank is carried back of the seat, which is provided with large doors. To the rear of the tank there is a large trunk, and back of this the tires are mounted, giving a dashing appearance to the whole car which is very attractive.

Cowl dashes are low and sweeping, and there is no wood used. A view of the dash is shown in Fig. 14. This is the same for all models. It is leather-covered, and the various gauges, switches and other appurtenances are arranged where they are easily reached. The control is on the right and the operating levers are within the body and easily reached with the right hand. As a whole, the Chalmers dash for the coming year presents a most pleasing and neat appearance besides being fitted with everything necessary to the comfort of mind of the driver.

Harking Back a Decade

What the Motoring Publications of 10 Years Ago Had to Say on Live Matters of the Day

FROM *The Automobile and Motor Review*, July 26:

Out of 138 starters in the Paris-Vienna race of approximately 900 miles, over an exceptionally rough and dangerous course for more than half the distance, 71 finished. When it is remembered that the test included the passage of the Alps, the running time of the nine leaders, ranging from 26:22:43 to 28:13:30 may be considered remarkable, especially in view of the fact that there were many neutralized points which could not be passed in less than a certain time owing to local speed regulations.

New York casualty underwriters have raised the rates on motor vehicle liability to $100 for each private vehicle, the rate 16 months ago having been only $25. The standard automobile liability policy provides that the company shall indemnify the owner for loss sustained by the negligence or carelessness of the owner or his employee, the usual limits of these policies being $5,000 for injury to one person and $10,000 for a single accident in which more than one person is seriously injured.

A little brake test to demonstrate the certainty with which a motor vehicle can be operated in traffic and the efficiency of the brakes was conducted on Long Island between Mineola and Roslyn before a group of aldermen and reporters. A fifth of a mile stretch was measured off and the time was taken with a stop watch. The trials showed that a car weighing 2,700 pounds running at the rate of 30 miles per hour stopped in 95 feet 3 inches.

Motorists have under way a movement for a protective league similar to the L. A. W. and the New Motor Union of England. The league is to have headquarters in New York and will aim to include all automobilists. There are to be consuls at all important places in the country and it will be the object to protect the interests of every member who may be arrested for alleged violations of the law. He will be furnished immediately with a lawyer and, if necessary, with bail. The league will aim to protect the cause of automobilism generally and will work for the improvement of the highways. Finally it will endeavor to secure special road rights for automobilists.

Canadians Claim Undervaluation

OTTAWA, July 19—In response to representations made by members of the Canadian Manufacturers' Association, the Department of Customs, it is understood on excellent authority, is keeping very careful watch on the valuation upon articles crossing into Canada from the United States.

The valuation of an article imported from the United States into Canada is based upon the selling price of that article in the country of its manufacture, and it has been contended by the Canadian manufacturers that the United States exporters have been placing too low a value in their invoices upon the imported article.

It is stated that the alleged undervaluation is especially common in connection with the import of automobiles, whose values are changing from time to time as improvements are made and new patents are instituted.

In the case of gasoline tractors so much in demand throughout the western provinces, the department, it is stated, has also been especially active, and a new bulletin on this class of agricultural implements has also recently been issued, on account of the enormous number of machines imported to the Dominion.

However, the manufacturers insist upon the customs regulations being obeyed to the letter, and the Department of the Customs determined that there shall be no evasion and no decrease to the protection afforded to Canadian industries.

Calendar of Coming Events

What the Months Ahead Have in Store for the Automobilist—Shows, Conventions, Race Meets, Etc.

Shows, Conventions, Etc.

July 22-27.........Detroit, Mich., Cadillaqua Week.
Aug. 5-7..........San Francisco, Cal., Pacific Highway Convention.
Sept. 17-20........Denver, Col., Convention International Association of Fire Engineers.
Sept. 23-Oct. 3....New York City, Rubber Show, Grand Central Palace.
Dec. 7-22..........Paris, France, Paris Automobile Show, Grand Palais.
Jan. 11-25, 1913...New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 20-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Feb. 1-8...........Chicago, Ill., Annual Automobile Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 24-March 1...St. Louis, Mo., Annual Automobile Show.
March 3-8.........Pittsburgh, Pa., Annual Automobile Show.
March 8-15........Boston, Mass., Annual Automobile Show.
March 17-22.......Buffalo, N. Y., Annual Automobile Show.
March 19-23.......Boston, Mass., Annual Truck Show.
March 24-29.......Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Aug. 8-9..........Chicago, Ill., Banta Trophy Match, Chicago Motor Club.
Aug. 8-10.........Galveston, Tex., Beach Meet.
Aug. 8.......... Minneapolis, Minn., Annual Tour Minnesota State Automobile Association to Winnipeg.
Aug. 10.......... Whittier, Cal., Hill Climb.
Aug. 30-31........Elgin, Ill., Road Races, Chicago Automobile Club and Elgin Automobile Road Racing Association.
Sept. 2.......... Indianapolis, Ind., Speedway Meet.
Sept. 2.......... Winnipeg, Man., Track Meet.
Sept. 3-6........ Chicago, Ill., Commercial Vehicle Reliability Run, Chicago Motor Club.
Sept. 17...........Milwaukee, Wis., Grand Prize Race.
Sept. 20...........Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.
Sept. 21..........Milwaukee, Wis., Vanderbilt Cup Race.
Sept. ....Washington, D. C., Reliability Run, Automobile Club of Washington.
Sept. ....St. Louis, Mo., Track Races, Universal Exposition Company.
Oct. 7-11..........Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 12............Salem, N. H., Track Meet, Rockingham Park.
Nov. 6.............Shreveport, La., Track Meet, Shreveport Automobile Club.

Foreign.

Sept. 26-Oct. 6....Bourges, France, Agricultural Motor Car Exposition.
Nov. 8-16..........London, England, Olympia Automobile Show.
Jan. 11-22.........Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.

Why Price of Leather Is Rising

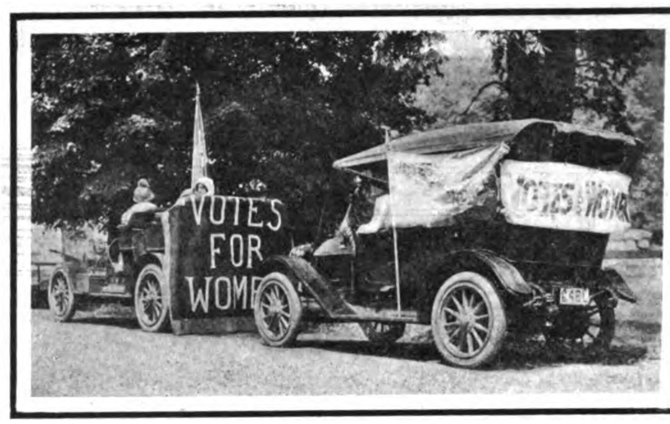
It has become one of the favorite diversons of certain interested sections of the American public to blame the automobile industry whenever the price of a staple line of material or merchandise shows a sudden bulge. Comment on leather is the latest example of this tendency to blame everything on the automobile, and its recent rise in price has been heralded broadcast by the publicity departments of several manufacturers of cheap shoes as being chargeable to the automobile industry on account of use of leather in modern automobiles.

Brewster & Company, one of the leading concerns in the country engaged in making automobile bodies, is authority for the statement that not over 10 per cent. of the American touring cars are equipped with leather upholstery; that cowhide is used mostly for such purposes and that it requires from four to five hides to equip an average touring car, thus making the average consumption of leather somewhat more than 200 square feet per car.

Cars with closed bodies are sometimes upholstered in leather, but the proportion is small as compared with the total. Runabouts and roadsters likewise are equipped with leather upholstery, but not in as large proportion as the touring car type.

The figures of the 1912 production are approximately as follows:

Type of car	Number	Amount of leather	Value
Touring cars	9,800	1,960,000	$548,800
Closed cars	1,600	400,000	112,000
Roadsters	8,200	820,000	229,600
Totals	19,600	3,180,000	$890,400



Connecticut suffragettes find the automobile useful in a campaign

L. F. Robertson, one of the prominent jobbers in leather in New York, had the following pertinent comment to make:

"All this talk about the automobile industry being accountable for the impending rise in the price of shoes is the veriest rot," said he. "It is true that 10 years ago there was no demand for leather for automobile manufacture and today it amounts to a considerable item, but the fact, so far as the rise in the price of leather is concerned, is due to basic conditions. In the first place, statistics show that there are over 3,000,000 less cattle on the ranges today than there were 2 years ago, the farmers having found that it is more profitable to raise grain or other agricultural crops than live stock. It is undeniably true that civilization has progressed and new uses have been found for leather in common with almost every other variety of commodity. The result has been not only to raise the price of leather, but also that of copper and beef and gasoline and vegetables, and poultry, and coffee and a few other things which escape my memory.

"Augmented demand and lessened supply always produce higher prices in the balance of trade. Leather is more widely used than ever before. We have a larger population and everybody wears shoes. The leather used in making shoes makes the handful devoted to automobile manufacture look like nothing at all. In my opinion the manufacturers of cheap shoes, who have not raised their prices to correspond to modern conditions, but who maintain their level of profit, or try to do so by other economies, are preparing the public mind for a horizontal boost in prices and in introducing the subject their publicity departments have taken the usual fling at the automobile."

There are two general classes of leather used in automobile upholstery work. First is the machine-buffed type, which sells at from 24 to 26 cents a square foot. The other variety is hand-buffed leather, which ranges from 28 to 32 cents a square foot. These prices are 4 cents higher than those that prevailed prior to the present agitation.

Suffragettes Use Automobile

Gaudily-bedecked automobiles are being piloted through the small cities and villages in the eastern part of Connecticut by members of the Connecticut Woman Suffrage Association who are finding that they can thoroughly cover more ground in less time in this manner than by any other means. The accompanying photograph shows two of the cars being used by the would-be voters to carry on the campaign for woman suffrage which is at present in full swing in that section of the country.

MILWAUKEE, WIS., July 22—After a hard battle, manufacturers of portable steel garages have won their fight against efforts made by the Milwaukee Common Council to prohibit the erection and use of such structures in Milwaukee. With the full consent of the chief of the fire department, as well as the Milwaukee Board of Fire Underwriters, the Council has just passed an ordinance amending the so-called garage law, permitting the use of portables.

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1912 Automobile Growth

THIS week THE AUTOMOBILE presents its semi-annual statistical review of the automobile industry, analyzing its phenomenal growth during the last 6 months and contrasting this unprecedented development with that of the corresponding period a year ago. The magnitude of the industry becomes apparent not only from the tabulation of state registrations, but also from the enormous capitalization of new organizations brought into the industry during the last half year, there being incorporations to the amount of over $136,000,000 for the entire automobile field, one-half of this amount for concerns to build cars and parts and the other half for garage and accessory enterprises. Both of these items tell more eloquently than figures of cars manufactured the wide-spread permeation of the motor vehicle into every avenue of modern life.

That the automobile exerts its influence from the lakes of Maine to the picturesque slopes of California is evidenced by the fact that Maine shows the highest percentage of increase in car registration since January, 1912, the figure being over 67 per cent., while California stands second in the ranks of total registrations, being exceeded only by New York State. Agricultural improvements and developments in Maine have turned the farmer's attention to the small car, and his purchases have been a leading factor in the history of motoring in the state this season.

Another attractive example of the buying possibility of the agriculturist comes from the rich farming states of Nebraska and South Dakota, which really rank first in the columns of the number of population per car owned. The District of Columbia occupies the premier position with one car for every thirty-five population, but so many of the cars registered in the district are the property of senators and congressmen, who make the capital but an official residence, that it is unfair to other states to rank the district first. Viewed from the residential viewpoint, Nebraska shares the laurel crown with South Dakota, both of which have registered one car for every forty-five population, a most remarkable proportion. Following these are two other agricultural states, Indiana and Iowa, in both of which the agricultural classes have been heavy buyers for several year. Maine comes next and New Jersey has the honor of being the first large-registration state in the classification with a car to every sixty of population, a fact largely explained by the New York business men who make the nearby Jersey towns their residences.

States with big metropolitan centers are classed low in the car-population column. New York, with its total registration of over 92,000, has but one car for every 100 population and Illinois one car for every 120 population. The low purchasing ability of the great city masses accounts partly for this, another potent factor being the fact that agricultural New York does not purchase as many automobiles as the farming areas of the great Mississippi valley, where distances demand quicker transportation than the horse affords.

From the tabulation showing the population per car registered, the Southern States rank generally last, the explanation being the large negro population and the lack of improved highways in many of these states. Florida takes first place, with Georgia second, due in the latter case very largely to the enthusiasm engendered by the state-wide good roads fervor.

The states that head the list showing the increase of registrations from January to July over the corresponding period of a year ago is somewhat surprising. It is a medley of East and West, of North and South, of agriculture and lumbering, of cotton and corn, Maine, Oregon, Mississippi, New Mexico, Delaware, Arizona, Alabama and Nevada being the order. Each state has its reason for the unexpected increase. With one it is more general purchasing by the farmer; with another the necessity of using the car by the mining operator; with still another, the road movement. All acknowledge the automobile, all are discovering that the business of the day demands it and all are buying it.

This tabulation has a lesson for every car maker, particularly those building cheap and medium-priced machines. To many, several of these states represent much unknown territory. This is particularly so with the higher-priced makers, who have largely confined their activities to the centers of population, and when they have gone out and attempted to convert the citizen in smaller centers they have found him wedded to the medium or low-priced machine and not vitally interested in the higher-priced commodity.

The various states reap goodly harvests from the sales of automobiles, there being collected in the first 6 months of this year $4,769,873 from motor car registrations in the different states. New York contributed over $941,000 of this sum; Pennsylvania's share amounted to $525,000; Massachusetts paid out $513,000 for registrations; New Jersey added $369,000, and Illinois $305,000. It is a coincidence that in all of these states, with the exception of Illinois, the good roads movement has been making masterly headway for several years and their roads are considered the best in the land, and superior to many of the European roads. Where the increase of automobile registration and good roads building goes hand-in-hand it tells a two-fold tale—the value of good roads in the sale of automobiles and reciprocally the influence of cars on the building of highways.

Two healthy developing factors in the industry are the electric vehicle and the commercial vehicle. The motor truck shows an increase of 25 per cent. over the corresponding period of last year and with the electric there is a heavy percentage of increase. The states that are leaders in pleasure gasoline machines are also leaders in the electrics, showing the present-day tendency of many owners of gasoline machines to buy electrics for city uses, such as church, theater and shopping. The motor truck shows its major increase in New York State, but there has also been an unexpected increase throughout the smaller cities in many of the states.

Colonel Frank M. Joyce Dead

Prominent in Good Roads Work in the Northwest and Widely Looked Upon as the Next President of the A.A.A.

COL. FRANK M. JOYCE

MINNEAPOLIS, Minn., July 22—Colonel Frank Melville Joyce died at 8:25 this morning at his home here after suffering many months from Bright's disease. Colonel Joyce was one of the best-known motoring enthusiasts in the Northwest and for years had been a leading spirit in promotion of motoring enthusiasm, good roads and motor legislation in the state. He was at the time of his death first vice-president of the American Automobile Association and has been generally looked upon as a successor to President Hooper, of the A. A. A. in 1913. He was former president of the Automobile Club of Minneapolis and first vice-president and organizer of the Interlachen Country Club.

Colonel Joyce graduated from Indiana Asbury college, now Depauw University. He started business as teller in the Queen City bank, Cincinnati, O., and for 5 years was the agent of the Provident Life & Trust Company. In 1890 he became district agent of the Mutual Benefit Insurance Company, and 5 years later was transferred to Minneapolis, where he resided up to the time of his death. He received his title of Colonel from Governor McKinley, of Ohio. He was son of the late Bishop Isaac W. Joyce, of the Methodist Church. Throughout his life he had been a great club-man, a thirty-second degree Mason, a member of the Hennepin avenue Methodist church and also high up in the councils of the Knights of Pythias.

De Dion Buses for New York

According to a note in *L'Auto* of July 12 the Dion-Bouton company, of Puteaux, France, has received an order for 100 double-decker motor omnibuses from New York. They are to be of the same type as the Paris omnibuses of the same manufacture excepting that the seating capacity is raised to 42 by utilizing the tops of the vehicles for seats.

At the De Dion agency in New York it was stated that twenty-five buses had been ordered from the factory and that the cars would be shipped within the next 3 weeks.

Minerva-Knight Ties Hermes

Belgian Grand Prize Race Over 720-Mile Course Ends Without Decision—Mercedes-Knight Team Also Stars

PARIS, July 21—The teams of Minerva-Knight and Hermes cars tied for first place in the 2-day Belgian Grand Prize race run over the Ardennes circuit and which closed today. The event comprised 12 rounds over the 30-mile course for each day of the race, making the total distance 720 miles. Ten teams of three cars each and several individual cars started yesterday. Among these were the winning Minerva and Hermes teams and the Lion-Peugeot cars of French Grand Prize fame, a Mercedes-Knight valveless team, three Opels, three Benzes, three Excelsiors, and three cars teams of S. A. V. A., F. A. B. and Vivinus makes. Two French Grand Prize Schneiders were also entered, but did not constitute a complete team.

No Fatal Accidents Recorded

While there was not one fatal accident, one car was wrecked in the course of the race, this being a standard Ford car. The Mercedes team of cars having Knight engines, with 4.5 liters (275 active inches) piston displacement, were penalized one point due to a slipping clutch, the Opel team six points owing to varied trouble; one of the Peugeot cars was braked by its driver when the spectators rushed the track, causing the universal joint to be damaged and entailing one point penalty to its team which was eliminated when Zuccarelli, one of the drivers, experienced timing gear trouble. Besides this team, the S. A. V. A. and F. A. B. cars as well as the Germain machine were withdrawn from the race.

The cars entered were classed by piston displacement, under three classes, 2 liters, 3 liters and 4.5 liters. Each class of car was assigned a mean speed at which to make every round of the course; for instance, the 3-liter cars were ordered to maintain an average speed of 64 kilometers (38.4 miles) an hour. The rating of the cars' work was done on the following basis: The first round every day, done within the assigned time, was counted one point, and each following lap was valued at 1-10 higher than the preceding one, making the second lap count 1.1 points, the eleventh 2 and the twelfth 2.2 points.

The 48-kilometer circuit over which the cars raced lies in mountainous territory, but all told the roads are good and hard, having been put in specially fine shape for the speed trials. The cars started at Anseremme, which is a suburb of Dinant. Not far from this town the grandstand had been erected and a dangerous curve was in sight of the spectators. The first 15 kilometers were on a hard but hilly road, followed by 4 kilometers of a fine straight-away which continued to Vignee, where the course has a right angle. The course led through Anseremme, across the St. Jean Bridge which spans the Lesse, and back to the starting point.

U. S. Rubber to Expand

Mammoth Tire Factory to Be Erected, Possibly Near Chicago, to Care for Growing Business

Price of Gasoline Still on Upward Trend—House Committee on Patents Reports New Bill

ANNOUNCEMENT by the United States Rubber Company that a mammoth tire factory is to be built to augment the present manufacturing plants discloses at least a portion of the motive for the recent financial expansion of the company.

President Samuel P. Colt recommended to the annual meeting of the stockholders that $10,000,000 of liquid cash capital be added to the company's finances, but the concrete reason for the addition was not made clear to the public at the time. Now it appears that the company contemplates the erection of a new factory which will have a capacity of 2,000,000 casings a year.

While the rumored statement that the new plant would be located at Chicago and that building operations would be started in October could not be confirmed at the offices of the company, it was announced that such action was probable.

For about 2 years the tire industry has been under constant and insistent pressure in all the manufacturing departments and overtime has been the general rule throughout the industry. Some of the factories have been constantly sold ahead for from 3 months to a whole year.

In response to the announcement of the contemplated erection of the new factory, the common stock of the United States Rubber Company became very strong and scored an advance of 2 1-2 points on investment and speculative buying.

Gasoline Price Still Soaring

Gasoline is now 16 cents a gallon, delivered in steel barrels in wholesale lots. The advance of 1 cent was announced last week, the quotations for 200-gallon lots being raised to 21 cents.

The Standard Oil Company explains the advance on the same old grounds, namely, the pressure of demand, the limited character of supply and the rise in basic oils.

At the present level in wholesale lots, the price is higher than it was at retail last year at this time and is 7 1-2 cents above the level established prior to July, 1911, and 6 cents more than it was January 1 this year.

The automobile owner who can purchase in wholesale lots and who gets 8 miles to the gallon, can do a mile, as far as fuel is concerned, for 2 cents. If he is obliged to buy in lots of 200-gallons, the fuel cost per mile is 2 5-8 cents.

Otto Car to Be Sold Direct

PHILADELPHIA, July 22—The Otto car will be handled in future as far as sales are concerned, by the Otto Gas Engine Works, original manufacturers of the car, according to announcement. For the past year the line has been handled and sold by the Otto Mobile Company, of Mt. Holly, N. J., which went into the hands of receivers last week. The manufacturing company announces that it has no corporate connection with the embarrassed concern.

New Patent Bill Reported

WASHINGTON, D. C., July 20—Three distinct assaults upon the patent monopoly established by the United States Supreme Court in its recent decision on the Dick case are incorporated in a bill reported by the House committee on patents. A substitute bill to recodify the laws and meet the Supreme Court's ruling has been unanimously reported by the committee. The measure is much shorter than that originally drawn by Chairman Oldfield, of the patents committee, and is designed as an emergency measure for immediate consideration of Congress before adjournment.

The principal provisions to break up the patent monopoly under the Dick decision are: Prohibit purchase of patents by corporations designing to secure a monopoly upon patents in a general industrial line. Permit use of patented machines with materials not specified as a restriction upon their use. Amendment of the Sherman anti-trust law to punish patent monopolies.

The committee's bill will meet the Dick decision which held that any patentee could restrict the use of his article and also require use of any material or contrivance with it, by prohibiting purchase of patents. Another important provision is that persons who violate patent restrictions which limit the use of materials barred by the patentee cannot be sued for infringement of the patent.

General recodification of the patent laws, as recommended by Commissioner of Patents Moore, will not be attempted by the House patents committee until next fall.

Changes in Packard Representatives

DETROIT, MICH., July 22—The following changes have been made in the list of Packard dealers:

The name of the Eastern Motor Sales Company, Albany, has been changed to read the Dominant Motor Company.

Automobile Securities Quotations

The undertone in the market for automobile securities was strong but quiet during the past week. Transactions were not large in volume but for the first time in several weeks there was apparent a demand by odd-lot buyers. Those who are marketwise assert that buying of this character is a healthy sign. Among the big manufacturing companies there was an improvement in prices ranging from a small fraction to a point or more. General Motors was fairly active, the principal trades being made at a slight advance in the preferred and a material rise in the common issues. United States Motor Company was firm and rose fractionally. The tire stocks were steady as a rule but the movements were irregular. Comparative prices for July 23 of this and last year are:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., common	..	..	120	..
Ajax-Grieb Rubber Co., pfd	..	..	..	100
Aluminum Castings, preferred	..	..	100	..
American Locomotive, common	40¼	40½	42½	43½
American Locomotive, preferred	108½	109½	108½	109
Chalmers Motor Company	..	..	145	155
Consolidated R. T. Co., common	5	10	12	14
Consolidated R. T. Co., pfd	10	20	..	59
Diamond Rubber Company	..	..	..	..
Firestone Tire & Rubber Co., com	160	170	275	285
Firestone Tire & Rubber Co., pfd	105	107	105	107
Garford Company, preferred	..	..	99	101
General Motors Company, com	54½	55½	33	34
General Motors Company, pfd	87½	88½	76	77
B. F. Goodrich Company, com. (old)	245	248	75	76¼
B. F. Goodrich Company, pfd. (new)	115½	117½	108½	109
Goodyear Tire & Rubber Co., com	230	240	298	304
Goodyear Tire & Rubber Co., pfd	105	107	103	105
Hayes Manufacturing Company	..	..	..	97
International Motor Co., com	..	..	22½	25
International Motor Co., pfd	..	..	83	85
Lozier Motor Company	..	..	50	60
Miller Rubber Company	..	..	145	150
Packard Motor Co., preferred	..	..	105	106½
Peerless Motor Company	..	..	..	150
Pope Manufacturing Co., com	51	55	30	31
Pope Manufacturing Co., pfd	78	80	73½	74½
Reo Motor Truck Company	8½	9½	8¾	10
Reo Motor Car Company	23½	25	21	24
Studebaker Company, common	..	..	31½	33
Studebaker Company, preferred	..	..	94	95
Swinehart Tire Company	..	..	96	99
Rubber Goods Company, common	88	95	100	..
Rubber Goods Company, pfd	100	105	105	110
U. S. Motor Co., common	39	40	3	3¼
U. S. Motor Co., preferred	79½	80½	12¼	12¾
White Company, preferred	..	..	107½	108

Owners' Motor Company, Atlanta, to H. B. Odell, 240-2 Peachtree street.

Alvan T. Fuller, Boston, to the Packard Motor Car Company of Boston.

The Osmond L. Barringer Company, Charlotte, N. C., to Osmond L. Barringer.

The MacFarland Auto Company, Denver, to the MacFarland-East Auto Company.

W. D. Rightmire, Duluth, to the Zenith Service Company.

Peck, Haynes & Co., Grand Rapids, to the Peck Auto Co.

Meridian Auto Company, Indianapolis, to Carl G. Fisher & Co.

E. P. Moriarty & Company, Kansas City, to Packard-Kansas City Company.

Electric Garage Company, Omaha, to the Orr Motor Sales Co.

The United Construction & Supply Company, Regina, to the United Motor Company, Ltd.

Edward B. Zane, Spokane, to Edward B. Zane Co., Inc.

U. S. Motors Does $2,000,000 in June

Sidney S. Meyers, attorney for the Motor and Accessory Manufacturers, has been elected a member of the creditors' committee now active in handling the affairs of the United States Motor Company finances. The move was made in order to maintain close touch between the banking creditors, who originally took action to grant the present 90-day extension of credit, and the merchandise creditors.

Reports of June sales by the United States Motor Company are to the effect that the business was in the neighborhood of $2,000,000 and so far in July the promise is for about as much more.

Market Changes for the Week

Midsummer conditions prevailed in the markets during the past week, the only changes of interest being a 2-cent rise in Kansas crude petroleum and a sharp flurry in tin during which it advanced 72 1-2 cents per 100 pounds.

Crude rubber has been firmer in the markets than it has at any time during the past 3 months and while trading this week has not been of large volume, holders have been able to work off some small lots of up-river fine at $1.18 a pound. Stocks in the hands of consumers are believed to be materially less than they were in June, which account for the strong undertone in the actual trading. The imports totaled 1,304 packages.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb......	.07	.07	.07	.07	.07	.07	....
Beams & Channels, 100 lbs.....	1.41½	1.41½	1.41½	1.41½	1.41½	1.41½	....
Bessemer Steel, Pittsburg, ton	21.50	21.50	21.50	21.50	21.50	21.50	....
Copper, Elec., lb.	.17 15/100	.17⅜	.17⅜	.17⅜	.17¼	.17 6/10	—.00 9/100
Copper, Lake, lb.	.17⅛	.17½	.17½	.17½	.17⅜	.17⅝	+.00½
Cottonseed Oil, July, bbl....	6.28	6.55	6.45	6.41	6.36	6.50	+.22
Cyanide Potash, lb......	.20	.20	.20	.20	.20	.20	....
Fish Oil, (Menhaden)	.38	.33	.33	.33	.33	.33	—.05
Gasoline, Auto, 200 gals. @.	.20	.21	.21	.21	.21	.21	+.01
Lard Oil, prime	.85	.85	.85	.85	.85	..85	....
Lead, 100 lbs..	4.67½	4.67½	4.67½	4.67½	4.67½	4.67½	....
Linseed Oil...	.73	.73	.73	.73	.73	.73	....
Open-Hearth Steel, ton...	22.00	22.00	22.00	22.00	22.00	22.00	....
Petroleum, bbl., Kansas crude	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa., crude...	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.67	.67	.67	.67	.67	—.01
Rubber, Fine Up-river Para	1.15	1.16	1.16	1.16	1.17	1.17	+.02
Silk, raw Ital..	....	4.15	....	....	4.15	....	....
Silk, raw Japan	....	3.62½	....	....	3.65	....	+.02½
Sulphuric Acid, 60 Beaumé..	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs...	43.12½	43.85	43.55	43.40	43.50	43.85	+.72½
Tire Scrap....	.09	.09	.09	.09	.09	.09	....

Mack to Enter New Field

Has Resigned Vice-Presidency of International Company and Will Build Motor Fire Apparatus

Universal Directors Cancel Flanders' Option and Will Continue Business on a Greatly Enlarged Scale

JOHN M. MACK, one of the founders of Mack Brothers, makers of the Mack line of automobile trucks, now included in the product of the International Motor Company, which has also the Hewitt and Saurer lines, has resigned his position as vice-president and has entered another phase of the manufacturing field.

Mr. Mack has been one of the prominent figures in the commercial car field for several years. It has been announced that he has formed a $600,000 corporation to manufacture automobile fire engines and automobiles at Allentown, Pa., and has secured control of the Webb Automobile Fire Engine Company, of St. Louis.

It is stated that the manufacturing operations will be transferred from St. Louis to Allentown and that the new company has secured the plant of the Allentown Machine & Foundry Company, to which will be added a brass-making plant now located in Philadelphia and controlled by Mr. Mack.

Universal Truck Co. to Expand

DETROIT, July 20—The option of the Universal Motor Truck Company's plant, which was held by W. E. Flanders and the Studebaker interests, was canceled by the directors of the Universal Company, at a meeting held Thursday. This leaves the truck concern entirely in the hands of the Schlitz brewery interests of Milwaukee, represented by Messrs. Uehline and Kopmeier, and F. K. Parke, of Detroit.

The capital stock of the company will be increased to $1,000,000, the interested parties having already added $500,000 to the capitalization to make possible the enlargement of the plant and the production of an entirely new truck proposition in addition to the present product. The new machine is a worm-drive affair, having a capacity of 1 ton, and has been in the course of its development for some time.

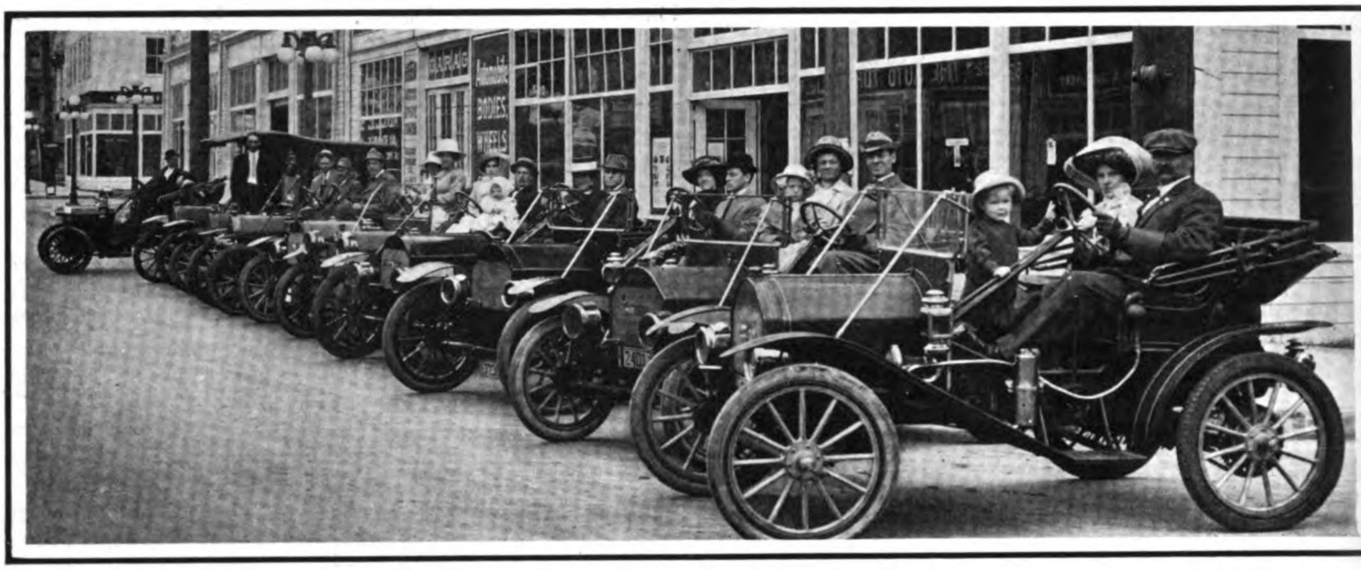
N.A.A.M. to Meet at Christmas Cove

The advance guard of the National Association of Automobile Manufacturers began to leave New York early this week for Christmas Cove, Me., where the regular meeting of the organization is scheduled for the last few days of this month. It is now expected that the meeting will be attended by about thirty-five members of the board and invited guests.

The program so far as it has been outlined does not contain anything of superlative interest to the public generally, but it is understood that the show question, the merger proposition which was acted upon at the recent meeting of the Automobile Board of Trade and other matters not upon the formal program will come up for discussion at least.

Writers Inspect Maxwell Factory

A group of New Yorkers representing automobile papers and magazines, accompanied by a photographer, made a trip of inspection on Monday through the Maxwell factory at Tarrytown, N. Y. The factory, which is located on the bank of the Hudson, was reached from New York by a fast motor boat chartered for the purpose. After a luncheon at Tarrytown, the factory was visited and the various departments inspected.



A few Brush owners in Portland, Ore., about to start on a basket picnic as guests of the local branch

GAS Traction Bought for $2,000,000—The Gas Traction Company, Minneapolis, Minn., has been bought into the $50,000,000 Emerson-Brantingham Company, of Rockford, Ill. The sale price was about $2,000,000.

New Service Station—The Taylor Automobile Company, 35 Orange street, Albany, N. Y., has established a service station in connection with its Locomobile agency.

Moves Into New Quarters—Burke & Aucock, agents for ignition apparatus, also doing repair work, have moved into larger quarters at 222 Columbus avenue, Boston, Mass.

Gardham Goes to Boston—Joseph Gardham, well known in the middle West as a driver, has gone to Boston, Mass.. to take charge of the Boston service department of the J. S. Harrington Company.

New Bedford Buys Abbott—The New Bedford, Mass., Board of Aldermen has approved an order for the purchase of an Abbott-Detroit car to be used by one of the heads of the municipal departments, the order being secured by the Boston agency.

Test Minneapolis Truck Law—License Inspector A. B. Gray has begun a test of the Minneapolis, Minn., ordinance requiring a tax of $1 for each motor truck used for hire. Several chauffeurs have been arrested on the charge of not having paid the tax and trials are set for future dates.

Vanguard Contract Not Renewed—The selling arrangement that exists between the Emil Grossman Company, of New York City, and the Vanguard Manufacturing Company, Joliet, Ill., for the sale of the Vanguard windshield will expire on August 1, 1912, and will not be renewed.

Changes to Motor Service—Frank Ware, superintendent of the Country Club, of Brookline, Mass., has disposed of the greater part of the horse-drawn equipment used to carry members to and from the club to the railroad and street car lines, putting three motor cars into commission for the same purpose.

Losey Paid Parting Tribute—Business interests of Indianapolis, Ind., paid a parting tribute to R. H. Losey, retiring manager of the sales branch of the Buick Motor Company, recently. Mr. Losey is to become general sales manager of the Republic Motor Company, with headquarters in New York.

Automobiles to the Rescue—The bursting of water pipes recently resulted in the entire water supply of the village of New Hartford, N. Y., being cut off. The Utica water company thereupon secured a number of automobile trucks, loaded them with milk cans of water and rushed to the relief of the villagers. The service was maintained till the break was repaired.

Valentine Goes to Rochester—John H. Valentine, head of the company bearing his name and which has had the agency for Chalmers cars in Syracuse, N. Y., has retired from the concern and is now connected with a Rochester, N. Y., company interested in the manufacture of motor trucks. Charles G. Hanna, inventor of the Hanna self-starter, is now at the head of the Valentine Company.

Form Self-Starter Company—Arrangements have been completed for the financing of a new self-starter company in New Orleans, La. The Thurber rotary self-starter, a recent invention by Edward J. Thurber and Jack Racklypt, of the Chalmers Motor Car Company of Louisiana, will be handled by a company to be capitalized at $200.000. The plant, which it is proposed to build, probably will be located in Detroit.

Ford's Minneapolis Branch—The Ford Motor Car Company has ordered plans in Minneapolis for its Northwestern branch at Fifth street and Fifth avenue to cost $250,000 to $300,000. The ground area will be 42,000 square feet. It has 340 feet of concrete in view. The building will be four stories at present, but the foundations will carry eight stories. The structure will be utilized for assembling, display, sales and shipping as well as service. The exterior will be brick with terra cotta trimmings.

Essenkay Opens Salesroom—The Essenkay Sales Company has opened a salesroom at 814 Seventeenth street, N. W., Washington, D. C., with W. G. Fairbank as manager.

Young Company Stops Business—The T. A. Young Company, which has had the agency for the R. C. H., Peerless and Marmon cars in Syracuse, N. Y., has gone out of business.

Utica After Light Law Violators—Utica, N. Y., is having trouble with automobile owners who are violating the law by failing to display tail lamps. Police in that city have been ordered to arrest violators of this ordinance.

Dinner for Rinker—Fred G. Rinker, retiring superintendent of the Indianapolis, Ind., plant of the Willys-Overland Company, was the guest of honor at a dinner given by thirty-five foremen of the plant at the Denison Hotel recently.

Reorganize Broad-Oak—The Broad-Oak Automobile Company, Columbus, O., which was recently sold out to a new set of owners, has been reorganized by the election of W. J. Miller, president; Robert R. Turner, vice-president, and R. M. Weaver, secretary-treasurer.

New Ottawa Tire Company—Another new firm is added to the business circle of Ottawa, Ont., being the Try-Me Tire Company, located at 266 Sparks street. This business was established through the enterprise of two well-known Ottawans, F. B. Carling and Eric H. McLachlin.

Cole Branch for Dallas—In preparation for the establishment of a branch house in Dallas, Tex., S. J. Kuqua, vice-president of the Cole Motor Company, is in Dallas for a few weeks. His branch will be the only one in Texas, and will be used as the distributing point of the South.

Trolley Scheme Falls Through—The International Trolley-Mobile Company, which was granted a franchise in Milford, Conn., some months ago for a trolley line through the town, has not been heard from lately and the terms of the franchise have not been lived up to so that it has expired.

Baltimore Agent to Move—Arrangements have been made whereby the Detroiter-Baltimore Company, Baltimore, Md., handling the Detroiter car in Maryland, Virginia and West Virginia, will occupy the property now used by the Lozier Sales Company. The Detroiter company will move into its new quarters August 1.

Cities and Towns Warned—The Maine Automobile Association has notified the selectmen of Scarboro and the city officials of South Portland that certain stretches of road within their jurisdiction are not in a safe condition for travel and that if any damage results to motorists or their machines while passing over the highways named suits for damages will be instituted.

Correction of R-C-H—In the July 4 issue of THE AUTOMOBILE it was stated, in the description of the new R-C-H, that the clutch is of the dry plate variety and that the gearbox is mounted amidship. This was an error, the clutch being of the leather-faced cone type and the gearbox being integral with the rear axle.

Service Station for Universal—Manager Charles Addison Malley, of the New England branch of the Universal truck, has leased the building 193 Pleasant street, formerly occupied by the Grabowsky truck company, as a service station and salesrooms for the Universal. H. L. Winters has joined him as sales manager.

Goodyear's Minneapolis Branch—Manager J. L. Jordan, of the Goodyear Tire & Rubber Company branch, in consultation with Western Sales Manager A. F. Osterloh, of Chicago, Ill., and Secretary G. M. Staddleman, of Akron, O., has selected a site for the new branch house in Minneapolis, Minn., and plans are being drawn.

Ford's Memphis Branch—Memphis, Tenn., is to be made the distributing point of the Ford Motor Car Company for a large territory in the South as soon as the new building of the company is erected. The Ford company has just closed a contract for a six-story, reinforced concrete building to go up in Union avenue at the Southern Railway Company's crossing. The new edifice is to cost $85,000.

Wants Name Changed—The Bowles Motor Car Company, Washington, D. C., agent for the Warren-Detroit, has made application to the court to change its name to the Warren Motor Sales Company. The company is to be reorganized and in future will be in part a factory branch of the Warren Motor Car Company, of Detroit, Mich. Charles Kloppmeyer will be the general manager.

Lippard-Stewart Officers Appointed—August Becker has been appointed president and E. J. Barcalo treasurer of the Lippard-Stewart Motor Car Company, Buffalo, N. Y., to succeed T. R. Lippard and R. G. Stewart, founders of the concern, who have withdrawn from the company to conduct the business of the Stewart Motor Corporation, recently incorporated to manufacture motor trucks of light capacity.

Changes in Baltimore—The United States Motor Company will discontinue the branch store in Baltimore, Md., now occupied by the Stoddard-Dayton Auto Company. H. S. Block, who has been manager of the branch, announces that he has arranged to purchase the Stoddard-Dayton company and will continue it as an agency. He will move to new quarters as the present building has been taken over by the branch of the Locomobile Company of America, T. W. Wilson, Jr., manager.

Seven Cartercars just purchased by the Milwaukee Fire Department for use of the battalion chiefs

Baker A No. 1, vest-pocket edition of Baker electric

Pope Director Resigns—Colgate Hoyt, of New York City, the banker, has resigned as a director of the Pope Manufacturing Company, Hartford, Conn.

Promotion for Brown—Sales Manager Benson, of the Studebaker Corporation, announces the promotion of A. H. Brown, manager of the firm's Spokane, Wash., branch, to be Northwestern sales manager for the company.

Devault Joins Federal—A. L. Devault, formerly with the United States Tire Company in Detroit, Mich., has joined the forces of the Federal Rubber Manufacturing Company as manager of its prospective Detroit branch.

Flatonia Club Elects Officers—The Flatonia Automobile Club, Flatonia, Tex., has elected the following officers: E. A. Arnim, president; F. W. Dusek, first vice-president; Hy Hurr, secretary; C. P. Thompson treasurer.

Hospital Buys Truck—The Boston, Mass., branch of the State Hospital has discarded its horse-drawn equipment and has installed one of the General Vehicle Company's electric machines to carry supplies to and from the hospital.

Land Company Establishes Club—The Bellevue Highlands Company, Gadsden, Ala., has taken over 253 acres of land on the top of Lookout Mountain for the purpose of establishing an amusement park and automobile club.

Smith Appointed Distributor—L. D. Smith has been appointed distributor for New York State of the O'Neil Tire Protector Company, which has established its state office and service station at 1056 Main street, Buffalo, N. Y.

Barnes Moon Publicity Manager—The rapid expansion of the business of the Moon Motor Car Company, St. Louis, Mo., has necessitated the appointment of a new advertising and publicity manager, Walter C. Barnes, of Springfield, Ill.

Miller Heads Cole Branch—F. P. Miller will have charge of the factory branch of the Cole Motor Car Company, Indianapolis, Ind., which is soon to be established in Detroit, Mich. Mr. Miller will be the Michigan distributor for Cole cars.

Crooks Alco City Sales Manager—Fred A. Crooks has been appointed city sales manager of the American Locomotive Works for New York City. Mr. Crooks, previous to his appointment, was connected with the New York sales department.

Van Wagner's Detroit Office—The E. B. Van Wagner Manufacturing Company, Syracuse, N. Y., has opened a sales office in Detroit, Mich., for handling the business in finished metal castings and die-cast bearings in the Middle West. Harry C. McCallum, Jr., will have charge of the Detroit office.

Bill to Manage Tudhope—Harry Bill, formerly general manager of the Metzger Motor Car Company, Detroit, Mich., has become general manager of the Tudhope Motor Car Company, Orillia, Ont., which makes the Everitt car in the Dominion. He takes with him Joseph Gardham as factory manager.

Syracuse Association Takes Joy-Ride—The members of the Syracuse Automobile Dealers' Association, Syracuse N. Y., took a number of their friends on their annual joy-ride recently, the destination being Trenton Falls. The route covered 150 miles and the run embraced some of the most picturesque scenery in the state.

Klaxet on the Market—The contest for the naming of the new Klaxon horn conducted by the Lovell-McConnell Manufacturing Company, Newark, N. J., has been brought to a close, the winning name being Klaxet. Several persons submitted this appellation, but H. I. Stengel, Spring Lake, N. J., was the first, entitling him to the award of $100.

Canadian Baker Company—The Baker Motor Vehicle Company of Canada, Ltd., was recently organized at a meeting in Walkerville, Ont. The following officers were elected: Jiram H. Walker, Walkerville, president; J. J. Coburn, Walkerville, secretary; W. C. H. Burnett, Detroit, treasurer; R. C. Norton, Cleveland, vice-president. It is the intention of this company to start operations immediately and it hopes to be able to build both pleasure and commercial electric vehicles in the near future. The company will manufacture the models now being made by the Baker Motor Vehicle Company, Cleveland, O.

Automobile Incorporations

AUTOMOBILES AND PARTS

Brooklyn, N. Y.—Dunham Auto Company; capital, $15,000; to deal in automobiles. Incorporators: Frank Dunham, Louis Carmadella, Charles L. Apfel.

Buffalo, N. Y.—Mason B. Hatch, Incorporated; capital, $20,000; to engage in the automobile business. Incorporators: Mason B. Hatch, Isabel W. Hatch, John M. Chipman.

Camden, N. J.—Auto Distributers, Ltd.; capital, $200,000; to conduct a general automobile business, comprising the manufacture and sale of motor cars. Incorporators: F. H. Hansell, I. C. Clow, John A. McPeak.

Chicago, Ill.—Triumph Motor Car Company; capital, $75,000; to manufacture automobiles. Incorporator: Gerald Christopher.

Indianapolis, Ind.—Brown Commercial Car Company; capital, $100,000; to manufacture freight automobiles. Incorporators: W. H. Brown, Carl H. Wallerich and others.

Memphis, Tenn.—Scott Motor Company; capital, $10,000; to engage in the automobile business. Incorporators: J. C. Scott, W. H. Hayler, C. L. Hunt.

Nashville, Tenn.—Hager Motor Car Company; capital, $5,000; to deal in automobiles. Incorporators: L. S. Hager, J. W. Hager, R. T. Pitman.

Nashville, Tenn.—Southwestern Motor Car Distributing Company; capital, $50,000; to conduct an automobile sales business. Incorporators: J. W. Bondurant, M. S. Bruce, G. C. Love, T. B. Crenshaw, H. J. Reiner, P. H. Phelan, Jr.

Newark, N. J.—Warwick Motors Company; capital, $125,000; to conduct an automobile engineering business. Incorportaors: James D. Necel, E. Orton Woodruff, Merton E. Hidden.

Newark, N. J.—W. S. Motor Truck Manufacturing Company; capital, $300,000; to manufacture automobile trucks. Incorporators: J. M. Woods, C. H. Tebbetts, L. T. Fetzer.

Owensboro, Ky.—Ames Motor Car Company; capital, $100,000; to manufacture automobiles. Incorporators: F. A. Ames, G. W. Yeoman, H. A. Robins.

St. Louis, Mo.—Superior Chicopee Motor Company; capital, $15,000; to manufacture and deal in automobiles. Incorporators: T. H. Burns, George C. Ward, Harry C. Carr.

Westfield, N. J.—Darby Motor Car Company; capital, $25,000; to engage in the manufacture of automobiles. Incorporators: Levy Douglas Darby, Harry C. Darby, Aaron B. Darby.

GARAGES AND ACCESSORIES

Cincinnati, O.—Acme Motor Delivery Company; capital, $15,000; to operate an express business. Incorporators: W. E. Minor, F. L. Allen S. P. Sutphin, Davis Wachmann, J. B. Minor.

News of the Garages

HAMPTON Beach Garage—F. L. Bristol, of Portsmouth, N. H., has opened a large garage at Hampton Beach, one of the big summer resorts of New Hampshire.

Holgate Garage Being Enlarged—W. Hustwiler & Sons, proprietors of the Holgate Auto Garage, Holgate, O., are constructing a large concrete addition to their building.

For 300-Foot Garage—The Colonial Motor Company, Baltimore, Md., is having plans prepared by the West Construction Company for a garage to be built in North avenue.

Watertown's First Garage—The F. H. Bronson building near the Taft School, at Watertown, Conn., has been fitted up by Charles Sherwood for a public garage, the first one opened in the town.

Buick Rochester Company Expands—The Rochester, N. Y., salesroom and garage of the Buick Motor Sales Company has been removed to 102 State street owing to increase of business.

Harrisburg Garage Adds Space—Schriver Bros., who have been conducting the Mt. Pleasant Garage on Thompson street, Harrisburg, Pa., have taken over the East End Automobile Company Garage.

Big Garage for Overland Branch—The Northwestern Overland Company, Minneapolis, Minn., is having plans drawn for a branch building to handle the Overland car, much larger than its present quarters.

Milford Garage Fire—Leaking gasoline set blazing by a lighted lantern used by workmen caused a loss of several thousand dollars and destroyed two motor cars in the garage of Nelson F. Huff, at Milford, Mass., last week.

Bristol, Conn., Garage—The Barker Automobile Company of Bristol, Conn., has given out the contracts for its new garage on Riverside avenue, which is to be a brick structure, one story high, with dimensions 100 by 60 feet.

Wedge Adds to Facilities—Plans have been prepared for a large addition to the sales agency and garage of the Wedge Company, at Sixth and Marietta streets, Zanesville, Ohio. The addition will be of brick 105 by 50 feet and two stories high.

South Carolina Garage—O. H. Wienges has purchased a site in St. Matthews, S. C., with a 90-foot frontage, and will erect a building. A portion of the structure will be equipped as a garage and occupied by the Wienges & Culler Automobile Company.

Etchell Garage Completed—The new garage of the Etchell Automobile Company at Five Points, Biddeford, Me., is now completed, giving the company a capacity for 25 cars. It is so located on two streets that cars may be driven directly through the building.

Plans for Orphans' Outing—Plans are being made by the motor Club of Harrisburg for the annual orphans' outing at Hershey Park on Friday, August 2. Last year the motor club inaugurated the annual orphans' day outing and took over 300 children to Hershey Park.

Springfield, Mass., Garage—One of the best garages in Springfield, Mass., has just been completed on Worthington street, in the center of the motor district, for R. A. McKee. It is two stories high, but the foundations are such that additional floors may be added from time to time.

Nashua Garage Company Incorporated—The City Garage Company has been incorporated at Nashua, N. H., by George L. Erb, who is president and treasurer, with John K. Martin as manager. The new company has purchased the garage and repair business of the City Carriage Company.

Transform Stable Into Garage—Columbus, O., is to have a large new garage to be located at the southwest corner of Third and Rich streets, in a large structure formerly used as stables for the Peruna Company. H. A. Sells and J. R. Clancy have taken a long-term lease on the property and the work of remodeling into an up-to-date garage is being pushed rapidly. The concern will be known as the Capitol Garage and Storage Company. It is expected to operate a taxicab business also. Mr. Sells will be in charge of the business and Mr. Clancy in charge of the mechanical end.

Automobile Incorporations

CLEVELAND, O.—King Valveless Auto Whistle Company; capital, $25,000; to manufacture automobile accessories of all kinds. Incorporators: Delroy Feffield, Orville C. Snyder, George H. Burrows, R. E. McMasters, C. J. Lowrie.

DETROIT, MICH.—Young Electric Company; capital, $50,000; to manufacture storage batteries. Incorporators: Philip Young, C. F. Tomlinson, G. W. Caverly, J. L. Marcero.

GRAFTON, W. VA.—Grafton Garage Company; to conduct a garage and repair business. Incorporators: Henry J. Pracht, H. D. Comerford, Albert Kunst, J. W. Yates, C. Lee Reynolds.

INDIANAPOLIS, IND.—Indianapolis Tire Company; capital, $30,000; to manufacture automobile tires. Incorporators: A. A. McKain, E. J. Holliday, A. C. Ayres.

INDIANAPOLIS, IND.—Jenney Electric Starter Company; capital, $300,000; to manufacture electric self-starters for automobiles and all other kinds of gas engines. Incorporators: Charles D. Jenney, William L. Taylor, Russell Willson.

JACKSON, MICH.—Jackson Rim Company; capital, $100,000; to manufacture automobile rims. Incorporators: Otis W. Mott, Winthrop Withington, Mark Merriman.

NEW BRUNSWICK, N. J.—Consolidated Auto Supply Stores; capital, $1,000,000, to deal in automobiles, supplies and accessories. Incorporators: B. F. Hardesty, A. W. Dennen, S. A. Ross.

KANSAS CITY, MO.—Palace Garage Company; capital, $5,000; to conduct a garage and repair shop. Incorporators: Elmo Sanders, G. Mass, Ida Dick.

NEW YORK CITY.—Essenkay Sales Company; capital, $100,000; to deal in a tire-filling material. Incorporators: Henry S. Young, Byron F. Abbott, William C. Oliver.

NEW YORK CITY.—Fifty-second Street Auto Repair Company; capital, $2,000; to engage in the repair business. Incorporators: Arthur Williams, Jr., Harold Matzinger, Anna H. Darrs.

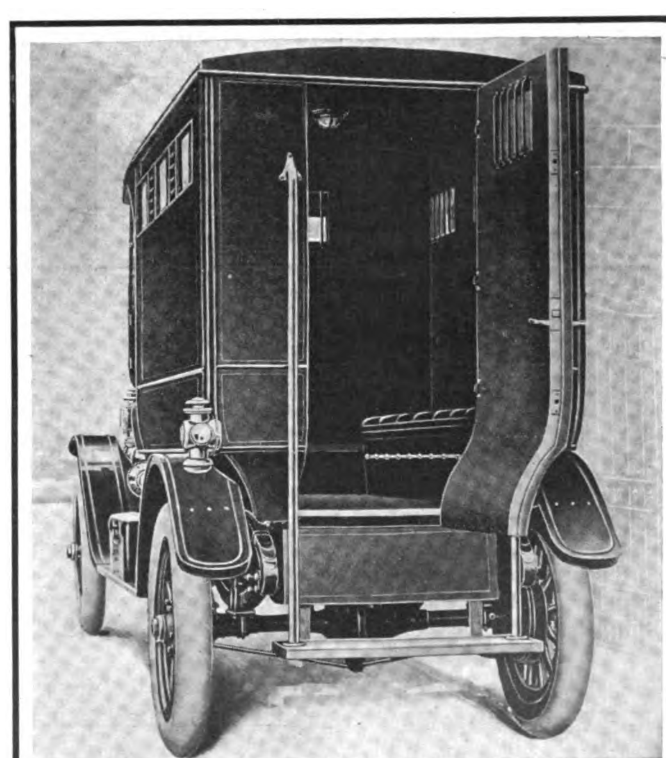
NEW YORK CITY.—International Auto-Lamp Manufacturing Company; capital, $300,000; to manufacture automobile lamps and lighting system accessories. Incorporators: Hyman Agar, Nathan Agar, Thomas Cunningham.

NEW YORK CITY.—Far Rockaway Cab Company; capital, $25,000; to conduct an automobile taxicab business. Incorporators: Edwin Sommerich, Joseph L. Steinman, Arthur Behal.

PLYMOUTH, MASS.—Plymouth Garage & Machine Shop Company: capital, $10,000; to conduct a garage and repair shop business. Incorporators: Adoniram J. Smith, Ruth E. Kingan.

CHANGES OF CAPITAL

CHICAGO, ILL.—Automobile Owners' Association; capital, decreased from $100,000 to $50,000.



Rear view of Schacht motor patrol used by Hamilton, Ont., police

New Automobile Agencies

PLEASURE CARS

Place	Car	Agent
Alexis, Ill	Henderson	W. A. McKnight.
Atlanta, Ga	Henderson	Atlanta Auto. Sales Co., Inc.
Baltimore, Md	Everitt	Square Deal Auto Co.
Bloomer, Wis	R-C-H	W. A. Struve.
Boston, Mass	Henderson	James A. Binney.
Bridgeton, N. J	R-C-H	W. Middleton Sheppard.
Chicago, Ill	R-C-H	Chas. E. Hammerly.
Cincinnati, O	Peerless	Peerless Motor Sales Co.
Columbus, O	Lozier	Gwinn Sales Co.
Davenport, Ia	Auburn	Newman Machine Co.
Davenport, Ia	King	Davenport Auto Co.
Davenport, Ia	R-C-H	Hanson Auto Co.
Des Moines, Ia	R-C-H	Sears Auto Co.
Grundy Centre, Ia	Henderson	A. C. Schafer.
Hartford, Conn	Velie	H. W. Yeager.
Kansas City, Mo	National	H. F. Sumin.
Kent, O	R-C-H	J. A. Ewing & A. R. Atkins.
Kingston, N. Y	R-C-H	Ulster Garage.
Little Rock, Ark	Marmon	G. L. Omohundro.
Los Angeles, Cal	Henderson	J. W. Wilcox.
Mattoon, Ill	Henderson	Mattoon Refrigerating Co.
Missouli, Mont	Henderson	J. J. Deakin.
Mobile, Ala	Studebaker	Bloch Brothers.
Montreal, Que	Detroit	DeVaux Motor Co.
Montreal, Que	Nyberg	DeVaux Motor Co.
Mount Sterling, O	Regal	H. Clay McKee & Sons.
Nashua, N. H	Haynes	City Garage Co.
New Glasgow, N. S	Cutting	Stevens Motor Co., Ltd.
Niagara Falls, N. Y	R-C-H	Niagara Falls Auto Transit Co.
Northampton, Mass	R-C-H	T. J. Collins.
Osborne, Kan	R-C-H	F. M. Cole.
Philadelphia, Pa	Henderson	Johnson Motor Sales Co.
San Antonio, Tex	R-C-H	Lawton Motors Co.
San Benito, Tex	Henderson	Whittlesley Garage & Machine Co.
San Francisco, Cal	Henderson	Bennheim-Moore Motor Car Co.
San Juan, P. R	Marmon	G. A. Besosa.
Shamokin, Pa	R-C-H	Geo. W. Turner.
St. Louis, Mo	Henderson	Model Auto & Sales Co.
St. Louis, Mo	R-C-H	Weber Imp. Co.
Strasburg, Ill	R-C-H	John Bauer, Jr.
Syracuse, N. Y	Paige-Detroit	Charles G. Hanna.
Toronto, Ont	Brockville	Chadburn & Hunt.
Toronto, Ont	Havers	Bowveur & Son.
Toronto, Ont	Norwalk	Matheson Automobile Co.
Washington, D. C	Henderson	Matheson Motor Co.
Waterloo, Ia	Henderson	Blackhawk Auto Co.
Windsor, Ont	King	F. S. Evans.

ELECTRIC CARS

Montreal, Que	Waverley	DeVaux Motor Co.
Toledo, O	Flanders	Charles P. Landman.

COMMERCIAL VEHICLES

Baltimore, Md	Board	Square Deal Auto Co.
St. Louis, Mo	Gardford	Cochrane Motor Sales Co.
Topeka, Kan	Lincoln	I-A-R Motor Co.
Washington, D. C	Federal	Empire Autobile Repair Co.

Motor Fire Apparatus

AKRON Adds to Fire Equipment—The Board of Control of Akron, O., has awarded the contract for a piece of motor-driven fire apparatus to the Webb Motor Fire Apparatus Company of Indiana at $8,200.

Camden, N. J., Energetic Buyer—The city of Camden, N. J., has bought three Studebaker roadsters equipped with chemical apparatus for its fire department. The three new vehicles are to constitute a flying squadron.

Add Another Life-Saving Car—Springfield, Mass., has added a second life-saving car to its fire department equipment, the order being filled by the Knox Company, of that city, that has built all the motor apparatus used by the Springfield fire department.

Chelsea Orders Fire Apparatus—At a recent meeting the Chelsea, Mass., Board of Aldermen appropriated $5,900 for the purchase of a combination motor chemical and hose wagon for the fire department and $3,600 for a combination automobile ambulance and patrol wagon for the police department.

Minneapolis Buys Fire Engine—The Minneapolis Fire Department Committee has recommended the purchase of a Nott Fire Engine Company pumping engine, made in Minneapolis. It is a motor engine also. The machine is said to have passed efficiency standards set by the city in the last few weeks' tests. The engine was contracted for in March at $6,500.

Albany Department Progresses Slowly—Fire Chief Bridgeford, of the Albany, N. Y., department, is planning to purchase within a few months several motor tractors similar to the one now in use in the Schenectady department. Chief Bridgeford intends to motorize the Albany department later on, but for the present he believes the tractors ought to increase materially the efficiency of Albany's fire system.

Car Economy Makes Firehouse Possible—When John Lennon, Son & Company submitted to the Niagara Falls, N. Y., Board of Fire Commissioners their bid of $9,180 for the construction of the new Highland avenue firehouse, gloom reigned among the fire officials, as it was too steep, but when Chief Utz discovered he had saved $225 on his automobile the story was different and the contract was awarded.

Niagara Falls Buys Combination Wagon—The new motor combination police patrol ambulance, costing $3,500, was delivered to the Niagara Falls, N. Y., police department last week. The machine is a Haynes, the chassis section being built at Kokomo, Ind., while the Henry Brunn Company, of Buffalo, made the body. The patrol will seat ten people, and with all accessories of an ambulance contains first aid paraphernalia.

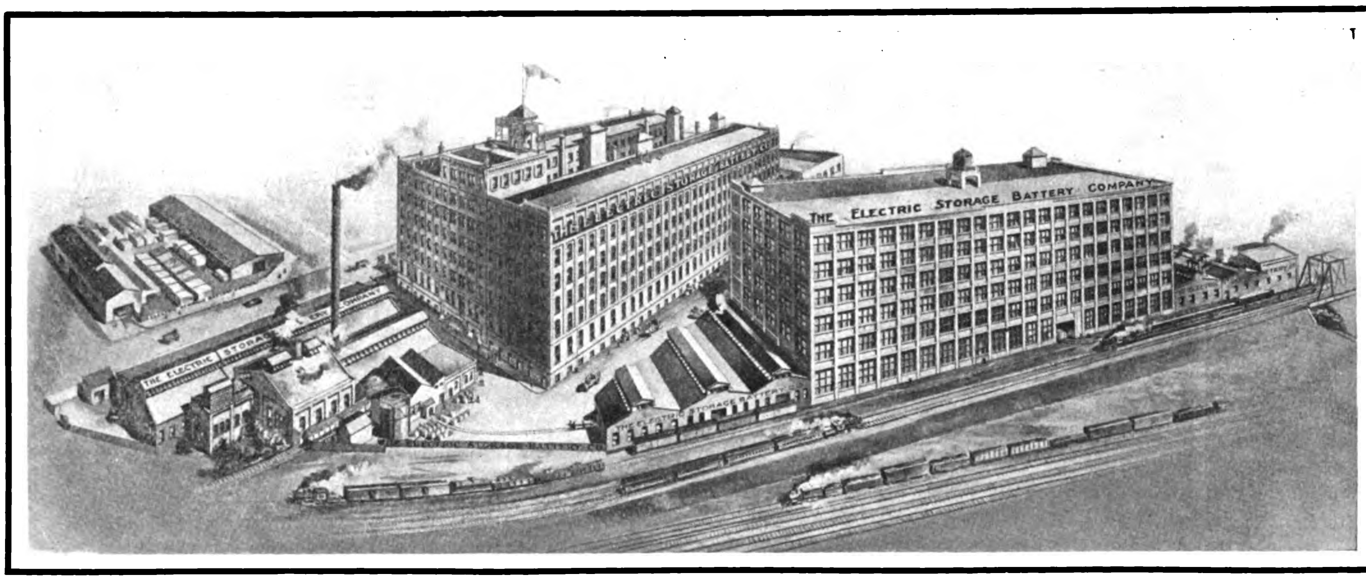
Davenport Motorizes Department—Convinced of the economy and efficiency of motor fire-fighting apparatus, Davenport, Iowa, has decided to dispense with the old-style horse-drawn apparatus and will purchase from the Seagrave Company, Columbus, O., an 80-horsepower motor tractor, which will be used in propelling the aerial trucks, an 80-horsepower combination hook, ladder and hose car and a special city service motor hose wagon.

St. Paul Fire Brigade News—The St. Paul salvage corps recently put in operation a salvage corps wagon furnished by the Woldref-Odell Motor Car Company, costing $6,250. It was made up of a body built by the Mitsch & Heck Wagon Company, of St. Paul, after plans by the superintendent of the corps, and Manager J. H. Segraves, of the motor company, and set on a Pierce-Arrow six chassis. The weight is 5,000 pounds. The car will carry five men, two tanks and fifty covers.

San Francisco to Motorize Department—The complete motorization of the San Francisco Fire Department at an early date will come as a result of the test made by the fire commissioners recently. It this test it was demonstrated conclusively that the motor-driven apparatus far outranked the horse-drawn apparatus in efficiency, and that in the case of ordinary fires the flames would often be extinguished by the motor apparatus before it would be possible for the horses and their heavy engines to arrive on the scene. Many of the smaller California Cities and towns have long boasted motor-driven apparatus. San Bernardino has used the motor wagons for several years and a number of the cities of Southern California early took this modern type of fire fighter.

Victor chemical and hose wagon now in use in Colorado City

Factory Miscellany



Bird's-eye view of the 14¼-acre plant of the Electric Storage Battery Company of Philadelphia

BIG Storage Battery Factory—The plant of the Electric Storage Battery Company, Philadelphia, has a floor-space of 14 1-4 acres, its entire capacity being devoted to the manufacture of storage batteries and accessory battery apparatus. The Exide battery made by the company is especially designed for use on gasoline cars, other types being made for electric car use. The building shown at the right of the above picture is a recent addition to the plant. It is 300 feet long, 115 feet wide and six stories high, with a one-story triangular extension 80 feet by 120 feet.

Reading Garage Changes Hands—H. F. Machmer and W. S. Degler have formed a partnership and will conduct the Riegel Garage.

Chalmers Wants to Build Now—The Chalmers Motor Company, Detroit, Mich., has approved plans for the erection of a new four-story factory building costing $75,000.

Timken Axle to Erect Factory.—A new factory is to be built for the Timken-Detroit Axle Company by Nettleton & Weaver, of the same city. The building is to cost $45,000.

New Penn Plant Starts Work—The new factory of the Penn Motor Car Company, New Castle, Pa., was put into full operation last week, work having been started in all departments so that car shipments can begin at an early date.

Willys-Gramm Plant Enlarging—The Lima, O., branch of the Willys-Gramm Motor Truck Company is to be enlarged in the near future. The plans for the addition and alterations have not yet been completed, but some definite announcement is expected within the next month.

New Pennsylvania Iron Center—The Eagan-Rogers Steel & Iron Company, Crum Lynne, Pa., representing a new industry for that section, has just started manufacturing operations. This company manufactures castings and small automobiles. The plant employs 200 men.

Moving Into Corbin Plant—P. & F. Corbin are now moving the machinery for their door-check department into the building formerly used to manufacture the Corbin motor cars at New Britain, Conn. The space thus vacated at the main plant will allow the manufacture of the company's other lines.

New Company in Maine—The Auto-Cart Company has been organized in Maine to build commercial vehicles at Hallowell, and it has the financial support of the leading business men of that city, also of Augusta, Gardiner and other Maine cities. Work will be commenced shortly on the vehicles.

Minneapolis Dealer Constructs Building—The Mitchell and Flanders electric representative in Minneapolis, F. E. Murphy Automobile Company, has had plans drawn for a building 100 by 137 feet, which is to be erected at Thirteenth street and Hennepin avenue. The building will be of brick and reinforced concrete and three stories high. Its cost will be $60,000.

Niagara Factory on the Way—Plans and specifications for the factory buildings of the Niagara Gasoline Motor Company, which concern has decided to locate at Dunkirk, N. Y., have been completed and work on the new structures will be started in a few days. The company decided to locate here if a $50,000 stock subscription could be raised by local citizens and the amount of $46,000 already has been raised.

New American Plant Completed—The American Motors Company, of Indianapolis, Ind., maker of the American Underslung cars, has just completed a three-story brick and steel addition to their plant No. 2. This new building is one of the handsomest and best lighted factory buildings in the city. It is of absolutely fireproof construction and is entirely inclosed with glass. The building is 85 by 120 feet, providing about 30,000 feet of floor-space. This will give about 100,000 feet of floor-space at plant No. 2.

English Reciprocating Valve-Grinding Tool; Adjustable and Lockable Valve Lifter; Sanitary Eye Protector; Battery Switch for Other Than Dual Magnetos; Spark-Plug With Visible Gap in Porcelain

Valve Repairing Tools

AN ingenious valve grinder devised in England is shown in Fig. 1. It is the product of Brown Brothers, Ltd., Great Eastern street, London, E. C. This machine is named the Warrow reciprocating valve grinder and is operated by the rotation of the handle H. The inner end of this handle or crank carries the part B which is shaped along almost half its circumference as a bevel gear. This gear, when rotated by the handle H, alternately engages the pinions P1 and P2 which are unit with the spindle S; the latter is held in place by the grip G. As the faces of the bevel pinions P1 and P2 are opposed, their alternate engagement with B imparts rotation in two alternate directions to the spindle which engages the valve, so that the latter is moved through half a revolution twice to every full turn of the handle H.

The second tool shown in Fig. 1 is the valve lifter of the Wright Wrench & Forging Company, Canton, O. This tool consists of two prongs P and P1, the latter being fulcrumed on the former at F. P1 carried a movable jaw J which may be locked along any point of the short arm of the prong. In operation, the bifurcated ends of the short arms of both prongs are placed around the valve stem and lifter stem as in Fig. 1, while the long arms, instead of being parallel, form an acute angle at A. By compressing the long arms till they are parallel the valve spring is compressed and the lifting tool may be locked in this position by means of the locking hook L holding the two long arms together. The valve lifter is made of drop-forged, case-hardened steel and made small and strong, so as to be adaptable to almost any type of valve.

Silk Gauze Lined Eye-Shield

The Leasure sanitary type of eye and nose protector, Fig. 2, is made by the Sanitary Sales Company, Bradford, Pa. It is a simple and light construction of one sheet of transparent material shaped to cover eyes and nose, which is fitted at its lower side with a piece of silk gauze, while the upper end partially covers the forehead. A smooth elastic band which is fastened around the head in the same way as ordinary goggles serves to attach the shield. The protector is designed to safeguard the eyes and the exposed parts of the face more thoroughly than is the case with ordinary goggles.

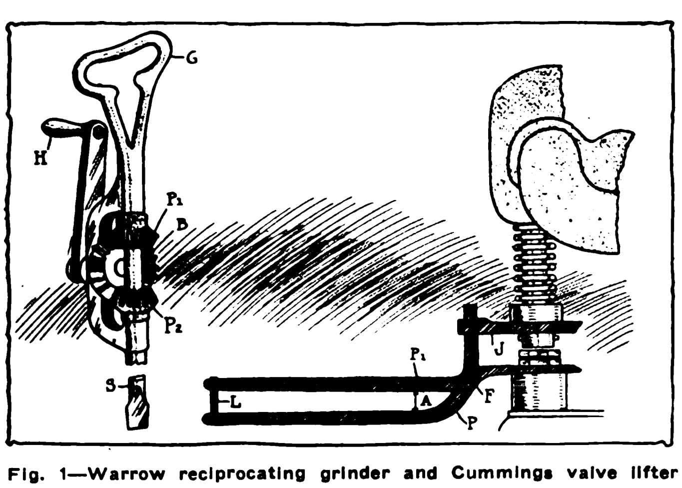


Fig. 1—Warrow reciprocating grinder and Cummings valve lifter

Foster Self-Starting Switch

A switch which permits the use of a self-starter requiring a battery for starting a motor equipped with other than a dual magneto is made by the Foster Appliances and Specialities Company, 146 West Fifty-sixth street, New York City. This switch is used in connection with an induction coil, both being illustrated in Fig. 5. The wiring system is shown in Fig. 4. The switch is of the kick-type appearance, but is preferably operated by hand. When the handle H is at either position marked M, the switch permits the magneto current to pass through it; but if the handle is in the central position B, a battery current is sent through the switch and thence to the distributer and the spark-plugs. When the motor is running, the switch handle is in either of the end positions M, and when, after rest, the motor is to be started on its acetylene self-starter, a quantity of acetylene is admitted to the cylinders, after which the handle is moved with moderate speed from one position M to the other. In this way the battery is put on for just long enough to produce one or two sparks in the cylinders, after which the magneto takes up the ignition work.

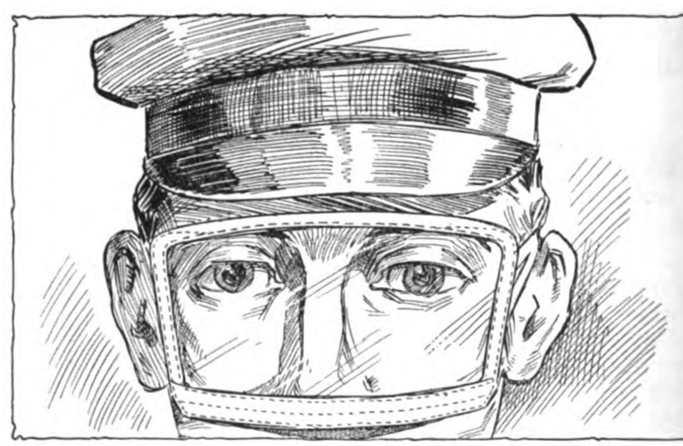


Fig. 2—Leasure light sanitary goggles and nose protector

Fig. 5 (III) shows the back of the switch with connecting pieces C1 and C2, which serve to connect the switch to the magnet. When this is done, the magneto attachment is put in place. To do this, the magneto bridge connecting the magneto terminals is removed, after which the contact nut on the collector is unscrewed and replaced by the attachment so that the horizontal contact (G in Fig. 4) points away from the magneto. Then the three terminal screws on the periphery of the switch casing are connected as follows: Looking on the back of the switch, the left-hand upper contact S3 is connected to the secondary lead coming from the coil, the right-hand upper contact S2 to the ground and the central contact S1 at the bottom of the switch to the primary lead from the coil.

The construction of the switch is shown in Fig. 5, (III) to (V), (III) being the back of the instrument which is made of an insulator substance having the appearance of red hard rubber. The inside of the insulator casing is seen at (V), the two ends of each contacts C1 and C2 projecting through the back, but being separated by the insulator substance on the inside. When the handle H is in either position M, the copper contact D (IV) connects the upper point of C1 to the lower point of C2 (V) or *vice versa*, so that the current flowing from the collector to the distributer of the magneto can pass through the switch. When the handle is put into the position B, the magneto current is interrupted, but the secondary current coming from the coil passes through the switch to the magneto attachment and thence to the distributer. The battery currents, primary and secondary, take the following paths: The battery primary current enters at S1, passes through the spring-fitted plunger P resting on it, then into the contact C3 driven into the insulation and grounded on the metal part M. From the casing the current flows through the spring S4 to contact S3 and thence to the ground, returning to the battery. The secondary current lead L from the induction coil is attached to the contact S3, and when the handle is in the central (battery) position, the contact C3 which is connected to S3 through the insulator casing contacts with pin P1 (IV). P1 is in contact with pin P2 which projects slightly out of the switch body K and rubs against the upper point of contact C1 which is connected to the magneto attachment.

The induction coil, Fig. 5 (I) is of the conventional type, the binding posts being Q1 and Q2. V is the vibrator, which is a steel spring held in place at one end by the screw W, while the other end carries the vibrator contact piece which makes intermittent contact with the bridge W1 of the binding post Q1. The high-tension wire is shown at L.

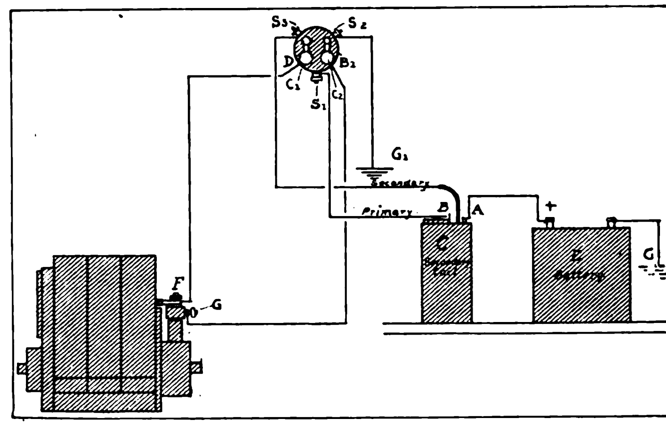


Fig. 4—Wiring diagram showing connections with Foster switch

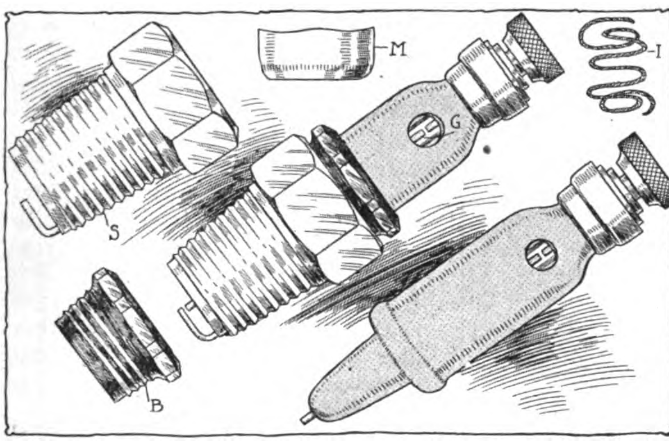


Fig. 3—Jeffery-Dewitt visible spark-plug and component parts

Jeffery-Dewitt Visible Plug

The new spark-plug of the Jeffery-Dewitt company, 500 Butler avenue, Detroit, Mich., is equipped with a visible spark gap in a circular opening of the porcelain, Fig. 3. This gap is formed by having the positive electrode shaped in two pieces, the upper one of which is rigidly secured to the terminal screw and is provided with a bolt thread near its upper end. This bolt is carried by a nut form of bearing, so that, by screwing the terminal screw in one direction or the other, the movable electrode portion is raised or lowered, increasing or decreasing the length of the visible spark gap G. The parts of the plug are shown in Fig. 3, S being the shell, B the bushing, I the insulating cord which separates it from the porcelain and M the metal cup which holds it in place thereon.

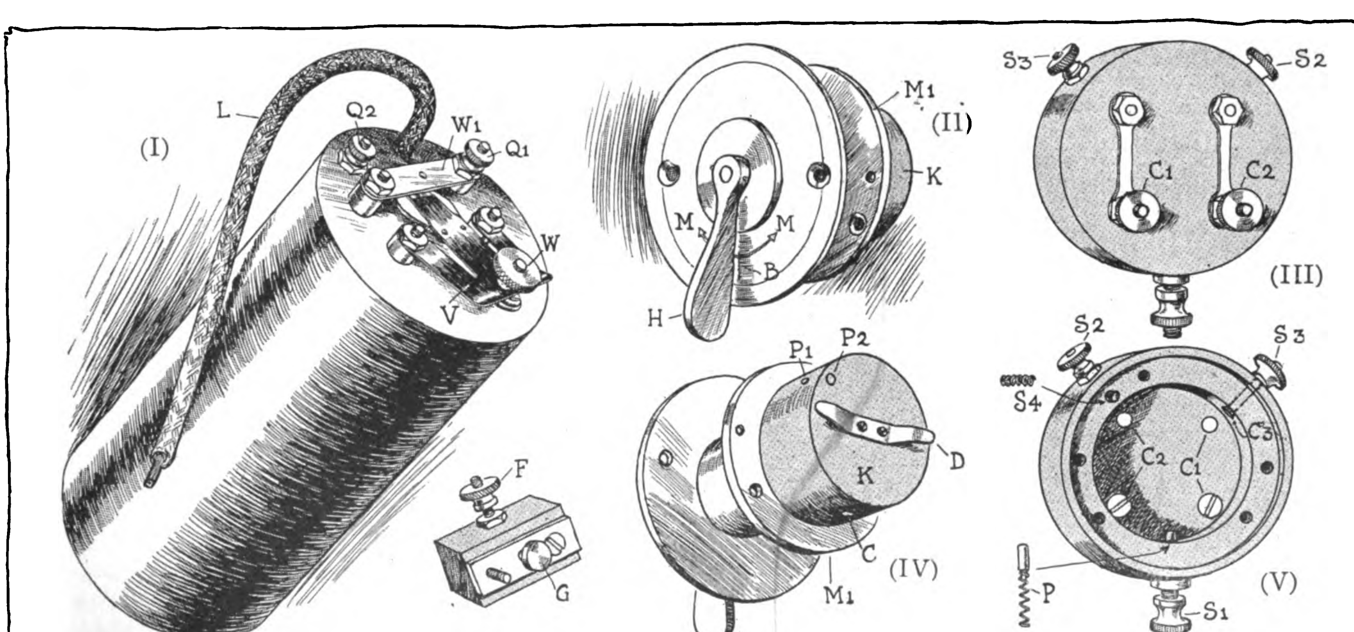


Fig. 5—Foster switch and parts: (I) Induction coil; (II) Front of switch, showing appearance on dash; (III) Switch body and moving contact; (IV) Back of switch casing with magneto contacts; (V) Inside and front of open switch casing

AUTOMOBILE Wheel—Operating on the elasticity of springs contained in spoke cylinders and a double rim. The wheel described in this patent consists of a hub H, Fig. 1, a series of spokes carried by the same and consisting of cylinders C and a rim composed of an outer portion O and an inner one I. The longitudinal axes of the cylinders are out of alignment with the wheel radii. In the cylinders, plungers P are positioned and spaced from the hub ends by coiled springs. The inner rim portion I is secured to the cylinder ends, and a series of bowed springs S is in place between inner and outer rims; to these springs the ends E of each alternate plunger stem is secured, while the other plunger stems are secured to the center of bowed spring T. The ends T are slidable on springs S.

No. 1,032,877—to James W. Calta, Platte, S. D. Granted July 16, 1912; filed December 29, 1911.

Lockable Monkey Wrench—The movable jaw is equipped with a pawl engaging a ratchet face on the shank.

This patent refers to a monkey wrench, Fig. 2, consisting of a shank S and two jaws J mounted on it, one of which is fixed and the other movable. A portion of the shank face is shaped as a ratchet which is adapted to be engaged by a pawl P mounted in the movable jaw. A pawl operating lever L serves to make the pawl prevent the movement of the jaw in one or the other direction.

No. 1,032,580—to Edward H. Anderson, Durham, Me. Granted July 16, 1912; filed March 6, 1912.

Automobile Bumper or Fender—In which shock is absorbed by springs coiled around arms which slide in guides.

The subject matter of this patent, a spring-operated bumper, is shown in Fig. 3. The bumper consists of a bumper bar B attached to arms A, which slide in guides G, springs S being coiled around the portion of A, which is outside of the guides G. The guides are adjustably secured to side bars S1 of the chasssis, being protected on clamps C

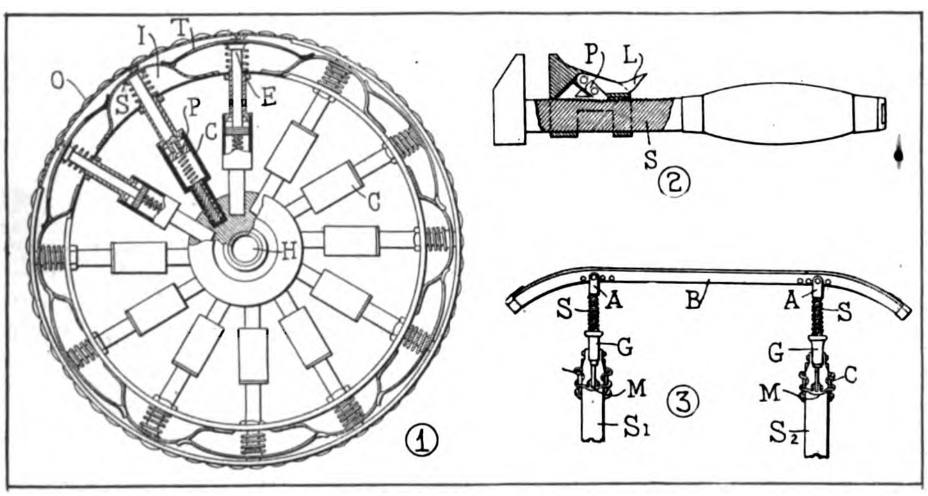


Fig. 1—Calta wheel. Fig. 2—Anderson monkey wrench. Fig. 3—McGregor bumper

No. 1,032,690—to Allan L. McGregor Chicago, Ill. Granted July 16, 1912; filed November 13, 1911.

Automobile Controlling Mechanism—Which provides for moving all fou road wheels in steering the car.

This patent describes a controllin mechanism for self-propelled vehicles composed of steering levers S1 and S. connected to steer front and rear roa wheels respectively. The steering gea is so constructed as to actuate the fron and rear steering. The constructio also including means for impartin movement to levers S1 before doing th same to S2.

No. 1,032,934—to Bennett J. Patrick Brookfield, Mo. Granted July 16, 1912 filed November 16, 1911.

Rotary Valve Construction—A rotary cone valve adaptable for connecting two sets of passageway:

An illustration of the valve referred to in this patent is see in Fig. 5. The construction includes a casing C which has tw sets of ports, P P and Q Q, opening in transverse planes. Th ports of one set are in vertical alignment with those of the othe A rotary closure R capable of connecting co-ordinate parts i mounted in the casing C.

No. 1,032,649—to John G. Bieniek, Chicago, Ill. Granted Jul 16, 1912; filed July 5, 1911.

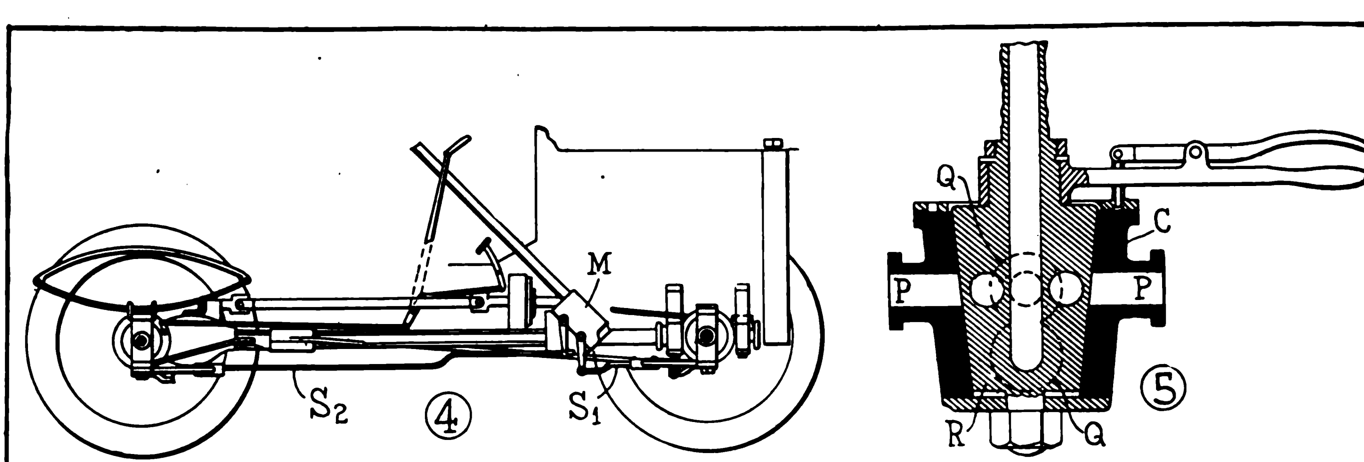
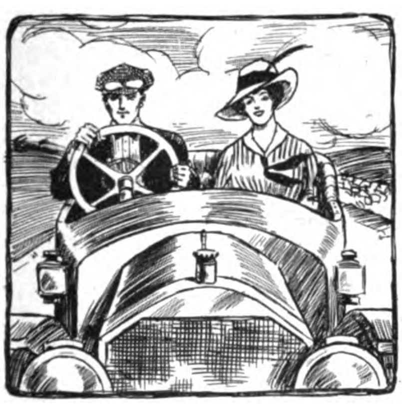


Fig. 4—Patrick automobile controlling mechanism. Fig. 5—Bieniek rotary valve

The AUTOMOBILE

Right or Left Control—Which?

Each System Has Its Advocates and Although the Former Has Been Considered Standard Practice for Years, the Latter Has Been Gaining Ground Rapidly—Advantages and Disadvantages of the Systems



Left-side control is making great strides in automobile engineering, having been introduced by a number of prominent designers. Many of the majority admit the utility of the left-side steer and the equally new though practical central arrangement of control levers. The divided opinions of engineering experts are contained in the following article.

PROMINENT among the tendencies in automobile design which have characterized the past 2 years is that of changing the steering wheel from the right side of the car to the left and the gearshift lever and emergency brake lever from the right side to the left or center. Today it is a much-discussed question as to which type of drive and control should be made standard, the number of companies changing from the right-side drive to the left type during the past season making the status of the right-side drive as a standard construction somewhat doubtful.

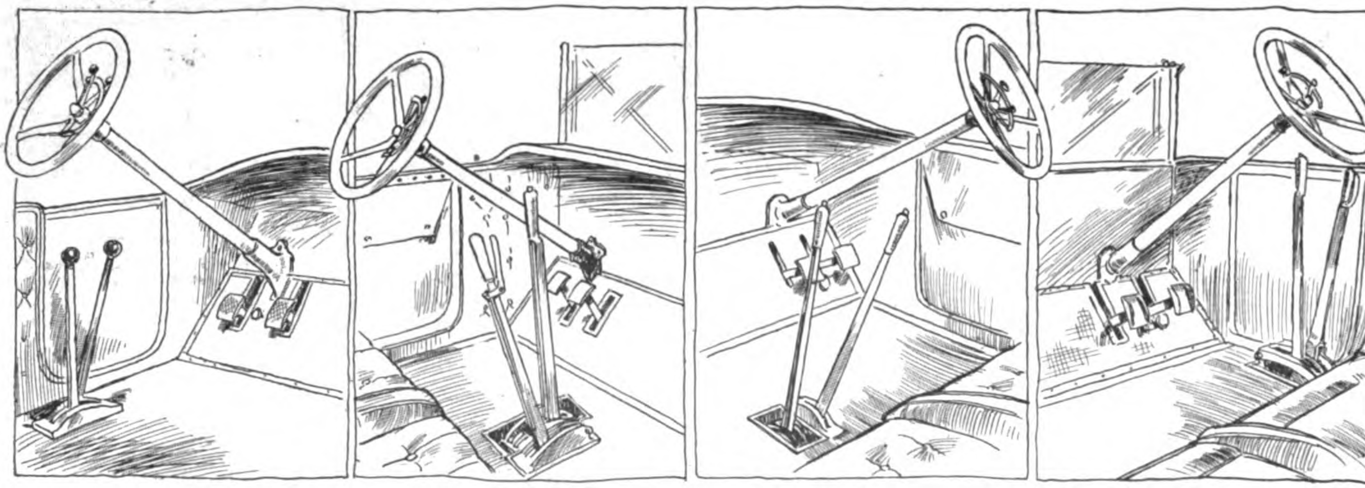
For some time the builders of the small cars have pinned their faith to the left-side drive, some of them placing the levers on the left side and others making the gear control central. The manufacturers of the larger, higher-priced machines have been more conservative, practically all of them adhering to the right-side drive, and most of them keeping the levers on the driver's right, until the announcement of their models for 1913 when it developed that several of them had been converted to the left-side drive with the levers on the left of the driver or located in the center of the floor-boards. The great majority, however, still continue to make the right-side drive their standard construction, although a number have settled the question to their own satisfaction by placing the levers in the center and making the situation of the steering wheel on the right or left optional with the customer.

It seems to be generally admitted that the left-side steer has all the advantage for city driving, while for country driving, the right-side steer is superior. As regards motor trucks, it is almost universally conceded that the left-side drive is better, as the greater part of their work is performed on the city streets.

Most of the right side adherents concede that the left type of drive is preferable for city driving, at least in congested sections where the traffic is fast and dense, but all maintain that this is a minor consideration as the long distances covered are over country roads where the right side drive has all the advantage. The believers in the left-side principle, however, claim superiority for that type not only in city driving, but also under all other conditions.

As to what is to be the standard construction on American-built cars, or whether the location of the steering wheel is to be made optional, time alone can determine, but, from all indications, the placing of the gearshift and emergency brake levers in the center will come to be generally adopted at some time not very far in the future.

Throughout the industry there seems to be a feeling that left-side drive is the coming standard, irrespective of the location of



Showing the four possible combinations of the steering wheel and gearshift and emergency brake levers in the driver's compartment of a modern automobile

the levers. But the general sentiment is that it is not yet time for such a change, that the public does not want it as yet and that the new state of affairs will come about gradually.

There are still a few adherents of the lever form of steering but these are mostly in the electric field, the wheel form of steer being practically the universal preference for gasoline cars.

The controlling features of the modern automobile, consisting of the steering wheel and, generally, a gearshift lever and an emergency brake lever, permit of four possible arrangements. These are: Steering wheel on the left side, with the control levers on the driver's left; steering wheel on the left, with the levers in the center, on the driver's right; wheel on the right, with levers in the center, to the left of the driver; and wheel on the right, with the levers on the right. The last type has the best claim to being the standard at the present time, 103 of the leading cars of the country using that type of drive and lever control as compared with seven makes which have become converts to the system in which both wheel and levers are at the left, seven which retain the right-side steer but combine it with a central lever location, and ten using the left drive.

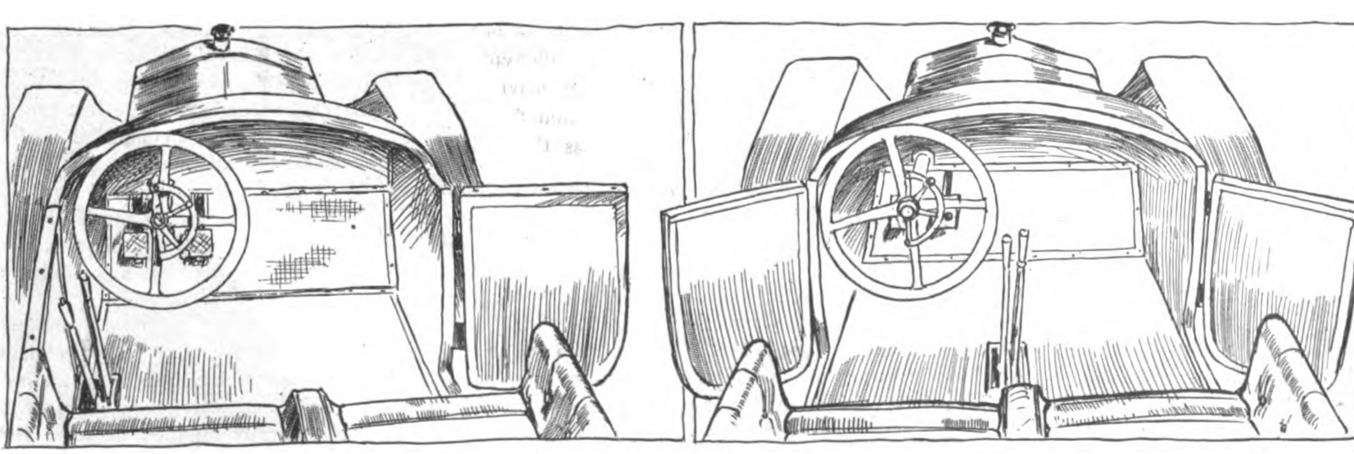
Advantages and Disadvantages

Each of the four possible arrangements has its advantages and disadvantages, as cited by its adherents. This being the case, it would naturally seem that the type to be adopted as standard should be that embodying the most important advantages and the least disadvantages. The main advantages and disadvantages of each type are as follows:

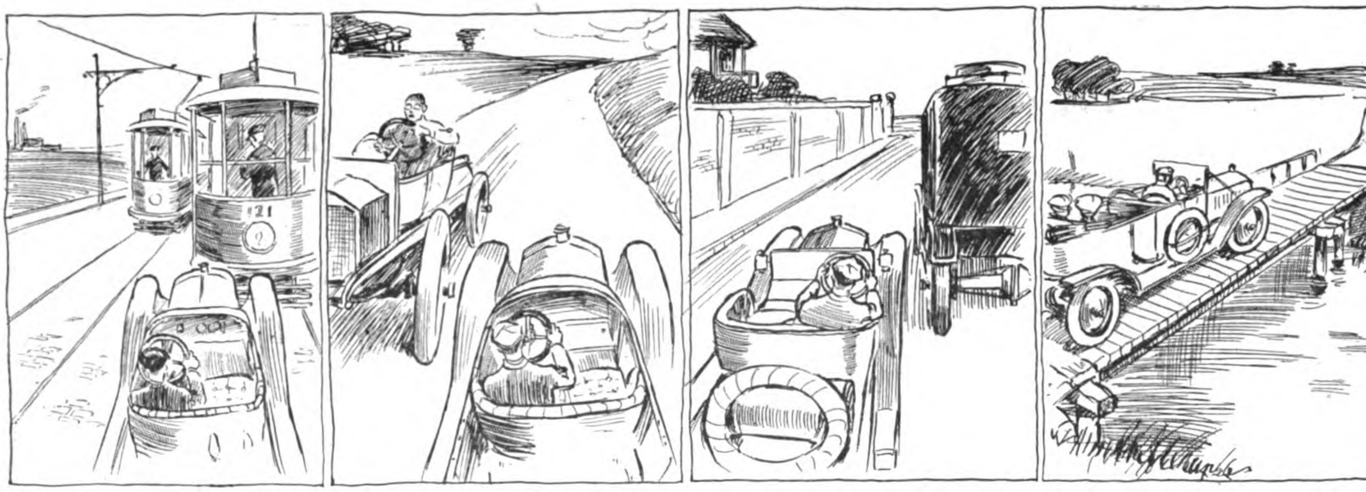
Steering wheel on the left side, with the control levers to the left of the driver:

Advantages: 1. Both front seats are accessible from the curb. 2. The driver can get out of the car quickly and easily to open the door and assist ladies to alight. 3. In passing vehicles going in the same direction, the driver is able to see any obstacle or other vehicle coming in the opposite direction sooner than with the steering wheel on the right side. Also, he can see how much room there is in which to pass a car on a narrow road. Similarly, in passing vehicles coming toward him, that is, in the opposite direction, he is able to see how much clearance there will be between the fenders of the two machines and thus to avert a possible accident. 4. The rules of the road necessitate keeping to the right, and the slant of the crowned roads throw the center of gravity of the car to the right. Putting the driver on the left overcomes this and there is a better weight distribution all around. 5. Driver has better view when turning to the left into a side street. 6. It is easier to signal when he is about to turn to the left. When turning to the right, no signal is necessary as the driver must keep to the right anyway.

Disadvantages: 1. The gear control and emergency brake levers are crowded close to the door and render exit from the left side of the car impossible, or at least difficult. 2. The driver has not a good view of overtaking traffic. 3. The driver has difficulty in estimating the minimum distance which he must keep between the car and a ditch to its right; also, in turning around a curb into a street to the right, he is liable to strike the curb stone of the pavement which is not in his view. 4. The fact that the traffic laws of Great Britain, its colonies and many other foreign countries prohibit driving at the right side of the road, forms the same disadvantage as the reverse law existing in the United States, thereby restraining the export business of



With the wheel and levers on the left, both seats are accessible from the right, but the levers are crowded against the door, while with the wheel on the left, but the levers in the center, there is free access to each seat, but the levers may be disturbed by the passenger



The two pictures on the left illustrate some of the advantages of left-side steer, while the other two indicate some of the good points of the right-side type

companies building left-hand drive cars. 5. The driver has to shift the levers with his left hand. Many, however, contend that this is not a disadvantage, as the left hand is just as efficient as the right for this purpose, it being merely a matter of growing accustomed to the different arrangement.

Steering wheel on the left side with the levers in the center, that is, to the right of the driver:

Advantages: 1. This type has all the advantages of the left-side steer as given above. 2. It has the additional advantage of permitting the use of two front doors, giving free access to each of the front seats from its side of the car. 3. It gets the levers out of too close proximity to the door. 4. By placing the gearshift lever directly over the gearbox, the material otherwise needed to transmit the motion from the quadrant at the side of the car to the box becomes superfluous, resulting in a saving thereof. This economy is paralleled by the saving in energy otherwise evidencing itself as friction or lost motion in the mechanism between gearshift lever and the speed-change set. 5. This system also retains the feature of right-hand shifting of the gears, with whatever advantages are bestowed upon it by custom and the familiarity imparted by years of right-hand shifting.

Disadvantages: 1. All disadvantages attaching to the left steer. 2. Driver must avoid levers in entering or leaving the car at the right side. 3. Passenger in the right front seat may disturb the levers. 4. The use of a single lap-robe in the front seats is rendered impracticable.

Steering wheel on the right, with the control levers in the center, to the driver's left.

Advantages: 1. Overtaking traffic can be observed. 2. In passing a vehicle coming in the opposite direction, the driver can see the edge of the ditch on the right of the road and knows how far he can turn out. 3. In passing a vehicle going in the same direction, he can see how much clearance there is between the fenders and thus is able to avoid accident. 4. In drawing up to a curb, he can see how much clearance there is between the front wheel and the curb. 5. The levers are not crowded against the door. 6. There is free access to each of the front seats from its side allowing the use of two fore-doors.

Disadvantages: All the disadvantages of right-side steer, which comprise: 1. The driver cannot see how much clearance there is between the fenders when passing a car going in the opposite direction. 2. He cannot see as well to make a turn to the left as with the left-side steer. 3. He cannot judge the amount of room between his car and the edge of the ditch, when passing a car going in the same direction, as well as with the left-side steer. 4. The use of a single lap-robe with any amount of comfort in the front seats is made practically impossible. 5. Left-hand gear-shifting. 6. Passenger in the other front seat may disturb the levers.

Steering wheel on the right, with control levers on the right.

For and Against Right Control

Advantages: 1. All the advantages of the right-side steer, as mentioned above. 2. As the present standard, everyone is accustomed to it. 3. Most people are right-handed, and may find it easier to shift the gears with that hand. 4. Clear access from the left side of the car.

Disadvantages: 1. All the disadvantages of the right steer, as already outlined. 2. The gear control and emergency brake

When the wheel is on the right, with the levers in the center, both seats are accessible, but the levers may be disturbed by the passenger, while with the wheel on the right and the levers on the right there is free access from the left, but the levers are crowded against the door

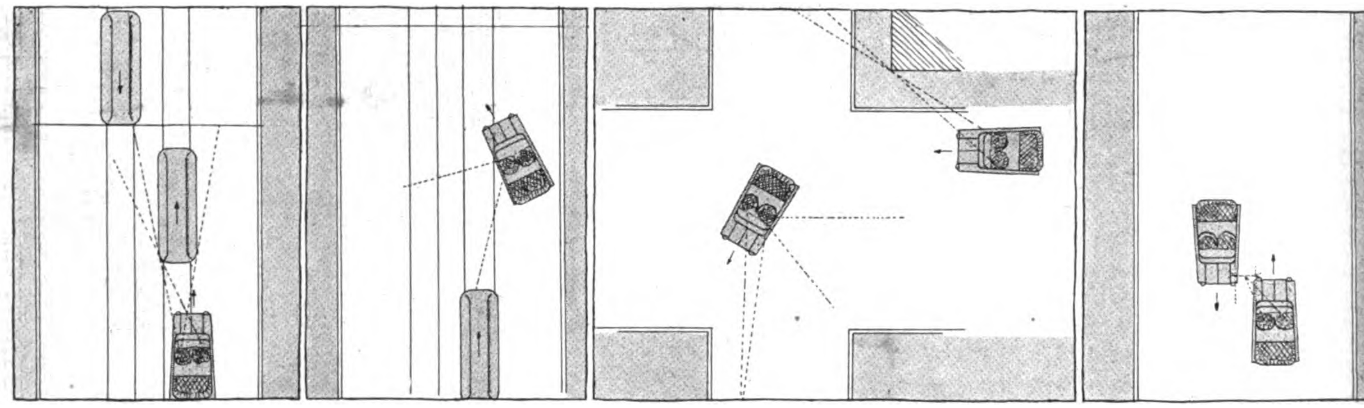


Diagram illustrating the ideas of William G. Wall, of the National Motor Vehicle Company, regarding the advantages of left-side drive

levers are crowded against the door. 3. Position of levers renders entrance and exit at the right side of the car a practical impossibility.

From glancing over the claims of the two systems to superiority, it appears that there is comparatively little advantage to be claimed for one type of steer over the other, as what is an advantage for the one is a disadvantage for the other. However, it seems illogical that we, in this country, should mount our steering wheels on the right when our rules of the road are the opposite of those in force in England, for example, where they consistently mount them on the right.

There is a distinct difference, however, in the question of the proper location of the control levers. The point at which they seem to give an excellent combination is in the center, irrespective of the location of the steering wheel, though placing them on the extreme left has the decided advantage of giving free access to both front seats from the curb.

In order to ascertain what the automobile engineers themselves thought of the question, THE AUTOMOBILE wrote to a number of the leading members of that fraternity, requesting them to give some of their views on the subject. Many highly interesting communications resulted, excerpts from several of which are given in this article.

Herreshoff Favors Left Drive

Many of the engineers stated their preference for the left-side type of steer, without being particular regarding the position of the control levers, although a few specified center levers. A number of them, however, maintained that the right-side steer is the best system, most of them preferring the central location for the levers. A few had no preference, declaring that one is as good as another and that it is all merely a matter of custom. There were some adherents of the left-side lever control and some of the right side. In other words, opinion seemed to be very much divided. Consideration for a similar division of opinion among the automobile-buying public found expression in the views of others who held that the location of the steering wheel should be made optional with the purchaser, while the control levers should be placed in the center.

C. F. Herreshoff, vice-president of the Herreshoff Motor Company, Detroit, Mich., is very emphatic against the right-side steer. After pointing out the advantages and disadvantages of each type, he states:

"I have driven in crowded streets in many of our American cities and I believe that there should be a law to prevent people driving a car with right-side drive, because those who drive cars with that type of drive are endangering the lives of others by getting mixed up in traffic. I have been in a great many tight places because of this and the driver has always stated that he could not see. It is a positive crime to allow big trucks to go along on our highways, and particularly in the cities, where traffic is congested, with the driver on the right side. The driver should always be at the extreme left where he can look over his shoulder to see the approaching traffic.

"We are selling cars all over the world and we cannot sell a left-side drive to foreigners, because the traffic rules are just the opposite to our own. Yet we have copied their right-side drive until our traffic has become of such importance that driving a car of this type is not only dangerous but needless."

Henry Souther, former president of the Society of Automobile Engineers, also speaks in favor of the left-side drive. He says:

"I see no particular objection to the left-side steer nor the left-side control, a few minutes' use making the left hand quite as expert as the right in gear-shifting.

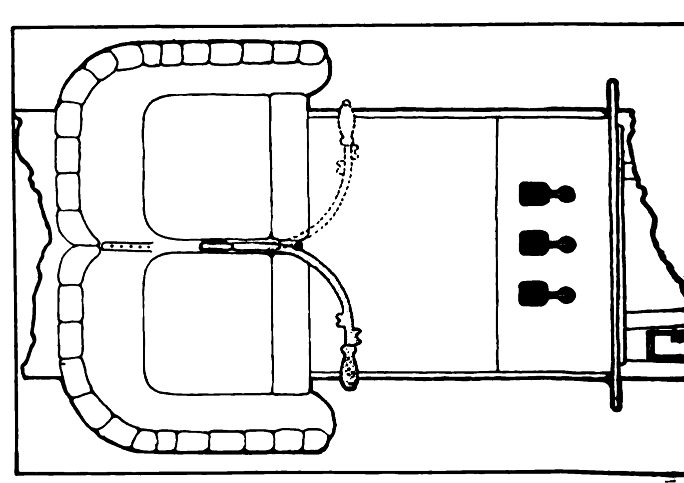
"Our present laws relating to stopping with the right side of the car on the right side of the street makes the left-side steer and, therefore, the right-side exit most desirable. Many times I have been obliged to put the women members of my family out into the slush or mud in the street because the traffic laws would not permit me to place the left side of the car against the curb. This alone is enough reason for the left-side steer."

William G. Wall, of the National Motor Vehicle Company, Indianapolis, Ind., points out the advantages in comfort and safety to be found in the left-side steer, declaring that:

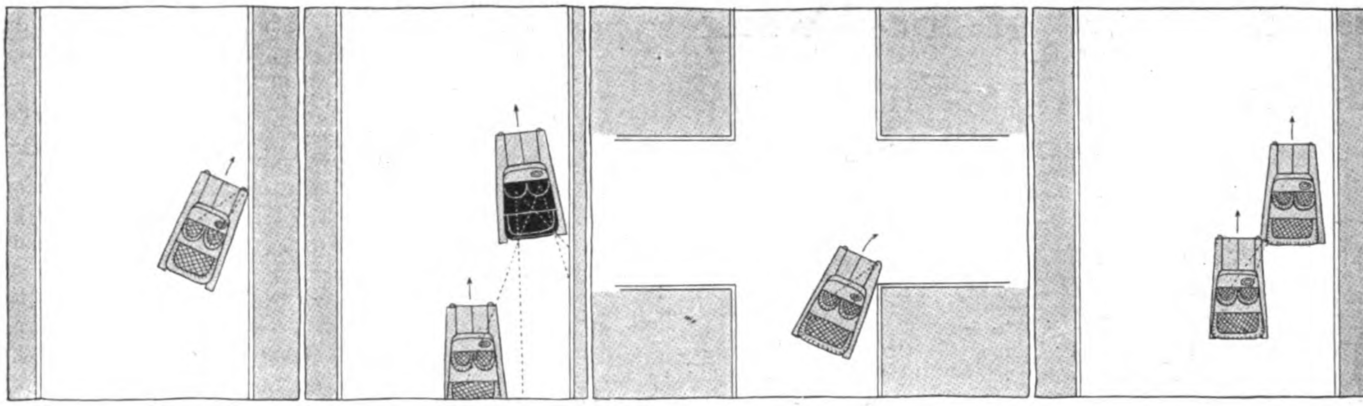
"About the only reason that can be given for retaining right-side drive is the cost to the manufacturers of changing their tools and jigs, which would be necessary in order to change to the left-side steer.

"The diagram (on page 212) shows the advantages of the left-side steer over the right-side type in respect to the view in traffic, in turning and in passing vehicles, especially street cars discharging passengers. The diagrams show the lines of vision from the two front seats and it is obvious which one has the advantage, not only in regard to traffic but also to looking down side streets and past buildings.

"Of course, the left-side lever location can be used with the left steering, as it is to a certain extent. Without question,



Plan view of the Duryea system, showing two positions of lever



Showing some of the points in favor of the right-side type of drive as emphasized by D. Fergusson, of the Pierce-Arrow Company

however, it is so much easier to operate any controlling apparatus with the right hand that it seems as if the center control naturally went with the left-side steer."

Frank Briscoe, vice-president of the United States Motor Company, makes the point that

"One objection to the left-side steer is that it will not do for export trade, as a left-side steer is just as wrong for England and her colonies as the right-side steer is for us, on account of their rules of the road being opposite from those in this country.

"There are some people who still prefer the right-side steer, for what reason I am not aware, and there is a possibility of our having to build cars with an option as to right- or left-side steer, which may produce another nuisance similar to the nuisance of the wide tread for southern trade."

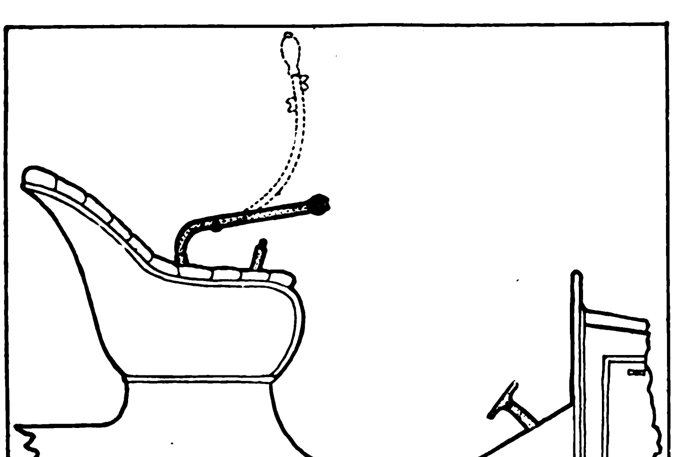
Elwood Haynes, the father of the Haynes car, expresses himself as in favor of the left-side steer without giving any preference as to the location of the levers. Chester S. Ricker, of the Henderson Motor Company, Indianapolis, Ind., H. J. Edwards, of the Edwards Motor Car Company, New York City, and J. F. Firestone, of the Columbus Buggy Company, Columbus, O., prefer the left-side steer in combination with the central position for the levers.

E. P. Batzell, however, stands forth as a defender of the right-side steer, but also prefers the levers in the center.

F. B. Stearns, of the F. B. Stearns Company, Cleveland, O., states:

"Personally, I do not believe there is a sale lost or made due to either right or left-side steer, although the left-side steer apparently has some theoretical advantages. Practically all of the high-grade cars are right-hand today, and all the users of these cars are accustomed to this type of drive."

D. Fergusson, of the Pierce-Arrow Motor Car Company, Buffalo, N. Y., after stating the various advantages of the right-side steer in respect to driving in both city and country, as shown in the diagram on page 213, declares that.



Steering and control arrangement used in the Duryea car

"The fact that right-side steer has become standard practice all over the world indicates that this is the natural position for driving. All horse-drawn vehicles are driven from this side and, as a matter of choice, it is therefore absolutely desirable to adhere to this method unless it can be shown to be wrong.

"The correct position of the change-speed and emergency brake levers is at the right of the driver. These are then out of the way of the adjoining passenger and robes can be used to much greater advantage."

Charles F. Barrett, of the Knox Automobile Company, Springfield, Mass., Harry C. Stutz, of the Ideal Motor Car Company, Indianapolis, Ind., E. E. Sweet, of the Cadillac Motor Car Company, Detroit, Mich., and Leigh B. Lynch, of the Studebaker Corporation, Detroit, Mich., esteem the matter one which should be optional with the purchaser, although all but Mr. Barrett state that they have no preference whatever in the matter.

Right and Left for Duryea

Charles E. Duryea, president of the Duryea Motor Company, Saginaw, Mich., is not troubled by the question of right or left steer on his cars as he has an arrangement designed to give both in combination with the placing of the levers in the center. He says:

"There is a very perceptible movement toward central-lever control with ambidextrous steer. Others who are using the conventional arrangements can better point out their good and bad points than we, who are using a more practical, more simple and, in our humble opinion, far superior device.

"We place the steering post at the center of the seat, both laterally and longitudinally, and permit the steering tiller to project forward and outward in front of the body of the operator. This arrangement gives a long lever and ample power to swing toward the wheels or hold them firmly. The tiller may be thrown up into a nearly vertical position out of the way in mounting or dismounting. It may also be thrown over to the opposite side and manipulated by the occupant of the other front seat."

According to the sentiments expressed by New York City automobile dealers, the left-hand drive is gaining in favor for metropolitan use. Some criticism of the left-drive system is made by a few concerns which sell cars upon which the option of left-hand construction is given and the companies and firms that handle right-drive cars can see little advantage in the opposite construction, but in the majority of cases the opinion is expressed that the left drive has distinct advantages.

Following is a brief outline of the views of a number of typical concerns along Broadway:

Cartercar—right-hand drive. Little inquiry for left drive.

Locomobile—optional. Twelve Berline-body cars equipped with left drive and center control were manufactured in January. One of these cars is still in stock, the sale of it having been canceled because of the left drive. The argument was made by the customer that the chauffeur could not open the

(Continued on page 241.)

Legal News of the Week

Ever-Ready Company Sues the Interstate Electrical Novelty for Infringement of Electric Battery Tester

August 12 Set for Sale of Atlas Plant—Mais Factory to Be Sold the Following Week

THE American Ever-Ready Company has entered suit in the United States District Court against the Interstate Electrical Novelty Company, charging infringement of Fuld's patent on a device for testing electric batteries. The device consists of a pair of holes drilled through the casing of a battery, opposite the battery terminals. They are so arranged that it is possible to test the battery without breaking the seal. The utility of the idea is that where batteries are kept in stock for considerable lengths of time and are subject to deterioration, it has been customary to open the containers to discover whether or not they were in salable condition before a sale. After the seals have been broken, there is no way in which to determine whether the battery has been used. Under the patent, the claim is made that while the battery can not be used without breaking the seals, a thorough test can be made as to its efficiency.

Cannot Sell Cut-Price Spark Plugs

Injunction was granted against the Auto Surplus Stock Syndicate and its president, forbidding them from violating the Mosler license to sell spark plugs. Albert Falck for the Mosler company showed the United States District Court the contention of the complainant that the syndicate was selling the plugs in suit at less than the scheduled price.

Law Violators Blame Manufacturers

BUFFALO, N. Y., July 30—One section of the Callan automobile law states that tail lamps should be installed on automobiles so as to cast their rays for a distance of at least 50 feet behind the machine and also should be placed so that the license number plate on the rear of the automobile can be seen plainly at all times. Buffalo motorists are openly violating this ordinance, explaining in many instances that suitable space for tail lights is not provided by many automobile manufacturers. However devices are on the market which allow placing the lights in the required position and, so Police Chief Regan declares, violators of the tail-light ordinance will be arrested promptly.

Victor Lamp Sues Knickerbocker

Alleging infringement of the Corcoran patent on a screw adjustment used in a certain type of vehicle lamp, the Victor Lamp Company has entered suit against the Knickerbocker Brass Goods Company, of New York, asking an injunction, accounting and damages in the United States District Court. The device is covered by patent number 980,493, issued in January, 1911, and transferred to the Victor company in June, 1912. Louis F. Perl is handling the matter for the complainant.

Atlas Plant to Be Sold August 12

INDIANAPOLIS, IND., July 29—In the superior court today, Judge Weir postponed the sale of the Atlas Engine Works to August 12. This was done with the consent of the receiver at the request of M. L. Thompson, representing a prospective bidder and the Baldwin Locomotive Works, Philadelphia, a heavy creditor.

Mr. Thompson said that the company which contemplates buying the Atlas plant has not yet been organized, but that the men who expect to go into it have ample funds to buy the property at a figure $25,000 higher than that offered by another prospective bidder from Detroit.

Fred C. Gardner, receiver of the Atlas company, has completed an inventory and his appraisement is $1,135,723.77. The inventory and appraisement is made up as follows: Cash on hand, accounts and similar items, $234,905.40; buildings, $518,056.50; grounds, $117,600; machinery, $351,845.13, and sprinkling and water system, $50,000.

The prospective bidder will have to agree to assume a bond issue of $1,050,000, pay another bond issue of $105,000 and pay mercantile accounts and the cost of the receivership proceedings amounting to about $80,000.

Ford Injunction to Be Argued

BUFFALO, N. Y., July 29—In United States district court, Wednesday afternoon, Judge John R. Hazel will hear arguments from officers of the International Automobile League of Buffalo who will try to show cause why the temporary injunction secured against that organization last week by the Ford Motor Car Company of Detroit, Mich., should not be made permanent.

In the bill of complaint filed by the Ford Motor Company officials it is alleged that for the past three years the International Automobile League of Buffalo and its officers have been engaged in various and continued attempts to infringe on patents and to break their contracts with the Ford people. It is alleged that the International Automobile League had advertised to sell Ford machines at less than the fixed price.

Taxicab Company in Difficulties

Petition has been filed by the American Taximeter Company to have the Kayton Taxicab and Garage Company declared bankrupt. The original motion for a receiver was denied, but Williams, Folsom & Strouse, attorneys for the petitioning creditor, announce that it will be renewed. The liabilities of the concern are estimated at $14,000 and the assets are placed nominally at $10,000 by the attorneys for the petitioner.

August 19 Set for Mais Sale

INDIANAPOLIS, IND., July 29—Judge Joseph Collier of the Superior Court has authorized Franklin Vonnegut, receiver for the Mais Motor Truck Company, to offer the concern's plant and property for sale on August 19. It is thought the plant will be bid on by some of the present stockholders and a new company organized to continue the business.

An appraisement of the property is under way and will soon be filed in court. Under the terms of sale, one-third cash must be paid at time of sale, one-third in twelve months and the remainder in eighteen months. Deferred payments are to bear 6 per cent. interest and be secured.

Shiland Leaves Buick for Havers

PORT HURON, MICH, July 29—Harry E. Shiland, formerly general sales manager of the Buick Motor Car Company, and for over twelve years an active factor in the manufacturing and sales of automobiles, has accepted a position as assistant general manager and director of sales of the Havers Motor Car Company, of Port Huron. There are rumors of other important announcements in connection with the Havers company.

A DECREE dissolving the Oliver Motor Car Company, bankrupt, was signed and filed by Judge Mandell on Friday, July 26, in the United States Circuit court. An order directing the sale of machinery has also been issued by the Judge.

General Motors' Thrift

Anticipates Floating Obligations and Will Deposit $1,000,000 on Account of October Bond Payment

Export Trade Figures Do Not Include Cars Taken Abroad by Owners for Pleasure

ANTICIPATING its floating obligations by paying them before the due dates, General Motors has liquidated its seasonable loans and it is announced by the management that $1,000,000 will be deposited with the Central Trust Company within a few days on account of the instalment of 6 per cent. bonds which is due October 1. The balance of the instalment is not due for 60 days.

General Motors floated $15,000,000 of gold notes 2 years ago this coming fall for the purpose of retiring floating obligations of the company and its subsidiaries and to furnish working capital. A part of this issue was so arranged that it had to be paid off in instalments. Last year the instalment was $1,500,000 and a similar amount will be retired this year. Next year, under the agreement, $2,000,000 will fall due and the same amount in 1914. The following year the remainder of the issue, amounting to $8,000,000 may be discharged at the option of the company or may be continued for 20 years. The company has the privilege of calling the bonds at any interest date on payment of 102 1-2 with accrued interest.

The action of the directors in setting aside such a sum as $1,000,000 for bond payment 60 days before it is due attracted much attention in the industry and was taken as a proof that the financial plans of the company have worked out nicely during the past season. The stock responded quickly to the report and advanced sharply to 77 1-2 and 34 respectively for preferred and common.

The fiscal year of the company ended July 31, but the annual report will probably require from 6 weeks to 2 months before ready for publication. It is understood that the company made new high marks all along the line.

Export Figures True Trade Index

WASHINGTON, D. C., July 29—O. P. Austin, chief, bureau of statistics, Department of Commerce and Labor, in commenting on automobile exports to foreign countries said that the figures as compiled are a true index to the business being done by American manufacturers with the people of other countries. Early in the automobile industry, Mr. Austin states, when figures on exports were prepared, they often included those machines sent abroad for pleasure purposes by the owners. In other words, these shipments were not kept separate from those sent purely for commercial purposes.

When it was discovered that such was the case instructions were given not to confuse the two and, as a result, the figures now submitted represent only those machines and parts shipped to be sold abroad, and indicate the increasing demand in other countries for the American-made product.

[Automobile Row was much interested in the report of the Bureau of Commerce and Labor covering the figures of foreign trade during the fiscal year ending June 30. The report showed that the total value of automobile exports including cars, parts and tires was about $28,000,000.

As compared with the showing of 1902, this is an increase of 2,800 per cent. in exports.

Last year the figures of the bureau showed exports of $20,000,000 but the manufacturing companies challenged them sharply and claimed that they should have been advanced at least $5,000,000.

The details of the figures for this year are as follows:

Exports	Value
Automobiles	$21,500,000
Parts	4,000,000
Tires	2,500,000
Total	$28,000,000

The figures show that the automobile industry is not only the most rapidly growing domestic line of manufacture, but also occupies that position in the foreign trade of the United States.

In former years automobiles shipped abroad for use by their American owners were included in the export totals, but for several years past such exportations have been separated from the amount of merchandise of this class that was shipped to foreign countries for sale.]

Michigan Buggy Adding to Plant

KALAMAZOO, MICH., July 29—An extensive addition to the automobile manufacturing department of the Michigan Buggy Company will be erected just north of the present plant. Ground already has been broken and it is expected the new portion of the company's plant will be ready for occupancy by September 15.

The building will be of reinforced concrete, 150 by 50 feet in dimensions and three stories in height. It will be fire-proof and equipped with an automatic sprinkler system. Nearly the entire north side of the building will be of glass. Sales and display rooms will occupy the first floor of the structure, while the second floor will be devoted to storage and the third floor to the painting and upholstering departments.

During the coming year the company expects to turn out 4,000 cars, for which orders already are being booked. This number will be an increase of 100 per cent. over the 1912 output.

Spayde Locates in Kalamazoo

KALAMAZOO, MICH., July 29—The Spayde Manufacturing company of Vicksburg, capitalized at $50,000, will locate in Kalamazoo within the next week. Articles of incorporation have been filed with the secretary of state and the Burtt building at Fulford and Clinton streets has been purchased. The company, which was organized at Vicksburg several years ago, manufactures automobile parts under patents granted to Herbert O. Spayde, the president. It recently outgrew its quarters at Vicksburg and decided to remove to this city. Following are the incorporators: Herbert O. Spayde, Henry E. Spayde, C. L. Major and Oliver Coleman. All reside at Vicksburg, Mich.

$450,000 Studebaker Stock Retired

Goldman, Sachs & Company, financial agents for the Studebaker Corporation, officially confirm the report that the Studebaker concern has ordered the retirement of $450,000 of the preferred issue floated several months ago. The reason for the retirement of the stock is that the company's business has been on such a large scale that there was no necessity of allowing this stock to remain outstanding.

U. S. Tire Co. Moves Offices

The general offices of the United States Tire Company have been moved to the new United States Rubber building, Broadway and 58th street, New York. This structure has recently been completed and will be utilized in future as the home of the United States Rubber Company and its subsidiary companies. The building is twenty stories high. The United States Tire Company will occupy the basement and sub-basement as a stock room; the ground floor for its New York branch and the fifteenth, sixteenth and seventeenth floors as general offices. The company has over 400 employees in its general offices.

Simms Co. Reorganized

C. G. Stoddard, of Edwards Motor Car Company, Assumes Active Management—Anderson Vice-President

Willys-Overland Capital Increase Approved by Ohio Secretary of State

THE reorganization of the Simms Magneto Company, Bloomfield, N. J., which was recently secured by the Asset Realization Company and the active management turned over to C. G. Stoddard of the Edwards Motor Car Company, has been completed. The original capital of the company was $1,000,000, all common stock. The new capital is $750,000, of which $500,000 is preferred stock and $250,000 common stock, all paid up. This new financing program has wiped out all the old debts of the company and provides a working capital of over $300,000, which, taken together with $100,000 worth of stock now on hand, puts the company in excellent shape to pursue its work.

The organization is working slowly at the start, having now over thirty men on the pay roll and adding more each week as the organization proceeds. R. C. Anderson, Racine, Wis., has been made general manager. He was formerly vice-president and general manager of the J. R. Case Company. At present two types of magnetos are being produced, SU4 and SU6, one for four-cylinder cars and the other for six-cylinder machines. The development of the two types of instruments for four and six-cylinder motors will be taken up in the near future. The company will have its complete line ready for the 1914 market. In the new organization C. G. Stoddard is president, A. A. Fisher, secretary and treasurer, and three additional directors are Campbell Carrington, vice-president of the Asset Realization Company; W. M. Kilbourn, vice-president National City Bank, New York, and Frederick Simms, London, England.

The company has secured sole American rights for the SU carbureter, the manufacture of which will be commenced in a few months and a complete line produced for the 1913 trade.

Willys Stock Increase Approved

TOLEDO, O., July 29—The increase in capital stock of the Willys-Overland Company, from $6,000,000 to $15,000,000, forecasted some time ago, was formally approved by the secretary of state at Columbus, Thursday. As a result in the increase in the organization's financial forces, extensive improvements will be made and these are already under way. The addition to the local factory will be made at an expense of several hundred thousand dollars. Incident to the expansion many new models will be placed on the market next year, among them smaller and cheaper cars.

Cordner Leaves American-Marion

E. Q. Cordner, sales manager of the American-Marion Sales Company of New York since that company was organized to handle the American and Marion lines, has resigned to accept the post of manager of agencies for the R. & L. Company, Eastern agents for the Garford line.

New Tire Chain Company Formed

TOLEDO, O., July 29—Toledo has a new industry directly allied with the automobile trade. The Walker Tire Chain Company is the name of the new concern which has a capital stock of $150,000. The company, originally the Walker Chain Mat Company, was organized last June and incorporated June 18. The concern will manufacture a patented anti-skid automobile and truck chain. The officers of the company are: President, H. F. Rohrman; vice-president Hugh Williams; treasurer, Maurice A. Carter; secretary, Charles A. Newman. Among the stockholders are John A. Dix, governor of New York; W. A. Huppuch, chairman of the public service commission of Hudson Falls, N. Y., and J. S. Parker, member of the general assembly of Salem, N. Y. The company was organized without debt and recently received its first order for 1,000 sets of chains. The plant will be temporarily located in the factories building when it is completed. The foundry work will be done at Bridgeport, Conn. and Brooklyn, N. Y., until the company builds its factory here, which it contemplates doing as soon as a suitable site can be secured. The assembly work will be done in Toledo. All of the officers are Toledo men except Vice-president Williams who resides in Granville, O.

Cole Agents Hold Conference

INDIANAPOLIS, MD., July 29—Several agents for the Cole were entertained at the factory of the Cole Motor Car Company in Indianapolis, during the week of July 22. The meeting was the regular quarterly conference of agents with the company. A dinner and conference were held at the Columbia Club at noon on July 25 and on the following day the agents, accompanied by J. J. Cole, president; C. P. Henderson, sales manager and H. C. Bradfield, manager of newspaper advertising, went to Detroit to inspect the Northway and Timken plants.

Market Changes for the Week

Few materials changed their prices during the past week despite the fact that a satisfactory degree of activity prevailed throughout the market. Tin was notable for its rise, the advance aggregating $1.30 per 100 pounds for the week. Steel, copper and lead remained at their old quotations, that of beam and channel steel being nominal during the latter half of the week. All told the tone of the steel market was firm, and whatever tendency of price changes that could be noticed was upward. The further fractional rise in the price of antimony may be ascribed, at least to some extent, to the use of this material in automobile bearings. The long-established price of cyanide of potash fell off slightly.

Up-river Para, which opened at $1.18 a pound, declined during the week in response to a fall of London prices and closed at $1.16. Petroleum, gasoline and lubricants remained at their former prices. The table shows the price fluctuations for the week.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.	.07	.07	.07¼	.07¼	.07¼	.07¼	+ .00¼
Beams & Channels, 100 lbs.	1.41½	1.41½	1.41½	.....	.....	.....	....
Bessemer Steel, Pittsburgh, ton	21.50	21.50	21.50	21.50	21.50	21.50	....
Copper Elec., lb.	.17½	.17½	.17½	.17½	.17½	.17½	....
Copper, Lake, lb.	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	....
Cottonseed Oil, August, bbl.	6.47	6.48	6.47	6.53	6.60	6.55	+ .08
Cyanide Potash, lb.	.20	.20	.20	.20	.20	.19	— .01
Fish Oil (Menhaden)	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime	.85	.85	.85	.85	.85	.85	....
Lead, 100 lbs.	4.67½	4.67½	4.67½	4.67½	4.67½	4.67½	....
Linseed Oil	.73	.73	.73	.73	.73	.73	....
Open-Hearth Steel, ton	22.00	22.00	22.00	22.00	22.00	22.00	....
Petroleum, bbl., Kansas crude	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa. crude	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine Up-river Para	1.18	1.18	1.18	1.17	1.16	1.16	— .02
Silk, raw Ital	....	4.15	....	....	4.15	4.30	+ .15
Silk, raw Japan	....	3.62½	....	....	3.62½	3.67½	+ .05
Sulphuric Acid, 60 Beaume	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs.	43.75	44.10	44.62½	44.87½	45.00	45.05	+1.30
Tire, scrap	.09	.09	.09	.09	.09	.09	....

The agents attending the meeting were William L. Colt and Harry S. Stratton, New York; E. J. and H. J. Habich, Boston; Gordon Cowie, Washington; E. A. Green and E. H. Baker, Buffalo; G. B. Schaefer and Frederick J. Decker, Rochester, N. Y.; C. M. Crim and G. H. Bronner, Utica, N. Y.; Jesse H. Wilbur, Troy, N. Y.; L. A. Perkins, Rutland, Vt.; F. Hagan, San Antonio, Texas and George Paddish, Brazil, South America.

Axle Makers Predict Record Year

FLINT, MICH., July 29—That the season of 1912-13 will be the most prosperous, in an automobile way, ever experienced by the city of Flint, is the prediction of General Manager H. H. Bassett, of the Weston-Mott company.

"Never before at this season of the year have we been so busy," he said. "This is supposed to be the dull season of the year and in previous summers there always have been slack periods. This summer, however, our customers have been pressing us to the limit. We have been busy every minute this year and from now on we will continue to be busier. The coming season will see us working our plant to capacity for the first time since factories 4 and 5 were erected."

In addition to its old business, the Weston-Mott company has secured the business of a large number of manufacturers who previously have had their axles made elsewhere. It has bid successfully for the business of many motor truck companies.

Another new branch is the manufacture of hubs, rims and axles for the makers of electric pleasure cars.

Automobile Securities Quotations

Automobile securities had a quiet week in the market, midsummer dullness being charged with the want of activity in trading. The whole list showed firmness, particularly the issues of the big accessory companies. The new Goodrich stocks moved up a peg on good business reports and the announcement that the initial quarterly dividend of 1 per cent. had been declared on the common. Studebaker preferred yielded a fraction despite the announced retirement of a large block of preferred stock and an optimistic statement as to business conditions by one of the executive officers. General Motors held firm on similar good reports. The affairs of the United States Motor Company are progressing favorably, according to Chairman Strong and the rehabilitation of the company is assuming a closer position.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., common	..	..	120	..
Ajax-Grieb Rubber Co., preferred	..	..	95	100
Aluminum Castings, preferred	..	..	100	..
American Locomotive, common	39¾	40	42¼	42¾
American Locomotive, preferred	105	105¼	108	109½
Chalmers Motor Company	..	..	145	155
Consolidated R. T. Co., common	5	10	13	14
Consolidated R. T. Co., pfd	10	20	50	59
Firestone Tire & Rubber Co., com	160	170	275	282
Firestone Tire & Rubber Co., pfd	105	107	105	108
Garford Company, preferred	..	..	99	101
General Motors Company, com	52½	53½	33	34
General Motors Company, pfd	87	87½	76½	77½
B. F. Goodrich Company, com. (old)	245	248	77¾	*78½
B. F. Goodrich Company, pfd. (old)	116	117½	108½	*109
Goodyear Tire & Rubber Co., com	230	240	324	330
Goodyear Tire & Rubber Co., pfd	105	107	103½	104½
Hayes Manufacturing Co	..	..	..	97
International Motor Co., com	..	..	22½	25
International Motor Co., pfd	..	..	83	85
Lozier Motor Company	..	..	50	60
Miller Rubber Company	..	..	145	150
Packard Motor Co., preferred	..	..	105	106½
Peerless Motor Company	..	..	..	150
Pope Manufacturing Co., com	48	52	30	31
Pope Manufacturing Co., pfd	78	80	73½	74½
Reo Motor Truck Company	8½	9½	10	11½
Reo Motor Car Company	23½	25	21	24
Studebaker Company, common	..	..	34	34½
Studebaker Company, preferred	..	..	94¾	95½
Swinehart Tire Company	..	..	96	99
Rubber Goods Co., common	88	95	100	..
Rubber Goods Co., preferred	100	105	105	108
U. S. Motor Co., common	38	39	3	3¼
U. S. Motor Co., preferred	77½	78½	13¼	14
White Company, preferred	..	..	107½	108½

*New.

Jewett Succeeds Lozier

Latter Retires from Presidency of Lozier Motor Company—New York Man for Vice-President

Company Will Soon Put on Market a Smaller Six at a Lower Price

DETROIT, MICH., July 30—Complete reorganization of the Lozier Motor Company was effected Monday at a meeting here of the board of directors. H. A. Lozier has resigned the presidency of the company and is succeeded by H. M. Jewett, president of the Paige-Detroit Motor Car Company. R. D. Fosdick, formerly commissioner of accounts of New York City, has been made vice-president and treasurer, while E. P. Earle and H. A. Kahler, prominent in New York's financial circles, have been added to the directors.

Coincident with the executive changes comes the announcement that the company will be in a position to make deliveries on a smaller six-cylinder car of lower price than the present 50 horsepower machine, which heretofore was the only model manufactured. This addition to the line will necessitate expansion of the plant, arrangements for which have already been made. The manufacture of the present Lozier model will be contained.

No change will be made in the policy of the company, and while Mr. Lozier has retired from the presidency he will not sever his connections with the company but will continue to take an active interest in its affairs. The remainder of the organization will remain intact. Mr. Jewett also retains the presidency of the Paige-Detroit concern. The addition of Messrs. Kahler and Earle gives the company strong backing in the East.

Wyeth Car Makes Initial Bow

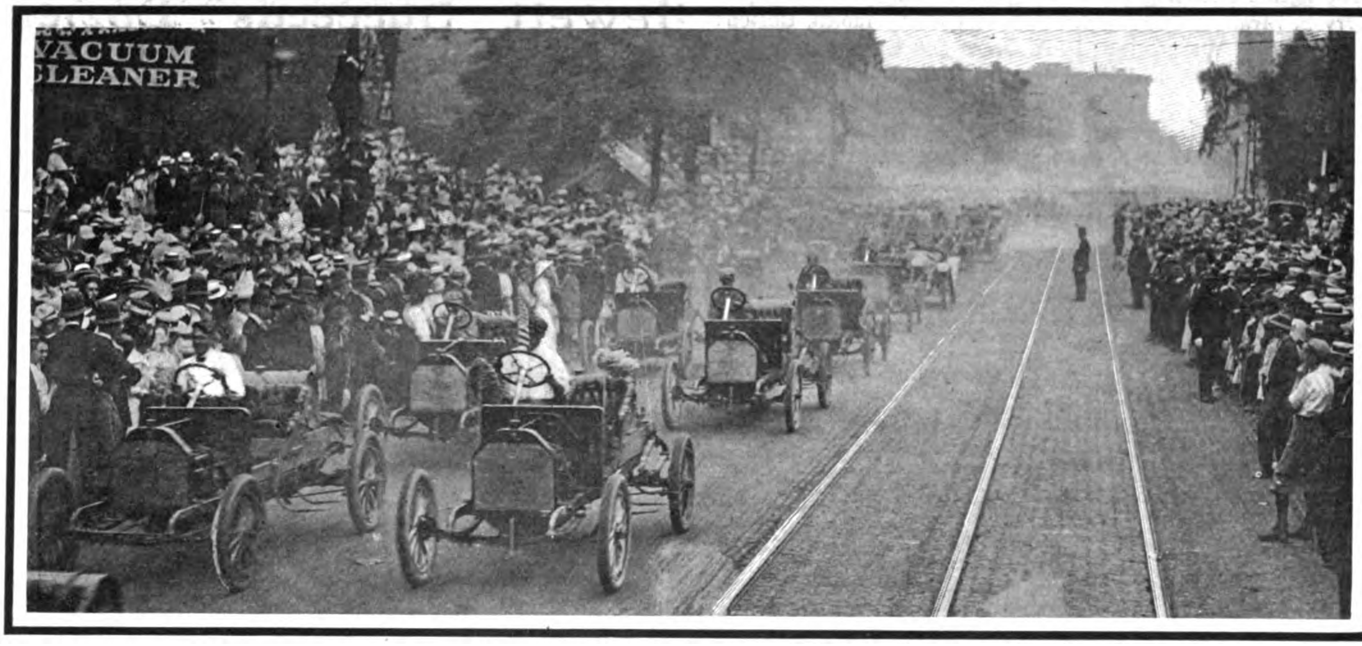
BOSTON, MASS., July 29—The Wyeth is the latest addition to the motor industry and it has been put on exhibition at Boston. It is made in Waltham, Mass., and comprises a runabout, also a delivery wagon. The runabout sells for $450, the open delivery wagon $500 and the closed delivery vehicle $550. The motor is a single cylinder 4 1-4 x 6 in., S.A.E. rating 7.2 horsepower, developing 13 horsepower on a brake test at 1200 revolutions. The ignition is two sets of batteries, Bemus timer, high grade coil. The lubrication is splash and pressure feed system, sight regulation on the dash. The oil tank is under the hood. The motor is water cooled with thermo syphon system. The transmission is planetary, two speeds forward and reverse, running in oil and double cased. The wheelbase is 90 inches.

Some of the features original with the car and for which the makers have patents comprise the body suspension, the body being hung between side members, hinged at front end and independently supported on full-elliptic springs at rear; also the straight line drive without universal joints; and a muffler guaranteed silent and free from back pressure. The car weighs 1,000 pounds.

G. & A. Increases Capitalization

Increasing its capitalization from $25,000 to $100,000, revising its official roster and preparing to enter its new factory at Long Island City, the G. and A. Carburetor Company is about ready to cut a bigger figure in the accessory industry of the automobile business. The increase in capital has just been announced, although it was effective July 1. C. Stanley Mitchell has been elected vice-president of the corporation.

Several mechanical innovations and a new type of auxiliary carbureter are under consideration by the company.



Some of the E-M-F test cars which participated in the Cadillaqua pageant in Detroit

Cadillaqua Fête a Success

Automobile Industry of Detroit Plays a Big Part in the Week's Festivities—Monster Parade

Commercial Vehicles Featured in the the Industrial Pageant—Antiques and Modern Racing Cars in Line

DETROIT, MICH., July 27—Detroit, the first city of the land so far as automobiles are concerned, saw the final feature of its great birthday week yesterday. The success of Cadillaqua, as it was called on the suggestion of W. E. Blaine, who received from the Cadillaqua association a Flanders 20 touring car as reward for his originality, was due in no little measure to the part played by the automobile and the giant motor car industries of the city.

The parade, which was perhaps the largest gathering of automobiles yet seen by any people of any time, required an hour and 45 minutes to pass the reviewing stand on Woodward avenue. The giant column was three abreast in many places and was more than 2 miles in length. The total distance paraded was 5 miles, the start being made at the corner of Grand Boulevard and Woodward avenue. The column wended its way down the latter thoroughfare until Jefferson avenue was reached, where it turned east and continued to East Boulevard, and there disbanded. Throughout the entire 5-mile course, the streets were deep lined with a record-breaking throng of people.

There were many beautifully and gaily decorated automobiles in the long column, but no one contingent was so consistently attractive as that of the suffragettes, the half dozen cars which made up their part of the procession being a profusion of yellow, intermingled with the blue and gold Cadillaqua colors. There was a countless array of "Votes for Women" banners displayed. To further show their independent spirit, several of the ladies of this section of the affair piloted their own cars.

In point of number of cars entered, the Studebaker Corporation, maker of E-M-F's and Flanders 20's, easily surpassed all others, although the Cadillac, Hudson, Overland, Krit, Jackson, Detroiter, Paige, Warren, Abbott, R-C-H and Hupmobile entries were not far behind. The novel feature of the E-M-F gathering was the test cars which were in line, about thirty being seen. Following these were a number of both E-M-F's and Flanders. The Detroiter contingent led the procession.

The Wolverine Automobile Club was the promoter and director of the automobile parade and it offered prizes to the persons or concerns having the best decorated cars. The first prize was given to an electric which was most beautifully decorated in white, paper flowers completely covering its sides. A giant butterfly was fastened to its front and appeared to be pulling the machine under the direction of a huge doll fastened above the seat and in whose hands two long white ribbons were fixed as reins. The two ladies who rode in the car were also dressed in white to further set off the pleasing effect of the whole.

A unique feature was the appearance of several Packard and Cadillac veterans in the line. The oldest Packard, which dates back to 1899, preceded the youngest Packard, which had been turned out of the factory but a few minutes before the start of the parade. Cadillac veterans of all ages were seen, the oldest model coming first and being followed in succession by later types until at the last the 1912 product appeared. The oldest Grinnell electric was also in line. Lozier paraded its Vanderbilt Cup winning car of last year.

Factories Represented in Pageant

The industrial pageant which took place on Wednesday evening also had a large representation among Detroit automobile factories. The Packard concern entered a pure-white and gold-trimmed float, which was among the prize winners of this event. It consisted of a phaeton model finished all in white and upholstered in white velvet in which were seated several persons also in white.

A costly float was entered by the Chalmers company, which was composed of one of the concern's latest models mounted on top of a platform, the sides of which represented the huge factory in papier-mâché. Many lights iluminated the windows of the miniature plant.

The Flanders electric and the United States Tire floats were also very attractive and represented a large amount of work. The latter carried a great map of the United States. The Studebaker float was made doubly attractive by its setting, it being partly concealed by a bank of clouds, and surrounded by a number of young women. The Cadillac float was of spotless white. A Cadillac car was placed on a raised platform and was drawn by four white horses. The Warren-Detroit float showed a number of workmen in the act of assembling a chassis.

Knight Motor in Europe

L. B. Kilbourne, Partner of Sleeve-Valve Inventor, Reports Rapid Growth of Their Business Abroad

Why Sigma-Knight Did Not Start in Grand Prix—Hard Luck Prevented Targa Florio Win

CHICAGO, July 27—L. B. Kilbourne, partner of Charles Y. Knight, inventor of the sleeve-valve motor, is back in Chicago after a visit in Europe, some of which time was given up to attendance at the trial of the suit of the English Argyll company, a decision in which is expected shortly.

"Our business in Europe is growing in leaps and bounds," says Mr. Kilbourne. "The Daimler company, which made 2,600 Knight-engined cars for 1912, has made its plans for 3,000 for 1913. In addition it is selling many engines to others in that country. The Sidderley-Deasey already has used 450, fitting to both fours and sixes, while a considerable engine business is done by Daimler in Germany, France and America. The Daimlers are making more six-cylinder cars than fours. In Belgium the Minerva people are erecting new factories and planning to increase their output from 1,200 to 2,000. Panhard of France has added a Knight six and also is making a small four, making three models of Knights in all, while the Mercedes company in Germany has brought out two new Knight models to go with the one it originally had. One of these is 4 3-4 by 5.

"The Sigma-Knight builders in Switzerland are at the present time reorganizing their company with the idea of broadening out. They started out with only the Switzerland rights and found they were handicapped by being so limited. They saw the opportunity to get the Italian rights and they have taken an option on this privilege, which will be taken up when the company is reorganized. One of those interested in the Switzerland company is young Levassor of France. The Sigma-Knight is made in two models, one 18 horsepower and the other 25 1-2 and the car is a success.

"It was because of this reorganization that the Sigma did not start in the French grand prix. It is not generally known, though, that it did run in the Targa Florio in Sicily. An agent bought the car himself and entered it and it was only because of hard luck that he did not win. He writes that at the end of 200 miles he was 35 minutes ahead, when he lost his gasoline tank. He had to make a new tank and wait 2 hours for more gasoline, yet he finished tenth."

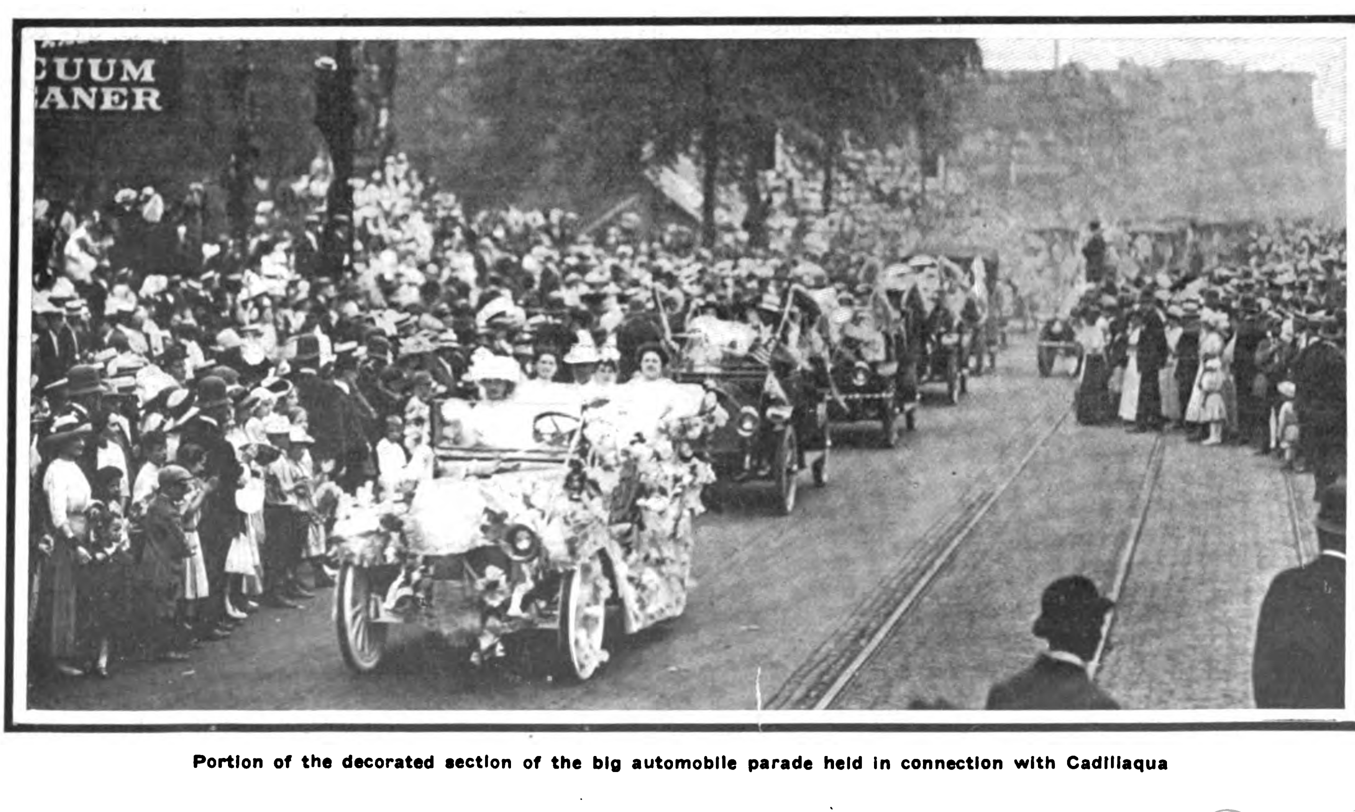
A cablegram received on Wednesday from London by Mr. Kilbourne conveys the information that the suit against the Argyll company has been decided adversely to the Knight interests, but that an appeal has been taken, with strong hopes of ultimately winning. The decision was based upon the legality of the amendment made in 1908 to the first claim of Knight in 1905. The English judge hearing the case refused to read the claim as amended on the ground that the scope of the patent was widened thereby, which is denied by the Knight interests. It is stated that former practice always considered an amendment through the comptroller as final. The judge held that the Knight patent is not invalidated, but holds that it covers only the reciprocating motion. Leave was given to amend the error in the specification.

Motor Fire Apparatus on Show

On Wednesday, October 2, there will open in Madison Square Garden, New York City, to continue till Saturday evening, October 12, an exposition of modern apparatus for the prevention and extinguishment of fires. The exhibition is to be held in conjunction with an international conference of fire-department officials representing many of the larger cities of the world.

Many manufacturers of motor fire apparatus will be represented in the exhibition, which will include fireproof building construction, fire alarm systems, automatic sprinklers, fire escapes, and, in fact, every conceivable device and manufacture in the fields of fire prevention and extinguishment. Daily conferences will be held, where architects, builders, engineers, insurance men, and fire-department officials from all over the world will read and discuss papers on pertinent subjects.

Mayors of many of the principal cities of the United States have appointed their fire chiefs or commissioners as delegates to the conference and exposition.



Portion of the decorated section of the big automobile parade held in connection with Cadillaqua

Boulant Surgeon's car in marching order—tents folded

Rear view of Surgeon's car camped to receive patients

Hospitals Rushed To the Injured

Surgeon's Car with X-Ray Plant Proposed for French Army and as Adjunct to City Hospitals

Also to Furnish Large Quantities of Sterilized Drinking Water for Troops in Camp

WHILE the automobile military ambulances which are intended for taking the wounded from the firing line to the rear for surgical aid and thence to the field hospitals are the subject of constant efforts for improvement, little has so far been done for giving those who have been so severely injured that they cannot be transported all the way to the field hospitals the benefit of an immediate and thoroughly aseptic operation, which is frequently absolutely necessary for their eventual recovery, especially if their injuries affect the bowels. In this respect the Boulant Surgeon's car which is being proposed as a regular equipment for the French army represents an important advancement in the humanitarian efforts for assuaging the horrors of grim war, and its value as an adjunct to emergency hospitals in large cities and industrial centers is also being considered.

According to the established routine in the medical field service, the wounded are first bandaged or tourniquetted where they lie in the field by the medical staff of the regiment, and are then carried on a stretcher to the first aid stations, which are barely beyond the danger zone. Here they receive further treatment and to each of them there is pinned a ticket of diagnosis, white if he cannot be moved to one of the field hospitals and red if he can. The Surgeon's Car is intended to get as close to these first aid stations as possible, to take care of the men with white tickets, but in most cases the service of the regimental ambulances will be required for covering the greater or lesser distance to a suitable place where such a car can be stationed in peace. A framework accommodating from three to eight stretchers has been devised by means of which automobiles of all descriptions may be transformed into ambulance wagons, and the motor trucks and delivery wagons which are subsidized by the French government are especially adaptable for this purpose. The ambulance shown in one of the accompanying illustrations is a transformed taxicab, however. While these ambulances are fairly well equipped to give medical service, experience has shown that their facilities cannot be relied upon where strictly aseptic operations are indispensable. And the field hospitals have no independent means of transportation.

Here is where the Surgeon's Car comes in. It is built on a truck chassis and is of the size of a large Paris omnibus. The body is divided into three parts. The wounded are entered at the rear in a vestibule compartment containing everything necessary to prepare for an operation; a tank with 200 liters of filtered water, a wash basin, drawers for clean blouses, aprons and other linen for the operator and other drawers for soiled articles. When the car has arrived at its halting place the tents which are folded up on its sides while it is in transit are raised, as shown in one of the illustrations, to afford shelter for the injured before and after the operation.

Two swinging doors lead from the vestibule compartment to the operating room which is in the middle of the vehicle and measures 3.20 meters in length with a width of 2.20 meters. It is lighted by skylights and electric lamps. The walls are of veneered and lacquered wood without joints and all the corners are rounded. The floor is a closely jointed mosaic of porphyry or similar stone which does not absorb moisture. Shelf-closets with glass doors contain a number of metallic boxes each holding all the tools required for one kind of operation; one for laparotomy (abdominal incisions), one for trephining, one for amputations, etc. When needed these boxes with all they contain are sterilized by heating in an autoclave, and this may be done while the car is moving. The special tools are actuated electrically by flexible cable. The operating table consists of a foldable metal framework adjustable to all necessary positions of the patient and a sectional top which is made of wood so that the X-rays may pierce it from below. A slide forming part of the frame permits a jointed support for a Roentgen apparatus to be adjusted in any desired position.

Hot and Cold Water Plentiful

All instruments serving for X-ray examinations, including diffusion plate, dynamo, induction coil, bulbs and the fluorescent plate with black cowl for examining by daylight, are grouped in a glass cabinet in the operating room. By means of two wires which hang from the ceiling and may be connected with the poles of the induction coil at any moment a considerable volume of ozone can be produced to sterilize the air in the compartment. A wash basin which is reserved for the operator is piped to receive either water which has been sterilized by the ultra-violet rays or hot or cold water from the autoclave. In a corner of the room the electric motor is placed which actuates the saws and cutting instruments and this can be switched to work a pump that draws the water for the needs of the vehicle. A long flexible hose connects the pump with stream, pond or well even at some distance, and the pumped water passes through a filter into a sterilizing apparatus operating with ultra-violet

French Club Will Run 1913 Grand Prix

Contest Will Be on a Fuel Consumption Basis and Will Be Decided in a Single Day

Course Must Not Be More Than 120 Miles From Paris, and Will Be Shorter Than This Year's

PARIS, July 16—Satisfied with the result of the Grand Prix run at Dieppe, the Automobile Club of France has already decided to hold another big race next year. As in the case of the 1907 Grand Prix at Dieppe, it will be run under a fuel consumption basis, the allowance being 20 liters per 100 kilometers, being at the rate of 14.1 miles to the gallon. A minimum weight of 1,763 pounds is imposed and a maximum of 2,204 pounds with tanks empty and no spares on board. The distance of the race will be about 560 miles to be covered in one day. There will be no limit to the number of cars that may be entered by any one firm, while the fee for each will be $800. If a minimum of 40 cars is not received by November 1 the race will not be held. With a view to making the race more spectacular than usual, the racing board has decided to run on a course of 28 to 38 miles round, compared with a course of practically 48 miles at Dieppe. Offers of a racing circuit have been asked for, it being stipulated that the center of the course must not be more than 120 miles from Paris.

The decision to limit the size of motors by restricting the fuel supply meets with a certain amount of criticism in technical quarters. The main advantage is that it will cause very close attention to be paid to carbureters and fuel economy and with the ever-increasing cost of gasoline this is a valuable feature. Against this must be set the additional complication in the holding of the race and the element of chance which is admitted by reason of a slight miscalculation in the gasoline consumption of the motors. The experience of 1907 was conclusive on these two points. Measuring the gasoline of a uniform specific gravity to all the racing cars was a delicate operation, and in the race itself it was found that there were cars with a consumption rate rather too high, and others with a consumption rate rather too low. The French, indeed, are convinced that they lost this race to Italy by a fluke in the weather conditions for which their best cars were not prepared. In all probability the cars taking part in the 1913 French Grand Prix will be only slightly inferior in cylinder area to the Peugeot which won this year. They will, however, be smaller than the racers of 1907, for on that occasion the fuel allowance was 30 liters of gasoline per 100 kilometers.

Careful Drivers Have Preference

Truck drivers should realize the great waste of money which they cause their employers by their reckless indifference to the laws of good and careful driving. They will find that their tire troubles decrease in a remarkable degree as soon as they begin to take pride in being considered careful, reliable drivers rather than would-be speed-kings at 17 miles an hour. Too many of them base their feeling of pride on their dexterity in operation of the machine, forgetting that their value to their employers lies, not in their ability to start the truck on high gear without quite tearing out the transmission, but in their applying themselves to their work with the idea of getting the best possible results in the least time and at the least expense, with some consideration for the more or less delicate and costly piece of mechanism placed in their charge. Too many drivers suffer under the delusion that, because a truck is built for rough service, it is capable of enduring all sorts of negligence and abuse, whereas it requires practically the same care as a pleasure car.

It is the careful truck driver who is getting the best position these days, because the truck owners have awakened to the fact that it is the driver, more often than the truck or the tires, who makes the use of a commercial vehicle expensive to maintain. Those that have retained their first drivers have generally done so because they found that they were reliable and efficient as regards driving, and, by no means to be forgotten, that they knew something about the science of loading, just how much weight to put on each wheel to get the best results with the least wear and tear on the tires, or evidenced some intelligence in this respect.

rays. The capacity of this installation reaches 600 liters of water per hour, so that a vehicle of this kind can supply a considerable quantity of water for neighboring troops, when this is desirable—this water being drinkable no matter how polluted its source.

A doorway leads from the operating room to the front compartment. Here the autoclave is located which is heated by alcohol to 130 degrees C. and also a water tank which can be heated if necessary with an alcohol burner. In the same compartment there is found the main dynamo which is driven from the 40-horsepower vehicle motor and supplies current for the electric motor and an auxiliary storage battery. A special small dynamo takes care of the lighting circuit. The driver's seat is entirely separated from the interior of the vehicle as in the case of an ordinary omnibus.—From *Omnia*, July 6.

Operating room with skylights and doorway to laboratory

Taxicab transformed into ambulance with eight stretchers

General Construction Features of German Gasoline Motor Fire Engines with Centrifugal Ejector Pumps—Eventual Development of the Combustion Motor for Automobiles Presaged in the Activities of the World's Navies

GERMAN Fire Engines—Among the fire engines operating solely with gasoline motor power the type built by the Adler automobile works is notable, partly because it has seen much active service in the city of Frankfurt-am-Main and partly because its construction differs at important points from the other pure gasoline-motor engines. In all of these it is kept strictly in view by the manufacturers that a chassis closely resembling the chassis for an ordinary motor truck is one of the first requirements, if it shall be possible to furnish these modern fire engines at such low prices as will make them generally acceptable to small municipalities, without the patronage of which no economical mass production could be contemplated. To reconcile with this consideration perfect suitability for the fire-fighting service has constituted a problem leading to somewhat different solutions. In the N. A. G. and the Daimler-Marienfelde gasoline motor fire engines, which were partially described in THE AUTOMOBILE of July 11 and 25, the pump, which is a positive rotary-piston pump of special construction, is located and operated at the extreme rear of the vehicle. In the Adler engine, on the other hand, the pump used is a high-pressure centrifugal pump and the hose connections are made at the side of the vehicle—either side—at a point in line with the driver's seat. From front to rear the main parts follow in this order: Motor and clutch, then the pump through which passes the transmission shaft, then the change-gear and the cardan shaft to the rear axle. And the transmission shaft can be clutched either to the change-gear or to the pump, the pump shaft being hollow and surrounding the transmission shaft and the special clutch connecting the motor shaft either with the transmission shaft or with the pump shaft. Special gearing for driving the pump is thus avoided. The rear axle in the Adler engine is developed in the latest type, though not in the engine illustrated herewith, on the principle of parallel axles of which one supports the load and the jolts and the other transmits the driving effort to a spurwheel reduction gear on each of the rear wheels. The motor is governed down to a maximum of 900 revolutions per minute for traveling purposes but can be operated at 1,600 revolutions when driving the pump, and in that case a portion of the water flowing through the pump may be bypassed through a special tank where it comes in contact with the cooling-water pipes from the motor, thereafter returning to the pump system.

WHY CENTRIFUGAL PUMPS ARE USED

The advantages of the centrifugal pump, as compared with the reciprocating piston pumps used with steam fire engines, lie partly in their simplicity, their low cost of production and in the fact that they function best at high speed and may be connected with a gasoline motor shaft without the use of cumbersome reduction gearing. They are also much less subject to wear—as from the effect of sand in the water supply—as the rotating vanes do not rub against the walls of the casing, and they greatly reduce the wear of hose, as the uniform pressure at which they may be operated obviates the to-and-fro motion of the hose on the ground which always accompanies the use of the reciprocating piston pumps of steam fire engines. The great danger to the firemen on ladders which arises when the hose in their hands suddenly stretches itself out rigidly because some of the outlets for water have been stopped and the pressure thereby has been suddenly increased, is also avoided with the centrifugal pump which under all circumstances produces a pressure determined by its construction, its size, its speed and the pressure previously existing in the water supply, but can neither burst the hose by accumulated pressure nor stop the motor by abnormal resistance to its work. If the water outlets are all stopped the centrifugal pump continues to operate and, according to the data presented in the German trials, consumes under these conditions about 45 per cent. of the power required for the maximum throw of water. The same data indicate that a throw of 50 meters high and 75 meters distance is attained and that the evacuation pump admits of drawing water to the pump from a depth of up to 9 meters where no hydrant pressure is available.

THE COMPOUNDING OF PUMP PRESSURE

The centrifugal pump used is a multiple pump, see Fig. 3: a number of centrifugating disks are mounted contiguously upon the pump shaft, the water from the supply pipe arrives at the central admission port of the first disk, is thrown out against the wall of the enveloping casing and forward against a baffle disk with an increase in its pressure of say 3 atmospheres. With this increase it enters the central port of the next disk and is again thrown out with a new increase of pressure also amounting to 3 atmospheres. The third disk similarly raises the total pressure, so that, if only three disks are used, the total working pressure at the nozzle amounts to the initial hydrant pressure plus 9 atmospheres minus the friction loss in the mechanism and the hose. To obtain the best results there must of course be certain suitable relations between the speed and power of the motor, the volume capacity of the pump and the number and sizes of the hoses and their nozzles, and in these respects the system offers a large field for technical development. In the Adler fire engine pump made at the Sulzer-Ludwigshafen works, 5 centrifugating disks are arranged in parallel, as referred to, in one housing. A manometer on the pump outlet indicates the pressure at disposal.

The objection to the exclusive use of a centrifugal pump lies in its inability to draw water from a lower level when it is first brought to the fire until a continuous column of water has been established between the pump and the water supply, either by exhausting the air in the suction hose or by carrying a small water supply on the engine by means of which the continuous connection can be effected. It seems that the Adler engines for use in Frankfurt-am-Main can depend on hydrant pressure for this purpose anywhere within its sphere of action, as no special means for starting the pump are mentioned. In other similar constructions, however, either a tank holding 300 to 500 liters is carried and provisions are made for connecting this supply with the centrifugal pump and at the same time with the local water supply without interrupting the pump's work, or the centrifugal pump is supplemented by a positive air-evacuation pump. The Mannesmann-Mulag company at Aachen uses the tank system in the engine of its manufacture; the Sulzer concern makes a pump with an auxiliary evacuation pump as well as the type used by the Adler company, and the Ehrhardt & Sehmer company of Saarbrücken is mentioned as the producer of a centrifugal pump built in one with a positive rotary-gear evacuation pump in such manner that the latter can be thrown into or out of action by a spurwheel change-gear. The two pumps, the centrifugal water pump and the air pump, can thus be operated concurrently, which is of special advantage in cases where the water contains many air bubbles, as under these circumstances the water column in the suction hose is liable to be broken. The same firm has developed a six-way valve or faucet, with the effects of each position of the cock plainly indicated in words inscribed on the adjacent machine parts, by the use of which the correct handling of the engine by the crew has been much simplified.

With reference to the use of centrifugal pumps in the future it was stated by Fire Commissioner Schänker of Frankfurt at a public discussion of the merits of the various pump systems, that recent trials had led to a new construction which makes it possible to start pumps of this type working from a low-level water supply without first filling the suction hose or using an evacuation pump and also without carrying a tank with an initial water supply.—From *Der Motorwagen*, June 10.

Motor Warships Now Afloat—That the automobile motor is a type of combustion motor in which a great sacrifice of economy has been made to the need for small size and small weight is demonstrated by nothing else so plainly as by the enormous development which has taken place in the past few years in combustion motors of great power operating with cheap heavy oil as fuel—or with tar oil, vegetable or animal oil or almost any other liquid or liquifiable hydrocarbon—and using much less of these substances per horsepower-hour than the automobile motor uses of gasoline. With the price of gasoline steadily rising and no certainty that the supply will be sufficient ten years hence for the number of automobile and kindred motors which, according to the present rate of increase, will then be in operation, all developments of combustion motors which promise relief from the fuel problem step into the sphere of direct economical interest for users and makers of automobiles, and hereto comes the practical evidence which such developments afford of the perfectibility of the combustion motor in the matter of design. It had scarcely been foreseen, for example, that it would be possible to operate heavy oil motors on the two-cycle principle, and reversible at that, with practically the same reliability and fuel economy as had been demonstrated in favor of the four-cycle and irreversible type. Yet no sooner had the time come when the impending expiration of the first Diesel patents opened the domain of experiment and manufacture to the industrial world at large, before these discoveries were made which at once placed the combustion motor in the front rank as a power producer for ships of all sizes and reduced it to a question of time only when it would take the place of steam also for such stationary purposes as the driving of the rollers in steel mills, where reversibility is an important

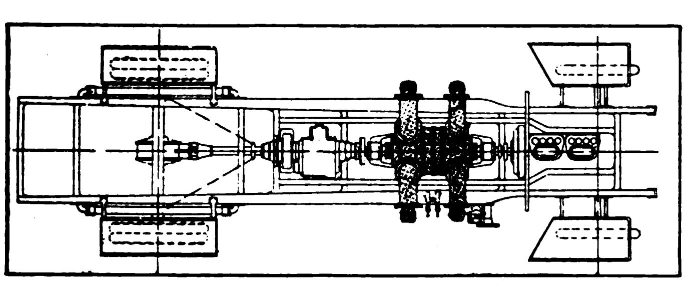


Fig. 1—Plan view of Adler fire engine chassis

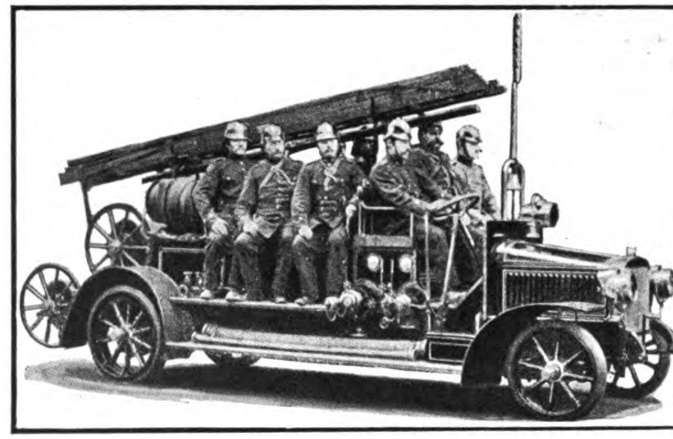


Fig. 2—Gasoline motor fire engine on a run

factor heretofore regarded as one of the indispensable advantages of the steam engine. In comparison, it was a small matter that it was also found practicable to use the combustion motor in its horizontal type as well as in its vertical type for ships, yet this fact, too, contributes to convincing the automobile maker that the type of motor to which he has pinned his faith is perfectible in unexpected directions and that things of direct interest to him are likely to come up in those branches of combustion motor manufacture with which at present he has little to do. The one feature in the heavy oil motor upon which more than upon any other, its success and adaptability seem to depend is the use of nothing but pure air for the piston to act upon during the compression stroke, as herein lies the avoidance of premature ignition and the availability of any liquid fuel which contains the required number of heat units. To the introduction of this feature in automobile motors, but without the great weight of motor parts and the use of auxiliary devices for fuel injection which the automatic ignition system of the heavy oil motors at present render necessary, the automobile industry is looking forward as the nearest possibility in sight and in this respect a close watch upon the efforts which are now put forth all over the industrial world for lightening the heavy oil motor may be said to be on the order of the day, with a better chance perhaps for direct benefits than may be derived from observing the labors of aeroplane motor builders, whose designs tend toward the turbine with sacrifice of fuel and economy considerations.

WHAT THE NAVY DEPARTMENTS ARE DOING

Just how far the practical development of large two-cycle combustion motors has already advanced is best shown by the data at hand with regard to their adoption in the navies of different nations, where progressiveness and technical insight are probably combined in as full measure as anywhere. Some information on this subject has been compiled by Ernest Trebesius, engineer, for *Der Praktische Maschinen-Konstrukteur*.

Several years ago the Russian government made the beginning by equipping the two gunboats *Kars* and *Adagan*, which are both of 630 tons displacement and 61 meters long by 9 meters broad, with 1,000-horsepower oil motors. The speed obtained was 14 knots, and as both boats were in the Black Sea service, where the supply of raw oil from the many wells in the adjacent country offered no difficulties, the conditions were economically as favorable as possible. [Dr. Diesel on his recent visit to America reported a number of other and later installations of oil motors in Russian warships.—Ed.] Italy started with motors of relatively small size installed in small torpedo boats and, encouraged by the results, is now placing Fiat heavy oil motors of 12,000 to 14,000 horsepower in a 650-ton torpedo-boat destroyer, which probably has been launched by this time, and for which a speed of 30 knots has been guaranteed. Twenty small Italian torpedo boats of 120 tons are at the same time being equipped with oil motors of 3,000 horsepower each, which will give a speed of 27 to 29 knots. The absence of smoke and smokestacks which betray the steam-powered warship at a considerable distance has been one of the first considerations favoring the adoption of the oil motor for torpedo boats and destroyers.

The French navy is experimenting with a 1,200-horsepower oil motor operated with tar oil—so that the fuel may be one under national control—and contemplates now to take the next step by placing a motor plant developing 30,000 horsepower from three oil motor units of 10,000 horsepower each in a man-of-war of the super-dreadnought type. So far as England is concerned, where naval development is kept well under cover, it is yet known that at one navy yard forty oil motors of about 500 horsepower each and arranged in groups of ten await installation in an old cruiser for trial purposes, it being apparently the intention to have each group drive one of four propeller shafts and to have in all 20,000 horsepower available in the boat.

Austria has built at the Danubius wharves at Fiume a 950-ton convoy for submarine boats with 2,000-horsepower oil motors giving a speed of 15 knots. The Turks had ordered several oil motor boats for coast defense in England, but when they were to have been delivered some of them fell into the hands of the Italians and the rest returned to England. Holland is placing 1,500-horsepower oil motors in three gunboats of 530-tons displacement.

In the commercial marine the most decisive step is to the credit of the East-Asiatic Trading Company of Denmark, which has already placed three oil motor ships of 7,000 tons each in active commission in the goods-carrying trade with Siam and China, and has five more similar ships under construction at English and Danish wharves. The three boats now running are the *Selandia*, the *Fionia* and the *Jutlandia* (Latin adaptations from the names of certain portions of Denmark), which are equipped with two groups of 1,200-horsepower oil motors each. For their very long trips to India they carry only 900 tons of oil, while with steam power they would have to carry 5,000 tons of coal. A very considerable gain in pay-tonnage is, of course, the result.

According to Lloyds Register twelve oil motor boats ranging from 4,500 to 8,000 tons and intended for trade purposes are at present on the keel at English and Scotch shipyards.—From *Der Praktische Maschinen-Konstrukteur*, July 4.

Properties of Nickelplating—Exhaustive experiments at Dresden have confirmed the best practice in the nickelplating trade. Iron in the anodes or the electrolyte is precipitated with the nickel, making it brittle and scaly. The current therefore gradually cleans such a bath of the harmful admixture. Salts of magnesium in the bath make the nickel coating smooth and silvery in color. High acidity makes a hard and brilliant but not a uniform, flexible or adherent coating. The addition of ammonium salts improves the uniformity while maintaining the brilliancy, but causes a powdery bloom if a strong current is used. A flexible and adherent coating is more readily obtained from a sulfate than from a chloride of nickel. An addition of sodium salt further improves a sulfate bath. The experiments go into all details.—From *Metall-Technik*, July 6.

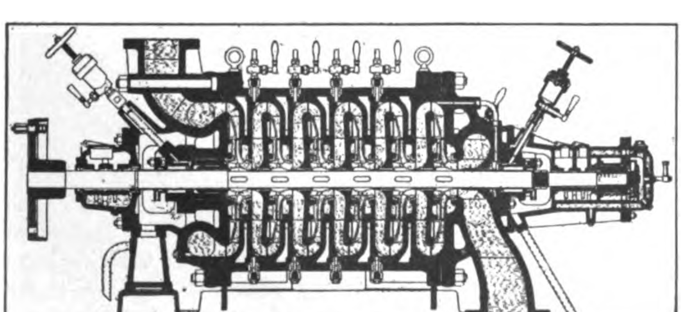


Fig. 3—Section of Klein centrifugal pump for fire engines

Harking Back a Decade

What the Motoring Publications of 10 Years Ago Had to Say on Live Matters of the Day

Cars So Scarce That Premiums Are Offered for Second-Hand Machines in Good Condition

FROM *The Automobile and Motor Review,* August 2, 1902: The winning of the Gordon Bennett cup by England has placed a new face on the question of road racing and opens up a long vista of promising possibilities, both of international sport and material benefit to the motor car industry. We believe that an immediate announcement of the Gordon Bennett cup race over English roads next summer, if such were possible, would be hailed with delight by American, English and French builders alike, as well as individual motorists of the three nations.—*Editorial.*

The question of automobile insurance against fire is again being agitated. A new policy, originating in Connecticut, has been framed to meet modern conditions of automobile use. The policy covers automobiles while within buildings, on board railroad cars or ships. The rate is 3 per cent. The old form of policy under which the insurance on the building itself was voided by the entrance of the automobile, was 2 1-2 per cent.

Banker Brothers in Pittsburgh, one of the half-dozen big firms of dealers in that city, reports selling thirty-five Peerless cars, twenty-three Pierce automobiles and almost 100 smaller machines so far this season.

Premiums Offered for Used Cars

Stories of premiums for second-hand cars are common. G. W. Hayden, of Chicago, tells the latest. He was offered $2,500 for his Winton, which had been driven 2,000 miles. The car cost him $2,000 and he took the $500 profit.

A suggestion is being considered in legislative circles to pass a law requiring owners of automobiles to register them, pay a license fee and exhibit a number plate to identify the car. While the motorists have entered a protest against such a law, it is thought the chances of enactment are good.

A gasoline shortage has made itself felt in Eastern Connecticut. Not a gallon of 74 test fuel is available at New London. In other places where there is still a small supply the price has bulged up from 10 cents to 30 cents a gallon.

Ernest Cuenod, vice-president of the Swiss Automobile Club, has filed a belated protest against awarding the middle-weight gasoline car prize to Percy Owen as a result of the outcome of the speed trials on Staten Island in May. Cuenod claims that his understanding of the rules was that the prize should go to the driver who made the best time in the first heat and that the subsequent heats were to be mere exhibitions. He beat Owen in the first heat, but in the second Owen's time was over 5 seconds faster than that of his rival in the first heat.

L. A. Weston & Company announce a new artillery wheel to interchange with the wire wheels now being produced by that company.

The Oldsmobile Company, of Cleveland, continues to place cars at the rate of one a day. The company is several weeks behind in its deliveries.

The assets of the Milwaukee Automobile Company which were appraised at $8,700 have been sold to Herman Falk, one of the stockholders in the defunct corporation for $925.

Steam tonneaus designed by W. M. Gage, of Saratoga, N. Y., are to be manufactured in that city. Mr. Gage states that the location of the boiler under the hood renders the occupants of the car safer than they would be otherwise.

Tire Repairs on the Road

Improper Inflation the Cause of Much Tire Trouble—Proper Methods of Inserting Inner Tubes

Pressure Will Sometimes Decrease in New Tires Owing to Expansion of Latter

IN these days of the perfected automobile, 90 per cent. of the annoying delays on the road are due to tire troubles. No car is immune from them. The expensive, high-powered and elaborate machine is just as liable to be seen drawn up at the side of the road undergoing tire change or repair as is the low-priced, diminutive runabout.

This condition of affairs, although lamentable, must obtain until such time as a satisfactory substitute is found for the present pneumatic which is well nigh as perfect as the tire maker can make it. No one will deny that the present automobile tire is more or less of a nuisance, but as yet no one has come forward with something equally as good and as practical to take its place. And until that time, we should make the best possible use of what we have with us.

The tire is subject to a number of maladies which are not so much characteristic faults as they are those of the careless driver. The automobilist who drives with utter disregard for his tires, and only remembers that they are part of the car's equipment when puncture or blow-out occurs, is the first to denounce pneumatic equipment in general and the make he is using in particular. And so it goes. Many tire troubles which are really due to negligence or carelessness on the part of the automobilist are unjustly charged to faulty materials and workmanship.

Reputably made automobile tires of today are good for at least 6,000 miles if ordinary care is taken to get the most out of them. Cases are on record where they have run from 8,000 to 17,000 miles in ordinary service, however. These are not exceptional mileages by any means, one manufacturer citing an instance where a tire gave 40,000 miles of service. This latter figure must be considered exceptional, however. On the other hand, many automobilists do not get over 3,000 to 4,000 miles out of the best tire made, if there is any such doubtful distinction between the well-known makes. Such low figures can only be the result of careless driving.

Uniform Tire Inflation Requisite

Improper inflation is responsible for more tire trouble than anything else. Many automobilists do not realize this. They fill their tires perhaps to the proper pressure and pay no more attention to them until they are quite noticeably deflated, when they are again treated to a supply of air. Such a procedure means that the tires are running under-inflated half of the time, because even when there is no noticeable leak, there are a number of ways in which the air pressure may be reduced. It is, therefore, a bad policy to simply inflate the tires and then forget all about them until they are quite apparently below pressure. Test this pressure from time to time to make sure that there has been no reduction. For this purpose an accurate pressure register is almost indispensable.

Most automobilists do not realize that the valve is quite apt to leak slightly unless it seats with extreme accuracy. If there is any dirt on the seat it is doubtful if the rubber washer can hold tightly enough to resist the air pressure. If this washer is worn or out of shape, then there will most surely be a slight escape of air, while, if the threads of the valve stem have been damaged, there is further possibility of loss of pressure.

New tires usually expand slightly after being in use for some time, so that their pressure will decrease somewhat, even if there is no leakage from any source whatever. This is a fact which the average driver does not know, but one which the Michelin company asserts is quite common. It is also commonly accepted that the outside temperature has a great deal to do with the pressure in the tire, and that when driving over hot pavements and country roads, the heat expands the contained air dangerously. This consideration often prompts the would-be careful driver to let some of the air out of his tires when driving under such conditions. As a matter of fact, the increase in the air pressure due to this slight expansion is so small as to be almost inappreciable on the tire gauge. Such a small increase may be disregarded, while the detrimental effect of running with the tires under-inflated is much more to be guarded against. It is far better to leave the pressure as it was.

Over-inflation is not to be recommended either, for, aside from the fact that resiliency and flexibility are sacrificed by inflating above prescribed pressures, the fabric and the rubber are strained and stretched harmfully. Pneumatic tires are intended to partially absorb road jars and rough spots, but when abnormally inflated they become but little superior to solids in this respect. In short, their purpose is defeated. Further, highly inflated tires, through the extra vibration to which they subject the entire mechanism of engine and chassis, tend to increase the car's rate of depreciation to a marked degree.

Inserting Inner Tubes in Shoes

In the fitting of inner tubes in the shoes or envelopes, a number of things must be remembered, for on this operation largely depends the possibility of blow-outs. Cracks, creases, pinched places, wrinkles, bunches, twists—all are enemies of the tube and must be rigidly guarded against. The driver may reason that, since he is in a great hurry, he cannot afford to spend much time in getting the tire together. Painstaking fitting of the tube may take longer at the start, but it will save time and trouble in the long run.

Before attempting to fit the tube within the envelope, the air should be completely removed from the former. First remove the valve cap, then the entire valve and spring. Start at the point of the tube opposite to the valve-stem and roll up the tube toward the stem, forcing the air from the farthest part of the tube toward the opening. After the tube has been rolled up tightly and all the air expelled, replace the valve parts so that no more air can enter.

Having made sure that there is no dirt or other foreign matter on the inner surface of the envelope and that it is free from cuts, the next thing to do is to sprinkle powdered talc or soapstone around this inner surface. This should be done carefully, just enough being used to make a smooth backing for the tube. Too much powder is apt to form into hard lumps which chafe the tube in time in just the same way as dirt or pebbles would. On long runs the slight rubbing of the tube and envelope surfaces on one another heats them somewhat, and the right amount of this powdered material acts as a lubricant to reduce this frictional heat.

Having carefully prepared the envelope, take hold of one side of it firmly about a foot from the hole for the valve-stem, pulling it open so that the tube may be inserted well into it with the other hand. Place the stem in position first, then proceed to insert the tube in sections of about a foot at a time, being careful not to twist or stretch it. When the last section is to be inserted, if the tube has been properly handled, there should be no apparent extra length. Now partially inflate the tube just enough to remove all the wrinkles. Then run the hand around inside the envelope between it and the shoe to smooth out any slight bunches and to equalize the tension all around. If all wrinkles, bunches and the like have been completely removed, the shoe is ready to be placed upon the rim, but not before. It is a mistake to place an envelope in position when creases or wrinkles are still to be seen, for when the normal pressure is added they will simply deepen and eventually crack. A blow-out will be the ultimate result.

Making Limousine Bodies Water-Tight

How to Provide Against Leakage of Rain Around Bottoms of Frameless Glass Windows and Doors

How the Work Is Done Is Shown in a Series of Detail Side and Sectional Drawings

Fig. 1—Section of limousine door

FRAMELESS glass for windows on closed bodies has become so generally used, that progressive bodybuilders have already set about trying out different methods to overcome the one objectionable feature that this style of window has, *i.e.*, the entrance of water around the bottom of the glass when it rains. The amount of rain that sifts in at the bottom of the glass is not so much as would be supposed, and where the body is of all-metal construction and proper provision has been made to take care of the leakage, it is not really a serious matter.

Fig. 1 is a section cut lengthwise through the door of a limousine and illustrates the difficulty mentioned. It will be noticed that the glass is longer than the opening in the door and that the bottom of the glass is below the top of the bar, on which ordinarily the glass frame is made to rest for the purpose of forming a watershed. In this illustration, the glass is always supported by the lift strap and the rain leaks in at the opening indicated by the arrow; the majority of bodies in which the frameless glass is used are constructed in this manner.

Fig. 2 is a section of the side elevation of a limousine body, showing the door and part of the rear side window. This is the first of the illustrations showing a different method of assembling the frameless glass in the body to overcome the difficulty shown in Fig. 1. This illustration, Fig 2, and the succeeding one, which is a section through line W-X, and marked Fig. 3, shows the side and end views of the glass in the raised position, and the metal channel hooks that support the glass and make a water-tight connection between the glass and the door bar are indicated by the letter A on Fig. 2 and A2 on Fig. 3.

Fig. 4 is an enlarged illustration of the preceding one, Fig. 3, and the channel book A2 is more clearly shown. The glass rests in this channel without any fastening other than the pressure of the channel members against the glass, and there is also a thin rubber channel between the glass and this outer metal channel.

Some Details of Construction

Fig. 5 is the channel in which the glass slides up and down. Near the top of this figure a piece is broken out and a cross section is shown to illustrate the end view. This channel can be either of wood or metal; in this case wood is used, and Fig. 8 is a duplicate illustration made larger and dimensioned. The wood channel is entirely covered with broadcloth, which is cemented to the channel, the edges meeting at the back.

Fig. 9, which is directly above, is a cross-section through line U-V, Fig. 4, and shows the assembled glass and channel in the pillar. It will be noted that the groove in the pillar is wider than the channel, and looking at Figs. 3, 4 and 6 the reason for this is shown. In Fig. 4 the glass is supported by the hook A2 engaging over the iron fence of the door bar. This is accomplished by forcing the glass outward and bending the channel, the spring B assisting to hold it in position. When the glass is to be lowered, as shown on Fig. 6, it is raised by the lift strap till the hook is clear of the iron fence, when the channel will assume a straight position and the glass can be lowered.

Fig. 7 shows the pillar without the channel in position, and R is the groove to receive same. When assembling this channel in the pillar, it is only fastened by one wood screw at the top; the groove R is smaller at the bottom to prevent the channel from rattling, but it does not prevent it working to assume the position required on Fig. 4.

In the case of the door, the glass is put into the groove through the opening at the top, whereas the other glasses must be put in from the inside, and as the channel must be put in place at the same time as the glass, it can readily be seen that a channel the full length of the pillar run cannot be assembled in place after the job has been trimmed; therefore these side channels cannot be much longer than the glass. Below this, to the bottom, the runway is formed by a groove in the pillar, this groove being lined with cloth the same as the channel. The channel is fastened at the top with a screw in the same manner as that of the door, the lower end having a spur on the back side that engages in a plate let into the pillar groove. The channel oscillates to perform the same function as illustrated in Figs. 4 and 6, and the spur working in an elongated slot in the plate controls the movement.

The method above described is a practical working plan and is in actual use; it is not expensive to put in and it insures the car owner against any possible damage that may be done by water leaking into the body through the bottoms of the windows.

THE consumption of cooling water is about the same for most of the small alcohol and benzine motors in the German market—namely, about a quart per horsepower hour. This consumption is about the same whether cooling is effected by evaporation or by water circulation, the former being the more simple.

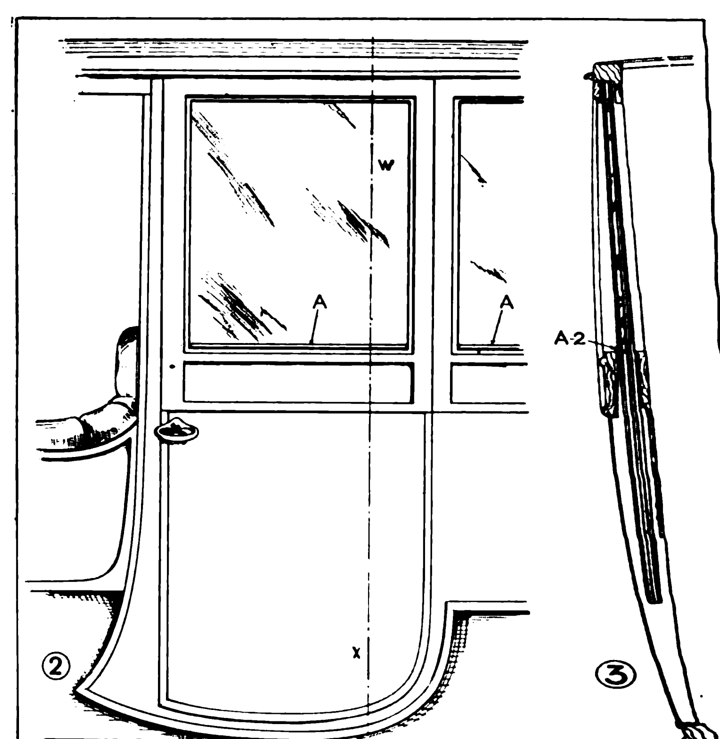


Fig. 2—Section of side elevation of limousine. Fig. 3—Section through line W-X

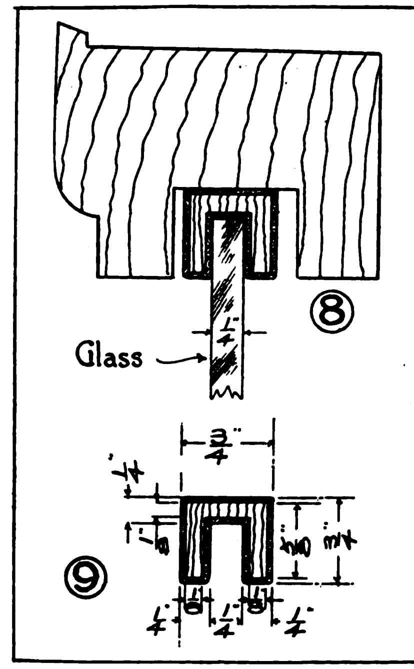
Mechanical Details of Grand Prix Winner

Arrangement of Valves Is One of the Distinctive Features of Motor-Intake and Exhaust Valve Camshaft

Used Shaft Drive, Although Previous Peugeot Racing Models Were Equipped with Chain Drive

PARIS, July 21—There are numerous distinctive features on the Peugeot car with which Boillot won the French Grand Prix. The racers were built to the design of M. Vaselot, chief engineer of the Peugeot company, and are lightweight machines with a very efficient motor. The four cylinders are a block casting of 100 to 200 millimeters bore and stroke, compared with 155 millimeters bore for the racing Fiats. The entire power plant—motor, clutch and gearbox—is carried on a single-piece channel section subframe having the form of an elongated U, the two extremities being carried on a cross member and the front end being attached at a single point to a very stout cross frame member beneath the radiator. This gives a three-point suspension. The lower portion of the crank chamber is bolted to the subframe along its entire length, and the upper portion bolted on this. The lower portion of the crankcase is deeply ribbed to assist in cooling the oil, and the forward portion forms a deep, almost circular oil well, also with radiating fins.

The most distinctive feature of the motor is the valve arrangement. There are sixteen valves inclined in the head at 45 degrees, thus giving a hemispherical form of combustion chamber. The same position is used on the Fiats, but the distinctiveness of the Peugeots lies in the use of two camshafts, one for the intake valves and the other for the exhausts. At the motor front is a vertical shaft, driven from the crankshaft by means of bevels. The two camshafts extend fore and aft, immediately above the line of valves, and each is contained within an aluminum housing, also carrying the tappets and return springs for the tappets. The camshaft housings are mounted some distance above the top of the cylinders, there being a gap between the tops of the cylinders and the bottom of the housing of between 3 and 4 inches, a series of stout steel bolts projecting from the cylinders serving to carry the housings. Obviously this arrangement has the advantage of removing the valve-operating mechanism entirely from the heat of the motor. At the forward end, and practically on a level with the top of the cylinders, is the timing gear housing, this housing receiving the vertical shaft and the forward ends of the camshafts. By the use of two camshafts the heads of the cylinders are left free for the spark-plugs, these being but one per cylinder. A cross-shaft drives magneto and water pump.



Figs. 8 and 9—Enlargement of Fig. 5, showing dimensions of slide channel and glass

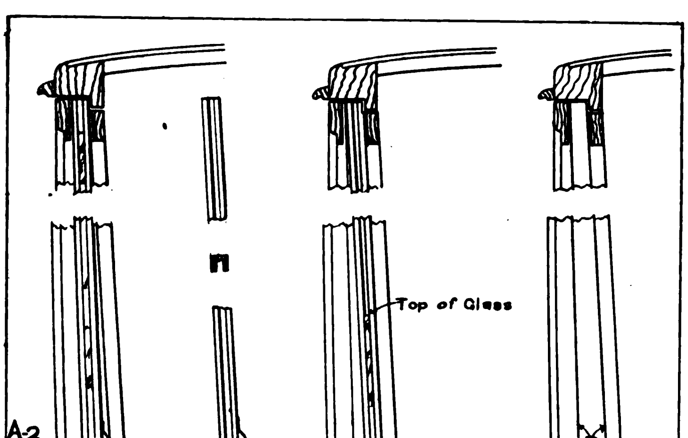


Fig. 4—Showing channel hook that supports glass. Fig. 5—Section of slide channel. Fig. 6—Illustrating operation of lowering glass. Fig. 7—Pillar without channel in position

The lower end of the downward extension of the vertical shaft drives the oil pump contained within the circular front portion of the base. The maximum oil pressure is 16 kilos to the square centimeter, compared with only 4 or 5 kilos on the most advanced types of touring or racing cars from other factories. In view of the high pressure special means had to be taken to prevent leakage. All the oilways are steel tubes welded in position. The oil is carried at this high pressure to the five plain bearings of the crankshaft, through the hollow crankshaft to the connecting-rod ends, and up the tubular connecting-rods to the wristpins. The camshafts being entirely independent oil is pumped by hand to the rear end of each shaft, an overflow being provided at the center of each housing to give a return to the base of the crankcase. A small pump on one of the camshafts keeps up pressure on the gasoline tank.

Abandoned Chain for Shaft Drive

Although Peugeot has always favored chain drive for racing cars, these models were built with a final drive by shaft and bevel gearing. With a correct distribution of the weight they held to the road perfectly, showing their superiority over the chain-driven Fiats at speeds of more than 10 miles an hour. The clutch is of the multiple-disk type running in oil. The gearbox provides four speeds with direct drive on fourth and the final drive is by propeller shaft to floating type of rear axle. The cars are not equipped with either distance or torsion rods, all the drive being taken through the broad semi-elliptic springs.

To eliminate, as far as possible, violent bouncing of the car at high speeds, very stout, broad leather bands form a bracelet around the rear axle and one of the rear frame members. No attempt is made on these cars to reduce head resistance by the use of stream-line bodies.

Defining Bore and Stroke; Best Valve Dimensions for Touring Car; Repair on Badly Worn Stearns Axle; Mysterious Blow-Outs; Criticises Test on Motor; Trouble Shifting Gears; Livery Maintenance Cost

Wants Several Terms Defined

EDITOR THE AUTOMOBILE:—1. What is the real meaning of bore and stroke, and why is the stroke longer than the bore?

2. What is the essential value in a four-speed car, and what advantage is claimed by the makers over the three?

3. Why do some cars have direct drive on third and some on fourth, and which uses the most gasoline?

4. What are semi-floating and floating axles?

Shreveport, La. X. Y. Z.

—(1) By bore is meant the diameter of the motor cylinder. Stroke refers to the diameter of the circle through which the crank swings. In order to expand the gas as much as possible the stroke is most often larger than the bore.

(2) You are referred to the July 18 issue of THE AUTOMOBILE on page 130 for a full discussion of this matter.

(3) The majority of cars in America having a four-speed gearbox have the direct drive on fourth, fully 75 per cent. having this arrangement. The advantages of this arrangement and the reasons are also discussed in the article referred to under question 2.

(4) In both the floating and semi-floating rear axles the weight of the car is all carried on the housing of the rear axle. In the floating type the axle can be withdrawn by simply removing the hub cap, while in the semi-floating axle the end is connected rigidly to the wheel.

Touring Car Valve Dimensions

Editor THE AUTOMOBILES—Will you kindly give me the best dimensions for overall diameter of valves with conical seats and lift of same for touring car of following specifications? Four-cylinder, L-head, block motor, 4 1-2-inch bore by 5 1-2-inch stroke. Direct drive ratio 3 to 1. Car weight complete, unloaded, 2,700 pounds. Also for same car equipped with four-cylinder, L-head, block motor with 4 1-2-inch stroke.

C. WILLIAMS.

Philadelphia.

—The valves for both motors should each have a diameter of 2 5-8 inches and a lift of 5-16 inches.

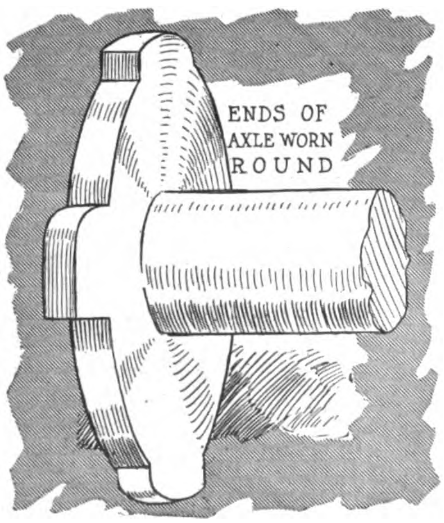


Fig. 1—Showing wear on axle end

Neat Repair on a Rear Axle

Editor THE AUTOMOBILE:—The following is a repair which I think would interest many of your readers as it is rather novel.

The driving axles on a Stearns 30-60 had been worn round at the wheel end, as shown in Fig. 1, and naturally occasioned a great amount of trouble. As I have a well-fitted shop, being equipped with good tools and a small lathe, I determined to make the repair myself. The first step was to saw off the rounded edge, as shown in Fig. 2. The sawing was continued to some depth, the object being to slot the metal, in order to take a small key of the shape shown in the same illustration. The edges of the slot were trued up with a fine file as the key is to fit very tightly into the slot. The keys should be a driving fit and can then be tapped in lightly with a hammer, as shown in Figs. 3 and 4. After they are driven in place, as indicated in the various illustrations showing the work on this job, it would be practical to drive the car and it would be reasonably safe. To hold the keys in place against side slip they are tapped out to take a machine screw, as in Fig. 5. After this is screwed in far enough to hold the key against slip it is sawed off flush with the surface of the key and filed smooth. This repair will wear indefinitely and will take up all the lost motion which would be

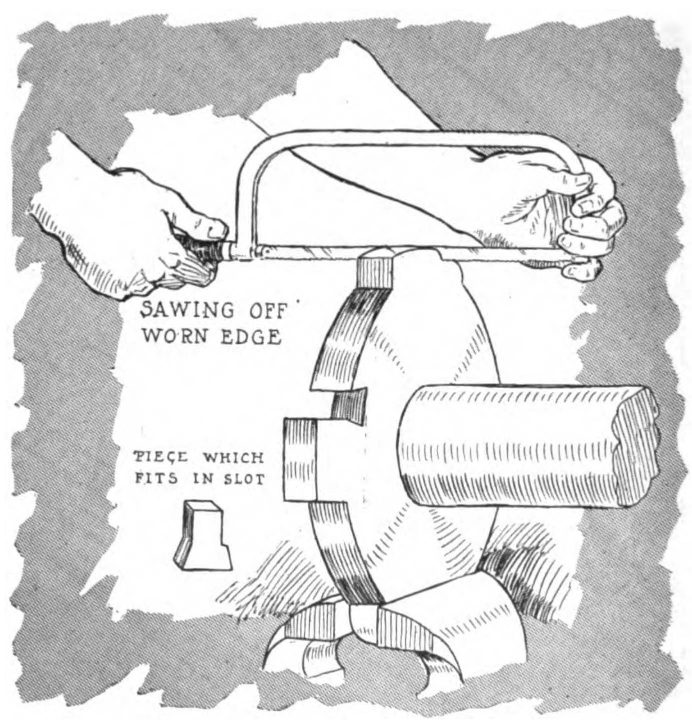


Fig. 2—First operation in making repair on Stearns axle and key-piece

found should the axle be left as it was in the first place. The most important thing to remember in connection with the work is that extreme accuracy must be used in the fitting or the repair will not last.

New York City. CHAUFFEUR.

Has Blow-Outs Frequently

Editor THE AUTOMOBILE:—In your issue of July 11, Mr. Sauermilch tells of his troubles with tubes often blowing out without cause and I wish to say that I have had the same trouble, but my casings are the straight-side style instead of the clincher. They also have a canvas flap covering the tube next to the rim which I think caused the trouble by getting a fold in it, no matter how careful I was in putting in the tube. As Mr. Sauermilch says, it nearly always happens while the car is standing idle, but I have had it happen two or three times on the road. I put in a new tube, thinking maybe it was the tube's fault, but it blew out before being run 25 miles and this time on the road. I then bought a new casing of a different

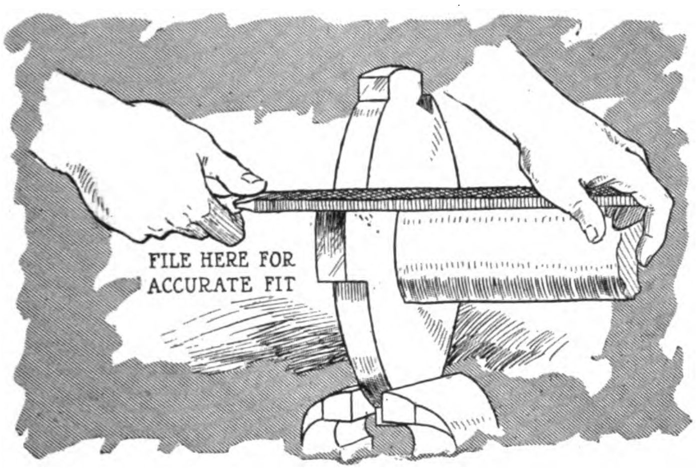


Fig. 3—Filing the groove in order to secure most accurate fit

make, straight-side also and without the canvas flap, and put it on the same wheel and had no more trouble from that wheel, but still have another one that gives trouble. Do you think it would do to take out the canvas? I have been afraid to do this as the beads on the casing are different than the new one. I have also thought of putting in a reliner, but don't know if it would help any. The trouble began after the car had run about 1,000 miles and the tires were new.

Orchard, Iowa. W. R. WORSELDINE.

—It should do no harm to take out the canvas flap, but it is doubtful if it is that which is giving the trouble, although it is a possibility. A reliner would harly prevent the trouble either, as it would make it even harder to get the tube properly into the casing. It is impossible to state the cause of these blow-outs without seeing the tire, but with a proper fit of the inner tube and proper pressure on the tire, these things should not occur. Perhaps the experiences of other motorists along similar lines could help you. THE AUTOMOBILE will gladly publish any suggestions regarding this case.

Disagrees with Test Results

Editor THE AUTOMOBILE:—Referring to the test made in the laboratory of the Automobile Club of America by H. Chase, on a 48-horsepower automobile engine, permit me to say:

Since the fan and the radiator designed for the engine are indespensable thereto, both should have been included in the test. The former takes power. How much? Its speed is correct only within very narrow limits. What are those limits? Instead of using an ideal cooling system, Mr. Chase should use a blower, imitating the wind met on the road, as the great variety of conditions there ought to be duplicated as far as pos-

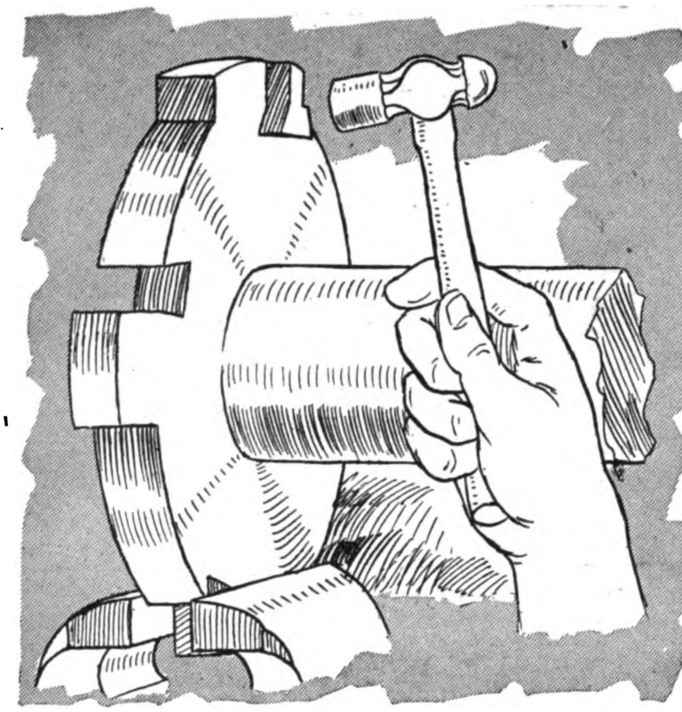


Fig. 4—Tap the piece carefully into place in slot until flush

sible. When Mr. Chase says that the engine, when driven by a motor (not under its own power), pumped less water than it did before, and when he then places the causes as probable I wish that he had gone a little further and ascertained just what the cause was. Since I believe, judging from my own investigations, that there are causes not yet discussed which are in part responsible for the noted difference, I suggest the following test: While the motor is firing regularly, stop the pump and note what syphon action takes place. Next, place the radiator in such a position that, theoretically, the syphon action ougt to be interrupted. Then place it so that it will be actually stopped. Unless I am wrong there will be a difference in theory and practice which must have causes other than those known.

I would like to see the indicator cards taken at the exhaust, since I am convinced that we have much to learn in that direction. Among other things it will be noticed that the exhaust gases do not leave the cylinder in a stream during the time the exhaust valve is open. When Mr. Chase says that he has found oxygen in his test tubes while examining the exhaust, I be-

Fig. 5—Final step in repair

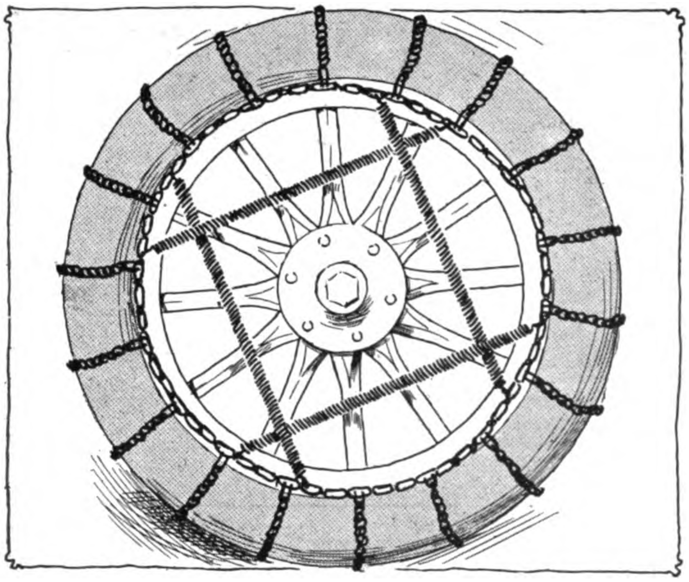


Fig. 6—Device used by reader to take up slack in non-skid chain and to prevent noise

lieve that he will not be able to duplicate for the following reasons:

I once attempted to preheat the manifold of an engine by tapping a 1-8-inch copper tube of a total length of about 2 feet onto the exhaust close to the exhaust port, and winding it in a coil around the intake pipe, with this result: only cold air and water would pass through. For Mr. Chase to point his test pipe in a direction to meet the outgoing gases was to take a step to no purpose. A jet action cannot be obtained on the exhaust side of an engine. At least, my attempts in that direction were failures. The Hornsby-Akroid people in England also failed in that, although an experimental engine was an apparent success. If Mr. Chase will increase the diameter of his tapoff considerably and take it for granted that gases leaving exhaust port expand in all directions at once, he will find no more oxygen. When the volumetric efficiency of a motor is mentioned I am interested in the temperature of the air after leaving the gasoline nozzle, at the valves, within the cylinder at the beginning and at the completion of suction stroke. Although a given volumetric efficiency may be recorded, the horsepower delivered will alter with the temperature of the air. Does the manifold, when forming a part of the engine casting, tend to unduly increase the temperature of the air and thereby the oxygen present? If so, would it be advisable to put a jacket on the manifold to keep the heat away from it? To what an extent do the hot cylinder walls repel the air by expanding it? I believe that all these questions need to be answered.

The definition of volumetric efficiency by Mr. Chase I do not think a happy one. One might think, in reading it, that it was possible that the incoming fluid might differ from the outgoing. The following definition I believe to be better: The volumetric efficiency of an engine is the difference between the actual inhaling per stroke per piston and its displacement.

In connection herewith I would like to see a comparison with an engine fully scavenging its cylinder, the Atkinson, for example, and a conventional engine. I believe that the increase in volumetric efficiency in the former is less than 5 per cent., and in thermal efficiency the increase is less than 2 per cent. Would Mr. Chase make a comparison?

If I were to sell a horse to a farmer, assuring him that it was suitable for plowing and then, although it did plow, it soon gave out, had I then sold the man what he wanted?

To put it in the shape of questions: How is an engine limited? Why is it limited? What limits it? Why, for example, is an automobile engine not suitable for a boat? To say that a boat is always going uphill is no answer, although I made it, not having a better reply. Why will an engine not deliver the same horsepower continually, say for a month? What prevents? We are displacing the horse, asserting that the motor does not tire, but this does not seem to be so. Why?

New York City. P. G. Tismer.

Two Useful Illustrated Tips

Editor The Automobile:—An ordinary claw hammer is a useful tool for opening hooks as shown in Fig. 7 or for removing broken cross-chains from tire chains. It is sometimes difficult to pry them open with a screwdriver.

Four springs for screen doors may be hooked across the tire chains, as shown in Fig. 6 and will take up the slack, thus diminishing the liability of the chains striking the mudguards.

Allegheny, Pa. Murray Fahnestock.

Cost of Livery Maintaining

Editor The Automobile:—Please give me the following information with the Case 40 as an example:

In using this car for livery service about what should the charge per mile be to cover all expenses and maintain the car up to the time when it would be so worn out that it would not pay to add more repairs on it to keep it in running condition? Above all this expense, how much would have to be added per mile cost so at the time the car was of no more use I would have enough money to purchase another car of the same cost as the original?

About how many miles should a car of this size and type run before it is worn out? Please give me this information itemized, *i. e.,* how much cost for gasoline, tire, lubricating oil and grease, insurance, maintenance for repairs, depreciation and driver. Car to be run over country roads.

Rupert, Idaho. F. A. Nelson.

—All these figures cannot be accurately determined by estimate. Some of them should be taken from an observation of the car itself working under the same circumstances as those you mention. This includes the cost of gasoline, oil, tires, etc. An estimate based on observing other cars would be as follows:

Gasoline, 2 cents per mile.

Oil and grease, 1-5 cents per mile.

Tires, 4 cents per mile.

Insurance, 1 cent per mile.

Maintenance would vary greatly; allow 2 cents per mile, which should include annual overhauling.

Driver, 10 cents per mile.

Depreciation sufficient to pay for new car after 150,000 miles, an arbitrary figure, 1 1-3 cents per mile.

Total: 20.5 cents per mile, without profit.

This is based on running the car about 10,000 miles per year, during which time the expenses would total up $2,050. If you charge 40 cents a mile the profits on one car should be $1,950 per year, provided that the car was only run 10,000 miles in the year. By keeping the car busier than this, the expense relative to the mileage would be reduced and the profits correspondingly increased.

Careful driving over rough roads will be a necessity to reach the figures given above.

Has Trouble in Shifting Gear

Editor The Automobile:—1. I have much trouble in sliding my gears into mesh and, after I get them in, I have just as much trouble in getting them out. Gears are of the sliding type with three speeds forward and one reverse.

2. After running on third speed a little while, the engine slows down and sometimes stops altogether. My machine is a four-cylinder, 40-horsepower Wood.

3. How far should I advance my spark and throttle levers while traveling on level road?

Plainfield, N. J. Reader.

—(1) The trouble is that you do not declutch far enough. This might be caused by the fact that you simply do not press far enough on the pedal or it might be that the pedal cannot go farther forward owing to faulty clutch adjustment or, as sometimes happens, the floorboards might not be slotted deep enough to allow the pedal to go down as far as it ought. The trouble is no doubt due to the continued engagement of the clutch to some extent while you are trying to shift gears.

(2) This looks like a matter of faulty fuel feed, but there is insufficient data in your question to answer fully. Weak batteries might cause the trouble if you do not use a magneto.

(3) After you have the motor started, turn the throttle lever on the steering wheel back as far as it will go and control the speed with your foot. The spark should always be advanced as far as possible without allowing a knock to develop in the motor.

How to Avoid Carbon Trouble

Editor THE AUTOMOBILE:—In removing carbon from the cylinders with kerosene, as suggested in THE AUTOMOBILE, how long should the kerosene be left in the cylinders before starting the motor?

Greenwich, Conn. CARBON.

—Leave the kerosene in the cylinder at least overnight and be sure to put it in while the motor is hot as the object is to dissolve the carbon with the vapor of the kerosene which will not be formed if the kerosene is placed in the motor after it has become cold. A tablespoonful put in each cylinder just after the car has stopped running every time you return home will keep your cylinders free of carbon. When starting the motor again open one pet-cock at a time for a few seconds to aid in blowing out any accumulated matter.

Tight Tappets Consume Power

Editor THE AUTOMOBILES—Will you kindly advise me as to the best adjustment of the valve tappets on my 1912 Cadillac? I have the tappets adjusted so that the motor runs very quietly. I have them tightly adjusted, thus eliminating any noise that would occur with loose tappets. Kindly advise me if this adjustment would cause a loss of power or heat the motor in any way. I wish to say that the motor does not skip at all with tappets drawn up snugly.

Lynn, Mass. SUBSCRIBER.

—The valve tappets must have clearance when the motor is cool or else you will lose power. When the motor becomes warm the valve stems expand and hold the valves from their seats. The proper clearance between the bottom of the valve stem and the top of the push rod when the motor is cold should be such that a visiting card can be slipped between them and just fit. Even when warm there will be a very slight margin of clearance. In this case, however, this should be no more than the thickness of an ordinary sheet of paper.

Another View of Starter Problem

Editor THE AUTOMOBILE:—The vigor in which the Editor of THE AUTOMOBILE expressed his thoughts on the starter problem, page 146, July 18, is worthy of a better cause. Engineering problems are not solved in a day or a year. They are like other problems, the pressure to shape comes from many sources. The engineer would change his engine to match the newcomer (the starter), but the prudence of the manager forbids. Salesmen hand in contradictory reports, one territory complaining that several sales are lost because the starter was not electric, another territory calling for a priming device. But lay the considerations aside for the moment. Forces at work today differ but little from those of yesteryear. When the first railroad coaches were built, the stage-coach was placed on rails. Who pretends that the automobile of but a few years ago was not what it was called, a horseless carriage, just as silly-looking a thing as the before-mentioned stage-coach of former days. How about the present-day delivery wagon? Just the horse left off. And the trucks? Human progress is not unlike the upbuilding of a coral reef, going on all the while, with many builders at work. This is hardly perceptible to the editors.

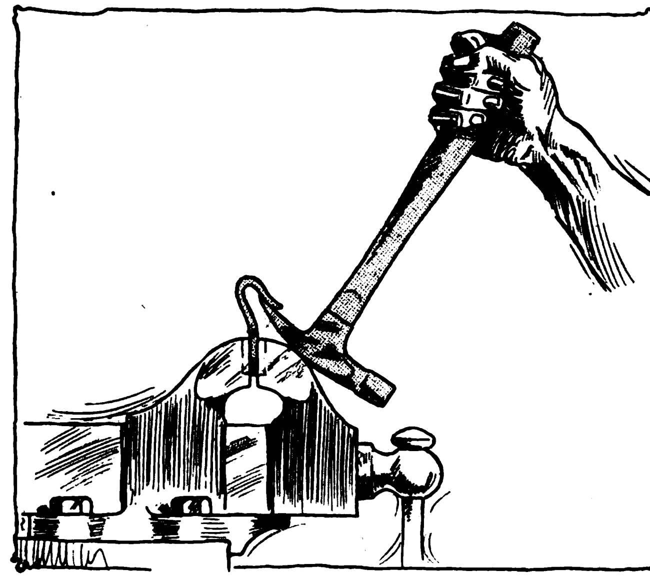


Fig. 7—Method which is more satisfactory than screw driver for opening hook

The trifling betterment of one design will help another to a new conclusion. Gradually, in a few years, unsightly will will become a matter of course—and the mighty editor will direct his attentions towards other matters.

New York City. B. BRITT.

Derivation of S. A. E. Formula

Editor THE AUTOMOBILE:—I would very much like to be enlightened on the S. A. E. formula for horsepower.

As I understand it, it has been based on observations made at a lineal piston speed of 1,000 feet per minute. This brings in the consideration of stroke and, by using this factor, the formula may be used nicely to compare the probable power of various cylinder dimensions. However, I have not been able to find an explanation of its origin. I would like to know the steps in its derivation.

Decatur, Ill. F. M. VAN DEVENTER.

—THE AUTOMOBILE has previously published the derivation of this formula, but since it is a matter of common interest, as many states use the formula as a basis of the calculation of horsepower in deciding the license fee, it will bear repetition.

The indicated horsepower of a four-cycle single-cylinder motor is equal to the mean effective pressure P times the area of the piston A, in square inches, times 1-4 the piston speed S in feet per minute and the result is divided by 33,000. The factor 1-4 holds good for the four-cycle motor since the power is only exerted on every fourth stroke or once for every two revolutions. This is expressed in equation form thus: $\text{I.H.P.} = \frac{P \times A \times S}{4 \times 33{,}000}$. Multiplying this by the number of cylinders N of the motor and further taking into consideration E, the mechanical efficiency of the motor, the formula for B.H.P. becomes: $\text{B.H.P.} = \frac{P \times A \times S \times N \times E}{33{,}000 \times 4}$ The A. L. A. M. assumed that the motor will deliver its rated horsepower at a piston speed of 1,000 feet per minute and that the mean effective pressure in the cylinder of the automobile motor will be 90 pounds to the square inch. It also assumed that the mechanical efficiency of the motor will be somewhere in the neighborhood of 75 per cent. and will average that figure. Substituting these values in the formula for brake horsepower and also substituting for A its equivalent $.7854\,D^2$, the equation reads: $\text{B.H.P.} = \frac{90 \times .7854 D^2 \times 1{,}000 \times N \times .75}{33{,}000 \times 4}$. Performing the indicated operations, the formula is simplified to its final form $\text{B.H.P.} = \frac{D^2 N}{2.489}$, or, in round numbers, the denominator may be called 2.5.

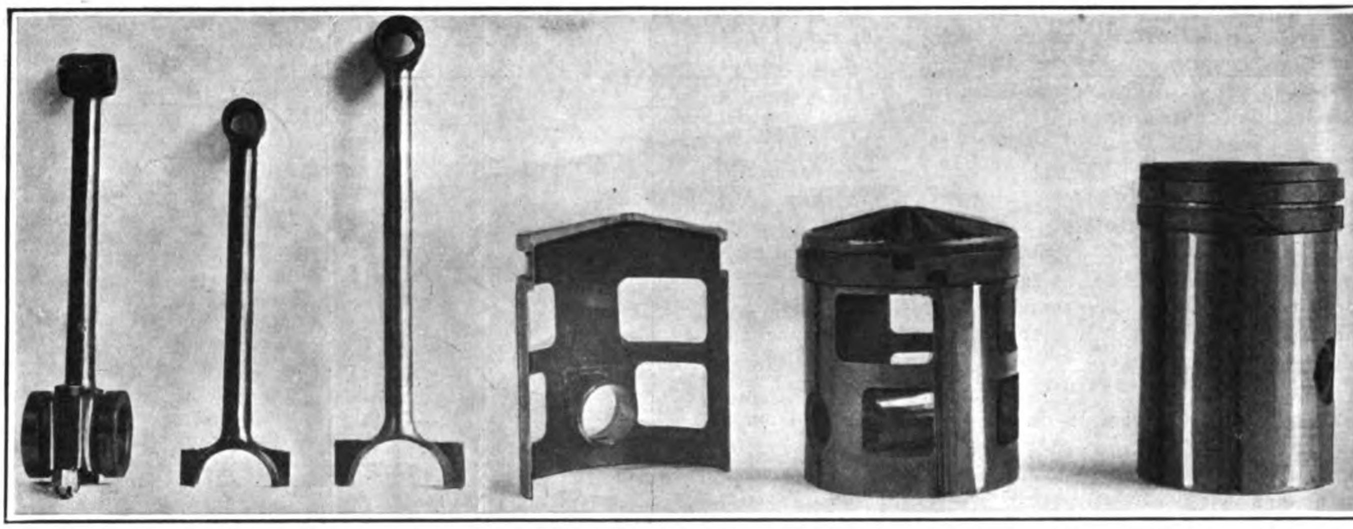


Fig. 1—Standard connecting-rods on Sizaire-Naudin   Standard steel BND racing pistons in Sizaire-Naudin

High Efficiency in New French Motors

Koecklin Motor Employs Combination Sleeve and Piston—Sizaire-Naudin and Alcyon Other Examples

THE two-cycle motor is receiving more attention in France today than it has for several years; in fact, it is being seriously considered in many circles. The two-cycle motor that is in the public eye today is very different from that exploited in America several years ago in that simplicity is not the only keynote. Rather, efficiency is placed in the foreground and simplicity is used only as it aids in efficiency. One of the latest French products is the Koecklin, a design of Alfred G. Koecklin and a type which has been well tried out, a motor of this design having competed in the recent Grand Prix race. Figs. 3 and 4 give the general scheme of this motor, which, is a combination two-cycle, sliding-sleeve design, but which differs from all previous motors of this style in that the sliding sleeve E1, Fig. 4, is an integral portion of the piston P. The sleeve has two sets of ports which extend practically throughout its circumference. The upper E serves to release the exhaust through the opposite passages E1, and the lower ports I admit the intake gases. The piston is a differential type, the small-diametered upper portion constituting the working piston and the large diameter lower part serving as a pump to suck the mixture into the annular space A on the downstroke, and deliver by means of the rotary distributor, or valve D, through ports I in the combustion chamber.

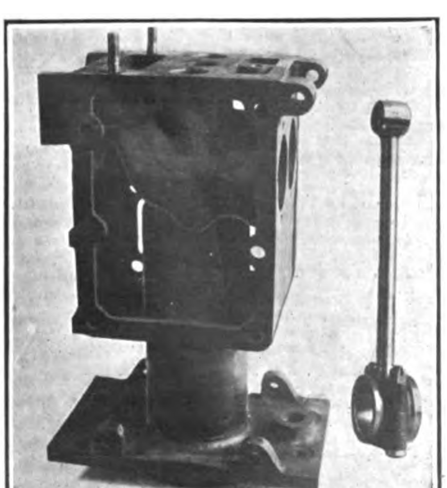


Fig. 2—Steel cylinder casting and connecting-rod of Sizaire-Naudin racer

The inventor claims by this design to have obtained an efficiency heretofore unknown with two-cycle motors, and in one size, namely 3.3-inch bore and 5.9-inch stroke, the motor developed 110-horsepower in its official tests. The four cylinders constitute a block casting of simple design. At the front end are two magnetos driven off a cross-shaft, and on the rear end of the crankshaft is a pinion driving the distributer valve through a silent chain. Thus the only meshing pinions on the motor are those driving the magneto. The crankshaft is carried on six S. K. F. ball bearings, there being a bearing between adjacent cylinders, one at fore end of shaft and two at fly-wheel end.

The motor is lubricated under pressure to all parts, the crankshaft being bored for the delivery of oil to the connecting-rod ends and the flow being directed through a tube on the connecting-rod to the wristpin.

In this motor, the crankcase compression generally utilized in two-cycle designs is not required, owing to the lower piston forming a pump which literally forces the fresh gases into the base of the cylinder and these in turn literally force the exhaust gases out of the upper portion of the cylinder.

Novel Sleeve on Koecklin Motor

The main feature of the Koecklin motor is the combination of a sleeve with the piston. The piston P has a tubular extension P I and on this sleeve or tube are two series of ports for the passage of respectively the fresh and the spent gases. Unlike that now familiar type of motor, the Knight, the fresh gases are not admitted through openings on one side of the sleeve and the exhaust gases expelled through openings on the opposite side. All the openings I on the lower plane serve for the intake, and all those E on the upper plane for the exhaust. Obviously, therefore, intake and exhaust take place all round the cylinder, and a complete view of the motor would show intake and exhaust pipes on both sides. Fig. 3 shows the piston at the end of its down stroke, and, as will be observed, the upper series of openings E on the sleeve coincide with the exhaust ports, and the lower series of openings I with the intake ports. The fresh gases rushing in at the base of the cylinder drive out the exhaust gases through the ports in the head, without any dead gases remaining, and with a practically complete filling of the cylinder. Fig. 3 shows the cylinder at the commencement of the firing stroke. It will be noticed that a rotary distributer D is carried between the carbureter and the reserve chamber of compressed fresh gas. This distributer gives admission from the carbureter to the lower diameter A of the cylinder, allowing the gas to be aspired, and on closing communication with the carbureter causes the gas aspired and compressed in the lower end of No. 1 cylinder to be admitted to No. 2 cylinder. This chamber is common to two cylinders, and, being heated by the water in circulation around the cylinders, there is no possibility of the condensation of gasoline on its walls.

The sleeve combined with the piston is in direct contact with waterjacketed walls throughout its entire length. This can be best observed in the drawings of the 3-liter motor built for competition in the French Grand Prix. The spark-plug 2 is set in a deep well, being placed in the centre of the head of the cylinder with water space all around, so that, while the piston has a water-jacket around it, only the sleeve is in contact with water-cooled surfaces on both sides. Two compression rings R are fitted just below the head of the piston, two R I at the base of the sleeve just above the intake ports, and three R2 at the base of the detachable head.

Other 3-Liter Motors of High Efficiency

The Sizaire-Naudin and Alcyon are two other examples of high-efficiency 3-liter motors in which some interesting details of construction are worked out. The Sizaire has cylinders of 3.07-inch bore and 6.1-inch stroke cast separately. Fig. 5 shows one of these cylinder castings. When the four castings bolt together they form a continuous waterjacket, the bolts passing from end to end, holding them together. These motors have run up to 101 horsepower at 2,000 revolutions on the bench, which is a piston speed of over 3,000 feet per minute. The normal running speed is 2,600 revolutions per minute when 80 horsepower is generated. The pistons are steel types, Fig. 6, comparatively short with one very broad rim at the top and the majority of the piston wall cut away with large rectangular perforations. In contrast with these special racing pistons is shown the standard Sizaire piston at the right in Fig. 6, which is much longer and uses two compression rings. Fig. 7 shows the standard connecting-rods used in the Sizaire cars at the left and the special rods for racing purposes at the right.

The valves, which have a diameter of 55 millimeters for a cylinder bore of only 78 millimeters are mounted horizontally near the end, there being two exhausts side by side on one side of the motor and two intakes on the opposite side. There are, however, only four cams on each camshaft, and, consequently, four push rods on each side. Each rocker, however, has two arms, one for each of the pair of valves. On the exhaust side, the valve springs are external and the exhaust gases are expelled vertically. Each valve is mounted in a cage, and, while the intakes are the same in design and size as the exhausts, their springs are contained within the intake manifold. To dismount an intake, four nuts have to be taken off and the complete valve with its cage can be withdrawn.

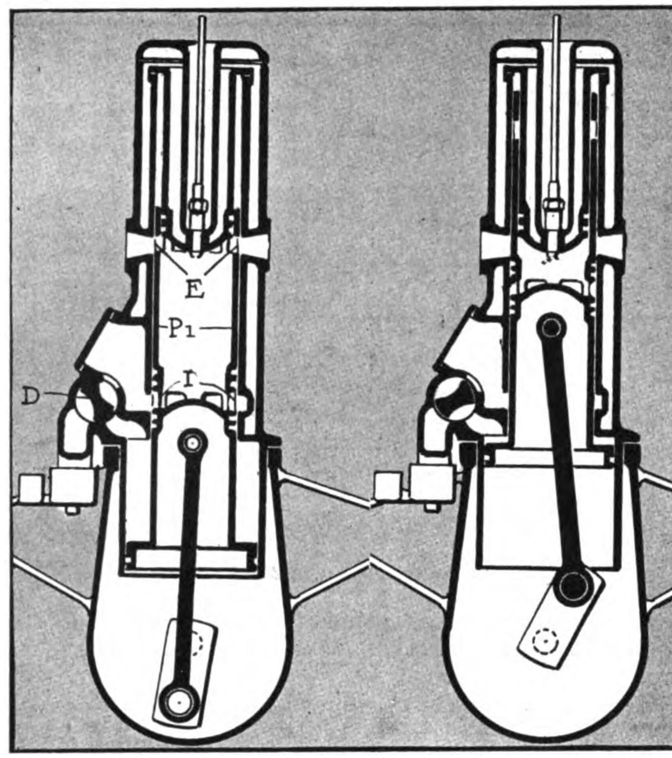


Fig. 3—End sections through the high efficiency Koecklin motor

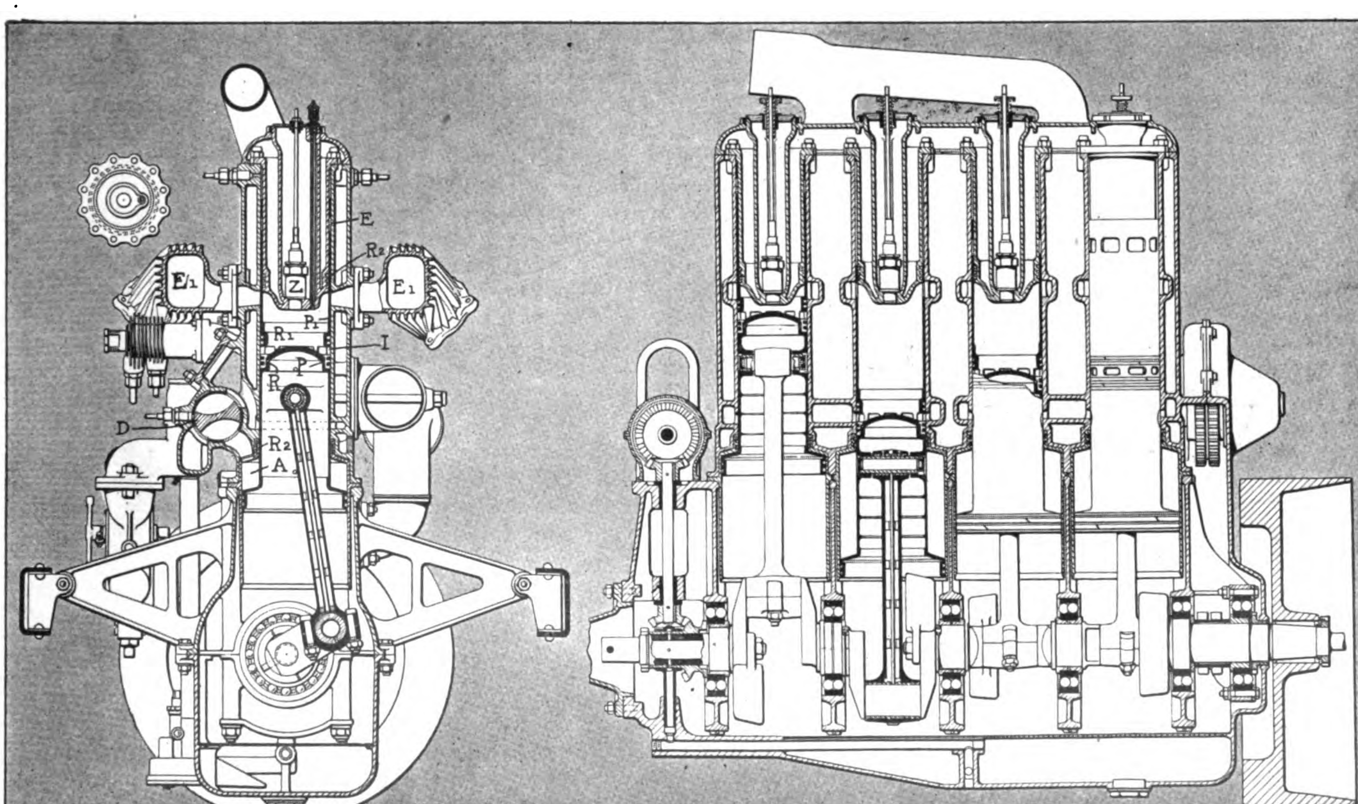


Fig. 4—Transverse and longitudinal sections through the Koecklin motor, showing details of unique valve action

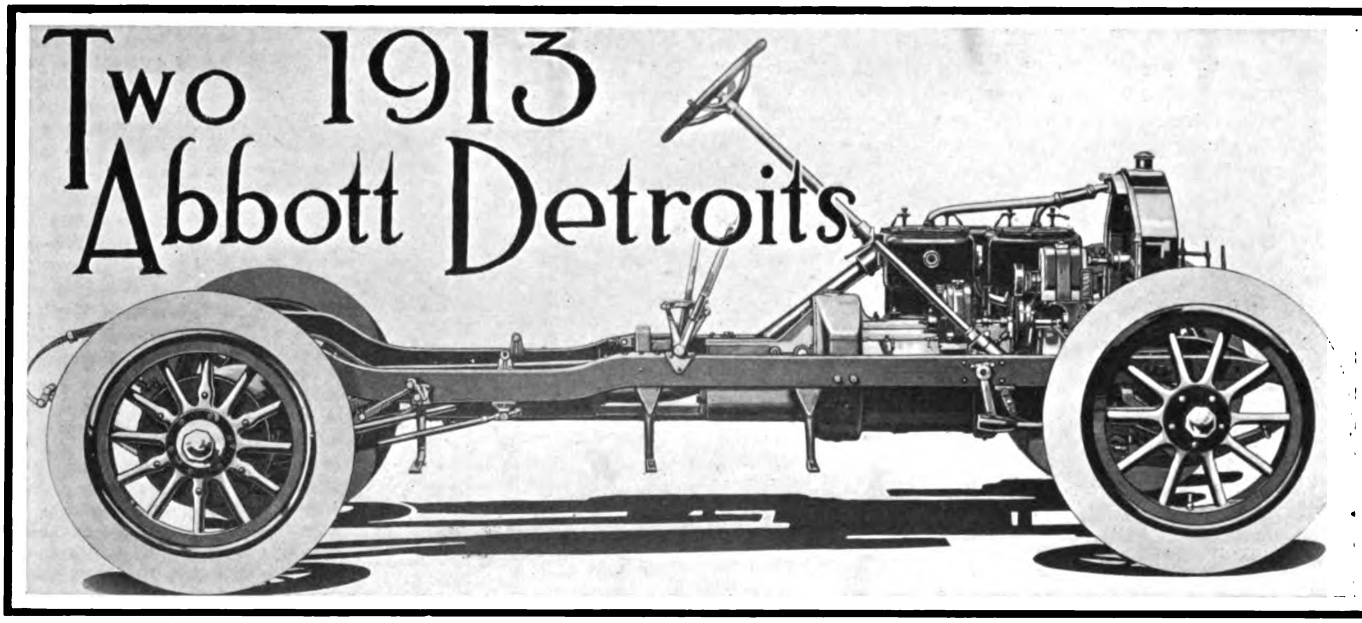


Fig. 1—Chassis of the 1913 Model 44-50 Abbott-Detroit, showing underslinging of front and rear springs

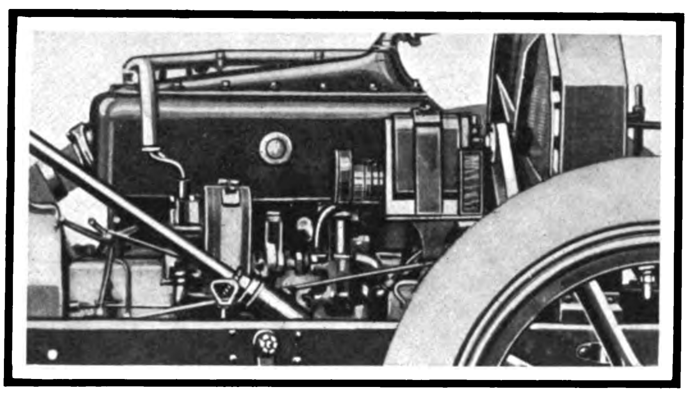


Fig. 2—Valve side of the 34-40 Abbott-Detroit

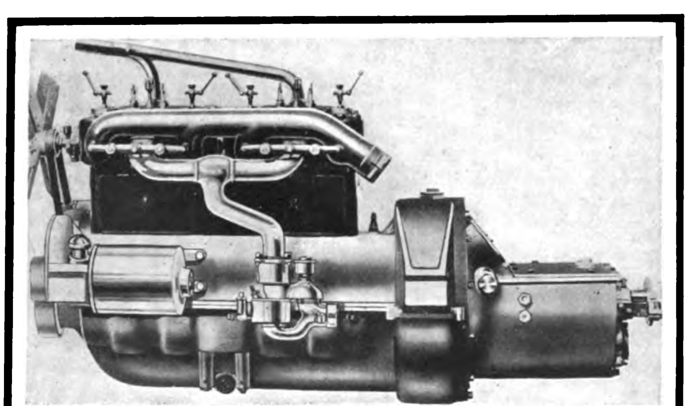


Fig. 3—Intake side of 44-50, showing electric self-starter

Two Models, 44-50 and 34-40, Latter of Which Has Been Re-Designed, and Is a Duplicate of Larger Model

THE Abbott-Detroit announcement for 1913 conveys the information that two models will be on the market for the coming season. These are to be known as models 44-50 and 34-40, the figures representing the horsepower ranges on block tests. For this year, the company made two models which were designated as 30 and 44, the latter being nearly the same mechanically as the larger 1913 model, but the smaller being very different from the new 34-40. In fact, the two models for the coming year are mechanical duplicates, the 34-40 being smaller in its various dimensions and having less power, but at the same time presenting the same appearance and mechanical design throughout. In order to bring about this similarity of the two, the small car had to be entirely re-designed, and is so different from the 30 of 1912 that it is considered a new car entirely, and its predecessor is looked upon as extinct. The unit power plant idea is carried out in both motors, flywheels, clutches and transmission gears being housed in cases which are made a part of the engines by being bolted to the rear of the crankcases.

Thus, both machines now use the same type of rear axle, both have Continental engines and their general chassis arrangements are alike.

Aside from the bringing of the two models to the same design characteristics, the most notable changes in the line are the adoption of an electric self-starting system, and the underslinging of the springs, front and rear, on both models. The latter feature has been incorporated to lower the center of gravity and leave the road clearance unaltered at 10 3-4 inches.

Description of Electric Starter

The electric starter is of Abbott design and consists of a motor mounted in a cylindrical case at the left forward side of the engine. This electric motor is independent of the lighting generator and the magneto, is driven by a storage battery and when in the operation of starting, is connected with the crankshaft through a train of gears. By making the starting motor a separate and distinct unit, the company believes that it has obviated all possibility of interference with the ignition and lighting systems through the failure of any one unit to perform its functions. The gear train between motor and crankshaft runs in a bath of oil. The crankshaft gear is mounted on an overrunning clutch which allows the gear to idle when not required for starting. Electrical connection between the electric motor and storage battery is made direct through the spark lever which makes the connection when the lever is retarded to a certain point. The spark lever automatically returns to its proper running position when released after the engine is started. At no time can the starter be operated unless the spark is fully retarded, which, under all ordinary conditions, would make it impossible to get a back-fire. In case of an unusual condition there is a protecting device located in the over-running clutch which will take a back fire caused by any trouble such as improper magneto setting or premature combustion due to carbon or other agencies, and will prevent such back-fire from damaging the starter or its parts. To start the motor, then, it is only necessary to bring the spark lever to its extreme retard position and to release the lever after the engine is running.

The 44-50 engine has cylinders cast in pairs, while the 34-40 is a monoblock-cast type. Cylinders are of the L-head design, their dimensions being:

Model	Bore, Inches	Stroke, Inches	A. L. A. M. Ratio	Horsepower	Piston Displ., Cu. In.
44-50	4½	5½	1.22	32 4	340.7
34-40	4⅛	5¼	1.27	27.2	280.6

Valves Are All On One Side

Inlet and exhaust valves are on the left; they have nickel-steel heads and machined steel stems. The two parts are electrically welded together and exhaust and inlet valves are interchangeable. The ends of all stems are hardened to protect them against excessive wear, and they are fitted with oil tempered springs. All valves, springs and stems are completely inclosed, there being two cover plates on each motor. Crankshafts and camshafts are carbon steel, heat-treated drop-forgings with a tensile strength of 90,000 pounds per square inch. The engines on both models are fitted with three crankshaft plain bearings of the following sizes:

Model	Crankshaft Diameter	Crankshaft Bearing Lengths
44-50	1⅞ inches	3, 3 11/16 and 4½ inches
34-40	1¾ inches	2¾, 3 and 4¼ inches

Bearings are all of Hoyt's nickel bronze. Flanges F, Fig. 4. are provided to take any end thrust which may be imparted from the clutch or from any outside mechanism.

The camshafts have integral cams. The steel is of the low-carbon analysis. The shafts revolve on Hoyt's bearings of nickel bronze, lubricated by oil which collects in pockets cast in the crankcases. Removal of the gearcase cover allows the easy withdrawal of the camshaft. The camshaft bearing sizes for both motors are 2 1-4 by 2 1-2 inches, 2 1-4 by 2 1-4 inches and 2 1-4 by 1 1-4 inches for the front, center and rear, respectively. Push rods, which are of the mushroom type, of crucible steel, bear directly on the cams.

Pistons are of the same grade of reverberatory air-furnace iron as that used in the cylinders, each being fitted with four diagonally split rings of the eccentric type, having a width of 1-4 inch. Five oil grooves are turned on the outsides to aid in the distribution of the splashed oil to all parts of the piston bearing surface. Pistons have a length of 5 1-2 inches in the 44-50 motor and 5 inches in the 34-40. Wristpins are of seamless steel tubing, pinched into the small ends of the connecting-rods, making them solid with the rods, the bearings being in the piston bosses. By this arrangement, the bearings are made longer, the total length of wristpin bearing in each piston being 2 7-8 inches, and the diameter being 1 1-4 inches for the large type and 1 inch for the small model.

Connecting-rods have a length of 11 inches in the 44-50 motor and 10 1-2 inches in the 34-40. Their lower bearings are 1 7-8 by 3 inches and 1 3-4 by 2 1-2 inches, for the two sizes of motors. These connecting-rods are of the universally used, tapering I-beam construction, made of 0.12 to 0.15 per cent. carbon steel, drop-forged and heat treated. Connecting-rod caps are held in place by nickel-steel bolts, four being used for each rod end. They are locked in place, connecting-rod bearings being adjusted by means of sheet steel shims of varying thickness.

The flywheel is fastened in the usual way to the crankshaft by means of a flange and six large bolts. The diameter is 17 1-2

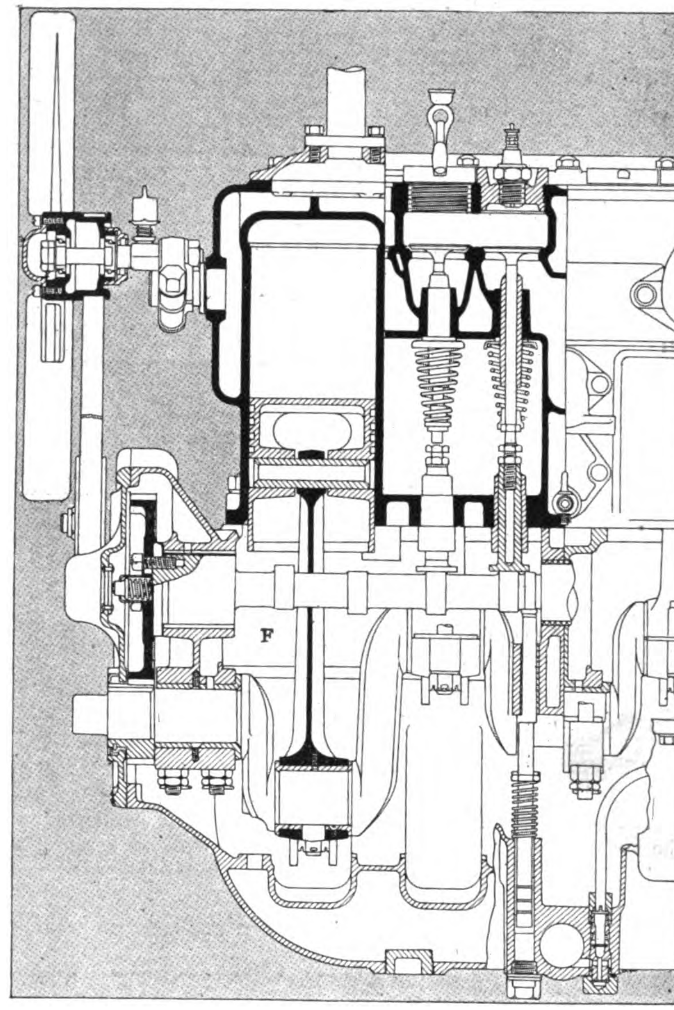


Fig. 4—Sectional view through cylinder of the Abbott motor

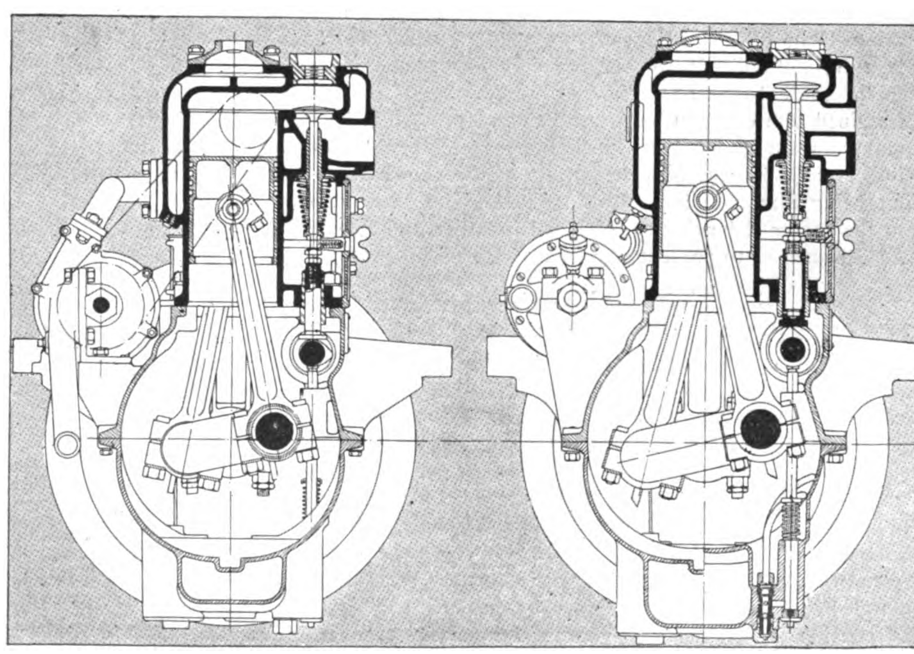


Fig. 5—Transverse section through Abbott 34-40, left, and 44-50, right

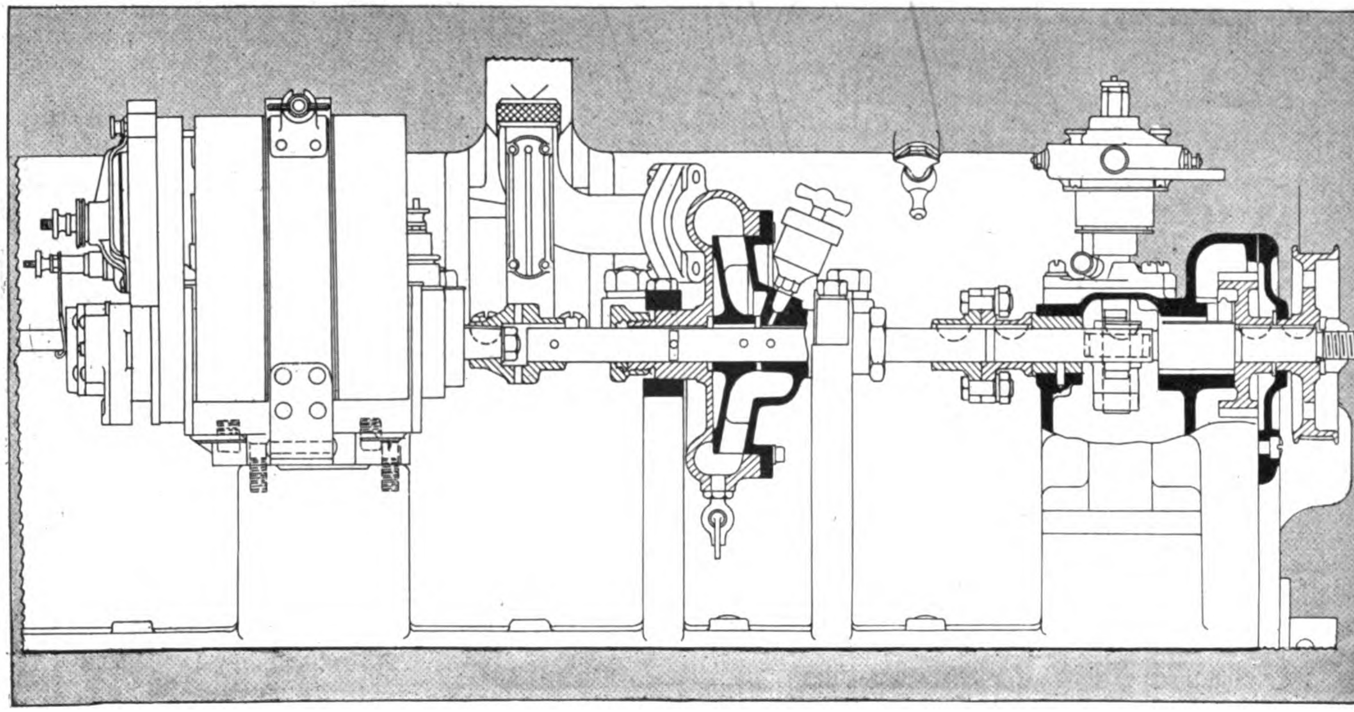


Fig. 6—Magneto and motor pump shaft are mounted on the right side of the motor

inches and the face width 5 inches for either type of engine.

All timing gears are helically cut on automatic hobbing machines, which process of manufacture tends to uniformity of teeth and to noiselessness. The gearset is housed in a case at the front of the motor, and consists of three steel gears and one cast-iron gear, the connecting-rod gear, idler gear and pump gear being of steel and the camshaft gear of cast iron.

Crankcases are made of an aluminum-nickel alloy and they are of the two-piece construction, all bearings being carried in the upper halves. The lower portions contain the oil reservoirs, and are made easily removable for accessibility of bearings, connecting-rod ends and crankshafts. The four supporting arms are integral with the upper half of the crankcase, two located in front and two in the rear.

Lubrication is by the constant-level splash system, with oil circulated by a double plunger pump, cam-operated from the camshaft. This pump forces one stream of oil over the timing gears in front and a second stream over the rear crankshaft bearing. The other bearings of the engine receive their oil by splash from the dipping of the connecting-rod ends into the oil troughs, there being an individual trough the oil in which is maintained at a constant level at all times, for each rod end. Oil from the troughs and that which flows from the bearings and cylinders finds its way into the bottom of the crankcase, whence, after being filtered it is again circulated. The lubricant is put into the motor through the combined breather and filler, which is so designed as to prevent any leak of the oil.

Three Units in Electric Apparatus

Water circulation is assured through the use of a gear-driven centrifugal pump mounted on the pump-and-magneto shaft between the magneto and the lighting generator. The pump and its paddles are bronze castings. The fan is a one-piece, pressed-steel construction, 18 and 16 inches in diameter for the 44-50 and the 34-40, respectively. The single wide water outlet manifold connection is at the top of the monobloc motor, while the larger engine is provided with two outlet connections, one for each pair of cylinders.

As already mentioned, the electrical apparatus consists of three separate units, one to perform each of the functions of lighting and starting the engine and igniting the cylinder charges. The last is accomplished through the use of a Splitdorf dual magneto, while an Auto-Liter generator, which is driven by silent chain from the pump shaft, furnishes the current for lighting all lamps. The starter-motor is independent of the other two pieces of electrical apparatus, and is mounted on the opposite side of the power plant, Fig. 3.

Mayer carbureters are used, the sizes being 1 1-4 inches and 1 1-2 inches on the two models. Carbureter adjuster and priming device are placed on the dash within easy reach of the driver. Gravity gasoline feed is from a 11.6-gallon tank on the 34-40 and 16.7 gallons on the 44-50. The 44-50 roadster carries 30.1 gallons with a reserve of 3 gallons and the 34-40 roadster 34 gallons, with a reserve of 2.1. Gasoline tanks are fitted with self-measuring gauges.

The clutch has fourteen disks, alternate sets being faced with Raybestos. The disks run dry. The gearset furnishes three forward speeds, the gearshift lever being mounted at the right, and the shift accomplished through the use of an H-gate. The gears are of chrome-nickel steel, and the shafts and broaches are of 3 1-2 per cent. nickel steel throughout. Gear shafts are mounted on Timken bearings.

The propeller shaft uses two Spicer universal joints and a

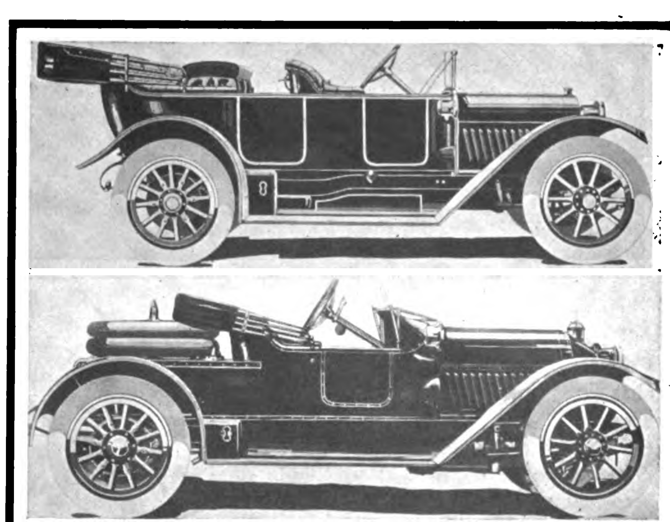


Fig. 7—Abbott-Detroit 44-50 seven-passenger touring car
Fig. 8—The 1913 Abbott 44-50 battleship roadster type

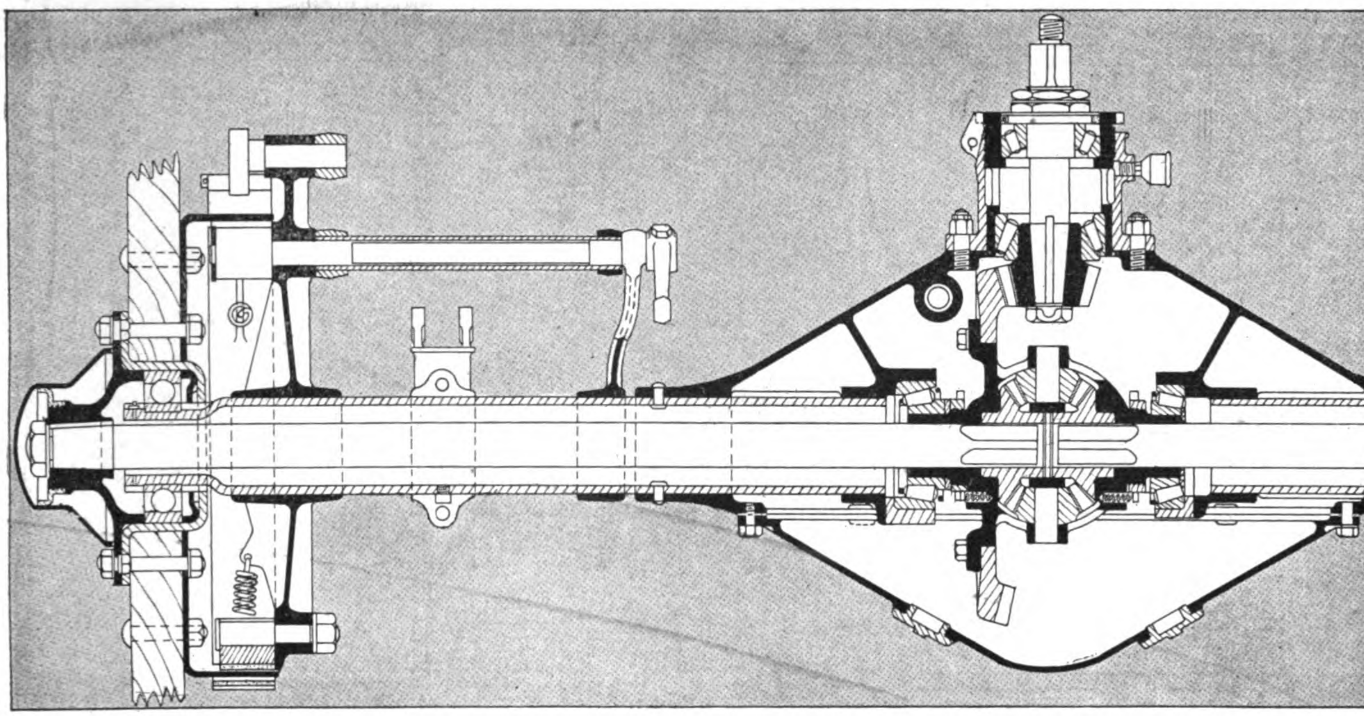


Fig. 9—View of rear axle on Abbott 1913 cars, showing differential brakes and wheel bearings

tubular, two-piece torque arm extends from the center cross-member to the differential housing. The side radius rods connect from a position half-way between gearbox and differential to the rear axle housing.

The rear axle is of the floating type and made amply strong. Shafts and gears are nickel steel and the radial and thrust loads of the rear wheels are carried on Shafer annular ball bearings. The pinion shaft, as well as the differential casing, is provided with Timken bearings. The differential housing has no flanges or webs, being considered amply strong without this feature. The differential is of the bevel type with nickel-steel gears. An assembled view of the rear axle used, as well as of the differential gears and pinion, is shown in Fig. 9. The front axle is of the conventional one-piece I-beam construction, the wheel spindles carrying Timken bearings. Steering knuckles are made of the same material as the axle, which is bowed in the center with a drop of 4 inches.

Brakes are 16 inches in diameter for 44-50 and 14 inches for the 34-40. They are internal expanding and external contracting lined with a friction-proof material. Drums are pressed steel and bolt directly to the rear spokes. An equalizing arrangement is placed in all brake connections. All working parts and bearing surfaces are provided with grease-cups.

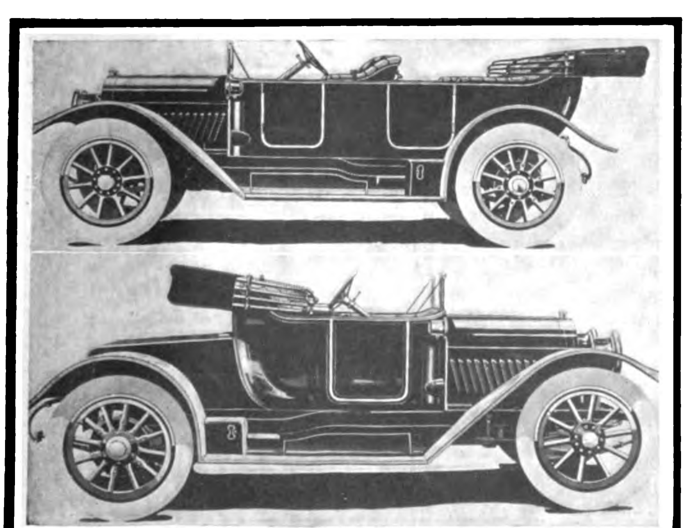


Fig. 10—34-40 Abbott-Detroit touring car
Fig. 11—34-40 three-passenger roadster type

The frames of the two models are practically of the same construction, there being a drop just to the rear of the gearset and a kick-up in front of the rear axle. The side-members are of channel section 4 inches in width with a depth of 1 1-2 to 3 1-4 inches.

Springs Identical on Both Models

Springs are practically the same on both models and are underslung. The rear ones are three-quarter elliptic, 48 inches long and 2 inches wide on all models. Front springs on the 44-50 are semi-elliptic, have a length of 38 inches and the same width as the rear springs. The front springs on the smaller car, while they are of the same width are 1 inch shorter. All spring bolts are provided with integral grease-cups.

Spokes of the wheels undergo a special oil treatment which is claimed to preclude any possibility of looseness and any decay due to water and weather. Wheel and spoke dimensions are as follows:

Model	Wheel Diameter	Spoke Diameter	Number of Spokes Rear	Front
34-40	34	1¼	12	10
44-50	36	1¼	12	10

Six most attractive body designs are offered. Limousines, seven-passenger touring cars, demi-tonneau models and a fore-door battleship type roadster may be had on the 44-50 chassis, while a five-passenger touring car and a three-passenger fore-door roadster are mounted on the smaller model. The price on the latter two is fixed at $1,700, while the cost of the other models ranges from $1,975 to $3,050. The Abbott-Detroit limousines are made in Berline and cab-side styles. The bodies are of metal and the rear compartments are finished in whip-cord and broadcloth. Fittings are all blackened nickel and the dashes are faced with leather. Some lights are also fitted. The touring cars have been altered somewhat and their lines have been made more rangy and sweeping. Ventilators have been placed in the sides of the hoods, while full equipment, such as robe-rails, foot-rails and the like are furnished. The roadsters are of two types, these being the 34-40 and the battleship model, which has a V-shaped radiator. This was brought out in January last and has been very successful. The body construction of the car is of sheet steel with rows of rivets showing.

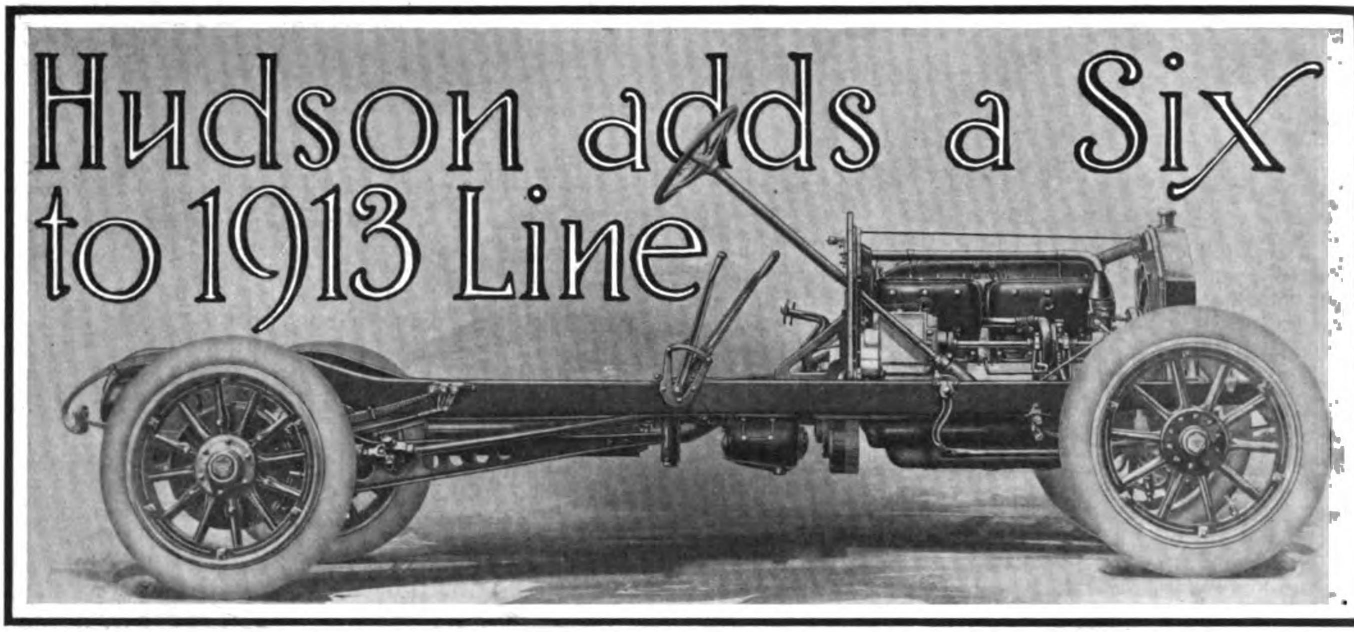


Fig. 1—Side view of the Hudson 1913 six-cylinder chassis

The New Car Will Be Known as Model 54, and in Many Respects Resembles the Four-cylinder Type

THE Hudson Motor Car Company has entered the six-cylinder field, this fact being conveyed in their announcement of an entirely new model, called the Hudson 54. It is in all respects a larger edition of the Model 37, announcement of which was made in the issue of July 11.

The motor is of Continental make; its general characteristics are comparable with those of the motor used on the 37. The powerplant is of the unit type, the gearset being bolted directly to the upper half of the crankcase. Cylinders are cast in blocks of three and the bore is 4 1-8 inches; stroke 5 1-4, cylinder dimensions being the same as those of the four-cylinder model. These figures give a stroke-bore ratio of 1.27. The horsepower rating, according to S. A. E. formula, is 40.8, but dynamometer tests show 54 horsepower at a speed of 1,500 revolutions per minute. The cylinders are of the L-head type, all valves being located on the left side, Fig. 2. These are interchangeable and have a diameter of 2 inches and a clear opening of 1 3-4 inches. Valve stems and springs are inclosed in dust-proof casings which augment the motor silence and protect the valve mechanisms against dirt and grease. There is a removable plate A, Fig. 2, over these valves for each block of three cylinders. The pistons are of gray iron and are made extra long so as to distribute the side thrust and to reduce the wear as far as possible on both the pistons and cylinder walls. The wristpins are pressed into the piston bosses and are held in place by studs of nickel steel which are prevented from working loose by cotter pins.

Details of Shafts and Bearings

The connecting-rods are of conventional I-beam sectional type; drop-forged and heat treated. Connecting-rod ends are fitted with specially designed caps, each secured by four nickel-steel bolts and castellated nuts. In case of wear, thin shims are placed between caps and connecting-rod bearings. The crankshaft has three bearings and it is of very substantial construction, well balanced. Its bearings are of bronze, lined with nickel babbitt. The camshaft is also of special steel, hardened and ground, and the cams are made integral with it. To avoid deflection in lifting the valves, the camshaft bearings, which are three in number, are made extra large. These are also of nickel babbitt. The tappets, which bear on the cams, are of the mushroom type and are in contact with the cams at all times. The dimensions of the various bearings are given below:

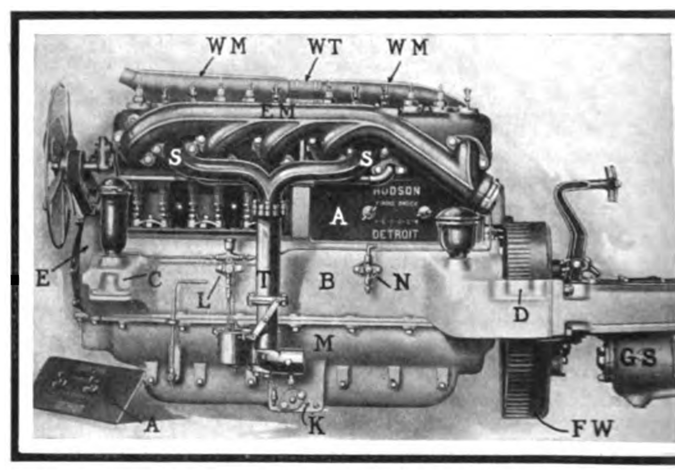


Fig. 2—Left side of six-cylinder Hudson motor

	Front Bearing	Center Bearing	Rear Bearing
Crankshaft	2 x 2 9/16 in.	2 x 3 in.	2¼ x 2 15/16
Camshaft	2¼ x 2⅛	2¼ x 1⅛	1⅞ x 1¼

The connecting rod bearings are 2 x 2⅝ inches and the wristpin bearings 1 1/16 x 1⅞ inches.

Cooling and Lubricating Features

As in the usual construction, the crankshaft bearings are bolted to the upper half of the crankcase B, Fig. 2, which is of an aluminum alloy and made very rigid. At its front end, the upper half of the crankcase has two integral arms C one at either side which fasten the motor to the frame, while the two rear hangers D are made a part of the arms which pass around the flywheel and to which the gear-box arms are bolted. The timing gears are in the usual position at the front of the motor and they are housed E against oil leakage. The gears are of the helically-cut variety and they run in oil, which adds to their silence and increases their efficiency. The water pump F, Fig. 3, of the centrifugal type, is mounted somewhat forward and is the same type as that used on the four-cylinder Hudson motor. It is mounted between two bearing hangers H which are integral with the upper half of the crankcase. Aside from carrying the water pump, these hangers serve to stiffen the pump and magneto shaft, J. By this mounting the glands can be packed or the pump removed without interfering with the other members of the power plant.

As will be seen from Fig. 2, the water outlet manifold connections are extremely large and of unique construction, extending over the entire top of each block of three cylinders, and the two being connected by rubber tubing WT. The exhaust manifold EM has six connections with the motor, four of which are uniform, while the last two come from the manifold in a peculiar way, due to the downward slope of the manifold. This downward slope is necessary in order that the manifold will pass under the floor boards.

Like the four-cylinder motor this new Hudson Six is lubricated by a constant-level splash system with a reservoir in a sump K beneath the crankcase. This lubrication system, which is of the conventional type, makes use of a pressure-distributing, plunger pump, L, cam operated from the camshaft. The oil overflows from the individual oil troughs, one being provided for each connecting rod, and into the oil sump, K, at the bottom of the crankcase. Here it is filtered and then pumped up by the plunger pump, distributed to both front and rear bearings and then returned to the troughs.

Gasoline Tank on Rear of Frame

As on the four-cylinder car, the Zenith carbureter, M, is used. The fuel is fed to it by pressure from an air-pump, N, cam-operated. In order to aid in starting the motor in cold weather, there is an adjustment on the dash for shutting off part of the air entering the carbureter. The gasoline tank, T, Fig. 4, is placed in the rear of the frame, an innovation on the Hudson cars this year. This tank is hung on two strong leather-lined brackets, D, and has a capacity of 22 gallons. The air pump maintains a pressure of 2 pounds per square inch on the fuel contained in the tank and an air gauge on the dash indicates this pressure within the tank. The piping from the tank passes forward along the left frame member to the carbureter. There are two intake manifold connections, S, Fig. 2, with the cylinders, one for each block of three, a straight tube T passing vertically from the carbureter to the manifold flange. This vertical tube is water jacketed.

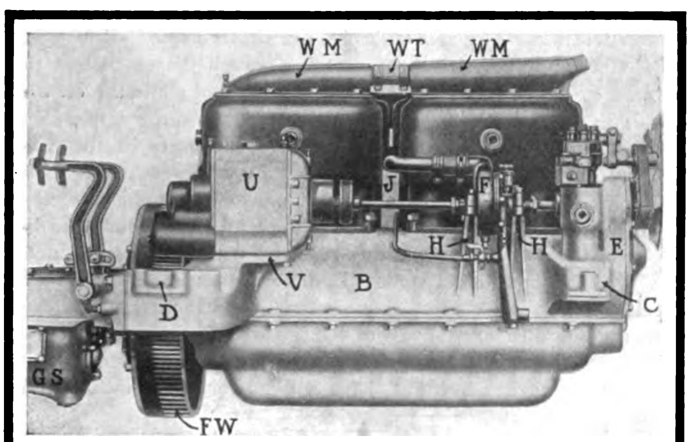


Fig. 3—Right side of six-cylinder Hudson motor

Electric Starter and Lighter

The Delco ignition, starting and lighting system is used on the Hudson six-cylinder motor, as well as on the four. The motor-generator is seen at U, Fig. 3, and is placed on the right side back of the water pump and next to the dash. A special bracket, V, has been cast on the upper half of the crankcase to hold this electrical unit. The system furnishes a dual ignition with magneto type of spark for ordinary running and storage battery current for emergency use. A kick switch on the dash controls the system. The firing order is 1, 5, 3, 6, 2, 4. The motor-generator, U, when used as a motor, draws current from the storage battery, which has a capacity of 80 ampere-hours. In starting the engine, pushing the starter button on the dash, in connection with throwing in the starter gears by pushing forward on the clutch pedal, completes the necessary operations. The pushing of this dash button sends current from the battery to the motor, and the gears being in mesh, the motor turns over the crankshaft until sufficient charge is drawn into the cylinders to cause the engine to operate on its own power. The periphery of the flywheel, FW, Fig. 3, has a number of teeth cut in it, as shown, with which the teeth of the starter gear mesh when the starting apparatus is brought into service. This use of the flywheel face is a part of the Delco arrangement and has been since its inception. When the starter button is released, the motor-generator becomes a generator and supplies current to the storage battery, which, when its capacity is reached, floats on the line and is ready to supply current either for lighting or for driving the electrical unit as a motor. All the lamps can be lighted directly from the generator or from the storage battery. A small lamp on the dash makes it possible to read the gauges at night. This dash lamp is in the same circuit with the tail lamp and should the latter go out for any reason, except the burning out of its filament, this fact will be indicated by the dash lamp being dark also. All the lights are electric, both side and head lights as well as the rear lamp, and the current for their operation is supplied by the generator which operates as such whenever the motor is running, and except when it is being used as a motor for starting.

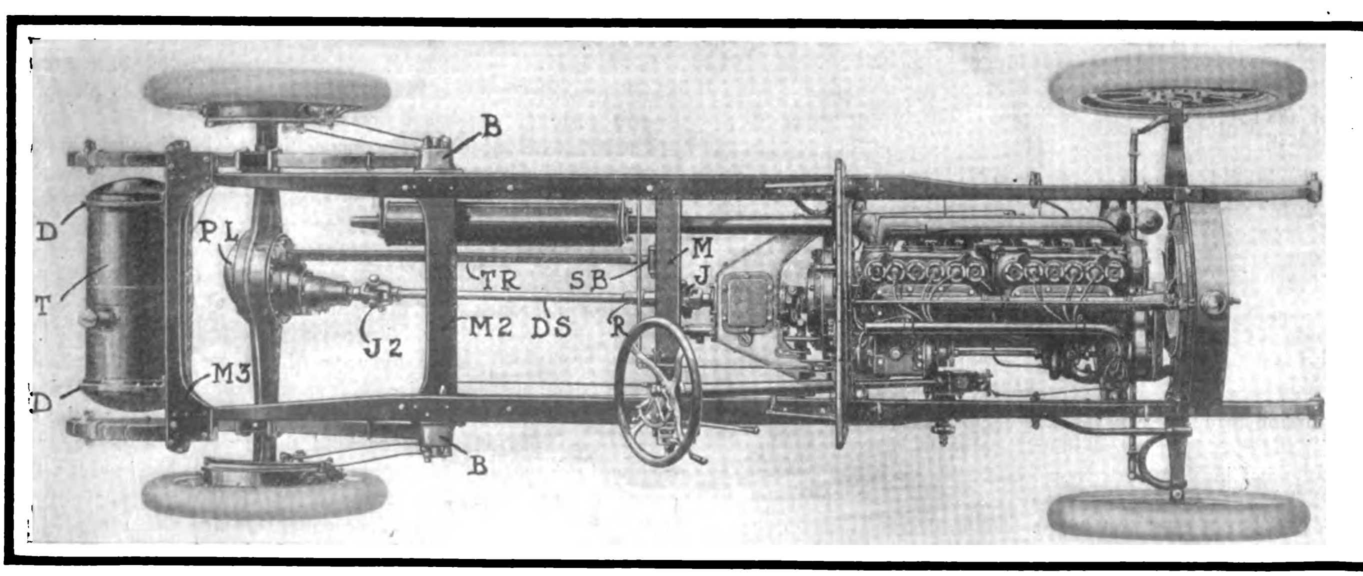
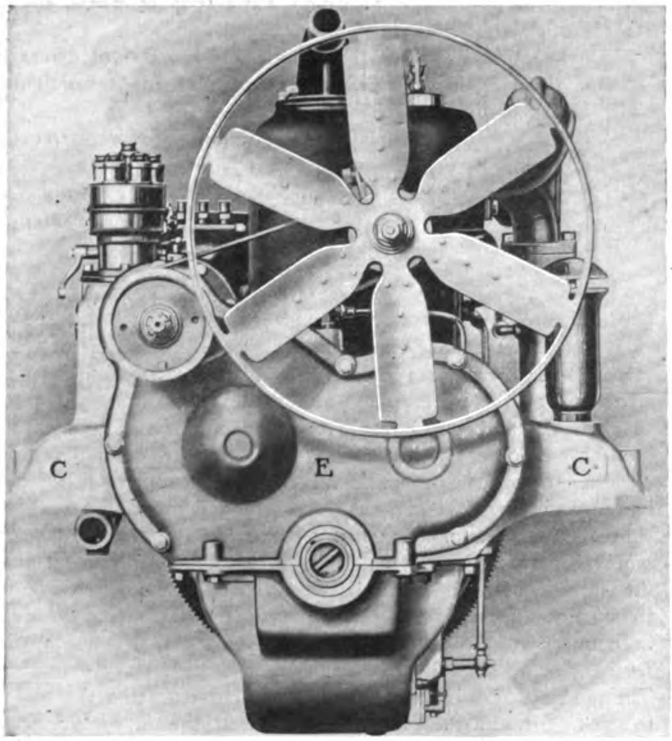
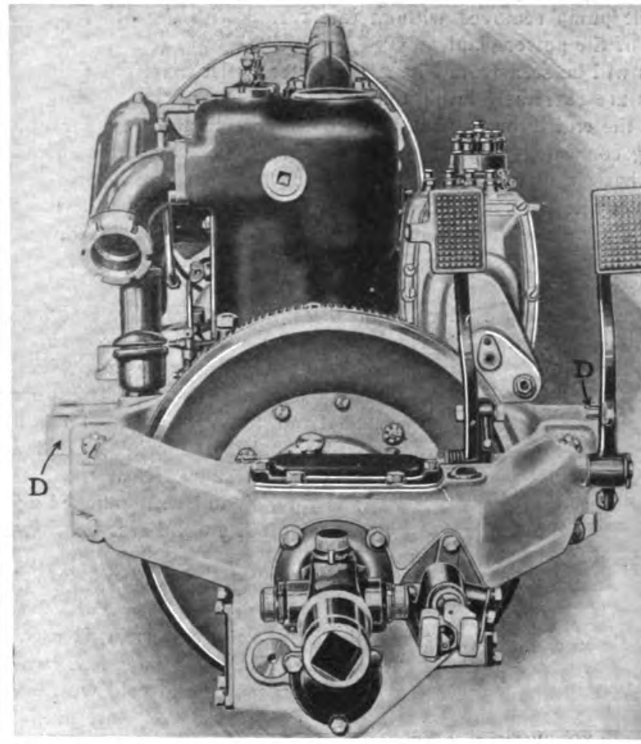


Fig. 4—Plan view of Hudson Six chassis, showing location of torsion rod to relieve strains on transmission shaft





Figs. 5 and 6—Front and rear views of the motor of the Hudson Six, showing supports of motor

The clutch is of the multiple disk type, having 15 plates, 11 inches in diameter. The driven disks, of which there are 8, have cork inserts. The entire clutch runs in oil and is contained in an oil-tight case which is a part of the flywheel. The clutch spring is located in a hole bored in the end of the crankshaft and the pressure is transferred to the clutch drum through a ball thrust bearing. In order to facilitate the separation of the steel disks when the clutch is released, small springs are placed between these disks. A plugged hole in the clutch casing is provided for use in cleaning the clutch parts and for lubricating them.

The gearset, GS, Fig. 2, which is bolted to the rear of the motor in a V-shaped frame, as seen clearly in the top and bottom views of the chassis, is of the three-speed, selective type, direct drive on third. Gears have a wide face and are made of special hardened steel. Large roller bearings, mounted in malleable iron cages, are used throughout the gearset. The gearbox is made oil tight to prevent the leakage of the lubricant in which the gears run.

The drive shaft DS, Fig. 4, is provided with two universal joints, J1 and J2, similarly placed to those on the four-cylinder model. One universal, J, is just back of the gear-box and another, J2, at the rear axle housing. The drive shaft is of nickel steel and heat treated. The front end of the shaft is squared and slides in the front or transmission universal joint, to allow for any differences of relative position of rear axle, due to unevenness of road surface.

Rear Axle Same as on Four

This sliding square, R, has a width of 1 3-8 inches and a length of 5 1-2 inches and is smooth finished, hardened and polished. A torsion rod, TR, runs parallel to the propeller shaft from the center cross member of the frame M, to the rear axle. This torsion arm TR relieves strain from the end of the transmission shaft and universal joint. Its front end is held by the cross member in a double spring buffer, SB.

The rear axle is of the same type as that used on model 37, and is of pressed steel and floating. The driving gears and differential are mounted as one unit, which is bolted to the axle and removable without taking the whole axle down, due to the floating construction. The rear axle driving shafts are of oil-treated nickel-steel and they drive the wheels through flanges bolted to the wheels. The driving pinion is of nickel steel while the crown gear is of specially hardened machine steel. A large removable plate PL in the rear admits of access to the parts of the differential. The rear wheels are carried on roller bearings, two for each. All wheels are of artillery type, spokes having a diameter of 1 3-4 inches, 10 spokes being used in the front wheels and 12 in the rear. The wheels are fitted with 36 by 4 1-2-inch tires with demountable rims. Both brakes are on the rear wheels the service brakes being external contracting while the emergency brakes expand from the inside. The brake drums, which are of one-piece, pressed-steel construction, and which fasten to the spokes by bolts, have a diameter of 16 inches and a width of 2 inches.

Axle and Frame Construction Details

The front axle is of one-piece drop-forged, I-beam type, and at its smallest point is 2 5-8 inches high by 1 5-8 inches in width. It has the conventional bowed center. The wheel spindles are of special steel and carry large roller bearings on which the wheels are mounted. Each spindle has two phosphor bronze bushings which are pressed into place.

The frame is of channel construction. The channels have a depth of 4 1-2 inches and a width of 3 1-4 inches, the metal being 5-32 inch in thickness. The side members are narrowed in front to allow for a small turning radius and a raise of 4 1-2 inches is made at the rear, permitting of the lowering of the center of gravity as much as possible, and at the same time giving ample clearance over the rear axle. The cross members M, M2, M3, Fig. 4, which are also of pressed-steel channel, are very substantial; M is just at the rear of the gear-box, the second, M2, half-way between this and the rear of the frame, and the third, M3, to which the gasoline tank, T1, is fastened, at the extreme rear. Its extension to hold the upper ends of the rear springs is shown in Fig. 4. The cross member M2 is given this position to aid in the supporting of the front spring shackles B1 of the rear springs. The brake equalizers are also mounted on this cross member M2 and the rear brakerods pass from it to the brakes, as shown, Fig. 4. Rear springs have a 3-4 elliptic construction and their leaves are very thin and wide, and are made of oil-treated steel. They are tongued and grooved to prevent side motion, this also being further guarded against by the use of leaf retainers. All spring eyes are provided with phosphor-bronze bushings to prevent squeaking and wear. The spring shackles are drop-forged, while the suspension bolts are of steel, hardened and ground, and provided with grease cups. The spring sizes are as follows:

	Length	Width
Front springs	37 inches	2 inches
Rear springs	50 inches	2 inches

The wheelbase is 120 inches and the tread 60 inches.

Bodies which are provided on the new six are of sheet-steel of most distinctive design and may be had in either five-passenger touring car, five-passenger torpedo, two-passenger roadster, seven-passenger touring car, limousine or coupé types. The regular equipment consists of speedometer, dashboard gasoline gauge, demountable rims, windshield, mohair top with envelope and side curtains, and the usual complement of tools. This is in addition to the electric system already mentioned.

The body design is of exceedingly rangy appearance, the cowl being deep and having a low slope. Upholstery is 12 inches in depth of hand buffed leather, and the dash is also covered with leather, a feature which several of the makers have incorporated in their newest body designs. The doors have been made specially wide to permit of easy access to all seats, and door handles are within. The new six, in fact, comes up to the Hudson standard of mechanical and body construction in every way.

Right or Left Control—Which?

(*Continued from page* 213)

door of the car from the left side for the passengers. In the selling season the branch disposed of 300 little-sixes with right drive.

Franklin—right-hand drive. The only advantage of the left-drive, according to the head of the Franklin agency, lies in the fact that it is safer to make a turn to the left between cross streets. Considerable talk has been made on the subject of taxicabs but the local agency is firmly in favor of the existing type of drive.

Winton—right drive. C. M. Brown, sales manager, says that there is less talk of left drive than there was last year. He cites the strain upon the driver's nerves in meeting another vehicle at speed in a narrow road; the danger of scraping the curb with the right front wheel and the unnaturalness of the position of the driver at the left as among the disadvantages.

R. C. H.—left drive. The advantages of the left drive in heavy traffic and elsewhere are too apparent to need detailed defense. Where there are traffic rules, the idea of forcing the passenger in a two-seated roadster to dismount in the street and walk around the car is all that is needed in the way of an argument. Such practice is positively dangerous at worst and uncomfortable at best.

Knox—optional. While the branch sold more right drives this season, the left drive is growing in popular favor, particularly with closed bodies.

Metallurgique—right drive. Little inquiry for left-drive cars.

Pope—right drive on pleasure cars and left on trucks. Inquiry for left-driven cars is appreciable but not pressing. The left position in the commercial wagons has proved a safeguard and a convenience in traffic.

National— left drive. W. C. Poertner states that the change from right to left drive in this line makes for comfort, ease and safety for driver and passengers. Only a few prospective customers have balked at the left drive and after a trial, practically all of these have been pleased with the change. Mr. Poertner is enthusiastic and predicts a sweep for the idea. His company also handles the Herreshoff line with left drive.

Many Inquiries for Left Drive

Peerless—Left drive on town cars. The use of the left drive has been welcomed by the customers of the Peerless company and the New York branch is enthusiastic for the innovation. The safety and convenience of the left drive for town cars in New York is the keynote of the position taken. Speaking about the inability of the driver to open the door of the car for passengers without alighting, the Peerless company says that the chauffeurs of its patrons should not open the door as that function is within the province of the footman who sits in the right seat or the doorman of the establishment which is being visited.

Lozier—the left drive. Delighted with the change. Wonder why it was not made before.

Packard—right drive. There is an increasing inquiry for left drive, particularly with reference to the town car. With the advanced type of self-starter and taking the tires from the running-board and placing them at the rear, the left drive idea is growing rapidly for automobiles to be used in town and suburban service.

Ford—left drive. The attitude of the factory in retaining the left drive and announcing a vastly increased production for 1913 is favorably reflected in the New York branch.

Abbott-Detroit—right drive. Not an inquiry for left driven cars except for coupé types has been noted for 3 months and not a prospect has been turned away this year because the company handled no left drive cars.

Chalmers—right drive. Only an occasional inquiry for left drives.

Moon—left drive to be announced. The right drive is popular with those who have had experience with it and the same may be said for the left drive. The left drive is convenient in traffic, particularly with the roadster type. With closed bodies the advantages are numerous. The 1913 cars will be constructed so as to give right drive if the customers wish it.

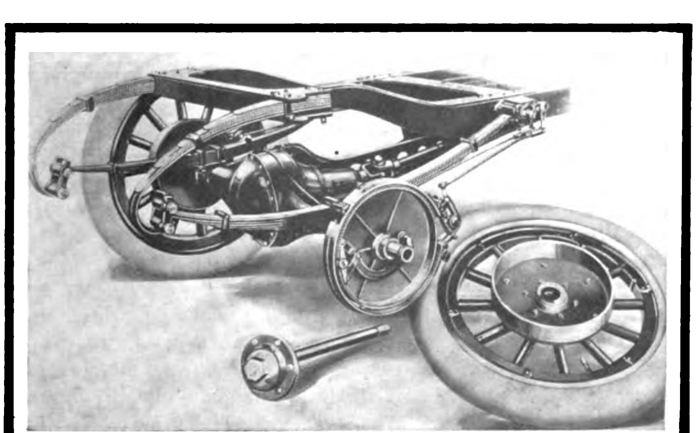


Fig. 7—Showing details of Hudson Six rear axle construction

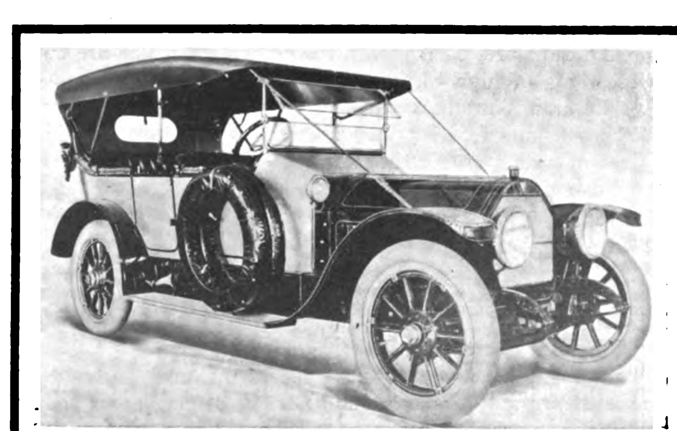
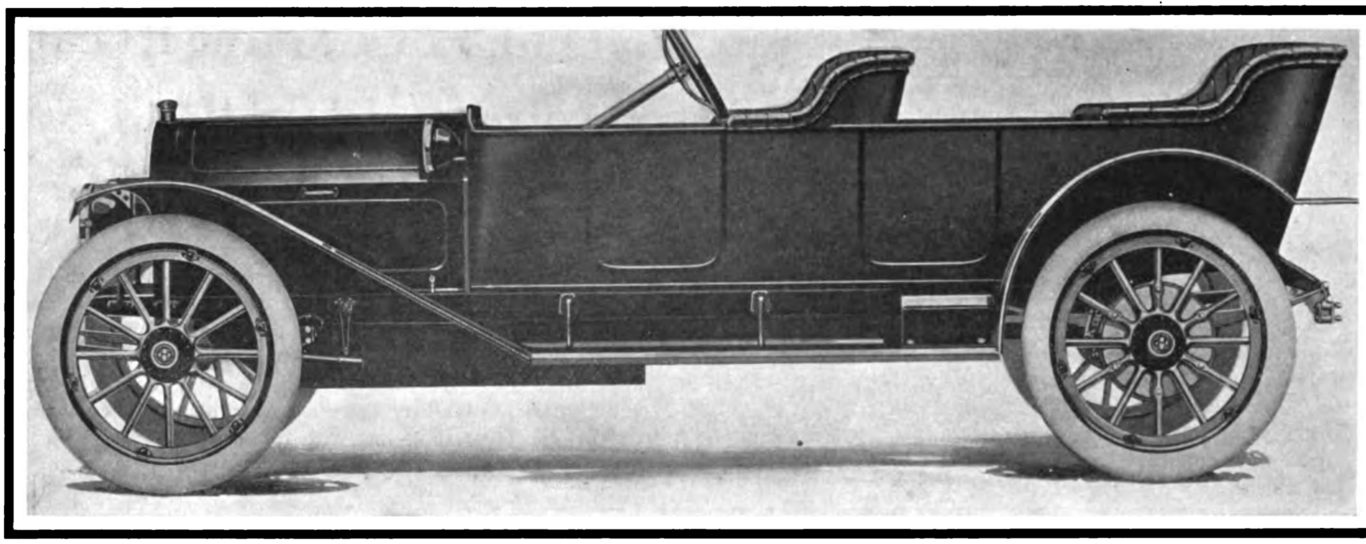


Fig 8—Six-cylinder Hudson with torpedo touring body



New Herreshoff six-cylinder, 36-horsepower touring car, with straight-line body design

Herreshoff Smallest Six

1913 Model, Just Announced, Will Sell for $1700—Left Drive and Center Control Features

A BABY six-cylinder touring car is soon to be put on the market by the Herreshoff Motor Company. This machine, which will be the smallest six yet manufactured in this country, will be made to sell for $1,700. The principal mechanical features of the car are its unit power plant, left-hand drive and center control, four-speed transmission, platform springs and three-point suspension.

The six-cylinder motor is rated at 36 horsepower, the bore being 3 3-8 inches, while it has a long stroke of 4 1-2 inches, giving a stroke-bore ratio of 1.33. The cylinders are cast in one block, and the design of motor and powerplant is such that its removal may be effected as a unit which includes clutch pedals, gear levers and brake controls.

The motor is of the T-head type, the exhaust valves being on the right and the intakes on the left. These valves are interchangeable, are mechanically operated from the camshafts and their stems and springs are completely inclosed by two removable cover plates. The valves have a diameter of 1 3-8 inches and a lift of 5-16 inch. Camshafts are 7-8 inch in diameter at the bearings, which are three in number. Their sizes follow:

Front camshaft bearing..............	⅞ inches by 3 inches
Center camshaft bearing............	⅞ inches by 2¼ inches
Rear camshaft bearing..............	⅞ inches by 2 inches

The cams are integral with the camshafts, which are cut from solid bars of high carbon steel.

The crankshaft is of ample proportions, it being a perfectly-balanced, one-piece forging and mounted on three bearings, the sizes of which are given below:

Front crankshaft bearing........	1½ inches by 2½ inches
Center crankshaft bearing.......	2 3/16 inches by 3 inches
Rear crankshaft bearing.........	1½ inches by 3½ inches

The wristpin, or upper connecting rod bearings have dimensions of 3-4 inches by 1 5-8 inches, while at their lower or crankshaft ends these rods have bearings measuring 1 11-16 inches by 2 1-8 inches. With all these bearing dimensions, the first figure applies to the diameter while the second gives the length. Throughout the motor, Herreshoff white metal bearings are used.

Pistons are of special iron and they have a length of 3 1-4 inches, this dimension being but 1-8 inch shorter than the diameter. The pistons are fitted with three diagonally-cut expansion rings of the eccentric type.

Cooling is accomplished by the thermo-syphon system, no water pump being used. The inlet and outlet water manifolds are of large proportions, there being but one connection to the cylinder casting for each, which arrangement is usually found with the conventional monoblock-cast type of engine. The cooling is aided through the use of a large fan, placed in the customary position back of the radiator. The water jacket space communicates around the entire six cylinders, due to the block casting. The jacket space has a width of 5-8 inch, while the jacket wall is 3-16 inch in thickness. The cylinder walls have a thickness 1-32 inch greater, or 7-32 inch.

Timing gears are placed at the front end of the motor and are inclosed in the usual way, the aluminum housing being proof against oil leakage. These gears are of the spur variety and have a width of 3-4 inch.

Crankcase a Herreshoff Idea

The crankcase is a one-piece construction of aluminum, the design of which involves a Herreshoff patent. The case extends back so as to take in the clutch, gear set and flywheel, thus carrying out the unit idea. The total length of the power plant from the front of the motor back to the end of the gear box is 68 inches, a surprisingly low figure considering that the motor is a six-cylinder one.

Splash lubrication is employed, there being an individual oil trough provided for each connecting rod. The lubricant from these crank pits overflows into an oil reservoir in the bottom of the crankcase, from which point it is drawn by mechanically operated plunger pump to the sight feed on the dash and thence forced forward to the timing gear case, serving the function of lubricating the timing gears as well as the motor bearings. From the gear case, the oil runs down again to the six connecting-rod wells.

A Stromberg carbureter is used with the new six, it being of the single jet type, fed by gravity. This carbureter has an auxiliary air valve fitted with two adjustments. There is also a shut-off valve in the primary air tube, which is closed for starting the motor, thus allowing richer mixtures to pass to the engine for the first few strokes.

Ignition is to be accomplished on the new baby six either through the use of the Delco ignition system or Bosch high-tension magneto. One set of spark plugs is used.

The clutch, which is located in the flywheel and completely housed, consists of 30 steel plates running in oil. Four strong springs hold the plates in engagement. The gear set is of the four-speed type with reverse. Gear changes are selective, and direct drive is on the third speed. The gears are of nickel steel. Gear shifting is accomplished through the use of a center lever, which is operated by the right hand, the drive being on the left side.

From the gearset the power is transmitted to the rear axle through straight-line shaft construction, this being possible due to the three-point suspension feature. The propeller shaft has a diameter of 1 1-8 inches. The rear axle is of the semi-floating type, of usual design. The rear axle shafts which connect with the rear wheels are 1 1-4 inches in diameter. All driving shafts are of chrome-nickel steel. Nothing differing from conventional construction is to be found in the differential parts, they conforming with standard practice. The gear ratio from engine to wheels is 4 to 1 on direct drive.

Frame Thoroughly Reinforced

The three-point suspension principle is also carried out in the body hanging, the front springs being semi-elliptic and the full platform arrangement being used in the rear. The spring sizes are as follows:

Front	1¾ inches width;	34 inches length
Rear	2 inches width;	42 inches length

With this platform method of rear suspension, there is a single fastening to the rear of the body at the center of the back. This fastening bolts to the rear cross spring, which is shackled at its ends to the half-elliptics on the sides. Thus, with one rear support and one at either side in front, the three-point body suspension is carried out.

The frame is of pressed steel, hot rolled, and is of channel section. It passes in a straight line back until the rear axle is reached, where it has a kick-up to clear the latter. The frame is reinforced by four cross members, two of which are forward to carry the power plant, one a little over half way back to which the brake equalizers are fastened, and the fourth at the extreme rear.

Both front and rear wheels carry 34 by 4 inch tires, mounted on quick-detachable, demountable rims, one extra rim being furnished. Brake drums measure 14 inches in diameter by 2 inches in width, and they are bolted to the rear wheel spokes by six bolts each. The service brakes are internal expanding, and the emergency brakes are outside, contracting on the drums and operated by the conventional lever.

The steering gear, is of the worm-and-sector type. The thrusts are mounted on ball bearings and are adjustable. To prevent the front wheels from striking the fore and aft steering connections, stops are provided. The steering wheel has a diameter of 18 inches, the throttle and spark levers being located on top.

The body, a good idea of which is furnished by the accompanying illustration, is of the five-passenger type, and made of sheet steel. It is well upholstered and roomy, making for the comfort of the passengers. The door hinges and fastenings are concealed. The wheelbase of 124 inches has been utilized most advantageously, plenty of leg room being afforded in both seats. The most striking feature of the body design is its long lines and graceful contour. The front mud guards are detachable, the inner shields of these as well as those of the rear guards extending to the frame of the chassis.

Transcontinental Alco Still Going

LARAMIE, WYO., July 29—Heavy rains that washed away bridges and turned the trail ahead into a sea of impassable mud, were encountered by the transcontinental Alco truck crew during the past 2 days.

Now that the roads are comparatively dry the truck was able to start this morning along the road to Medicine Bow. In 30 days of running time it has passed through eleven states and has rolled up a mileage of 2,550 miles since the start from the factory of Charles W. Young & Company, its owners, of Philadelphia. As an example of the difficulties which the truck has met with, the following is a statement from E. L. Ferguson, captain of the crew.

Calendar of Coming Events

What the Months Ahead Have in Store for the Automobilist—Shows, Conventions, Race Meets, Etc.

Shows, Conventions, Etc.

Aug. 5-7..........San Francisco, Cal., Pacific Highway Convention.

Sept. 17-20........Denver, Col., Convention International Association of Fire Engineers.

Sept. 23-Oct. 3....New York City, Rubber Show, Grand Central Palace.

Dec. 7-22..........Paris, France, Paris Automobile Show, Grand Palais.

Jan. 4-11..........Cleveland, O., Annual Automobile Show.

Jan. 11-25, 1913...New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.

Jan. 20-25.........Philadelphia, Pa., Annual Automobile Show.

Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.

Feb. 1-8...........Chicago, Ill., Annual Automobile Show.

Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.

Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.

Feb. 24-March 1...St. Louis, Mo., Annual Automobile Show.

March 3-8.........Pittsburgh, Pa., Annual Automobile Show.

March 8-15........Boston, Mass., Annual Automobile Show.

March 17-22.......Buffalo, N. Y., Annual Automobile Show.

March 19-23.......Boston, Mass., Annual Truck Show.

March 24-29.......Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Aug. 8..........Minneapolis, Minn., Annual Tour Minnesota State Automobile Association to Winnipeg.

Aug. 8-9..........Chicago, Ill., Banta Trophy Match, Chicago Motor Club.

Aug. 8-10.........Galveston, Tex., Beach Meet.

Aug. 10.......... Whittier, Cal., Hill Climb.

Aug. 30-31........Elgin, Ill., Road Races, Chicago Automobile Club and Elgin Automobile Road Racing Association.

Sept. 1-2..........St. Louis, Mo., Track Races, Universal Exposition Company.

Sept. 2.......... Indianapolis, Ind., Speedway Meet.

Sept. 2.......... Winnipeg, Man., Track Meet.

Sept. 3-6........ Chicago, Ill., Commercial Vehicle Reliability Run, Chicago Motor Club.

Sept. 17..........Milwaukee, Wis., Grand Prize Race.

Sept. 20..........Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.

Sept. 21..........Milwaukee, Wis., Vanderbilt Cup Race.

Sept. ....Washington, D. C., Reliability Run, Automobile Club of Washington.

Oct. 7-11..........Chicago, Ill., Reliability Run, Chicago Motor Club.

Oct. 12............Salem, N. H., Track Meet, Rockingham Park.

Nov. 6............Shreveport, La., Track Meet, Shreveport Automobile Club.

Foreign.

Sept. 26-Oct. 6....Bourges, France, Agricultural Motor Car Exposition.

Nov. 8-16.........London, England, Olympia Automobile Show.

Jan. 11-22.........Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.

"The transcontinental Alco climbed 5,140 feet in a distance of 50 miles; then descended 1,800 feet to the plains. Here it was caught in the throes of a torrential rainstorm. The cloudburst turned the trail that was being followed into a sea of mud.

"Ahead of us were 70 miles of roads, transformed into veritable rivers. We were fortunate enough to cross one bridge between Fort Collins and this city before it was destroyed by the great cloudburst."

Trails of deep ruts and high contours are in store for the truck for a considerable part of the way through Wyoming.

Transcontinental Alco encounters weak bridge near Sterling, Col.

The Automobile

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Right or Left Side Control?

IT will be years before all of the automobiles built in America will be either left or right-side control. Enthusiasts of left-side control expected to see every maker converted, in fact, stampeded, but they have refused to stampede. It is questionable if the tendency towards the left-side mounting of steering column and control levers is as strong as it was a year ago. At that time one or two of the biggest high-powered car builders were boldly courting the change; today they have decided to leave the column and levers on the right.

With medium-powered and low-powered machines the left-side control has made its greatest gains, with many the adoption of it being purely a selling argument. In contrast with this are the conditions of many old-established firms whose motor design is such as not to readily permit of mounting the steering column on the left and they are leaving their designs unchanged, rather than re-design the motor and add the complexity of another model to the manufacturing end of the business.

From the manufacturer's point of view the retaining of the right-side control may be desirable if he deems it unnecessary to make other changes in the model; but where he finds it necessary to re-design the motor he generally does this with the view of making it possible to mount the steering pillar on the left side if desired.

There are many engineering advantages for the left-side control, or at least advantages that go readily with this practice. With left-side control the gearshift lever and the brake lever can both be mounted on the forward end of the gearbox or on the rear end of it in the case of unit power plant constructions. This mounting frees these members from any possibility of binding due to frame warping. Their manipulation without binding is assured. Added to this is the reduced cost of manufacture due to the directness of connection between the gearshift lever and the shifter rods of these, and also an equal if not greater directness of connection with the brake control parts. In this respect left-hand control is cheaper and better. It is argued by right-hand devotees that the gearshift and brake levers can be placed in the center of the car when the steering pillar is mounted on the right side. This is true but it is also true that such combining of the parts calls for the operation of the levers by the left hand, which is not desired by many, although it has the good quality of leaving the steering wheel in the right hand, which should be important.

When the question of mounting the steering pillar on the right or left side is considered aside from its mechanical features and viewed solely from the point of advantage and disadvantage to the driver, there are points for and against each end of the argument. One of the strongest arguments in favor of the steering pillar on the left is that it permits of the front-seat passengers entering direct from the curb instead of having to walk into the street and around to the left side. This is a very important consideration, particularly in narrow city streets, where it is often necessary to wait for a fraction of a minute or more before passing vehicles will permit of entering the car from the left side. When attempting this entry on a dirty street it is often damaging to clothes because of mud splashed by other vehicles.

From the driver's viewpoint when the car is in motion the arguments are divided: locality becomes a factor, the road width becomes a factor, the horsepower of the car becomes a factor, and the design of body must also be considered. In certain localities the rules of the road are not observed as well as in others, and it frequently makes it specially dangerous for an overtaking vehicle when actually passing a slower-moving machine. With the driver on the right, he has a better opportunity of seeing just how close he can drive to the ditch, the right-side steering pillar being meritorius in this respect, and at the same time it must be remembered that as the driver has demonstrated it is not necessary to sit on the left side in order to pass a car moving in the opposite direction at the left, so it is not necessary to be sitting on the right side in order to safely overtake a vehicle on the left side.

But during a day's driving one meets many more vehicles traveling in the opposite direction than are overtaken, that is, moving in the same direction. Consequently the right-side control has the advantage in that it allows the driver to watch the ditch at his right when meeting vehicles perhaps over one hundred times a day as compared with having to watch the left ditch not more than a dozen times when overtaking vehicles. In this argument the right-side control has the advantage.

The left-side control has a distinct advantage in city driving with open cars or with any type of car in which the driver can readily look to the rear before turning across the street to the left at a street intersection or making a complete turn in the street. With a touring car with top up and side curtains in place the driver will actually have a clearer view of the street back of him when he sits on the right because his angle of vision through the back window of the top is wider when on the right side than when on the left. A test case will readily convince any driver of this situation. One factor acts against this argument, namely the carrying of a mirror on the left side of the windshield which makes it a comparatively simple matter for the driver to gauge the condition of traffic to his left and in rear of him.

There will never be any serious difficulties if makers continue to build automobiles with steering pillars on the right side and also on the left side. Machines following both designs have been in use for many years and no serious difficulties have exhibited themselves. Each has its arguments pro and con, its advantages and disadvantages, and its merits and demerits. The driver is the potent factor and with him alert, the driving advantages can be neglected in the argument and the question rested with the advantages to the occupants of the car, which is clearly in favor of the left-side pillar.

Elgin Prospects Are Booming

Fourteen Entries Have Already Been Received, Including Many Famous Drivers and Cars —Fields Sufficient in Each Event

CHICAGO, July 29—The Chicago Automobile Club now has fourteen entries for its road races at Elgin August 30-31. Besides Marhoefer in the Falcar in the Aurora cup and Bruce-Brown in the free-for-all, who were announced last week, the list includes four Mercers, four Stutzes, two Schachts and one each of the Benz, Ohio, and Falcar and Bruce-Brown's mount, which has not as yet been named.

In addition to this an effort is being made to bring over Georges Boillot, winner of the French grand prix, and his Peugeot. E. C. Patterson, a member of the Chicago Automobile Club, has cabled an offer to the Peugeot makers which it is thought they will accept, the Chicagoan agreeing to finance the expedition and not only start the car at Elgin but also put it in the Vanderbilt and grand prix at Milwaukee. Entries also are expected from Ralph Mulford, Ralph de Palma, Joe Horan, Louis Disbrow and several others. As it stood Monday, the entry list read as follows:

Aurora Cup, 231-300 class

Car	Driver	Car	Driver
Falcar	F. Marhoefer	Mercer	H. Hughes
Mercer	Not named	Ohio	John Raimey

Illinois Cup, 301-450 class

Car	Driver	Car	Driver
Stutz	G. Anderson	Schacht	B. Endicott
Stutz	Merz or Zengel		

Elgin National, under 600 inches

Car	Driver	Car	Driver
Stutz	G. Anderson	Mercer	H. Hughes
Stutz	Merz or Zengel	Schacht	B. Endicott

Free-for-all

Car	Driver	Car	Driver
Not named	D. Bruce-Brown	Mercer	H. Hughes
Benz	Erwin Bergdoll		

A conference between the Chicago Motor Club officials and the Elgin National Watch Company, donor of the Elgin National trophy, has resulted in the temporary transfer of the cup to the Chicago Automobile Club, which is given the racing rights to the trophy for this year. The deed of gift will be changed to permit of non-stock cars competing.

ROCHESTER, N. Y., July 29—Bob Burman was awarded the Remy brassard and trophy Saturday afternoon at Crittenden Park when the Blitzen Benz car made a mile in 1:29, crossing the tape several yards ahead of Elmer McDonald, in a 110-horsepower Benz machine, followed by H. Kyle in a White car. Burman was victor in every event in which he entered, having withdrawn in the seventh and final event in favor of Billy Knipper of Rochester. In the third event, Burman made one mile in 1:08, in his Blitzen Benz, almost equalling his own record of 1:07 made last year at Montreal, Que.

The Cutting was victorious in the fourth event when Burman made 3 miles in 4:09, beating Kyle, in his White by 2 seconds. Billy Knipper in McDonald's Benz car, in the final event, raced 2 miles in 3:10, nosing out Kyle in his White. Schaubert in a Cutting and Sutton, driving a Schacht car, followed.

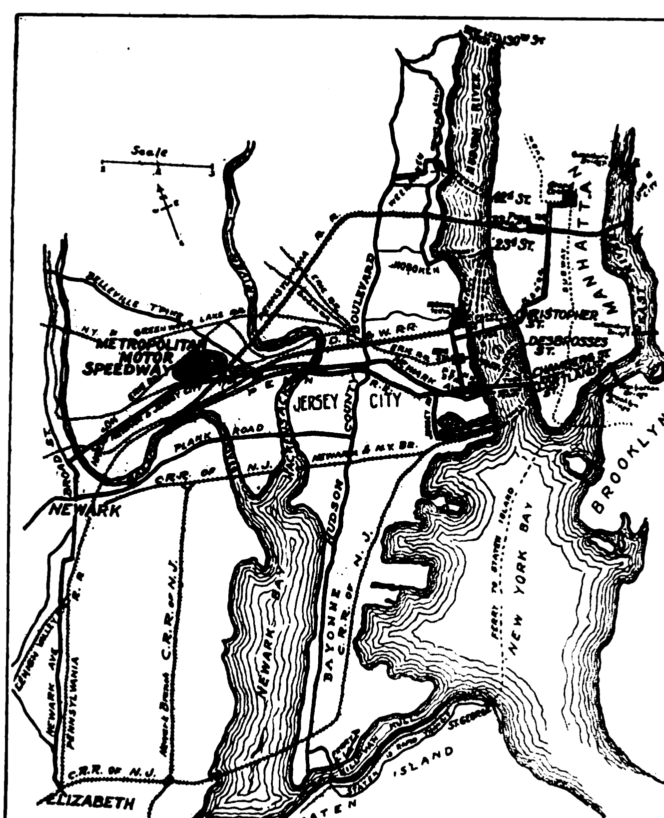
Metropolitan Motor Speedway

Location of 2-Mile Circuit Is Ideal—Accommodations to Be Provided for 200,000 Spectators —Track Will Be 60 Feet Wide

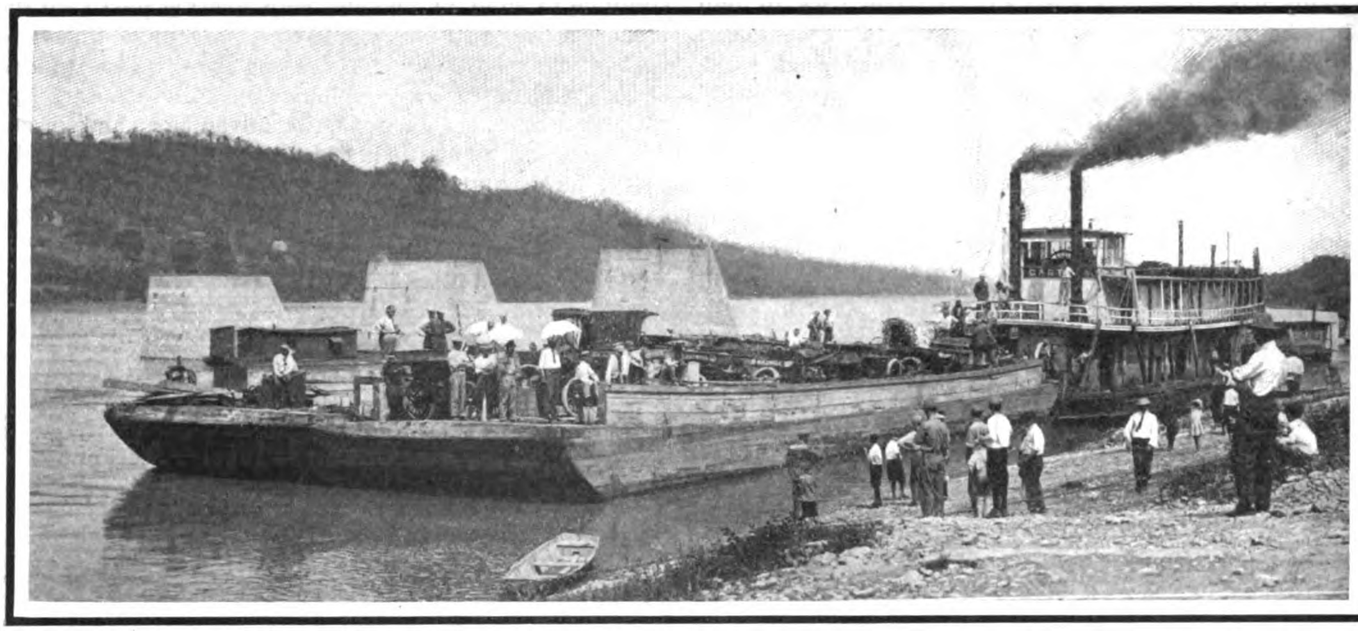
PROSPECTUSES of the Metropolitan Motor Speedway Association have been issued describing the possibilities contained in the big project to convert a section of the Meadows into a great race-track and amusement park.

Jefferson De Mont Thompson is president of the $1,500,000 corporation that has been formed to carry out the plan. A. R. Pardington is vice-president and general manager; Theodore F. Keer, treasurer, and W. H. Osborne, secretary.

The ground work of the speedway is a tract of 300 acres on the lowlands, midway between Jersey City and Newark. It is reached by four lines of transportation. It is the announced intention of the company to construct a 2-mile speedway, 60 feet wide except on the turns, where it will be 75 feet wide and scientifically banked with saucer curves. The stands will accommodate 200,000 and there will be parking spaces for automobiles sufficient to take care of 10,000. It takes 12 minutes to reach the track from downtown New York.



Map showing location of the proposed Metropolitan Motor Speedway



Four-States tourists warping into Maysville landing, where 4 hours were consumed in unloading cars

Four-States Tour Ends

All of the Twenty-Eight Pleasure and Commercial Cars Finished Intact—Business Results Good

INDIANAPOLIS, IND., July 29—Success beyond the dreams of promoters or entrants marked the finish of the second annual Indiana Four-States Tour. Tired and weary, but happy in the knowledge that they had performed their mission and worked for the good of the entire automobile industry, in other states as well as Indiana, the Hoosier tourists returned to their respective factories on July 26.

The original mileage as clocked by the pathfinders was 1,224.8, but road conditions and several detours to get around bridges coupled with two detours to take in cities not on the route, placed the final mileage at 1,423.0 miles.

The first week saw all the sales force representatives of the several companies eager to land a dealer and make the initial sales. However, the second week they were still working hard; one company having reported closing an agency in the last night control, Columbus, Ind.

The agents in the second week seemed to be the livest set of dealers of the tour, and the prospects for business in Ohio for all lines, Indiana-made and otherwise, looks to be far better than for some years.

While some of the companies did not make as pretentious efforts to obtain business as others, every one of the companies represented expressed themselves as gratified with the results. Many of these now have road men covering the territory on both sides of the route calling on the prospective business gleaned during the tour by the company representative.

An experiment tried this year was the shortening of the runs each day that the men might not grow tired so quickly. Several times the tour did not leave the night control until noon the next day and often after an early start the next night control was reached before noon. This met with the approval of some and the disapproval of others, as some hold the shortening of the time and the lengthening of the daily runs would be more conducive to success.

Road conditions were fair. In fact unless the tour was laid in the East, it is hardly probable that as uniformly good roads could be found anywhere in the country west of the Alleghanies. Many of the roads in northern Ohio were dirt. Central Ohio with the old National pike provided rather rough going for the autos. Southern Ohio and the strips in West Virginia were good. The Kentucky roads of blue limestone were excellent.

As a tribute to H. O. Smith, president of the Premier company, the tourists left the beaten trail on the way out of Lexington after visiting the home of Henry Clay, and wended their way to Versailles.

On arriving at Columbus, the tourists were greeted by Frank E. Smith, of the Maxwell plant at Newcastle, the president of the Indiana Automobile Manufacturers' Association.

Great Reception on Reaching Home

The home coming was auspicious. All the commercial bodies in Hoosier capital bid the gasoline missionaries welcome. That night they joined hands with the automobile interests and spread a banquet for the returning tourists at the German House.

During the banquet, a silver loving cup was presented to Mr. Menasco, Mr. Leeman making the speech of presentation.

Mr. Smith spoke of the injury to the trade by getting out annual models. He suggested that new models should be brought out in series, and said that annual models injure the trade with two classes of buyers—the man of moderate means, who is slow about investing, and the man of wealth who does not care to tie up his money in a product that may depreciate 25 per cent. in a season.

Mr. Handley's talk was along the line of the financial side of the industry. He said until recently it had been hard to get money to finance the industry because the financial interests had not been awake to the magnitude and soundness of the business.

Out of the twenty-four pleasure cars to start everyone finished and all in good repair. The cars had been washed frequently and as most of them were finished cars they did not show the wear that would seem unavoidable in a trip of this length. No serious accidents marked the trip.

Four heavy duty cars made the trip, the Nyberg 3-ton and the Service 2-ton trucks being the heaviest. Both of these finished in Indianapolis with the pleasure cars. The famous Premier prairie schooner was converted into an ambulance and also carried baggage. The wonder of the whole trip was the Whitesides 2-ton truck. This car built in Newcastle and accompanied by Col. V. F. Whitesides, its designer, was always the last car to leave any control. The truck carried a piano and six men and was able to make a speed of from 25 to 33 miles an hour on the road and maintain it every day.

Belgian Race Was a Fiasco

Complex Rules Prove Unsatisfactory—Jockeying and Resulting Squabbles Punctuate the 2-Day Battle

ANSEREMME, BELGIUM, July 21 (*Special*)—The following details supplement the report in last week's AUTOMOBILE on the 2-day Grand Prix road race of Belgium for 1912, in which the Silent-Knight Minerva and Hermes teams tied for first place. The race was run under experimental rules, which were found unsatisfactory. Instead of the usual practice of declaring the fastest car the winner, teams of three were admitted and a minimum average per pound, according to cylinder area, was imposed. The team most nearly adhering to this average was to be declared the winner. It admitted cars varying in cylinder area from 2 to 4 1-2 liters, the average speed for a 3-liter car, for instance, being fixed at 40 miles an hour. This average had to be maintained on individual rounds; loss of time on one round could not be made up by speeding on another one. The manufacturers themselves had decided on the averages.

The Peugeot company entered a set of 3-liter cars prepared for the French grand prix, and Boillot, who acted as race manager for his drivers Goux, Zuccarelli and Thomas, got a verbal agreement from the committee that in case of dead heat the cars most closely adhering to the average would be given the advantage. It was an easy matter for these lightweight racing Peugeots to cover the 30-mile course at a speed of 40 miles an hour. Boillot, taking advantage of the defect in the rules, stationed himself 300 yards from the timers' box and as his cars came round stopped them and gave them the start so that they could run over the line within a few seconds of their official time for finishing at the average speed imposed. So well was it done that the differences between the fastest and the slowest of the twelve rounds was not more than 5 seconds for any one of the three cars. But four other teams, Mercedes, Opel, Minerva and Hermes, finished without the loss of points, though not with the same absolute and artificial regularity, and when Boillot claimed the advantage he was informed that all five sets of cars were considered equal.

There was a wordy battle, in which the jury remained firm in its decision that the second day's run of 360 miles should be started with the five teams classed equally. Dissatisfied at the decision, the Lion-Peugeot men were given the order to go all out on the second day, while the Minerva managers, who had objected to the artificial timing of the Peugeot men, openly adopted their tactics. The crowd got on the course during the initial round, and to avoid a disaster Goux had to brake furiously. The effort caused injury to his universal joint, necessitating a roadside repair which made it impossible for his Lion-Peugeot to finish the initial circuit in the limit imposed. He had no further trouble, and ran throughout at an average of 50, but his point penalization was ineffacable. Later Zuccarelli had trouble with his overhead timing gear which caused his elimination. This left Thomas as the only clean score man of the team.

Minerva, who ran with the Knight motor of 3.1 by 4.8 inches bore and stroke, finished the 720 miles at the imposed average of 38 miles an hour, thus securing the maximum number of points for its team of three. Hermes, a Belgian firm with a four-cylinder model of 2.8 by 4.7 inches bore and stroke, also maintained its average—35 miles an hour—throughout the distance, being the prizes between these two. . The following are the official particulars of the cars, and speeds imposed:

Car	Bore and stroke	Cyl. area	Speed imposed
Minerva (Knight motor)	3.1 x 4.8	3 liters	40 m.p.h.
Hermes	2.8 x 4.7	2 "	35 "
Mercedes (Knight motor)	3.9 x 5.5	4.4 "	44.4 "
Opel	2.7 x 5.1	2.1 "	35.3 "
Lion-Peugeot	3 x 6.1	3 "	40 "
Schneider	3.2 x 5.5	3 "	40 "
Germain (valveless)	3.6 x 5.9	4 "	43 "
Sava	3.2 x 5.5	3 "	40 "
F. A. B	2.9 x 4.7	2.2 "	35.5 "
Miesse	3.5 x 5.5	3.6 "	42 "
Ford	3.7 x 4	2.9 "	39.9 "

Just before the start of this race Michelin made the official announcement that he would take no further part in automobile racing. No reason is given for this withdrawal.

Twenty Clean in Farm and Ranch

DALLAS, TEX., July 30—The tour for the farmers and ranchmen of Texas under the auspices of the Farm and Ranch Publishing Company, of Dallas, ended Saturday. Twenty of the twenty-six cars which left Dallas on the Monday previous returned on Saturday morning, and fourteen of the number had perfect scores. On arrival in Dallas the contestants were given an elaborate banquet where the prizes of $1,000 were distributed.

The tour extended over more than 700 miles of Texas' richest agricultural section and a number of the important cities were touched. The names of the contestants who finished with perfect scores were as follows: First division, touring car class: W. R. Bishop, Franklin; J. M. Howe, E-M-F; W. R. Mickle, Chalmers; R. B. Dunn, Mitchell; B. W. Bean, E-M-F; B. W. Rutherford, Maxwell, O. L. Sims, Overland; J. Mantel, Hudson; H. V. Kendrick, Buick; S. J. Hall, Hupmobile; W. H. Camp, Reo; W. R. Newton, Ford; R. J. Roach, Ford. Second division, runabout class: L. B. Blair, Maxwell.

Silent-Knight Minerva starting away from the pits

One of the Hermes team just beyond the grandstand

Course Selected for the Milwaukee Races

Stretch on the Town Line road, looking to the west

Old Fond du Lac road, after passing Congress cross road
Straightaway on New Fondy road beyond Sommerville turn

Promoters Quietly Abandon Course First Announced and Sign Up All Property Owners Along New Route

MILWAUKEE, WIS., July 29—The four international road racing classics to be run at Milwaukee on September 17, 20 and 21, will use a course 8.2 miles long lying entirely within the township of Wauwatosa, Milwaukee county, instead of the much-touted Greenfield course, in the township of Greenfield, Milwaukee county.

After 2 months of quiet preparation, the Milwaukee Automobile Dealers' Association, promoter of the great speed carnival, announced today that the Greenfield course was secretly abandoned on June 1, on which date the town board of Wauwatosa presented an offer to the association of an 8.2-mile course in its township, under the condition that nothing in relation to the new course be made public until the last and final details had been completed. The offer of the Wauwatosa board included the completed course, together with all property rights, for a period of 3 years, taking from the shoulders of the M. A. D. A. the entire expense of building the roads into shape for high speed, which amounts to approximately $2,000 per mile, or $16,500.

The course will consist entirely of concrete road, with a 30-foot roadway, built under the direction of the state highway commission, with state aid. The turns, all of which will be rebuilt, will be of concrete, but the M. A. D. A. will be obliged to stand the expense, as the turns will be through private propery excepting in one instance, and the plan under which the town board is building the road will not permit of the construction of special turns for high-speed work at public expense.

The reason that the new course has been kept so absolutely secret for nearly 2 months is that the M. A. D. A. wished to avoid the many harassing difficulties that confronted it almost as soon as announcement of the selection of the Greenfield course was made early in the spring. After signing up all but one or two of the property-owners and residing tenants, the M. A. D. A. believed everything secure when it was discovered that Chicago and Eastern concessionaires were bidding for rights along the roads and when the situation was investigated, it was found that almost every foot of the course would be covered with peanut stands and soda water bars.

Just at this time Chairman Joseph M. Guentner, of the town board of Wauwatosa, approached the association with an offer to build a course and insure titles to every foot of ground bordering on the roads comprising the route, providing the association would keep it a secret until all details were completed. It was a most fortunate turn of affairs, and the offer was eagerly accepted. Two days later the town board had received the signatures of 98 of the 101 property-owners along the course. Within a week every one had been signed up. On June 29 the contract for building 8.2 miles of concrete road was awarded to Michael Schmidt, a reliable contractor of Wauwatosa city, and today concrete is already being poured at 10 points on the roads.

Description of the Circuit

The Wauwatosa course is a parallelogram, comprising the old Fond du Lac highway, from the northwestern corner of the city limits of the city of Milwaukee to the point of intersection with the Town Line road dividing the townships of Wauwatosa and Granville. It runs in a northwesterly direction. At the intersection the course runs due west along the Town Line road to Sommerville, where it intersects with the new Fond du Lac road, which it follows in a southeasterly direction almost parallel with the old Fond du Lac road. At the intersection of Burleigh road, the continuation of Burleigh street in the city of Milwaukee, the course strikes due east to the old Fond du Lac road. The two Fond du Lac road straightaways are each approximately 3 miles long; the Town Line road measures approximately .9 mile, and the Burleigh road 1.3 miles.

The Wauwatosa course is far superior to the abandoned

Greenfield course in every particular. It is almost flat throughout its entire length. The old Fond du Lac road is a straightaway as flat as a prairie road and it is here where the highest speeds will be attained. The new Fond du Lac road is not so regular, but probably more so than the most regular part of the old Greenfield course. The connecting roads at the north and south ends of the course are somewhat rolling, but the grades do not rise above 7 per cent. at any point.

There are two bad turns and two exceptionally good ones. The turn at Wanderer's Rest cemetery in the southwestern corner of the course, will have to be only slightly changed. It is a four-point cross-road, with rounded turns into each of the four connecting roads. The sweep from the new Fond du Lac road into the Burleigh road is one of approximately 145 degrees.

Advantages of the New Course

The Sherman Park turn, at the southeastern end, and the Sommerville turn at the northwestern corner, are very sharp and the town board is cutting a way through private property to make the round safe. The inside of the two turns barely measures 45 degrees. The Mud Creek turn at the northeast corner of the course measures about 120 degrees.

The location is ideal from a standpoint of accommodating the crowds. Two principal street car lines of the city of Milwaukee terminate at the two south corners of the course. They are fed by more than a score of trunk lines in the city limits. The main line of the Chicago, Milwaukee & St. Paul runs by the course, a half mile from the east leg.

The north city limits of the city of Wauwatosa are but 3-4 mile south of the lower end of the course, while the village of North Milwaukee lies about 3-4 mile northeast. The course touches the city limits of Milwaukee proper at the southeastern corner.

Records at Grand Rapids

Disbrow in Simplex Creates New Track Records—Dawson Suspended, Not Allowed to Start

GRAND RAPIDS, MICH., July 29—Before a monster crowd here last Saturday, Louis Disbrow, in his Simplex, broke two local records, established by De Palma, at the Comstock park mile circular track. Disbrow made 5 miles in 4:34.10 and 10 miles in 9:08.98. The previous records were: For 5 miles, 4:50, and for 10 miles, 9:22.

Dawson and his National were to have featured the program, but at noon, shortly before the races began, notice was received from the A. A. A. officials in New York that Dawson had been suspended from organized automobile racing because he participated in an unsanctioned meet at Memphis, Tenn., a short time ago.

Dawson's explanation of the Memphis affair is that he supposed the meet had the sanction of the A. A. A. Summary:

Time trials, one mile—Louis Disbrow (Case), 58.41; Heine Ulbrecht (Case), 1:01.32; Bill Endicott (Schacht), 59.54; Joe Nikrent (Case), 1:02.04.

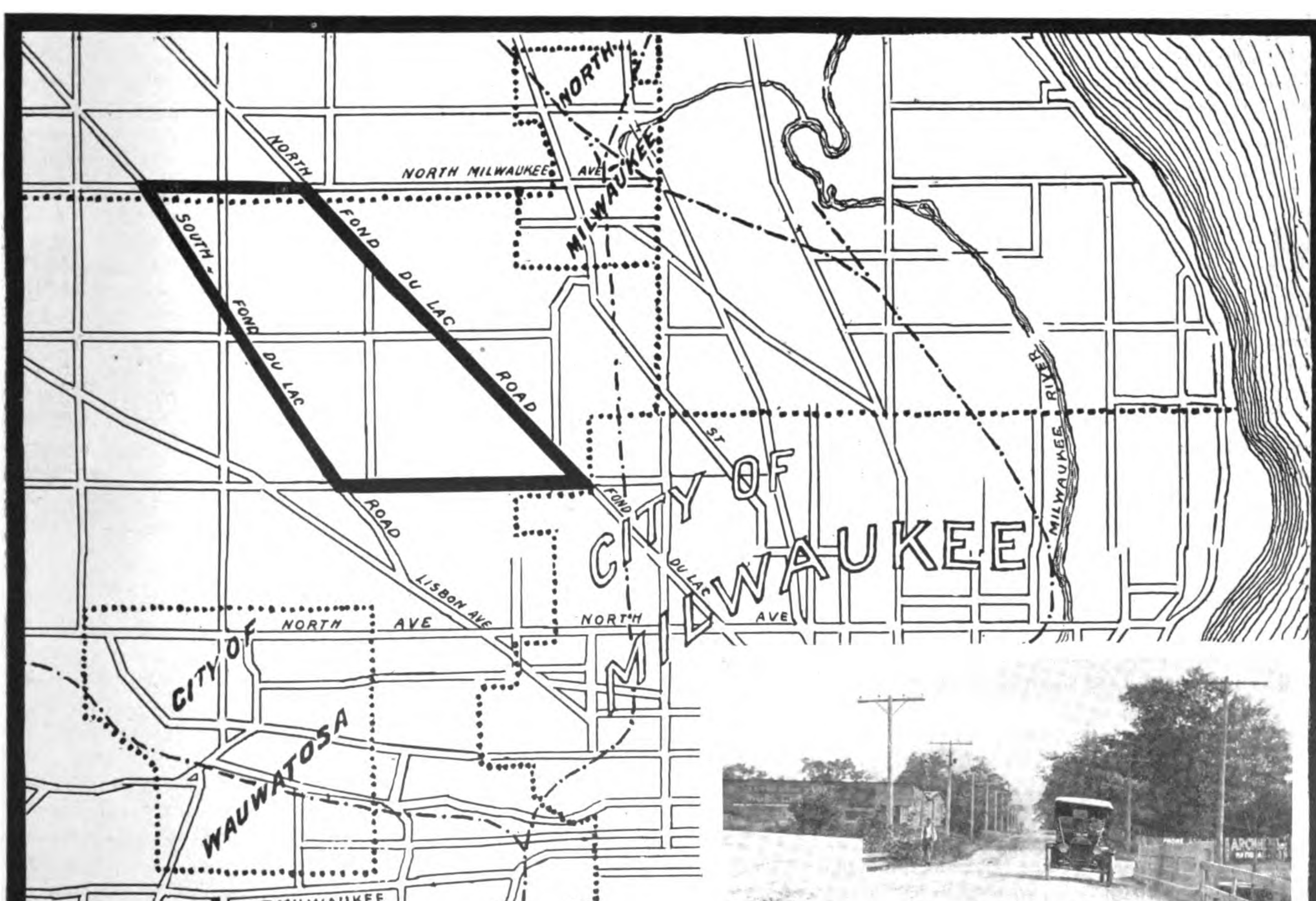
Five Mile—Joe Nikrent (Case), first; Bill Endicott (Schacht), second; Heine Ulbrecht (Case), third; time, 6:05.69.

Australian Pursuit Race—Disbrow (Simplex), won at end of fourth mile in ten mile race.

Exhibition Mile—Disbrow (Case), 57.97.

Five Mile Handicap—Disbrow (Simplex), first, 5:34.89.

One Mile Exhibition—Disbrow (Simplex), 53.59.



Wauwatosa course, 8.2 miles in length, which will be used by the racing cars contesting in the classics in September

Amenities of Racing on Half-Mile Tracks

Fences Proved Bothersome on the Wilkes-Barre Oval, Where Several Accidents Were Averted

WILKES-BARRE, PA., July 29—Saturday's race meeting on the half-mile track at the Driving Park was interesting to the good crowd that assembled. Dust was prevalent once more, just as it had been at the former meetings, despite the efforts of the promoters to lay it. Whalen's National was hard to beat in the races in which it was entered; in fact, it cleaned the boards on several occasions. The Mercer pair, Buick and E-M-F, made excellent showings. The summary follows:

Position	Car	Driver	Time
	Three miles, non-stock		
1	Buick	Williams	4:21½
2	E-M-F	Billy Burke	
3	Ford	Douglas	
	Five miles, non-stock		
1	Buick	Ringler	8:09½
2	Mercer	John De Palma	
	Five miles, non-stock		
1	National	Whalen	7:08
2	Mercer	John De Palma	ffl
3	Mercer	Ringler	
	Five miles, non-stock		
1	National	Whalen	7:05
2	Mercer	Ringler	
3	Mercer	John De Palma	
	Ten miles, non-stock		
1	National	Whalen	14:05 4/5
2	Mercer	Ringler	
3	Mercer	De Palma	
	Five-mile handicap		
1	E-M-F	Billy Burke	
2	Mercer	De Palma	

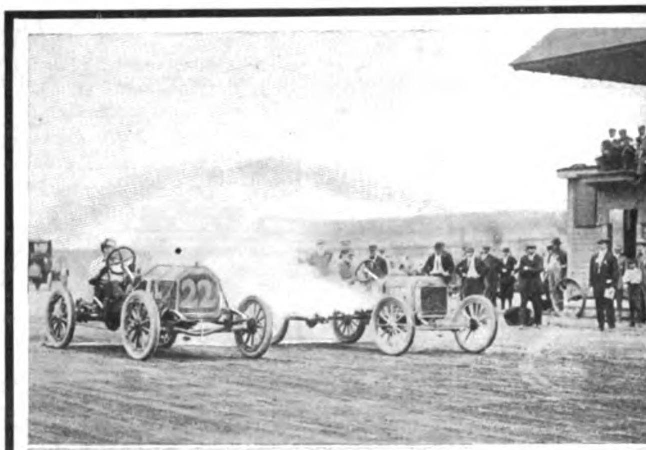
Hairpin Turns, Four to the Mile, Proved a Bar to the Creation of Records at Scranton

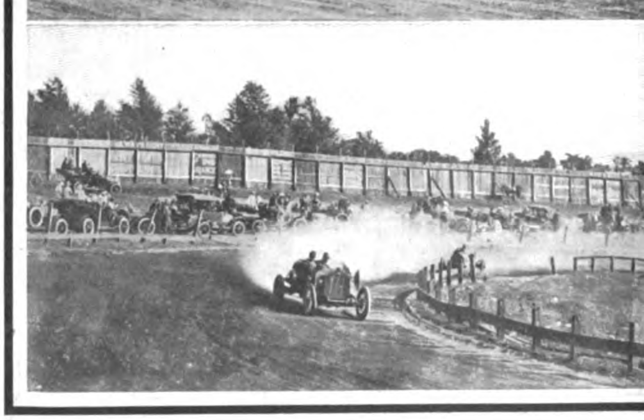
SCRANTON, PA., July 29—Neil Whalen in a National proved to be the star of the race meeting held on the half-mile track of the Minooka Driving Park Wednesday. The combination won the 3 and two 5-mile events for non-stock cars but was beaten in the handicap race by a Buick driven by Williams.

A fair attendance, estimated at 1,400, witnessed the trials. Williams also won two other events. The summary follows:

Position	Car	Driver	Time
	Three miles, non-stock		
1	Buick	Williams	4:32 2/5
2	Ford	Douglas	
	Exhibition, one mile		
1	Fiat	William Freitag	1:14
2	National	Neil Whalen	1:20
	Five miles, non-stock		
1	Buick	Williams	6:30
2	Mercer	Ringler	
	Three miles, non-stock		
1	National	Whalen	4:06
2	Marmon	Freitag	
	Five miles, non-stock		
1	National	Whalen	6:52
2	Buick	Williams	
3	Mercer	De Palma	
	Five miles, non-stock		
1	National	Whalen	6:32
2	Buick	Williams	
	Free-for-all, handicap, five miles		
1	Buick	Williams	6:06
2	National	Whalen	
3	Fiat	Freitag	

Whalen in National scrapes fence at Wilkes-Barre
John De Palma in Mercer skidding badly on turn





Start of the 3-mile non-stock race at Scranton track
National leading Buick and Mercer in 5-mile event

Fleet of Baker electric trucks which formed part of Cleveland's Fourth of July parade

BAKER Busy Selling Trucks—The ten Baker electric trucks shown on this page were part of a line of fifteen Bakers participating in Cleveland's Sane Fourth of July parade. Twelve Baker 2-ton trucks have been shipped to Washington, D. C., where they will be put in service by the American Express Company. The Baker Company at the present time holds orders equally as large as the Washington installation for seventeen other cities in the United States. These orders are additional to the earlier installations of Baker electric trucks which amounted to about a hundred cars in New York, Boston and other cities.

Dingley Takes National Car—Bert Dingley last week took his place as Los Angeles manager of the National Motor Car Company.

Nichols Joins Boston Chalmers—Fred W. Nichols, well known in Boston automobile circles, has joined the Chalmers Motor Company as assistant to Percy Owen, sales manager.

Brown Northwestern Studebaker Manager—A. H. Brown, manager of the Spokane branch of the Studebaker Corporation, of this city has been appointed northwestern sales manager for the company.

Dansville Board Sociability Run—The second annual sociability run of the Dansville, N. Y., Board of Trade, was made last Friday, Dansville to Canandaigua and return. About fifty machines participated.

Diamond Rubber Buffalo Branch—The Diamond Rubber Company, Buffalo, N. Y., has opened a mechanical goods branch at 721 Main street, that city. A. A. Lyon has been appointed manager of the branch.

Hanes Leaves Tiffin Taxicabs—The announcement is made that after July 13 E. C. Hanes severed his connection with the Tiffin Auto & Taxi Company of Tiffin, O. C. H. Lines and E. J. Rosenberger have entire control of the taxicab-operating concern.

Twin City Timken Agency—The Pence Automobile Company, Minneapolis and St. Paul, has been appointed agent in Minnesota, the Dakotas and Montana for the Timken tapered roller bearings.

Hartman Goes to Detroit—Charles W. Hartman, manager for the Studebaker Company in Dallas, Tex., and other representatives of the company in Texas have gone to Detroit, Mich. Plans are said to be under way for carrying on a larger business in Texas.

Menhall Enters Traveling Field—James W. Menhall, state agent for the Brush and Courier, and local representative of U. S. Motors products, and operating the largest garage at Beloit, Wis., will retire from business locally on August 1 to become traveling representative of the U. S. Motor Company in Wisconsin.

Sacksteder and Potter Resign—M. A. Sacksteder, formerly manager, and C. H. Potter, formerly assistant manager, for the United Motor Company in Texas, have resigned their positions and intend to open up a house for the sale of the Marion and the American cars. They are now on a tour of the North and expect to return to Dallas in the course of a few weeks to carry out the plans proposed.

Coler Overland Advertising Head—Announcement has just been made in Toledo, Ohio, of the appointment of Ernest Coler as manager of the advertising departments of the John N. Willys group of motor car factories. Mr. Coler will supervise the work of the departments of the Garford at Elyria, Ohio, the Gramm Truck Company, Lima, Ohio, and the Willys-Overland Company in this city.

Yeoman Joins Ames Company—George W. Yeoman, well known as sales and advertising manager of the Continental Motor Manufacturing Company of Detroit and Muskegon, Mich., has severed his connection with that company to ener a broader field as manager of the Ames Motor Car Company of Owensboro, Ky. Mr. Yeoman is vice-president

International Motor Company's new motor street sprinkler

Haynes Purchases California Company—The Haynes Automobile Company have purchased control of the Haynes Auto Sales Company of San Francisco, and announce the appointment of W. B. Cochran as direct factory representative.

Rose Leaves Studebaker Company—L. H. Rose, for five years manager of the Northwest branches of the Studebaker Corporation, has resigned that position to become head of the Northwestern agency of the Metzger Motor Car Company.

Sackett Takes Boston Oakland—Louis J. Sackett, one of the pioneers in the motor industry, who began his career in 1898, and was recently with the Cadillac agency in Boston, has been appointed manager of the Boston branch of the Oakland.

Satterthwaite Manager Whiting Company—J. G. Satterthwaite has been appointed manager of the Whiting Motor Company of New York, distributor of Mercer cars. His quarters are at Philadelphia, Pa., on the northwest corner of Broad and Green streets.

Mann Introduces Road Bill—Minority Leader Mann of the House of Representatives has introduced a resolution providing that all money received from the operation of the National parks be turned into the fund set aside for road improvements and bridge building.

Canadians Pay Hard for Gas—Automobile dealers at Hamilton, Ont., have raised the retail price of gasoline from 20 to 25 cents a gallan. This rate has been charged for some time by a number of oil and gasoline dealers in Ontario, but it was only last week that the Hamilton supply houses fell in line.

Reselling Cars Not Quite Simple—Secretary of State of California has issued a statement calling attention to the law whereby persons who have sold their automobiles are still subject to be taxed for them unless they have had their cars transferred to the new owners in the regular way through the office of the automobile license department.

Detroit Agencies Change Hands—Harry Postal and Richard Fair, of Detroit, Mich., have formed the Postal-Fair Motor Company, which has succeeded the Lion Motor Sales Company. The new company is a branch of the Michigan Motor Car Company of Kalamazoo, and in addition to that company's products handles the Lion and Peerless cars.

Street Regulations in Maryland—Maryland owners have been notified by the Automobile Club of Maryland that the club has received word from Justice of the Peace C. Scott Rickards, of Delaware County, Pa., that a law exists in that State prohibiting drivers of motor vehicles from passing trolley cars while the cars are stopped to let off or take on passengers.

Speed Case in Maryland Court—Counsel for the Automobile Club of Maryland has been authorized to appeal to the Circuit Court of Baltimore County against the decision of Justice Charles J. Hull convicting William J. O'Brien of speeding along Wilkens avenue, Baltimore, Md. The case will involve the right of the local authorities to prescribe a speed limit of 12 miles along Wilkens avenue.

Trego, Thomas Engineer, Resigns—Frank H. Trego, chief engineer of the E. R. Thomas Motor Car Company, Buffalo, N. Y., has resigned and his resignation will take effect on September 1. Mr. Trego has been chief engineer of this company since its recent reorganization and previous to that time was head of the maintenance department with the Hudson Motor Car Company.

Splitdorf Opens Service Department—Quarters for a New York service department of the Splitdorf Electrical Company have been secured on Broadway, near Sixty-second street. This store will also be utilized as the carbureter department of the company. The work of transferring a portion of the manufacturing operations of the company to the plant of the Eagle Company is progressing, but the present Bronx establishment will not be abandoned.

International Motor Company's Sprinkler.—The International Motor Company has begun the development of municipal automobiles, which offers some very practical and exclusive points of design. This company has recently sold to the City of St. Louis, a motor street sprinkler of unique design. This water wagon is built on a 6½-ton Standard Saurer chassis. The Gould pump equipment has a capacity of 400 gallons per minute against a pressure of 30 pounds of the pump circuit, and ten to twelve pounds at the nozzle. The pump is geared at 400 R.P.M. at a truck speed of 6 miles per hour which gives a water distribution of one gallon per 45 square feet. Control of the sprinkler is effected by two levers. The nozzles are easily adjusted to the full limit of useful nozzle pressure, in addition to an adjustment by a single ring nut which permits the throw of the water from the nozzles to be regulated for varying widths of streets, making the equipment a very practical one.

Automobile Incorporations

AUTOMOBILES AND PARTS

ALEXANDRIA, VA.—Check Spring Motor Company; capital, $100,000; to manufacture automobile engines and parts. Incorporators: C. E. Hooper, C. L. Lamber, A. S. Check.

CANTON, O.—Central Motor Car Company; capital, $25,000; to engage in the automobile business. Incorporators: R. F. Wilson, D. L. Tschantz, D. B. Wilson, Maggie Tschantz, Emma Wilson, Anna Herr.

CINCINNATI, O.—Cincinnati Motor Car Company; capital, $10,000; to manufacture automobiles for pleasure and commercial purposes. Incorporators: C. D. Wilson, H. C. Heisey, M. C. W. Shepler, J. C. Miller, R. M. Comer.

CINCINNATI, O.—Welbon Motor Car Company; capital, $25,000; to engage in the manufacture of automobiles. Incorporators: W. E. Welbon, H. S. Leymann, C. D. Wilson, C. W. Shepler, H. A. Welbon.

CLEVELAND, O.—Arter Auto Carriage Company; capital, $20,000; to manufacture, sell and repair automobiles and other vehicles, also to deal in parts and accessories. Incorporators: James G. Arter, B. Hexter, James B. Ruhl, C. A. Chapman, C. M. Lemmon.

MARION, IND.—Rutenber Motor Company; capital, $1,350,000; to manufacture automobile motors and parts. Incorporators: George W. Bowen and others.

MEMPHIS, TENN.—Southwestern Motor Car Distributing Company; capital, $50,000; to engage in the automobile business. Incorporators: J. W. Bondurant, N. S. Bruce, T. B. Crenshaw and others.

NEW YORK CITY.—L-M-S Motor Company; capital, $10,000; to manufacture automobile motors and other parts. Incorporators: Joseph J. Baker, Emil Akder, Herbert Cohen.

NEW YORK CITY.—Standard Automobile Company; capital, $10,000; to engage in the automobile business. Incorporators: Earl H. Fetchman, Henry B. Chapin, Alfred Freeman, Jule L. Janever.

NEW YORK CITY.—William Strathmann, Incorporated; capital, $5,000; to deal in motors, automobiles, etc. Incorporators: William Strathmann, Herman C. Birkemeyer, John H. Semken.

GARAGES AND ACCESSORIES

AKRON, O.—Akron Airless Tire Company; capital, $50,000; to manufacture and sell tires and other rubber products. Incorporators: William S. Brooks, Joseph J. Surbey, Ira H. Thompson, Frank H. Beyea, H. Lane Cole.

AKRON, O.—Majestic Rubber Company; capital, $3,000; to manufacture rubber goods of all kinds. Incorporators: E. Christian, O. W. Baum, J. A. Myers, A. L. Neiswanger, J. H. Ault.

BROOKLYN, N. Y.—E. Reineking Automobile Supply Company; capital, $5.000; to engage in the accessories and supply business. Incorporators: Emil Reineking, John Lucht, Bernard F. Nienstedt.

St. Louis Rubber Branch Moves—The United States Rubber Company, St. Louis branch, has moved into its new quarters at Compton avenue and Locust street.

Cadillac Branch for Sacramento—Don Lee, California distributor of the Cadillac line, has recently opened a branch in Sacramento, Cal. E. G. Anderson will be resident manager.

Franklin Announces Little Six—The Franklin Automobile Company, Syracuse, N. Y., announces that it will add to its line a two-passenger runabout built on the Little Six chassis.

Prest-O-Lite Opens St. Louis Branch—The Prest-O-Lite Company, of Indianapolis, has opened a service station at Channing and Locust streets, St. Louis, Mo., in connection with its branch.

Hall Oldsmobile Sales Manager—The appointment of J. V. Hall, manager of the Oldsmobile Company of Illinois, as general sales manager of the Olds Motor Works of Lansing, Mich., has been announced.

Smith Made Olds Ad Manager—L. Clyde Smith, assistant to the director of advertising of General Motors Company, Detroit, has been appointed advertising manager of the Olds Motor Works, Lansing, Mich.

Boston Mayor Buys Knox—Mayor John F. Fitzgerald, of Boston, has just bought a big six-cylinder Knox car in which to travel about on his duties as mayor, and as he is a candidate for United States Senator, the car will be seen flying about the state this fall on his stumping tours.

Chicago Buys Michigan Bonds—County Clerk Glorum, of Grand Haven, Mich., has received $100,000 from John Nuveen & Company, of Chicago, in payment for part of the issue of $600,000 good-roads bonds recently voted by the citizens of Ottawa county. Work on the roads will be begun at once.

White and Maroon N. J. Colors—The color scheme of the 1913 tags for New Jersey will be a white background with maroon letters and figures. This combination, the commissioner thinks, will be such as to make identification of the tags easy. The contract for the tags will be given out soon.

Automobile Incorporations

CINCINNATI, O.—Swing Wheel Automobile Company; capital, $50,000; to manufacture wheels for automobiles. Incorporators: A. J. Swing, Richard E. Warner, Rupert H. Langdale, C. A. Beckett, Richard A. Beckett.

DAYTON, O.—Automatic Lamp Control Company; capital, $15,000; to manufacture automobile control mechanisms for automobile lamps. Incorporators: Henry Ehlen, Ernest A. Eastman, William B. Meeker, Joseph Friedman, Mary E. Eastman.

DAYTON, O.—Stocker Rubber Company; capital, $10,000; to deal in automobile tires and other accessories. Incorporators: A. D. Stocker, Ira J. Cooper, H. H. Brewer, F. W. Johnson, J. W. Brumbaugh.

DAYTON, O.—Walter & Moosburger Company; capital, $10,000; to operate an automobile livery business. Incorporators: L. F. Walter, William H. Moosburger, W. C. McCommaughey, J. J. Lynch, John C. Shea.

EAST PALESTINE, O.—East Palestine Rubber Company; capital, $50,000; to manufacture tires and other rubber articles. Incorporators: R. E. Jones, Ulrich Winter, C. A. Oatsdean, Joe Hick, O. L. Shumate, A. S. Mauk, Albert Hartley.

GARDNER, MASS.—Brown-Rawson Garage Company; capital, $5,000; to conduct a garage and repair shop. Incorporators: Shirley J. Rawson, Harry W. Brown, Maud L. Rawson, Claribel Brown.

NEW YORK CITY.—Autodrome Company; capital, $50,000; to conduct racing exhibitions, deal in automobiles, aerial craft, etc. Incorporators: Harry L. Curran, Claire D. Curran.

NEW YORK CITY.—Automobile Importers Alliance, Incorporated; capital, $750. Incorporators: George J. Ginsburg, Hubert L. Wymer, Bernard C. Wymer, Henry W. Showers.

PATERSON, N. J.—Paterson & New York Motor Express Company; capital, $50,000; to conduct a general express business. Incorporators: John M. Simpson, Mary Brooks, Henry Smith.

SHEBOYGAN, WIS.—Sheboygan Auto & Supply Company; capital, $15,000; to conduct a garage, repair shop, paint shop and deal in accessories and supplies. Incorporators: Charles F. Kade, Sr., Charles F. Kade, Jr., Robert H. Thieman, Caroline Thieman.

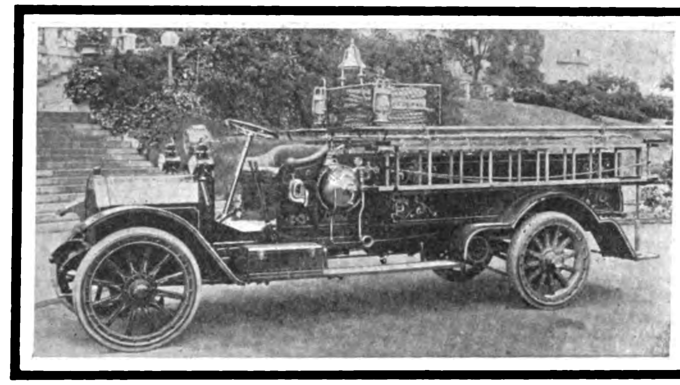
WILMINGTON, DEL.—Protective Auto-League; capital, $1,000,000; to represent the interests of automobile owners and operators. Incorporators: Isaac Fogg, George D. Hopkins, George W. Dillman.

CHANGES OF CAPITAL AND NAMES

CINCINNATI, O.—Jewel Carriage Company, changed name to Ohio Motor Car Company.

INDIANAPOLIS, IND.—Cole Motor Car Company, increased capital stock from $300,000 to $500,000.

TOLEDO, O.—Willys-Overland Automobile Company, capital stock increased from $6,000,000 to $15,000,000.



Chemical and hose truck turned out by the Federal Motor Truck Co.

Plans Track Near Fresno—A four-mile automobile race track near the town of Sanger, Cal., is being planned by W. D. Mitchell, a member of the board of supervisors. Neither time nor money will be spared to make it one of the finest speedways in the country. The location is within a few miles of Fresno, Cal.

Kalamazoo-Battle Creek Road—Prominent men of Kalamazoo and Battle Creek, Mich., are planning to build a macadamized road to connect the two cities. The road is to pass through Augusta, Galesburg and Comstock. The proposed road will be 23 miles in length and one of the finest automobile drives in America.

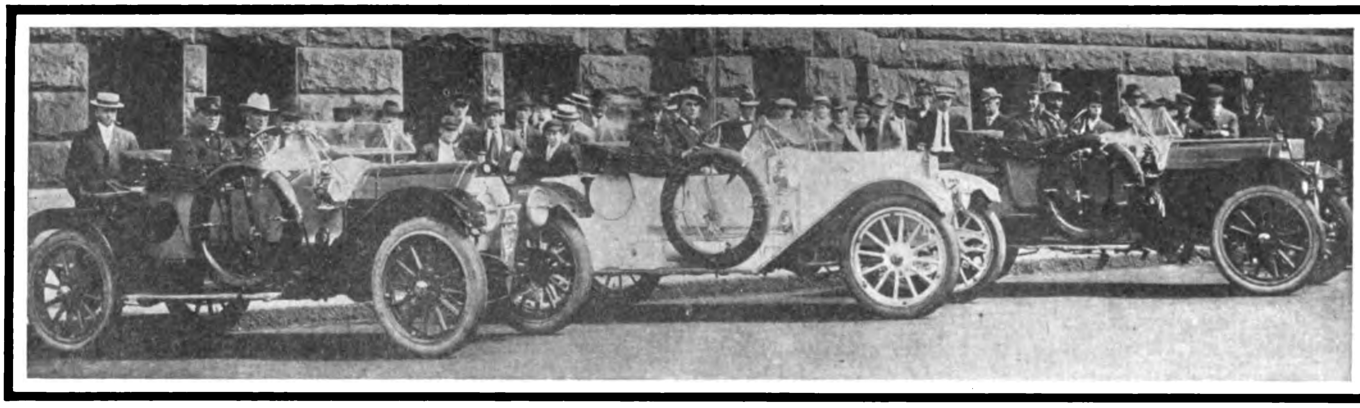
Los Angeles Business Change—The Los Angeles agency of the Stevens-Duryea automobile has passed from the Eastern Motor Car Company to the recently incorporated English Motor Car Company, of which P. A. English is president and Clarence A. English secretary and general manager. Temporary quarters have been secured at 1036 So. Grand avenue.

Louisiana Road Building Progress—One of the ante-election pledges of the present Louisiana Governor was to encourage the good roads movement. By dividing the parishes into road districts and putting a bill through the legislature providing for the application of certain portions of the levee tax fund to road building the promises have been kept. An increasing amount of interest in good roads is noted throughout the state.

Results of California Run—Edward J. Lyon won the Imperial Valley, Cal., road race on July 4th, in a 1909 40-horsepower Buick roadster, defeating a field of eleven entries, only four of which finished. A 30-horsepower roadster, driven by Clarence Conan, finished second. The course led through the towns of Brawley, Imperial, El Centro and Hopeville, covering a total distance of 206 miles and crossing 305 bridges built across irrigating canals.

Gotham Limit 15 Miles—Provided the ordinance proposed and recommended by the special committee of the New York City Board of Aldermen is adopted by the board, a speed limit of 15 miles an hour will be imposed on the motor vehicles in New York City, beginning September 1. A minimum fine of $25 and a maximum of $100, with imprisonment for 15 days or less, will be the penalty imposed for the first offense, and for the second a fine of $50 to $100 or imprisonment for 30 days.

To Change California's Laws—The need of new automobile legislation in California, which will replace the many antiquated and unjust measures pertaining to motor cars that are now on the statute books, is well recognized by the Automobile Club of Southern California. This organization has a legislative committee that has been engaged during the past year in drafting bills that will be submitted at the next legislative session and are designed to thoroughly revamp and reconstruct the motor laws of the state.



Chiefs of the Minneapolis Fire Department have been provided with Cole roadsters for quick duty

Touring Club's Work—The Touring Club of America is placing detour signs at points upon the main thoroughfares where it is necessary for tourists to avoid roads that have been closed for repairs or reconstruction.

Weissenburger Transferred—M. A. Weissenburger, who has been traveling in the New England states and the territory adjacent to New York City, has been transferred by the Regal Motor Car Company to the Pacific Coast.

Cole Cars for Fire Chiefs—The fire department of the city of Minneapolis, Minn., now owns twelve pieces of automatic fire apparatus. The latest addition to the city's fleet consists of three Cole roadsters, purchased for the work of the fire chiefs.

Tacoma's New Automobile Firm—The latest firm to join Tacoma, Wash., automobile row is the Union Motor Car Company, which will be located at 717 South C street. The new concern will handle Pope-Hartford, Peerless, Chalmers and Buick machines.

Oppose Double Automobile Taxation—About 300 Mississippi automobile owners have joined in an effort to restrain the recently adopted state automobile tax, which goes into effect Thursday. James R. McDowell, former assistant attorney general of the state, has been retained to conduct the case. The fight will be made on the ground that the payment demanded is double taxation, and also is class legislation.

Walpole Company Growing—The Walpole Rubber Company, which recently entered the tire making field at its plant at Walpole, Mass., has found the buildings there inadequate to get out as large a supply as the business warranted and so an unused factory at Foxboro, Mass., embracing 3 acres of floor-space has been secured and the work of installing tire machinery will begin at once. The company plans to turn out 1,000 tires a day in this new plant.

Experimenting with Automobile Bus—Arrangements have been made by the Pittsburgh, Pa., Council with an automobile company to place an experimental pay-as-you-enter automobile bus in Schenley Park about August 1. The vehicle will accommodate from thirty-six to forty persons. If the experiment proves a success the council may buy a number of machines for the parks instead of installing a street car line in the park.

New Agencies Established During the Past Week

PLEASURE CARS

Place	Car	Agent
Addison, Ill.	R-C-H	Schram Brothers.
Akron, O.	R-C-H	Akron Auto Garage Co.
Arlington Heights, Mass.	R-C-H	A. H. Ward.
Asbury Park, N. J.	R-C-H	Sofield Automobile Co.
Asheville, N. C.	R-C-H	Asheville Auto Co.
Atlanta, Ga.	Henderson	Atlanta Auto. Sales Co.
Belvidere, Ill.	R-C-H	H. H. Collier.
Chicago, Ill.	R-C-H	J. B. Kelly.
Chicago, Ill.	R-C-H	Schroeder & Son.
Chisago County, Minn.	R-C-H	White Bear Auto Co.
Collingdale, Pa.	R-C-H	George G. Guster.
Covert, Mich.	R-C-H	Shattuck & Son.
Crandon, Wis.	Henderson	Fred J. Rogers.
Dallas, Tex.	R-C-H	W. E. Talbot.
Delano, Minn.	R-C-H	William Heinen.
Devils Lake, N. D.	R-C-H	C. L. Doobs.
Dunnelen, N. J.	Henderson	Service Motor Co.
Edwardsburg, Mich.	R-C-H	Pearson & Pearson.
Elgin, Ill.	R-C-H	Henry Muntz Co.
Fall River, Mass.	Henderson	F. W. Davis & Sons.
Germantown, N. Y.	Franklin	A. W. Hover & Brothers.
Glens Falls, N. Y.	E-M-F	Glens Falls Automobile Co.
Glens Falls, N. Y.	Flanders	Glens Falls Automobile Co.
Glens Falls, N. Y.	Rambler	Glens Falls Automobile Co.
Grundy Center, Ia.	Henderson	A. C. Schafer.
Hartford, Conn.	Flanders	Fred W. Dart.
Hartford, Conn.	Peerless	George D. Knox.
Hartford, Conn.	Stevens-Duryea	H. M. Parsons.
Hartford, Conn.	Studebaker, E-M-F	Fred W. Dart.
Houston, Tex.	Lozier	A. C. Burton.
Indianapolis, Ind.	Little Car	H. C. McVey.
Jackson, N. C.	R-C-H	Northampton Motor Co.
Kansas City, Mo.	Paige-Detroit	Hall Brothers & Reeves.
Kansas City, Mo.	Stutz	Karshner Motor Co.
Kaukauna, Wis.	Marathon	T. W. McFarlane.
Kennebunk, Me.	R-C-H	Don Chamberlin.
Lodi, O.	R-C-H	A. A. Sanford.
Long Beach, Cal.	R-C-H	Hammond-Ballard Co.
Laramie, Wyo.	R-C-H	James G. Klock.
Los Angeles, Cal.	Henderson	L. W. Willcox Co.
Memphis, Tenn.	R-C-H	V. L. Rogers, Jr.
Milledgeville, Ill.	R-C-H	E. C. Miller.
Missoula, Mont.	Henderson	J. J. Deakin.

PLEASURE CARS

Place	Car	Agent
Monmouth, Ill.	R-C-H	Weir-Moore Motor Co.
Nashville, Tenn.	Michigan	Michigan Buggy Co.
New York City	Henderson	Henderson Eastern Motor Co.
Oakland, Cal	Haynes	F. W. Hauger.
Onancock, Va.	R-C-H	R. E. Powell.
Pipestone, Minn.	R-C-H	Bunn & Goembel.
Rochester, N. Y.	Henderson	Knipper-Kipp Co.
San Benito, Tex.	Henderson	Whittlesay Garage & Machine Co.
Sanford, Me.	Chalmers	Charles Lord.
Sanford, Me.	Paige-Detroit	Charles Lord.
Sanford, Me.	Peerless	Charles Lord.
Sanford, Me.	Pope-Hartford	Charles Lord.
Sanford, Me.	Stevens-Duryea	Charles Lord.
San Francisco, Cal.	Henderson	Bennheim-Moore Motor Co.
Seattle. Wash.	Garford	Waterhouse Trading Co.
Statesville, N. C.	R-C-H	R. H. Troutman
St. James, Minn.	R-C-H	J. J. Schutz.
St. Louis, Mo.	Crow-Elkart	Paine Auto Co.
St. Louis, Mo.	Henderson	Model Auto Sales Co.
St. Louis, Mo.	Hudson	Hudson-Phillips Auto Co.
Syracuse, N. Y.	Little	James Auto. Co.
Tacoma, Wash.	Buick	Union Motor Car Co.
Tacoma, Wash.	Chalmers	Union Motor Car Co.
Tacoma, Wash.	Peerless	Union Motor Car Co.
Tacoma, Wash.	Pope-Hartford	Union Motor Car Co.
Thompsontown, Pa.	R. C. H.	Harvey Hertzler.
Toronto, Canada	King	Matheson Auto. Co.
Wapakoneta, O.	Mercer	Clarence J. McFarland and Boone Thompson.
Warren, Pa.	Krit	W. O. Wilson.
Waterloo, Ia.	Henderson	Black Hawk Auto Co.

COMMERCIAL VEHICLES

Baltimore, Md.	Seitz	Rittenhouse-Winterson Co.
New York City	Stegeman	American-Marion Sales Co.

ELECTRIC CARS

Hartford, Conn.	Broc	George D. Knox.
Hartford, Conn.	Waverley	Fred W. Dart.

FRANKLIN Announces Little Six—The Franklin Automobile Company, Syracuse, N. Y., announces that it will add to its line a two-passenger runabout built on the Little Six chassis.

Norwalk 1913 Roadster Ready—The first 1913 model of the Norwalk 45 roadster has been completed at the factory along the Cumberland Valley railroad near Martinsburg, W. Va. The factory will be kept busy from now on turning out cars for immediate shipment.

Fritchle Plant for Bridgeport—Bart Roeder, President of the Eastern branch of the Fritchle Electric Vehicle Company of Denver, Colo., who has been making a tour of Southern New England seeking a location for a factory to build Fritchle vehicles, has determined to locate at Bridgeport, Conn.

Dorris Ready for Operation—The brick work on the new Dorris plant at Sarah street and Laclede avenue, St. Louis, Mo., has been completed and the company will move in about September 1. The Dorris production will be increased 50 per cent. for 1913. The concern will also increase its capacity for building trucks.

Columbus Auto Brass Building—The Columbus Auto Brass Company, Columbus, O., which has been operating a plant for the manufacture of auto supplies and accessories at 175 West Maple street, is erecting a new factory at the corner of Fourth and Warren streets. It is expected to move into the new plant in about two months.

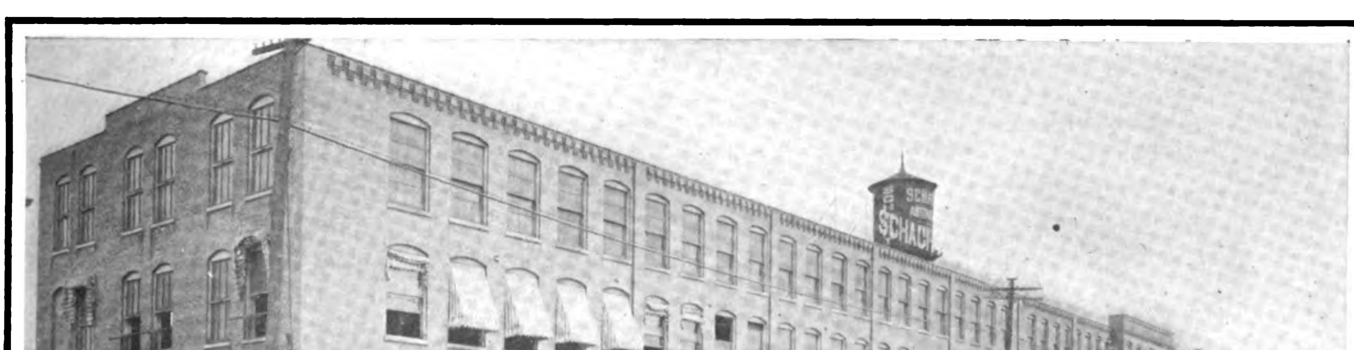
East Palestine's Tire Plant—It is now practically assured, through the efforts of the board of trade of East Palestine, O., working in conjunction with the people, that East Palestine will soon see the erection of a rubber tire manufacturing plant. The company asks a bonus of $3,500, which amount the board of trade is endeavoring to raise.

Lease Cortland Factory Building—Frederick R. Thompson and George A. Brockway, both of Homer, N. Y. have leased the plant of the Ellis Omnibus and Cab Company, Cortland, N. Y., for their factory where they will manufacture motor trucks. The plant was leased with an option for purchase if later desired.

Prest-O-Lite's New Factory—The Prest-O-Lite Company will build a $30,000 brick, stone and reinforced-concrete structure to be used in the automobile industry, in Grant boulevard, Pittsburgh, Pa. The structure will be 75 by 100 feet, one story high on the boulevard side and three stories high in Brereton avenue. There will be about 18,000 square feet of floor space.

Factory Opened at Brockville—A carriage company at Brockville, Ont., has begun the manufacture of automobiles this season. The machine it manufacures is called the Atlas. The motor, wheels, chassis and nearly all the other parts are imported from the United States and assembled in Brockville. The body of the car is manufactured at the local shops. The use of automobiles is rapidly increasing in this section, the moderate-priced car finding a ready sale.

Suburban Organizers Active—The Suburban Motor Car Company, of Detroit, Mich., is to begin operations at once on its factory at Ecorse, a new suburb which is 7 1-2 miles from city hall. The plant is to be entirely of reinforced concrete construction. The main structure will have a length of 400 feet and a width of 80 feet, the roof being of the sawtooth type. There are to be four side buildings, each being 60 feet by 400 feet. In front of these an administration building, 60 by 300 feet and two stories high, will be built after the factory has been completed. The power house will measure 150 by 200 feet, and it is planned to light the suburb by this plant as well as to furnish power for the factory. There will be no overhead shafting in the plant, the machinery to be driven by motors, in some cases these power units being for individual machines and in others for several in groups. Three cars have already been constructed, and twenty-five are to be put through the temporary plant immediately. While these are all four-cylinder types, it is planned to build both fours and sixes in the new factory.



Immense plant of the Schacht Motor Car Company, at Cincinnati, Ohio

Small Gasoline Vulcanizer; Cotton-Filled Mattress; Ingenious Belt Hinge; Mechanical Wheel; Nickel Polishing Compound; Lubricant Resisting All Temperatures; New Tire Iron; Latest Trade Literature

Diamond Tube Vulcanizer

A SMALL vulcanizer for use on the roadside is made by the Diamond Vulcanizer Company, 155 North High street, Columbus, O. This device, Fig. 1, is designed to repair punctures in tubes and comes in a box containing all the requisites to make a tube repair; the vulcanizer, a roll of patching rubber and cement to attach it to the tube. The vulcanizer proper is 6 by 5 1-2 by 2 1-2 inches and consists of two pieces of cast and machined metal, between which the tube is laid, the pieces being held together by two thumbscrews. The upper portion of the vulcanizer is shaped to form a small kettle into which gasoline or alcohol is poured until the space is nearly full of the fuel, which is then lighted. When the gasoline is burned out, the repair is finished, and the tube is ready to be replaced in the casing.

A certain amount of care is necessary in the operation of this vulcanizer, due to the use of gasoline as a source of the heat required in producing the tire repair. While gasoline is recommended for the work, it stands to reason that alcohol may be used in its place, which would naturally reduce the risks accompanying the use of the other fuel. In the combustion of the fuel the heat generated by the flame is largely absorbed by the vertical rib extensions of the vessel forming part of the vulcanizer, which transmits it to the rubber treated in the device.

White Swan Automobile Mattress

In Fig. 3 is seen the White Swan camping mattress for automobilists. It is made of tufted cotton felt, and is carried in shape of a roll. It comes in various sizes ranging from 2 feet to 3 1-2 feet in width, the length being standard at 6 feet 6 inches; the mattress weight varies from 16 to 25 pounds.

The compact size of the mattress when rolled together make it easy to find a suitable place for it in the car, where the passengers are not disturbed by its presence nor the mattress itself is in danger of being damaged. As the material which gives softness and spring to the mattress is cotton and not air under pressure, as in numerous other articles made for the same end, the punctures sometimes experienced with products of the latter sort are impossible.

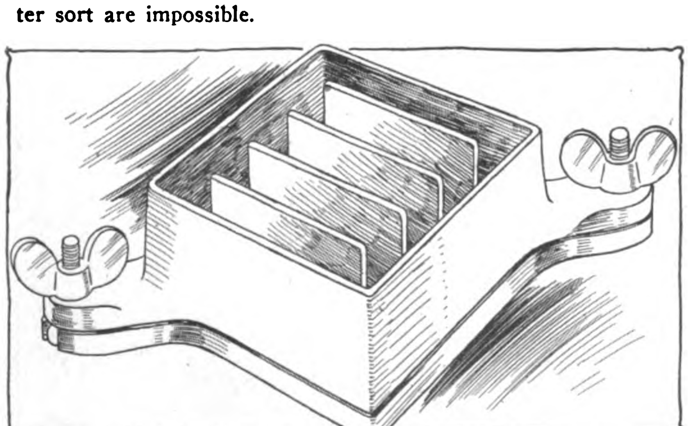


Fig. 1—Diamond vulcanizer heated by gasoline

Conn Fan Belt Hinge

An ingenious fan belt hinge for automobiles is the Conn type, shown in Fig. 2. Each hinge consists of seven pieces of hook-pointed steel wire which are bent in the upper left figure, and arranged on a steel pin which has a head on each end, keeping the wires tightly in place and preventing their coming off. When the hinge is put to use, every second wire is turned in an opposite direction from its neighboring two wires, giving the hinge the appearance seen at the right. The ends of the belt are then inserted between the upper and lower rows of points on each side of the hinge, after which the points of the hooked ends of the wires are hammered into the belt material. The Conn hinge is sold by Ash & Company, 1779 Broadway, New York City.

Bangs Coiled Spring Rim

E. D. Bangs, Milwaukee, Wis., makes a spring rim for the mounting of solid tires, which is used in connection with solid spokes. The wheel felloe is equipped with a number of coiled springs situated between the points where the spokes are attached to the felloe; the springs are contained in inverted cups fixed to the felloe and their free ends bear against the telescoping rim which floats in the felloe. This rim carries the solid tire, the method of attaching the latter to the rim being shown in the upper right corner of Fig. 3. The head of the bolt which holds rim and tire together extends into the open end of the spring cup and bears against the coiled spring. This arrangement has the following result: That when the tire strikes a road inequality, the shock is transmitted to the nearest one or two springs, where it is taken up in the form of spring compression or expansion which is released when the tire passes over a poor spot of the road.

Rex Nickel Polish Compound

The Arminger Chemical Company, Chicago, Ill., manufactures a new compound, the Rex Velvet Nickel Polish, which is specially adapted to prolong the life and luster of nickel plating on German silver. It is claimed by the maker that by the use of this polish the metal surfaces are not only kept brilliant but also receive a good cleaning when the material is applied, so that the strength of the plating is preserved. The polish is applied by means of a moist piece of cheesecloth or waste.

Western Gasoline and Oil Outfits

Complete storage equipment systems for gasoline and lubricants are manufactured by the Western Oil Pump & Storage Tank Company, St. Louis, Mo. The pumps have cylinders made of seamless brass; the pinions are of steel and the racks along which they travel are of malleable iron. Each pump is fitted with a measuring device registering every gallon drawn from the tank, and an automatic shut-off valve serves to positively interrupt the flow when pumping is stopped. The same company also manufactures cabinets in which the gasoline and oil equipment may be preferably stored. These cabinets are made of quartered oak with hammered copper trimmings, the doors being of beveled glass and the baseplates nickel lined.

Recent Trade Literature

IN its latest publication the National Motor Vehicle Company, Indianapolis, Ind., describes the details of Dawson's victory last Memorial Day. In addition thereto it also gives a number of records now held by National cars.

The Motorist's Handbook, brought out by the Michelin company, deals with the subject of repairing tire casings and inner tubes. The outfits manufactured for this purpose by the Michelin concern as well as the necessary operations are described in detail.

The *Reo Echo* of R. M. Owen & Company, Metropolitan dealers in Reo cars, is out. The summer number contains several interesting articles on farming and commercial uses of the automobile.

Tourists traveling through Maine this summer will find the roadbook of the Maine Automobile Association a useful addition to their equipment. The booklet contains a good map of automobile roads of the state of Maine and some text describing the touring ground found there.

Tractors are the principal subject treated in *Power and Efficiency,* a little journal published by the Waukesha Motor Company, Waukesha, Wis. It also takes up the special features of motors made by this company.

Fire truck tires are described in the small booklet which has but recently been printed for the Goodyear Tire & Rubber Company, Akron, O.; it contains descriptions and illustrations of single and dual equipment of the solid-tire class.

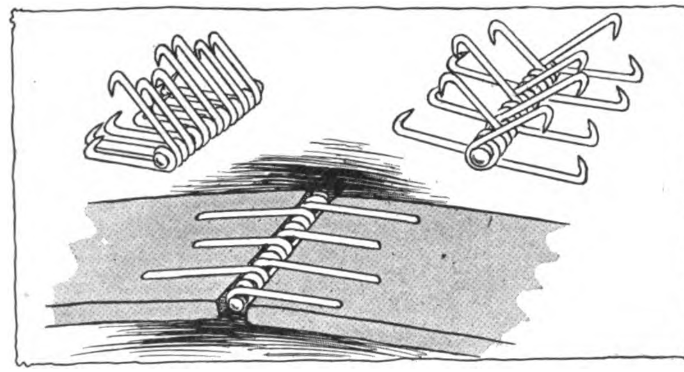


Fig. 2—Conn automobile fan bolt hinge

Pencils and lubricants fill most of the pages of *Graphite,* the house organ of the Joseph Dixon Crucible Company, Jersey City, N. J.

The July number of *Lozier Logic* is full of interesting history pertaining to the racing victories of the Plattsburg-Detroit product. Among other features a description of the last Fairmount Park races, in which the Lozier cars were among the early finishers, is of special interest.

The Cadillaqua festival recently celebrated in Detroit is the subject of a small pamphlet received by our office. Interesting details of the history of the great automobile center of Michigan and of the men that built it make the attractive booklet animated reading matter.

Parties interested in the makeup of an effective pamphlet will do well to procure a copy of the booklet *From Wool to Cloth,* which is being distributed by the American Woolen Company, Boston, Mass. The subject of the booklet is the manufacture of woolen goods, the whole process of making the finished product from the raw material being described in simple and interesting language.

The subject of solid rubber tires for hand-trucks is taken up in the latest booklet of the Goodyear Tire & Rubber Company, the designs of the various sizes of tires being illustrated by sectional views elucidating the various features of the products of the Goodyear company.

Automobilists interested in axles will find the attractive booklet of the Timken Detroit Axle Company an instructive piece of literature. This work describes the functions of automobile axles and explains the office of each part thereof in a manner which will greatly help the average owner to understand the anatomy of his car and call his attention to the care demanded by its various parts.

The Timken Roller Bearing Company, Canton O., has just published a little book on the *Care and Character of Bearings,* in which the construction of roller bearings is described in detail. The subject is one of interest to all automobilists and upon writing to the company any reader may obtain a copy of this booklet.

Harrison Agalite Lubricant

A lubricant for transmission, axle and bearing service, which is claimed not to congeal in cold weather or become thin in summer, is made by the Harrison Agalite Non-Fluid Lubrication Company, Inc., Syracuse, N. Y. The consistency of Agalite is said to be such that no grease which is placed in the differential can make its way to the brake drums, which would result in brake slippage. The lubricant, according to the maker, does not melt even when heated to a temperature as high as 200 degees Fahrenheit, but proves equally efficient a lubricant as at lower temperatures.

Three-Way Q. D. Tire Iron

The Brookline Motor & Specialty Corporation, 5 Pearl street, Brookline, Mass., is the maker of a simple device which serves for the removal of tires from Q. D. rims, especially when the tire has become rusted to the rim. Three parts constitute this tool; a handle, a hook which engages the outer bead and two wedges by means of which the tire is forced off the rim. The leverage of the handle is sufficient to make the work or taking the tire off its rim easy even when it has a rigid hold upon the latter. A screw which fits into any one of a number of holes on the handle permits of adjusting the iron for use on tires of different sizes.

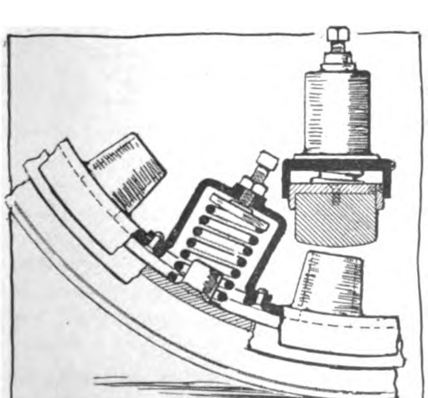


Fig. 3—Bangs coiled spring rim

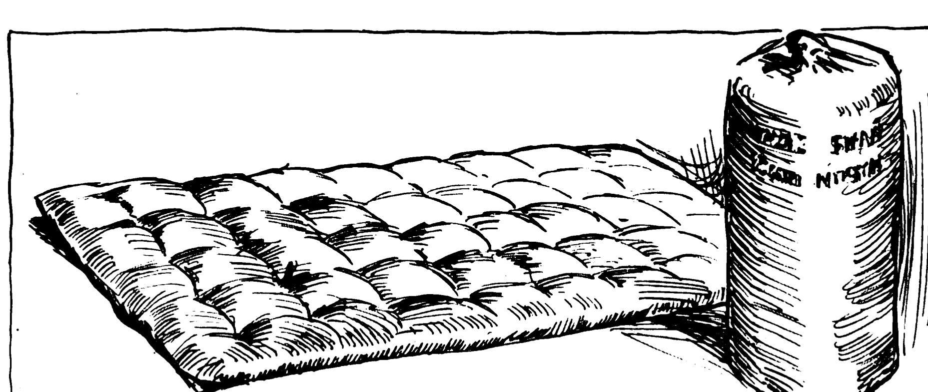


Fig. 4—White Swan tufted-cotton mattress

INTERNAL-COMBUSTION **Motor Valve**—Being a rotary cylinder in the head pressed tightly against the cylinder port by the pressure of the gas in the combustion chamber of the motor.

This patent relates to a rotary cylinder valve V in an engine construction, Fig. 1, which is encased in the head of the working cylinder. One side of the valve faces the cylinder port P serving for inlet and exhaust of the gases, and the other side of the valve is supported by and bears against a shoe S which is pressed against the valve by a piston P1. This piston is subject to the gas pressure existing in the working cylinder, being contained in a space which communicates with the combustion chamber by a passageway W. The valve is adapted to serve as inlet and exhaust valve, by making alternate connection between the interior of the cylinder and the respective manifolds.

No. 4,164 British—to J. Irigny Baverey, Rhone, France. Filed February 18, 1912. Granted June 12, 1912.

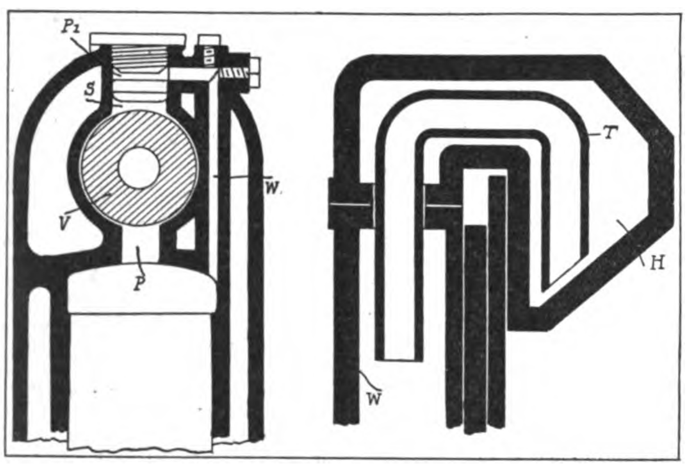


Fig. 1—Baverey rotary valve. Fig. 2—Philip-Reissig Jacket Syphon Idea

Cooling of Explosion Motors—Being a system of draining the head jackets of motors which are cast with jackets separate from those surrounding the cylinder walls.

The subject matter of this patent is illustrated in Fig. 2, showing the cooling of an engine of the Knight type, where the water-cooled cylinder head has an inwardly projecting extension forming a water pocket for the cooling of the head. The use of the tube T presents a means of communication between the jacket extension H which serves to cool the head and the space W of the water jacket cooling the cylinder walls. In draining the water from W, the tube T has the effect of a syphon, permitting the space H to be drained at the same time.

No. 5,406 British—to D. Philip and O. Reissig, Charlottenburg, Germany. Granted June 26, 1912; filed March 3, 1912.

Lamp-Turning Device—Which serves to swivel the headlights in the same direction as the front wheels of the car, the degree of turning the headlights being adjustable by the drive.

This patent describes a construction, Figs. 3 to 6, by means of which the headlights of a car are turned in the same direction as the front wheels when the latter are actuated. The mechanism operating the lights consists of a sleeve S surrounding the steering post, a lever L operating it, a set of gears G, G1, which transmit the rotative movement of the sleeve to the sleeve S2 equipped with an arm A holding the lever L1, Fig. 4. As L1 is turned around the ideal axis of sleeve S2, the rod R is drawn forward or backward, thereby turning one of the headlights to one side of the other. The connection C1 which attaches this headlight to its mate causes the latter to swivel in the same way as the first light.

The lever L is pressed by a spring against the stop S1 on the steering wheel, whereby the lamps are normally held so as to illuminate the path of the car when traveling straight ahead. The lever L1 is adjustable in the arm A, so that the amount of swiveling caused by turning the steering wheel through a fixed angle may be altered. Lost motion in the steering gear is compensated for by the lost-motion device contained in the rod R and shown in detail in Fig. 6. This takeup device consists of a piston R3 moving between two stops R2 in the tubular part R1 of the rod R. The method of securing the lamp holders to the car without boring holes in the chassis frame is clearly shown in one of the smaller illustrations, Fig. 3, where a link L2 is provided with three flanges M1, M2 and M3 and pointed screws S4 which bear against the outer edge of the frame. A screw S3 holds the flange M2 to the opposite side of the frame; a plug is inserted between M3 and the curved frame surface.

No. 5,453 British—to O. Riemann, Chemnitz-Coblenz, Germany. Granted June 26, 1912; filed March 4, 1912.

Vehicle Wheel Attachment—A method for locking wire wheels on the hubs by means of a nut and a cap.

In the construction, Fig. 7, a nut N serves to secure a detachable wire wheel to a hub H. The nut is locked by a bar B which may be used to rotate it and is pivoted at P. A cap C engages a thread on the hub, which is different from that carrying the nut N; this cap has a diametrical groove which engages the bar designed to lock the nut. The bar is held down and in position by spring-pressed pins Q which it carries and which engage a hole in the boss B1, Fig. 8.

No. 5,590 British—to L. Girardot, Paris, France. Granted June 26, 1912; filed March 6, 1912.

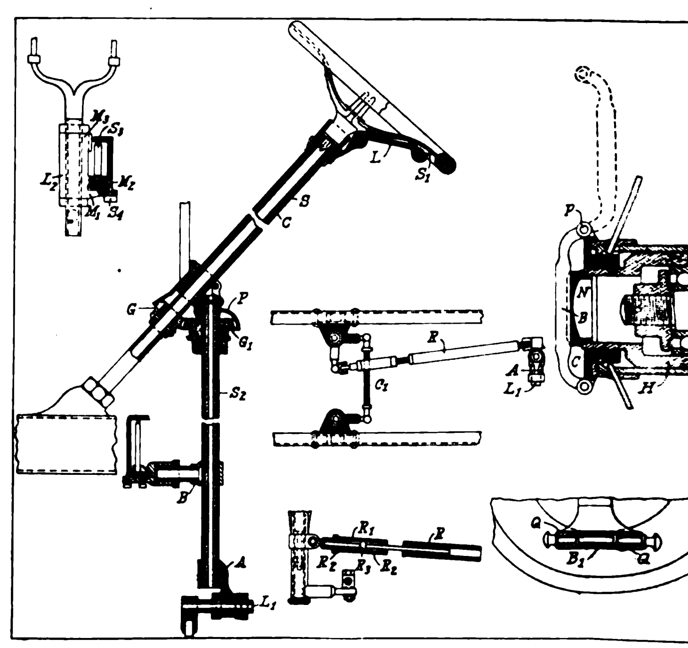


Fig. 3—Lamp attachment of Riemann device. Fig. 4—Construction of lamp-turning mechanism. Fig. 5—Link connection between mechanism and lamps. Fig. 6—Lost-motion takeup device. Fig. 7—Girardot wheel attachment. Fig. 8—Locking feature of same

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The Automobile

Increasing Brake Efficiency; Proper Methods of Application

Locking the Wheels Detrimental to Tires—Gradual Retardation Gives the Best Results—Full Brake Power Seldom Required—Opinions of Factory Experts

Technical Phase of the Subject—Best of Materials Requisite—Study of Friction Coefficients—Arguments For and Against Metal and Fabric Facings—Results of the Tests

STOPPING a car without applying enough pressure on the brakes to lock the wheels is the most efficient braking method. It is also the cheapest to the owner—In official brake tests conducted during the past 3 years after long-distance reliability contests the best brakes have been those in which the rear wheels were not locked. In such cases the cars have been stopped in the shortest distances. In not a few of these tests where a contestant has been given two successive trials better results have been obtained in the second trial by momentarily releasing the brake after the wheel was locked and then applying it again than were obtained in the first trial, where the wheel was locked from the second of brake application.

In all of these brake trials with cars traveling at 20 and 18 miles per hour when crossing the line at which the brakes had to be applied, the two rear wheels were locked and skidded towards the curb, so that when the car finally stopped it was at an angle of 45 degrees across the street. Such conditions have happened on dry asphalt pavement and also on some types of bitumen road surfaces.

Practically all of these brake tests called for stopping the car within a distance of 50 feet without penalization, and a penalty of one point per foot was imposed for every foot over the 50 required in stopping. In these tests many drivers were able to skid the wheels for 20 or 30 feet before crossing the 50-foot line, but still were compelled to take a penalty of a point or more, whereas others who did not lock the wheels stopped in distances of 28 to 40 feet.

RESULTS OF OFFICIAL BRAKE TESTS, WITH CAR TRAVELING AT 20 MILES AN HOUR

Car weight	Service brake	Emergency brake
3,740 pounds	32 feet	30 feet
3,900 "	33 "	33 "
3,750 "	36 "	30 "
4,280 "	55 "	22 "
4,090 "	45 "	40 "
3,790 "	38 "	68 "
4,260 "	97 "	39 "
6,030 "	27 "	35 "
3,750 "	23 "	28 "
3,340 "	31 "	28 "
3,450 "	29 "	49 "
3,620 "	39 "	53 "
3,490 "	61 "	46 "
3,830 "	31 "	30 "
4,010 "	63 "	40 "

These examples proved conclusively that locking the wheel is not enough; the brake must do more. The brake designer must keep this in mind in designing his braking arrangements; the manufacturer of brake facing materials must also keep it in mind and the driver must realize that he is not getting the maximum efficiency out of his brakes when he merely locks the wheels and permits the car to skid wherever it may.

When the wheels are locked the tire has to slide instead of roll over the road surface, and the actual possible retarding power of the tire is discounted in that one small portion of the tire surface does the work and it invariably becomes quickly glazed by dust or other matter accumulated from the street during the slipping or skidding, and which matter reduces the adhesion between the tire and the street surface. As already stated, better results and shorter stops have been made by momentarily releasing the brake after a short skid due to a new portion of the tire tread being brought into use, this portion not being glazed at the moment of application. Where a brake is designed to give gradual retardation instead of the instantaneous lock this factor is eliminated and the entire circumference of the tire is brought in contact with the road surface, there is not an opportunity for the glazing, with the consequent result of a quicker stop.

Automobile owners are constantly asking for the distance in which the car should stop from the moment of brake application. It is impossible to answer this question. The answer depends on the surface materials of the road, on the moisture element in the surface, on the car brakes, the car weight and the method of application. Some accurate figures are given herewith, these being taken from official tests with the car traveling at 20 miles per hour with two passengers and full equipment on. These distances range from 27 to 97 feet. In order to make the facts more valuable the car weights are given. In each case the tests were on level asphalt and the speeds full 20 miles. One set of brakes was applied at a time, the service or foot brakes first and the emergency or lever brakes second. It must be borne in mind that these tests were made after approximately 1,000 miles or road use with full load and at an average speed of 20 miles per hour schedule.

The figures show that a good brake should stop a car within 35 feet, one set used only. Brake engineers differ on this subject. "We believe that when the average car is traveling on smooth asphalt the brakes should be so constructed and so lined as to bring the car to a stop within 28 feet at 20 miles an hour, using both brakes at once," states J. R. Kelso, general manager of the Woven Steel Rubber Company.

Never Use Full Brake Power

Most brakes will readily fulfill these conditions when the cars leave the factory, but when the owner neglects the care of the brakes after the car is delivered to him, the efficiency rapidly falls off until he is suddenly made aware of existing conditions by the brakes failing him in an emergency where a quick stop is a necessity. A gradual stop is desirable; a sudden stop shortens the life of the brakes and tires. To use the brakes only when necessary is an excellent practice.

In descending a steep hill let the motor be the brake. Throw the gearset into second or third speed if the hill is very steep. Switch off the ignition and let in the clutch. The car will be practically driving an air compressor, saving the brakes and cooling off the motor. Near the bottom of the hill turn on the switch. In most cases it will be unnecessary to touch the brakes.

Before looking at the brake problem from the manufacturer's standpoint a few points of vital interest to the owner may be touched upon. The car should never be voluntarily driven into such a position where a sudden stop by the use of the utmost possible braking power is necessary. The brake lining will be rapidly worn away if this is done, necessitating an adjustment of the brake at frequent intervals. In hilly country brakes will require an adjustment after from 600 to 800 miles' use on an average car, while in level country they will only need regulating after between 3,000 and 4,000 miles of travel.

The figures apply to fabric-lined brakes, but with metal-faced types only a few users of such claim 15,000 miles' service in hilly countries without an adjustment. This freedom from adjustment is advanced by them as the strongest argument for the metal facing. While advancing these figures they also admit that the friction qualities of the metal are not equal to those of the fabric composition, and also that the brake is not so quiet in operation. There are others who use both metal and friction facings, metal on one set and friction on the other, the use of two materials being due to the different qualities of them, and so providing the driver with a higher safety factor than were a single material used. Some strike a half-way mark, using metal and fabric on the same brake, using soft iron segments with short segments of fabric between them, the iron being inserted to prevent the brake from glazing, and so giving a more efficient brake construction.

"A good brake lining must have four qualifications," says G. W. Dunham, consulting engineer of the Chalmers Motor Company. "First, it must be thoroughly heat-resisting; second, able to stand rough usage with a minimum amount of wear; third, it must not grab, and fourth, it must be silent in action." This statement is typical of the requirements of the manufacturer. According to the same authority, "If a brake fulfills these conditions it should hold the wheels just short of skidding which will give a stop in a minimum distance considering the weight of the car, the load carried and the conditions of the road. Any of the brakes provided on the cars of today are sufficient to lock the wheels, but the desirable feature, aside from stopping the wheels under all conditions is to allow them to turn very slowly."

There are two ways of stopping a car. One is by locking the wheels and skidding and the other is by allowing the wheels to turn and interposing the resistance on the brake drums requiring the momentum of the car to overcome the resistance there instead of expending its force in sliding the tires over the road surface. The first method wears tires and the second wears the brake material. Brake fabric is cheaper than tires and the answer to the question as to which is the best way to stop a car seems obvious.

Taking the testimony of the experts employed in the largest motor car manufacturing plants the conclusion which is reached immediately is that the most efficient stop is made when the force exerted on the wheels is just below the point where locking takes place and a skidding stop is made. The wheels are allowed to roll over the ground and a smooth silent stop is made. Putting the tire casing against a swiftly revolving grindstone will scarcely destroy it more quickly than allowing it to slide over the gritty surface of a road, but a stop made by not skidding will be accomplished in less distance, will minimize the stresses on the tire fabric, reduce the tendency toward side slipping and be far easier on the wheel itself. These are the reasons advancd by the designers for their declaration as to the best way to stop a moving automobile and in the light of this it is interesting to note what the engineers are doing to provide a braking outfit that will act in such a way that an ideal stop is made.

The matter of designing the braking system of a car is up to two distinct parties: The first is the manufacturer of the brake material and the second is the car manufacturer who designs the system of application and what is just as important, the system of compensation for the wear that must occur in the fabric. The producer of the brake material must bring out an article which will have above all a high coefficient of friction. As it is generally understood this coefficient is an expression showing the definite relation between the force required to just move a given load over a surface and the weight of that load. Where the pull required to move the load is P pounds and the weight is W pounds an expression involving the coefficient of friction f, would be $P = fW$. To illustrate: If a 10-pound pull were required to just move a load of 100 pounds weight over a given surface the equation would become $10 = f\ 100$. Solving, $f = .10$. In the case of the brake the load is the pressure applied by the driver, the coefficient of friction depends on the nature of the braking surface and the product of the two gives the pull as expressed above by P and this is the force that is exerted by the brakes in bringing the car to a stop.

High Friction Coefficient Necessary

The fabrics used for brake linings are composed to a large extent of asbestos fabric stranded with brass or copper wire which varies all the way, according to the claims of the makers and users from .25 to .90. Taking .60 as a probable average to further illustrate the meaning of the coefficient of friction as distinctly applied to the brakes of an automobile, the effect of the ordinary application of a brake will be noted:

When the driver presses his foot upon the pedal he sets in motion a system of levers and a cam on the brake which reduce the distance through which the different members of the system travel but which magnify the power to a large extent. Assuming for the moment that the pressure exerted upon the pedal results in a pressure of 1,000 pounds at the point of application of the brake to the drum, this will correspond to a load of 1,000 pounds pressing the brake fabric against the drum. The resulting friction will be the product of this load and the coefficient of friction, .60 making such product 600 pounds. This pressure is exerted at the rim of the brake drum which may be assumed to be a distance of 9 inches from the center of the axle and when referred to this point result in a stopping or retarding moment of 1,500 inch-pounds which is opposed to the moving car and which gradually brings it to rest.

It is evident then that the maker of the brake lining must make a high coefficient of friction an aim if he wishes his fabric to be a success, because where the coefficient of friction is low only a small percentage of the load applied to the brakes by the pressure of foot or hand is utilized in producing a stopping moment which after all is the final aim of any braking system.

Brake material must be able to resist the effects of a high temperature. There is a law of nature which says that no energy can be destroyed, it may change its form but it will never cease to exist. The energy which is stored up in a moving car must be dissipated gradually in bringing the car to rest and in doing this a large part of it is transformed into heat. The temperature at which most brakes are tested is at a dull red heat of iron. Other makers require that the material shall show no change of structure when submitted to a temperature of 800 degrees Fahrenheit. Should brake material char its integrity will be destroyed to such an extent that it will literally fall apart so that this heat-resisting quality is an absolute necessity. Some of the statements made by experts in the manufacture of brake linings may be repeated to show the importance in which temperature resisting qualities are held:

George D. Moore, president of the Standard Woven Fabric Company says: "The temperature which a brake lining should be capable of standing should be as high as a dull red heat. I have seen instances of brakes which have been run at temperatures quite as high as this."

I. A. Venters, speaking for the Johns-Manville Company declares that, "Any good surfacing material should be capable of withstanding a temperature of 800 degrees Fahrenheit."

Brake material must resist the effects of oil and water. If the material should absorb oil readily it would become useless in a short time because the coefficient of friction would be lowered to such an extent that it would be impossible to stop the car in a short enough distance. On the other hand it must not be so full of oil or other compounds that said oil or compound will run out when the band becomes extremely hot on account of the friction when the brake is applied. Oil is prone to work its way through the rear axle and out to the brake drums on many cars. Felt washers and packing boxes of various kinds have been used with success but after a time when wear has taken place the surface of the brakes is apt to acquire a slippery coating of lubricant which renders the brakes inefficient until they are washed off with gasoline. A renewal of the felt washers prevents the recurrence of a trouble of this nature.

Linings Must Be of Best Quality

The maker is exacting in his requirements of the brake lining manufacture because he is aware that, should it not possess ample wearing qualities, numerous replacements will be necessary. What the car maker requires is of great importance because it brings out better than anything else what the requirements of a good brake should be. An example of what automobile engineers consider as important in a brake may be mentioned: Speaking for the Pierce-Arrow Motor Car Company, D. Fergusson, chief engineer, has this to say: "The lining should not be compressible, otherwise the brakes will have to be frequently adjusted. Many brake linings require more taking up for this cause than for actual wear. They should not wear rapidly. The material should have sufficient tensile strength so as not to be torn away from its fastenings. The lining should be fireproof and if of metal should have a high melting point. The lining should be capable of being readily renewed. The punching of holes through it should not open up the seams."

"As a general proposition the brake capacity in all cars, both American and foreign for use in this country is inadequate," says W. A. Drysdale, consulting engineer for the American Asbestos Company.

"It is our impression that the brake capacity of the average American car for extreme use is rather under than over the proper requirements," says George D. Moore, president of the Standard Woven Fabric Company.

"The braking capacity of the average car is either not up to the standard, or else the average driver is very lax in the care of his brake," states I. A. Venters, of the Johns-Manville Company.

"We think that while many cars in the past had insufficient braking capacity, that the present tendency is to correct this trouble," says J. R. Kelso, general manager of the Woven Steel Hose & Rubber Company.

Speaking again, D. Ferguson says, "If the brake drum diameters are too large, the chances of locking the wheels are very great with even a moderate pressure applied to the levers. The proportion of leverage and brake drum diameter should be such that it requires considerable effort to lock the wheels, otherwise the tires will not last long."

There is a point evidently where these two extremes meet to produce the brake that will give the efficient stop noted before. It is the office of the maker of the brake material whether it be a copper or brass-asbestos fabric or a metal, to produce something which will meet the frictional requirements, have a high heat-resisting capacity, good conductivity, long-wearing qualities, good tensile strength, easily removed and renewed, silence in action, it must not grab, it must not absorb oil or water and it must be incompressible.

The car manufacturers must produce a system by which a gradual pressure can be put upon the brakes, the drum areas must be correct, the fabric must be ordered thick enough, the brakes must be readily adjustable with adjusting points above all accessible, the brakes must not be allowed to drag, it must be easy to get at the brakes to reline them and the drums must be of such material that they will not wear.

French Automobile Exports Gain

Paris, July 26—An increase in exports of more than $4,000,000, and a very slight increase in imports, with the United States still standing firm, are the outstanding features of the French automobile returns for the first six months of 1912. During the half year automobile imports rose to the sum of $1,337,940, compared with $1,316,940 for the same period of 1911.

The French national industry has every reason to be satisfied with volume of business done during the half year, for the actual increase, compared with the first six months of 1911, totals $4,155,180. Increased business has been done with England, Belgium, Germany, Switzerland, United States, Brazil, Argentine Republic, and Algeria. The most important feature of the foreign trade is the great increase with Belgium. From $2,747,640 in the first half of 1911, the volume of business has increased to $4,330,320 during the current half year. Great Britain still stands at the head of the list as the most important customer of France, but the increased trade with her has been very slight, and the total with Belgium comes close to that with England. The following are the official figures of French automobile exports for the first six months of 1912:

	Half year 1912	Half year 1911
Great Britain	$5,932,380	$5,835,480
Belgium	4,330,320	2,747,640
Germany	1,687,920	1,308,240
Argentine Republic	1,515,800	899,400
Algeria	1,477,260	1,021,320
Brazil	987,120	675,120
Switzerland	540,840	441,480
United States	543,180	295,500
Italy	445,880	527,040
Spain	333,340	252,540
Russia	178,140	262,800
Austria	108,540	230,760
Turkey	85,740	237,240
Other countries	2,195,160	1,471,980
	$20,361,720	$16,206,540

Legal News of the Week

Details of Knight vs. Argyll Suit, in Which Court Decided That Latter Had Not Infringed

Agent Can Sell All Types of Horns—Hupmobile Representative Bankrupt—Wishart-Dayton Bankrupt

LONDON, July 26—Further particulars regarding the adverse decision in the litigation commenced by Charles Y. Knight and associates against the Society of Motor Manufacturers and Traders involving the alleged infringement of the Knight patent in the Argyll single-sleeve valve engine have come to public notice.

The plaintiffs, Charles Knight and Lyman B. Kilbourne, were the registered legal owners of letters patent dated July 15, 1905, and numbered 14,729, for an invention of internal combustion engines granted to the plaintiffs for the term of 14 years from the date thereof; and the complete specification of the letters patent was duly amended by an order of the Chief Examiner dated November 16, 1908. The plaintiffs alleged that the defendants had infringed their letters patent, and they claimed an injunction and the usual consequential relief.

The plaintiffs' engine was used in the Daimler cars, and they complained in particular of the exposure and offering for sale at the defendants' stand at the show held by the Society of Motor Manufacturers and Traders (Limited) at Olympia, on November 3, 1911, of a 25-horsepower engine fitted to a limousine car and described as the "Argyll single-sleeve valve engine." The defendants denied the alleged infringement and the validity of the plaintiffs' letters patent. They also set up the usual defenses of anticipation and want of novelty, and alleged that the invention was not useful.

The trial of the action occupied several days as reported in *The Times* of July 4, and at the conclusion of the evidence and arguments judgment was reserved.

Claims of the Inventor

Mr. Justice Neville, in the course of his judgment said, that to claim for the patent for this invention the title of a master patent was, he thought, extravagant. The inventors declared the primary object of their invention to be to provide an improved form of internal combustion engine in which the moving parts should be directly connected and positively acting and the use of poppet valves and springs avoided. They declared that the invention consisted in certain features of novelty in the construction, combination, and arrangement of parts, all as fully described and more particularly pointed out in the claims. They then enumerated the parts and declared that either the cylinder described or a member telescoped with it should be operatively connected with the piston, but so far the court had not been told which of those parts was to be moved, the invention being in effect declared to be compatible with the movement of either. They then proceeded to tell the court that in the exemplification of the invention shown in the drawings of the two telescoped parts the cylinder was the one to be moved.

His lordship thought as a matter of construction that the exemplification was an exemplification in which one of two alternatives was adopted, but that subject to that the succeeding parts of the specification describe the invention itself, and not merely one way of carrying it into effect.

The present case showed the great care which should be exercised in allowing amendments to the claims in a specification, particularly where there was no opposition. The comptroller was doubtless told, as his lordship had been told, that the alteration was merely a verbal one, but clearly it could not have been intended to narrow the claim. It was, therefore, either wholly immaterial and should have been disallowed on that ground, or it must have been intended to widen the claim and was therefore illegal. In the result it had in the present action been relied upon in effect as altering a claim of an obviously limited character into one of the widest possible extent, and his lordship's conclusion was that upon the true construction of the specification the defendants had not infringed.

It appeared to his lordship that the action was a somewhat audacious attempt to resuscitate a patent for an invention of small compass and, to say the most of it, of very moderate utility, and by the help of an amendment to make it cover and embrace a wide field of enterprise in a comparatively modern type of mechanism, and so far as he was concerned the attempt failed and he dismissed the action with costs.

An appeal has been entered.

Hupmobile Agent Bankrupt

WASHINGTON, D. C., Aug. 6—An involuntary petition in bankruptcy was today filed against one Reed, the local agent for the Hupmobile. The Mutual Automobile Accessories Company, $28; Crane Wagner, Incorporated, $255, and Fox Stiefel & Company, $725.83, were the petitioners. Reed opened his shop several months ago at 1218 Connecticut avenue, in the heart of the fashionable residence district and looked to have a bright future. L. C. Loving and T. C. Bradley, were appointed receivers under a bond of $5,000.

The Diamond Rubber Company secured judgment against Reed for $310 and the Lovell McConnell Manufacturing Company filed suit against him for $230. Reed's total liabilities are about $6,500 and his assets $1,500.

Palmer & Singer to Appeal

According to Jay N. Emley, solicitor for the Palmer & Singer Manufacturing Company, a motion will be made in the United States District Court in the immediate future to vacate the order of Judge Hand providing for a decree *pro confesso* in the suit instituted last fall by the Enterprize Automobile Company for alleged infringement of the Dyer patents.

Mr. Emley asserts that the demurrer filed by him prior to the ruling of the court was not included in the presentation for decree *pro confesso* by the solicitors for the Enterprize Automobile Company, Dyer, Dyer & Taylor, and the latter hold that the various postponements and delays which have occurred from time to time did not contemplate the filing of any demurrer at all.

Can Sell All Types of Horns

PROVIDENCE, R. I., Aug. 5—Judge Brown of the United States District Court, for the District of Rhode Island, has denied the application of the Lovell-McConnell Manufacturing Company and others for an injunction to prevent the Waite Auto Supply Company from dealing in Newtone horns and from dealing in Klaxon and Klaxonet horns or from dealing in Newtone horns while at the same time dealing in Klaxon and Klaxonet horns.

Affidavits were presented on both sides and arguments were made from both points of view. J. Jerome Hahn, solicitor for the defendant company, moved that the application be denied and on July 29 the court held and ordered that the motion for injunction be denied. The main contentions will be tried out upon final hearing which will probably be had early in the Fall.

Must Appear in Court in Person

MALDEN, MASS., Aug. 5—Judge Bruce of the district court has read a lecture to the police of this city for assuming to tell motorists arrested for speeding that they could enter an appearance through their attorneys instead of appearing themselves and plead *nono nolo contendre*. The men so notified were ordered to appear before the judge so that he could hear what they had to say, as he believes that in making them come into a court of justice the seriousness of their offense will be impressed upon them more forcibly and they may be more careful in future. That the judge if fair was shown by his disposition on a case last week when a motorist whose car swung off the road a few feet and ran on the grass of the parkway was arrested on a charge of reckless driving. The judge discharged the man and told the arresting officer that there was no ground for such a complaint, explaining that reckless driving meant speeding at a rate that endangered the lives of people.

Rose-Grossman Suit Nearing Trial

In the suit of Rose Manufacturing Company against Emil Grossman and others the plea made by Charles C. Gill, solicitor for the defendant, has been withdrawn and leave to file an answer on the September rule day has been granted. The suit involves the validity of the Neverout license plate holder patent held by the Rose company. The plea that had been entered by Mr. Gill was that the claims set out in the petition had already been adjudicated. This plea is now withdrawn and an answer to all the material allegations will be filed.

Receiver Appointed for Madison

BALTIMORE, MD., Aug. 5—A receiver has been appointed for the Madison Motor Car Company by Judge Dawkins in Circuit Court. The bill of complaint was filed by Pinckney L. Sothoron, who states that he is a stockholder of the company, having twenty-five shares at $100 a share. The company consented to having J. Milton Lyell appointed receiver and permission was granted to the receiver to continue the business for 60 days.

Wishart-Dayton in Difficulties

Involuntary bankruptcy proceedings have been instituted in the United States District Court against the Wishart-Dayton Automobile Company which handled trucks in New York. The liabilities are estimated at $10,000 and the assets at half that amount. Spencer E. Wishart, the well-known race driver, was formerly connected with the embarrassed concern.

Goodyear to Sell $1,600,000 Stock

The Goodyear Tire and Rubber Company, of Akron, Ohio, is marketing the remainder of its authorized issue of $5,000,000 of 7 per cent. cumulative preferred stock through Spencer Trask & Company, of New York. Delivery of the new certificates will begin after September 1, according to the brokers.

The total amount to be disposed of aggregates about $1,600,000 and the market has stood above par for a long time on this issue. The circular issued by Spencer Trask & Company shows that 80 per cent. of the total output of the company consists of pneumatic tires and the estimated gross earnings for the fiscal year ending October 31, 1912, will be in the neighborhood of $25,000,000 with net applicable to dividends of $2,500,000. According to the balance sheet submitted in summarized form, the assets of the company amount to 200.6 per cent. on the preferred stock issue and 138.4 per cent. of quick assets.

THE following individual licenses have been granted by the Enterprize Automobile Company, authorizing the use of the Dyer transmission patents: To Joseph G. Fornecker, Sultan; Washington Garage, Sultan; William Scully, Sultan; Bruno Schultz, Rochet-Schneider; S. H. Bergs, Dragon; Jacob Hardtfelder, Allen-Kingston; Kelsey Smith, G. J. G.; Gustave Weyl, Cortland; Thomas Wilmarth, Mora; Thomas Callahan, Sultan; Andrew Lebrasseur, Mors; F. M. Rahill, G. J. G.; Melrose Garage, C. G. V.; Joseph Sperker, Sultan and William Whitman, Isotta.

Allen Brothers, American agents for the Metallurgique line, have taken out an importers license under the patents.

Willys Alleges Fraud

In Suit Against Officials of Gramm Company Avers They Voted Themselves Stock Illegally

Divided Surplus That Did Not Exist—Weed Chain Tire Grip Company Wins Two Suits

TOLEDO, O., Aug. 4—A sensational suit was this week filed in the common pleas court, by John N. Willys against A. L. White, president, and W. T. Agester, treasurer, of the Gramm Motor Truck Company, of Lima, O., asking the court to set aside a contract entered into last April on grounds of fraud. Mr. Willys alleges that on last April 15 he was induced by certain representations on the part of defendants, to enter into an agreement whereby he was to purchase 4,000 shares of the stock of the Gramm company at its par value. That he paid to defendants the sum of $50,000 in cash and gave his promissory notes due one for $75,000 on August 1, one for $75,000 due on September 1, one for $100,000 due on October 1, and one for $100,000 due on November 1. He alleges that the notes and stock were deposited in the National Bank of Commerce, at Toledo, O., which is also made a party defendant. Willys claims that at a meeting of the stockholders of the Gramm company, held last September, and controlled by White and Agester, the company was authorized to deliver to the A. C. W. Realty Company 1,000 shares of stock, for a fictitious indebtedness, and caused the company to issue a delivery certificate, dated August 1, 1911, without receiving any compensation therefor. It is claimed that Ira B. Carns, a stockholder in the Gramm company, controls this concern. It is further alleged by Mr. Willys that at the same meeting a dividend of $225,000 was declared payable in stock, and a division of stock was authorized when the company had no surplus capital. Shares were then distributed to the number of 750 to the A. W. C. Realty Company, 221 to A. L. White, 150 to W. T. Agester and 196 to I. B Carns, making a total of 1,142 shares. Willys alleges that White and Agester then voted to themselves respectively 755 and 800 shares of the common stock of the concern, and that the whole amount of 4,000 shares was then sold to him at par. He states that the company had no surplus to divide but had lost large sums; that it had no legal right to any real estate, but that it occupied the plant under a contract to purchase the property, and that it is indebted in the sum of about $135,000, none of which facts were made known to him at the time of purchase. He asks the court to grant the relief denied by defendants; that his notes be returned to him; that the contract be annulled; and that he may recover $50,000 already paid.

Weed Company Wins Two Suits

Final decrees in the suits for infringement of the Parsons non-skid patent have been entered in the United States District Court against the Newhall company and the Seneca Chain Company on application of the Weed Chain Tire Grip Company.

The last step in these prosecutions was not contested and the decrees were by consent of the defendants.

RICHMOND, VA., Aug. 3—Among the 121 indictments returned by a grand jury in the Hustings Court against firms and corporations failing to pay State license taxes appear the following:

Jefferson Garage, E. H. and N. W. Christian, proprietors; Diamond Rubber Company, of New York, R. G. Dunn, manager; Ford Auto Company, R. F. Kochler, manager; Thomas Motor Sales Company, O. B. White, proprietor; United Rubber and Tire Company, F. B. Goodloe, manager.

Atlas Deal Declared Off

Everitt People Object to Flanders Using His Name in Connection With New Company

Studebaker Corporation Drops Names of E-M-F and Flanders—Will Use Own Name for All Models

CHICAGO, Aug. 3—The deal between Normon W. Church, of Los Angeles, Cal., and Walter E. Flanders, of Detroit, in connection with the bid for the plant of the Atlas Engine Works, of Indianapolis, has been called off and following this announcement Mr. Church has told of the negotiations which, it was expected, would result in the purchase of the Atlas Engine Works and the occupation of the big factory of the Flanders Motor Car Company, which was to have been organized for the purpose of turning out a car to sell at $1,000 or under.

"About May 1," said Mr. Church, "information reached me through banking interests that it would be possible to secure control of the Atlas plant. I knew the factory and its possibilities and I realized what a big thing it would be to get it and turn it into a factory for the production of cheap cars. I first of all talked to W. F. McGuire, then factory superintendent of the Ford Motor Company, of Detroit, and he, too, saw the opportunities. Then we determined to interest Walter E. Flanders, the three of us to swing the deal. Mr. Flanders was agreeable and we proceeded with our plans.

"We determined to use the Flanders prestige to the utmost and decided to call the new concern the Flanders Motor Car Company, Mr. Flanders having discovered that his Studebaker contract did not stop him using his name in other businesses. This was after he had gone into the Everitt deal. When he joined the latter combination he was under the impression that his hands were tied so far as using his name was concerned.

"Investigating affairs at the Atlas plant, we found that it would be necessary to put the concern through a friendly bankruptcy, which was done, and we were prepared to close the deal at the receiver's sale which was held last Monday. I was called from Los Angeles and when I got East I found that the Everitt people had raised an objection to Flanders using his name for the company I was forming, claiming that it was doing them an injustice and robbing them of prestige that should be theirs. The next angle was when they insisted that the entire Everitt company be taken into the Atlas deal. I refused and rather than see the affair go by the boards I offered to withdraw entirely with the financial backing I had, including Mr. McGuire, and leave the field to the Everitt people. This they refused to take up and as I would not let them into the original Church-McGuire-Flanders combination the deal whereby the Atlas plant was to have been sold last Monday fell through. Mr. Flanders and myself are no longer connected in the deal. I am making this statement in order that the inside facts in connection with the matter may become known."

Drops Names of E-M-F and Flanders

DETROIT, MICH., Aug. 3—On the first of August, the familiar names E-M-F 30 and Flanders 20 went out of existence and henceforth these two cars made by the Studebaker Corporation will be known as Studebaker 30 and Studebaker 20, respectively. This change of name has been made because the factories for these machines are now entirely controlled by the Studebakers, and the officers of the corporation as well as the dealers selling the cars felt that the change was not only advisable but virtually essential. It has been done largely through a desire for consistency and uniformity, as well as from the fact that the Studebaker name is well known and of trade value. The old monograms which the cars bore have long since lost their significance, and the concern sees no reason why the machines should not bear the name of their present makers. Not only will all cars hereafter made carry the Studebaker script name-plate, but as soon as possible all dealers will be supplied with them, so that the cars in present use may be equipped with them.

Little Demand for Crude Rubber

Crude rubber experienced another dull, draggy week with prices about stationary and both buyers and sellers inactive. Importations aggregated a rather large total, the week-end receipts being 2,800 packages. The buying was placid and was reported to be for jobbing accounts. Reports have been circulated that the Brazilian syndicate has disposed of 650 tons of hard, fine Para, about one-third of its holdings, selling in the London market. In the meantime, since July 1, the movement down the Amazon to Para is estimated at 1,600 tons. The big movement to market is probably acountable for the lack of eagerness on the part of buyers and the tremendous manufacturing consumption is said to be the main support under the market. While the bids and offers have been quietly made in practically all the markets, trade has been satisfactory. The market has stood for a week around $1.16 1-2 on a basis of up-river fine.

Overland Close Up Garford Deal

TOLEDO, O., Aug. 4—The formal taking over of the Garford Company's plant at Elyria, O., by the Willys-Overland Company occurred here on August 1, when, at a meeting of the Overland directors, John N. Willys was elected president of the Elyria company, which will be known in the future as the Garford Department of the Willys-Overland Company. At this meeting.

Market Changes for the Week

Changes in the metal market were few and far between, and whatever fluctuations took place during the week were mostly of the downward sort. Thus lead declined 17 1-2 cents per 100 pounds, tin 25 cents for the same quantity, while copper remained unchanged during the entire week. One of the interesting features of the dull copper market is that the quotation of electrolytic metal is now above that of Lake Superior copper and has remained so owing to an intense inactivity of the market. Tin was erratic and mostly weak during the last 7 days. Steel in beam and channel form found no demand, although it was offered at $1.51 per 100 pounds. The table shows the price fluctuations for the week:

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.	.07¼	.07⅛	.07¼	.07¼	.07¼	.07¼	....
Beams & Channels, 100 lbs........	.....	.....	.....	.....	.....	a.151½	....
Bessemer Steel, Pittsburgh, ton	21.50	21.50	21.50	21.50	21.50	21.50	....
Copper Elec., lb...	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	....
Copper, Lake, lb.	.17¼	.17¼	.17¼	.17¼	.17¼	.17¼	....
Cottonseed Oil, August, bbl....	6.57	6.41	6.54	6.55	6.45	6.45	— .12
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	....
Fish Oil, (Menhaden) ..	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @....	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime..	.85	.85	.85	.85	.85	.85	....
Lead, 100 lbs....	4.67½	4.72½	4.72½	4.72½	4.72½	4.50	— .17½
Linseed Oil......	.73	.70	.70	.70	.70	.70	— .03
Open-Hearth Steel, ton......	22.00	22.00	22.00	22.00	22.00	22.00	....
Petroleum, bbl., Kansas crude..	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa., crude.....	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine Up-river Para.....	1.16	1.16	1.16	1.16	1.16	1.16	....
Silk, raw Ital....	....	4.15	....	....	....	4.30	+ .15
Silk, raw Japan..	....	3.67½	....	....	....	3.70	+ .02½
Sulphuric Acid, 60 Beaumé.....	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs......	45.50	45.00	44.50	44.50	44.50	45.25	— .25
Tire Scrap.......	.09	.09	.09	.09	.09	.09	....

A. L. Garford resigned as president of the company bearing his name, the interests which he owned in it being taken by the Willys-Overland organization. Mr. Willys' full title will be president and general manager of the Garford Department, in which capacity he has been acting for some time. The new department will be largely managed from Toledo. Mr. Willys will retain his office in that city.

Frank Briscoe Out of U. S. Motors

According to announcement made by the United States Motor Company, Frank Briscoe, one of the vice-presidents of the company, who has had charge of the designing department, has resigned. He will sail for Europe late in August to make a study of European automobile engineering. He will probably remain abroad for a year or more.

While resigning his office in the United States Motor Company, Mr. Briscoe will continue as president of the Briscoe Manufacturing Company, one of the subsidiaries of that company.

Republic Rubber Increases Capital

YOUNGSTOWN, O., Aug. 6—At the special meeting called for Monday last, the stockholders of the Republic Rubber Company voted an increase of the authorized capital from $4,000,000 to $10,000,000. A number of extensions and improvements were discussed and the semi-annual statement was read, showing a large increase in the business of the company.

At the directors' meeting following, the board declared a special stock dividend of 35 per cent. to the common stockholders of record August 1. It is stated also that an offering of preferred stock will be forthcoming in a few months. The regular cash dividend at the rate of 2 per cent. per quarter was declared.

Automobile Securities Quotations

Studebaker and General Motors were the strongest features of the week in the line of automobile securities, both companies being listed on the New York Stock Exchange and subject to the immediate effects of public demand in either direction. Reports of excellent business in the industry generally and particularly the optimistic attitude of the officers of both these companies is the cause of the strength shown. General Motors preferred moved up under active trading to 80 and both Studebaker issues advanced sharply, the common rising above 41 while the preferred rose to 97 1-2. Other issues were steady.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., common	..	..	125	..
Ajax-Grieb Rubber Co., pfd	..	..	95	100
Aluminum Castings, preferred	..	..	100	..
American Locomotive, common	38	38¼	43¼	43¾
American Locomotive, preferred	106	107	..	..
Chalmers Motor Company	..	..	145	155
Consolidated R. T. Co., common	5	10	12½	14
Consolidated R. T. Co., preferred	10	20	50	59
Diamond Rubber Company	..	..	..	..
Firestone Tire & Rubber Co., com	160	170	277	282
Firestone Tire & Rubber Co., pfd	105	107	105½	107½
Garford Company, preferred	..	..	99	101
General Motors Company, common	51½	52	35½	36½
General Motors Company, preferred	86	87	79¼	80
B. F. Goodrich Co., common	..	..	74	74¼
B. F. Goodrich Co., preferred	..	..	107	107½
Goodyear Tire & Rubber Co., com	230	240	333	338
Goodyear Tire & Rubber Co., pfd	105	107	104	105
Hayes Manufacturing Company	..	..	93	97
International Motor Co., com	..	..	28	29¼
International Motor Co., pfd	..	..	84¼	95¼
Lozier Motor Company	..	..	50	60
Miller Rubber Company	..	..	145	150
Packard Motor Company, preferred	..	..	105	106½
Peerless Motor Company	..	..	..	150
Pope Manufacturing Co., common	48	52	32¼	34
Pope Manufacturing Co., preferred	78	80	73½	75
Reo Motor Truck Company	8½	10	9¾	10¾
Reo Motor Car Company	23	25	21	24
Studebaker Company, common	..	..	41	41¼
Studebaker Company, preferred	..	..	97	97¼
Swinehart Tire Company	..	..	96	99
Rubber Goods Company, common	..	..	100	..
Rubber Goods Company, preferred	..	..	105	..
U. S. Motor Company, common	39	40	3	3¼
U. S. Motor Company, preferred	79	80	13¼	14
White Company, preferred	..	..	107½	108½

N. A. A. M.'s Meeting

Convenes at the Summer Home of General Manager Miles—Freight Rate Advance Discussed

Question of Car Insurance Also Considered—New Members Elected—St. Louis Dropped from Show Circuit

ONE of the most pleasant gatherings of the National Association of Automobile Manufacturers was held last week at Christmas Cove, Me., when the regular July and August sessions of the association were combined and conducted at the summer home of Samuel E. Miles, general manager of the association.

The business session, which was held on Monday, occupied about 4 hours and was largely devoted to the consideration of routine matters. One of the interesting matters that were discussed was the recently announced advance in freight rates on automobiles consigned to the Pacific coast. The former rates are $3 per 100 pounds in carload lots from Ohio, Michigan and Atlantic Seaboard common points to Pacific coast common points. The new rates differentiate between New York and New England common points, Buffalo common points and Detroit common points, and raise the rates respectively to $3.30, $3.20 and $3.10 per 100 pounds.

As the general practice is to ship two large cars or three medium-sized cars in a car, the raise would mean an advance in cost of shipment on automobiles from New York and New England of about $15 per vehicle; $10 per vehicle from Buffalo and common points and $5 per vehicle from Detroit and its common points. Just what will be done about the matter is still problematical, but the case has been referred to James S. Marvin, traffic manager of the association.

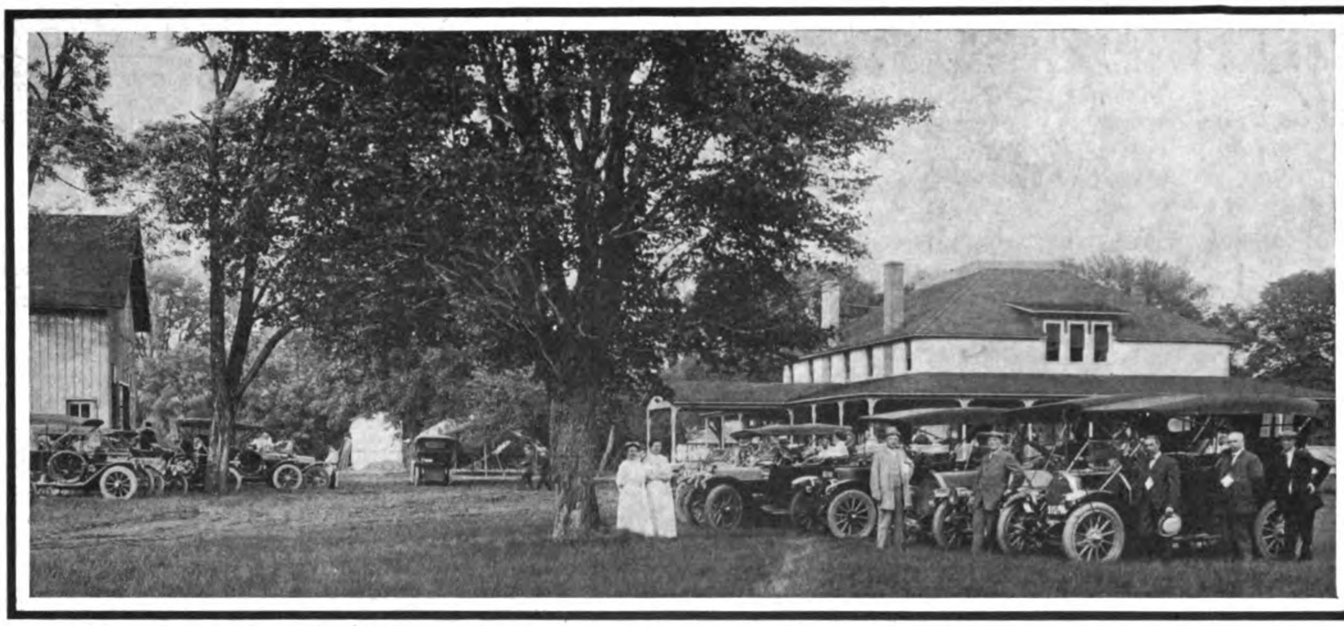
Insurance Rates Are Too High

Another subject discussed was the problem of insurance. Arguments were made that the rates charged for the various kinds of insurance were so high that many automobile owners were not taking out policies. This resulted in limiting the business of the insurance companies and the tendency was to cause owners of automobiles who were most liable to accident and mishap and who could not afford to do without insurance, to furnish a considerable part of the total business. Under these circumstances it was quite likely that the ratio of losses paid would be larger than they would be if the business was on a more reasonable basis and consequently broad and general.

No action was taken officially by the association, but the matter was referred to a committee for investigation and report.

Most of those who attended the meeting arrived at Portland on Saturday morning and were taken to Christmas Cove in automobiles. Sunday was spent in recreation as was most of Monday and all day Tuesday. Many of the visitors stayed over Wednesday and a few were still left to enjoy the hospitality of Mr. and Mrs. Miles at the end of the week.

A general meeting of the N.A.A.M. will be called for the near future, probably for the dates of the meeting at which the show allotments are made in October. The Motor Car Manufacturing Company of Indianapolis and the Warren Motor Car Company of Detroit have been elected to membership. The following changes have been made in representation: H. F. Campbell, Ideal Motor Car Company, to succeed E. C. Sourbier; Gleason Murphy, Rapid Motor Vehicle Company, to succeed J. F. Corl; H. S. Stebbins, Reliance Motor Truck Company, to succeed A. M. Bently. W. C. Teasdale represents the Ideal and Lucius E. Wilson the Warren companies. St. Louis has been dropped from the local show circuit, the dealers wishing to show in the Fall instead of on the dates suggested.



Scene at the Cold Brook Club, where the Elmira Automobile Club held its annual field day

Buffalo Club Opens New Home

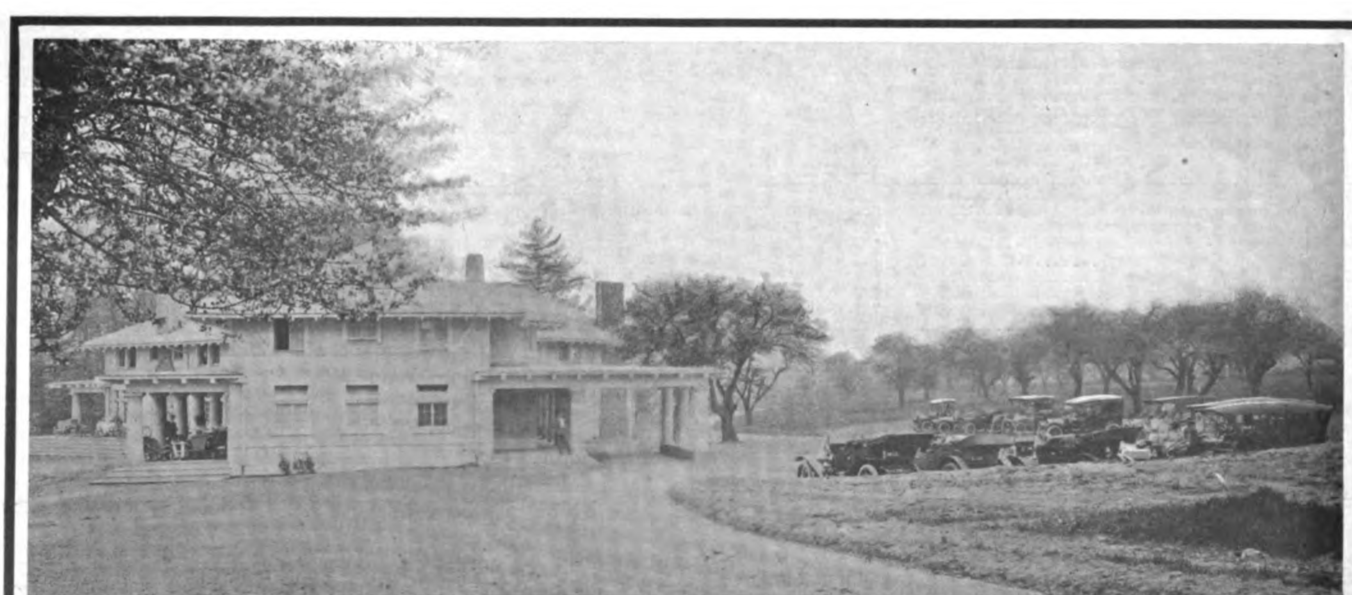
Structure Cost $75,000; Said to Be Finest of the Kind in the Country

BUFFALO, N. Y., Aug. 6—The Automobile Club of Buffalo's country clubhouse at Clarence, N. Y., which was constructed at a cost totaling $75,000, is said to be the finest country home owned by any motor organization in the United States. The estate on which this clubhouse is located comprises 70 acres, on which are stately pine and hickory trees as well as apple trees and shrubbery. The clubhouse is approached from the main highway by a broad smooth road leading directly to arched driveway. The building itself, which is 200 feet long by 136 feet at greatest width, is of Mission architecture and represents a spacious bungalow. The general reception room on the first floor has seating capacity for 500 people. This room is finished in weathered oak, unpolished, with vaulted ceilings and five fireplaces of red brick to hold large logs. Close to the main entrance in the interior of the clubhouse is a spiral staircase which leads to apartments on second floor planned especially for women guests visiting the clubhouse.

Elmirans' Annual Field Day

Over 200 Members and Friends Enjoy the Outing at Cold Brook Club Grounds

ELMIRA, N. Y., Aug. 5—About two hundred persons, including members, families and friends of the Elmira Automobile Club enjoyed the first annual field day of that organization last Wednesday at the Cold Brook club grounds, fifty automobiles being used in carrying the party to and from the grounds. During the afternoon cards and other games were enjoyed by the motorists and their guests. The menu was prepared under direction of two experienced caterers, Thomas Barnes and Frank Berner, and consisted of most delectable foodstuffs. At 9 o'clock the automobiles, which had been parked on the club grounds, were formed into a procession and the return was made to Elmira.



Magnificent country club house of the Buffalo Automobile Club at Clarence, N. Y.

Ready for the Galveston Races

Three-Day Carnival Will Bring Together Racing Cracks of North and South

GALVESTON, TEX., Aug. 3—Practice for the automobile races to be held on the hard-packed Galveston Beach, August 8, 9, 10, under the auspices of Galveston Automobile Club and the Texas State Automobile Association, has begun and daily hundreds of motor enthusiasts line the course to watch the tuning-up sprints.

A grandstand seating 10,000 people is now finished. From elevated seats in this stand the entire length of the 2 1-2-mile course will be in full view of the spectators at all times. This arrangement is new for beach races, which seldom proved spectacular because of courses being too long, permitting the cars to be seen only at the passing point. At low tide, the beach provides 200 feet of driveway, with an additional 100 feet or more which is taken up with the grandstand and parking spaces.

There are five events on the program for each of the first two days of the meet and a 200-mile free-for-all contest will be run on the third day.

Trying out a score of local cars preparatory to this week's races on Galveston Beach

Four Class C events and a special Class E event are slated for the first day, these ranging in distance from 10 to 75 miles. In the latter event, in order that a car win a prize, two or more cars must start in the same class and must finish within a period of 90 minutes. On the second day a similar event is to be run and in this the winning machine must finish within 60 minutes. Also, on the second day, three special Class E events are to be run off and several attempts will be made at the beach record.

Preparing Milwaukee's Race Course

MILWAUKEE, WIS., Aug. 6—A swarm of workmen are on the 8.2 miles of road comprising the new Vanderbilt cup course, and fourteen new culverts of the most advanced type have already been completed and the approaches graded. Two bridges are now under construction, and should be completed by August 10. The roads are all of macadam and have been down for more than 15 years. The surface is being scarified and a layer of 4 inches of No. 2 rock is being added. Two inches of fine screenings will complete the surface, which after being treated with a 70 per cent. asphaltum preparation as a binder, will be rolled to granite-like surface and later oiled and sanded several times. The 2.5 miles of concrete road which will comprise part of the course will be ready at the same time as the rest of the work.

Dawson Refused Reinstatement

Contest Board Also Disqualifies Schacht Company for Violating Advertising Rule

FOR violating rule 75, which prohibits advertising as performances of stock cars the showings of automobiles in races under non-stock conditions, the Schacht Motor Car Company, of Cincinnati, has been disqualified and suspended until the first of the year.

The offense upon which the ruling is based was the performance of the Schacht entry at the Memorial Day race at Indianapolis.

In addition to the Schacht matter the Contest Board of the American Automobile Association considered a number of other cases. Applications for reinstatement by Joseph C. Dawson and C. E. Shuart, suspended for participating in an unsanctioned meet, were held up pending a more satisfactory explanation. Joseph M. Matson was restored to good standing, having been suspended for failure to report at a sanctioned meeting in which he was entered. Hugh B. Andrews, promoter of the recent race meeting at West Side Park, Wilkes-Barre, Pa., was suspended until the first of the year for failure to comply with the requirements of the board with regard to safety precautions.

The following official records were accepted:

Santa Monica Road Race, Los Angeles, Cal.

Race	Miles	Car and driver	Time
Free-for-all Non-Stock	303.012	Fiat (Tetzlaff)	3:50:57.
231-300 CL. "C" "	151.506	Mercer (DePalma)	2:10:43.85
161-230 CL. "C" "	101.104	Maxwell (Josrimann)	1:37:57.90

Tetzlaff's average, 78.72 miles per hour.

Speedway Records Regardless of Class

Miles	Time	Driver	Car	Place	Date
3 Miles	1:54.88	Bragg	Fiat	Los Angeles,	May 5, 1912
4 Miles	2:33.37	Bragg	Fiat	Los Angeles,	May 5, 1912
5 Miles	3:11.75	Bragg.	Fiat	Los Angeles,	May 5, 1912

Class C Speedway Records, 161 to 230 Cubic Inches

25 Miles	21:12.42	Tower	Flanders Special	Los Angeles, May 5, 1912

Class C Speedway Records, 231 to 300 Cubic Inches

1 Mile	00:45.60	De Palma	Mercer	Los Angeles, May 5, 1912
2	1:31.55			
3	2:17.17			
4	3:02.70			
5	3:47.34			
10	7:27.33			
15	11:11.17			
20	14:56.05			
25	18:53.20	J. Nikrent	Case	Los Angeles, May 5, 1912

ST. LOUIS, MO., Aug. 4—The annual run of the Automobile Manufacturers' and Dealers' Association of St. Louis is to be a sociability event instead of a reliability. Owners will be invited to join the tour, which will be run off August 22, 23, and 24.

Right or Left Control?

Engineers and Lay Readers Take Up Discussion of "The Automobile's" Article on Subject

Advocates of Left-Side Steer Offer Excellent Arguments in Favor of Their Position

DES MOINES, IA.—My opinion is that the left-side drive is the proper one, after having used a car for one season with a left drive and previously using one with a right-side drive. I believe the advantages of the left-side are very clear, especially for city use. In passing a team going in your direction on the country road you are more apt to watch the road closely with a left-side drive than with the right and in this case you can always better be your own judge as to how far to turn out, and in meeting a team coming in the opposite direction, or in meeting another car, you can stay to the center of the road and allow for less room between the cars or between the team and car if the road is narrow.

If you are following a street car in the city it is certainly an advantage to drive behind a car where there is a double track and be able to get out far enough to see if there is a car coming and avoid same if it is coming, which is impossible if you have a right-side drive. Also if you are driving where you have to turn square corners it is easier to see the man coming behind who would likely be driving faster than you and passing you to your left.

I note that a great many people having right-side drives have a tendency to stay very close to the center of the road when you are meeting them. Sometimes this makes it dangerous to pass on a narrow highway.

Personally I have no choice so far as lever control is concerned, either right or left-side is satisfactory, and after selling both right and left-side drives for 2 seasons I find that there are a great many people not favorable to the left-side drive until after they have had a little experience, after which they always seem to favor it. For city use I would certainly recommend the left-side drive, and for country use I think one will answer the purpose as well as the other.—F. S. DUESENBERG, Sears Automobile Company.

Horsemen Favor Left-Side Seat

DETROIT, MICH.—The subject of left-side steering is one on which I have had fixed ideas ever since I built my first cars in 1900 and 1901. As every car is used a great deal in towns or cities I do not believe the possible advantages of a right-side drive for open country touring need to be taken into consideration. I have driven both kinds a great deal and I believe the preponderance of advantages is in favor of the left-side type.

In crowded traffic I believe a left-side steered car will make at least 25 per cent. better time than the right side. The ability to see if the road is clear to the left for passing enables one to keep going on take advantage of every opportunity to pass.

In turning to the right one can look to the gear as easily from the left side as from the right, and in turning to the left to cross the counter running traffic the left-side seat is obviously the better position. The same holds true also when turning around to go in the opposite direction. When riding on the front seat with the driver of a right-side steering car one is often asked by the driver whether or not the road is clear to the left of the overtaken vehicle.

Several years ago there were a number of articles in *Rider and Driver* on this subject and they disclosed the fact that many expert horsemen favored and were driving in the left-side seat. If right-side steering is accepted in left-turning countries such as England and others, and as has recently been adopted in France, it seems only logical that left-side steering is correct for right-turning countries like America. I have yet to see a communication in any of the English papers objecting to right-side steering. This considering the Englishman's habit of writing letters to his favorite paper upon the slightest provocation, would seem to be the best indorsement of left-side steering in this country.

As to country road driving I believe that it is more a matter of what one is accustomed to rather than a question of the relative advantage. England has notoriously narrow and hedge-obstructed roads but we hear no demand for left-side steered cars for country use. Personally I prefer the left-side steering car for all uses after driving both over long periods of time and under all conditions. I believe the left-side control has retarded the adoption of left steering but with the advent of the center control I expect to see left-side steering come rapidly into favor for both pleasure and commercial cars.—EDWARD T. BIRDSALL, M. E., Consulting Engineer.

Engineer Shows Left-Side Merits

DETROIT, MICH.—I think the problem of whether the right or left-side drive is preferable can be divided into two classes: matters regarding the mechanical construction and, second, advantages to driver and passengers.

Now as regards the mechanical construction of the car, the left-side drive results in having the change-speed levers mounted directly on the gearbox, forming one unit, with consequent elimination of the usual right-side drive troubles where two telescoping shafts run from the gearbox to frame, on the end of which the control levers are mounted. This construction requires very careful fitting to avoid too much rattle on the one hand, or cramping on the change-speed lever on the other, due to the fact that each connects two different members of the chassis—namely—the frame and the gearbox, and these two units are not immovably connected to each other. This point, of course, assumes the placing of the change-speed levers in the center of the car. This construction, generally known as central control logically follows left-side steer, owing to the fact that with the fore-door bodies levers on the left side are very awkward to install properly in a reasonable width of body.

Most makers have found it necessary in the past to use heavier springs on the right side of cars with right-side steer, due to the fact that the torque reaction of the motor causes a considerable load on the right side of the car, and with well crowned roads there is also a tendency for a greater weight to be thrown on the right side. The tires carried on the right side also tend to increase the weight, and with right-side drive the driver also sits on that side. With left-side drive the driver's weight is thrown on the left side, and when there is no other passenger in the car (and considerable driving is done alone) his weight balances to a certain extent some of the other constant weights on right side of the car.

Then such a small item as the position of the iron for supporting top front bow is bettered with left-side drive and central control, owing to the fact that this arm can be placed further forward without interfering with driver's elbow when changing gears and putting on brakes. Anyone who has had his funny bone shocked severely due to contact with the top iron in putting on brakes and changing gears suddenly will not fail to appreciate this point.

The advantages of the driver are many. Also to the passenger in the front seat. The obvious ones, of course, which have been most noticed, are the easy exits of passenger and driver to the sidewalk or curb without having to walk around the front of car through the mud. Also the passenger can step directly from the running board to the curb without the considerable jump from the running board to the street, which is a very important item in the case of elderly people and invalids, and with such people the front seat is a great favorite, on account of its being more easy riding and easier to enter, due to the being right alongside door.

Another advantage of left-side drive is the ability of the driver to see around street cars and slow-moving vehicles it is desired to pass. With left-side drive the driver can see an approaching street car or vehicle beyond the car he wishes to pass, before turning way out. With right-side drive it would be necessary to clear the car ahead before the driver could see whether another car or vehicle was approaching. This is especially important in winter time when in many parts of the city, after a heavy snow storm, the traffic is confined principally to the two central car tracks. Also the mirror used for observing traffic in the rear is of much more value with driver on the left side than where he has to see the mirror from a considerable distance or from the right-hand side of the car.—J. G. PERRIN, Lozier Motor Company.

Right Drive and Left Control

EAST CANAAN, CONN.—Your recent articles on the merits of right and left-side control were worthy of the attention of all motorists, but there is one point in this controversy that I failed to see mentioned. Personally I favor right-side steer with central levers for this reason: When shifting gears it is possible to steer and at the same time throttle the motor with the right hand, leaving the left free to work the shifting lever. Now with the levers at the right of the driver, in order to shift gears, it is necessary for him to remove his right hand from the throttle lever and also the wheel, which is rather awkward for anyone who throttles by hand.

Of course this does not apply to those who use the foot accelerator, but in my humble opinion, the foot accelerator is all wrong, the foot not being as sensitive or as well adapted to this purpose as the hand. It is very hard also to properly control a car on a rough road with the foot.

It is very gratifying to me to see the rapid gains that are being made by the little-six type of car. The superiority of the six-cylinder motor seems to be generally admitted, but the makers of this style of engine have usually built heavy, high-powered cars and charged as high a price for them as they thought the luxury-loving class could be induced to pay.

I believe that there is a fast increasing number of the motor wise who are waiting for a reliable, low-powered moderate priced $1,500 to $2,500 light six, and I predict a brilliant future for this type of car.—D. C. CANFIELD.

Left Drive Favors Passengers

NEW YORK CITY—The point of left or right-side control is very vital to say the least. I cannot see any advantages of the right-side control. Center placing of gear shift is coming fast and the public demands a right-hand operation. This forces the steering column to the left. In road driving I have always feared the oncoming car above everything else for this reason. Two cars meeting at high speed pass each other at the sum of the two speeds. With a ditch on one side and the oncoming car on the other I would much prefer to just miss the oncoming car and take the chances on the ditch.

In overtaking another car traveling in the same direction you do not attain the high speed of passing and usually take more precaution to see that you have a clear road to get around or probably because you don't know which way the fellow in front will turn.

The fore-door has come to stay and for the sake of alighting on the sidewalks or stepping stone it is certainly preferable to have the steering column on the left side. The passengers in my opinion should have the preference over the chauffeur.—ANONYMOUS.

NEW ORLEANS, Aug. 6—Passengers arriving on last week's boat from Bermuda state that the question of lifting the ban against automobiles is being considered. Motor cars have been prohibited on the island for several years due to recklessness that characterized their operation when first introduced into Bermuda.

Foreign Trade Openings

Opportunities Abroad as Indicated by the Government Daily Reports from Consular Stations

2-, 3-, 5- and 10-Ton Trucks in Demand—Agencies for Pleasure Cars Wanted in European City

AUTOMOBILE TRUCKS—A leading dealer in automobiles and accessories in a European city informs an American consulate that he desires to receive from American manufacturers of automobile trucks immediate offers f.o.b. New York of automobile trucks of 2 to 3 tons capacity. Prices in excess of $2,500 cannot be considered, nor offers which do not carry with them exclusive agency rights for the country. Correspondence should be in English, and catalogues and drawings should be accompanied by all necessary technical information. File No. 9270.

MOTOR TRUCKS FOR HAULING ORE—A report from an American consul in Mexico states that a company in his district is in the market for a couple of motor trucks for hauling ore from mines to the railways. These trucks would probably require steel instead of rubber tires, as the roads on which they are to operate are rough, rocky, mountain stretches. They would have to be sufficiently powerful to travel short distances of 20 per cent. grade road. In the absence of rubber tires the trucks would have to be equipped with pneumatic shock-absorbing springs in order to preserve the motor. Information and prices are requested on 3, 5 and 10-ton ore capacity trucks. File No. 9262.

Want Passenger and Freight Cars

AUTOMOBILE AGENCY—An American consul in a European country reports two reliable business men in his district, one of whom resided for 12 years in the United States, desires to procure the agency of a strongly built, medium-weight, good appearing automobile which can be retailed there at from $900 to $1,860. The inquirers are well acquainted with the business element of the city in which they are located, speak and write English, are energetic, and in the opinion of the consul would make first-class representatives for any automobile firms desiring representation. File No. 9261.

PASSENGER AND FREIGHT AUTOMOBILES—One of the commercial agents of the Department of Commerce and Labor reports that a bank in an American city, with European connections, is requested by a prominent foreign automobile transport company to procure catalogues and price lists of American passenger and freight automobiles. All communications should be transmitted to the American offices to be forwarded. File No. 9301.

DIESEL ENGINES—An American consular officer reports that a firm in his district desires to secure the agency for American manufacturers of Diesel engines. It is believed these goods can be introduced to the satisfaction of the manufacturers. The members of this firm, one of whom is an American, are energetic and have an excellent reputation in the city in question, as they have been identified with leading local concerns. Correspondence may be in English. File No. 9295.

TRADE WITH BARCELONA—At the request of the consulate general, the Barcelona custom house compiled statistics showing the imports into Barcelona from the United States. These indicate increasing possibilities for the introduction of American goods. For instance, seven more automobiles were imported from the United States in 1911 than in 1910, but there is undoubtedly opportunity for a far greater trade here if the proper methods are adopted by the American manufacturers.

TRADE WITH VANCOUVER—The automobiles invoiced at the Vancouver consulate general for shipment to the United States during 1911 were valued at $36,397, an increase of $7,919 as compared with 1910.

Exports Gain 65 Per Cent.

Foreign Countries Get Over $10.000,000 More of Our Automobile Products Than Last Year

Imports Increase Only 8 Per Cent. for the Fiscal Year—Tire Exports Show 27 Per Cent. Gain

WASHINGTON, D. C., Aug. 5—Official figures of automobile exports and imports for the fiscal year ending June 30, 1912, have been issued by the Department of Commerce and Labor. The showing, as far as export business is concerned, is not up to the estimates sent out from semi-official sources last month, but it is sufficiently impressive in that it proves that the export business was about 65 per cent. larger than it was during the foregoing period based upon the official figures. Last year, it will be remembered, the manufacturers who had been particularly active in the export field, protested that the government figures were much too low and the same kind of a protest is being heard now, although so far it has not been so pointed as it was last year.

The total amount of export business in the automobile line, including cars, parts and tires was $25,657,294, against $15,509.229, during the preceding fiscal year.

The tabulation and comparison are shown in Table I.

It will be noted that Canada maintains first place as a customer of the United States and that Great Britain and British Oceania follow in order, the three British divisions taking an amount in excess of the total exportation of the previous year.

There was a slight reduction noted in France, Germany, Italy, Mexico, and the West Indies and a measurable increase in South America and in scattering business.

With the value of tires reckoned in with the totals to aggregate sum of the exports would probably reach the unofficial figure of $28,000,000.

The automobile imports for the year show a total of $2,438,325, which is an increase of $288,000 over the business of the previous year and a decrease of $1,400,000 as compared with the fiscal year of 1910.

The figures and comparisons are shown in Table II.

Tire Exports Gain 27 Per Cent.

WASHINGTON, D. C., Aug. 3—Exports of motor car tires during the fiscal year ended June 30, 1912, amounted in value to $2,657,809, as against $2,085,107 worth exported during the previous fiscal year. The exports for the month of June increased in value from $246,625, in 1911, to $321,889 in 1912.

The total imports of India rubber during the fiscal year just ended amount to 110,210,173 pounds, valued at $93,013,255, as against 72,046,260 pounds, valued at $76,244,603, imported during the fiscal year 1911.

The imports for June last amounted to 6,815,153 pounds, valued at $5,442,859, while in June a year ago the imports amounted to 6,322,768 pounds, valued at $5,508,081.

TABLE I—EXPORTS OF AUTOMOBILES AND PARTS FOR JUNE, 1911 AND 1912, AND FOR 12 MONTHS ENDING JUNE, 1910, 1911 AND 1912

ARTICLES AND COUNTRIES	June—				Twelve Months Ending June—					
	1911		1912		1910		1911		1912	
	Quantities	Values	Quantities	Values	Quantities	Values	Quantities	Values	Quantities	Values
Automobiles, and Parts of— Automobiles.........No..	1,554	$1,702,872	1,941	$2,116,174	6,926	$9,548,700	11,803	$12,965,049	21,757	$21,550,139
Exported to—										
United Kingdom........	......	$529,382	327	$222,961	......	$2,656,214	......	$2,595,679	5,716	$4,454,448
France..............	......	37,948	67	49,905	......	825,904	......	532,121	574	469,721
Germany..............	......	19,886	27	35,787	......	275,241	......	251,629	288	226,227
Italy..............	......	18,517	42	35,185	......	337,614	......	215,041	211	193,037
Other Europe..........	......	117,555	161	161,123	......	550,414	......	764,287	1,223	1,031,434
Canada..............	......	861,975	755	1,026,567	......	4,383,487	......	6,774,769	6,288	7,560,655
Mexico..............	......	40,861	7	8,470	......	540,325	......	649,666	273	418,599
West Indies and Bermuda	......	27,724	30	31,822	......	413,888	......	398,593	329	350,440
South America.........	......	99,040	167	174,145	......	342,767	......	891,133	1,611	1,911,066
British Oceania.........	......	206,130	146	143,376	......	350,193	......	1,352,532	3,625	3,280,988
Asia and other Oceania.	......	52,801	136	158,478	......	348,523	......	786,570	1,137	1,197,155
Other countries.........	......	15,939	76	68,355	......	165,650	......	297,209	482	456,369
Parts of (except tires)..	......	$324,886	......	$361,835	......	$1,641,520	......	$2,544,180	......	$4,107,155
Total................	......	$2,027,758	......	$2,478,009	......	$11,190,220	......	$15,509,229	......	$25,657,294

TABLE II—IMPORTS OF AUTOMOBILES AND PARTS FOR JUNE, 1911 AND 1912, AND FOR 12 MONTHS ENDING JUNE, 1910, 1911 AND 1912

ARTICLES AND COUNTRIES	June—				Twelve Months Ending June—					
	1911		1912		1910		1911		1912	
	Quantities	Values	Quantities	Values	Quantities	Values	Quantities	Values	Quantities	Values
Automobiles, and Parts of— Automobiles..No..dut....	117	$256,514	42	$100,927	1,473	$2,851,446	888	$1,898,843	963	$2,134,18
Imported from—										
United Kingdom........	12	$31,820	7	$17,105	101	$236,015	128	$297,382	188	$434,61
France..............	29	69,424	21	50,106	782	1,467,646	377	797,931	401	964,63
Germany..............	41	81,513	3	8,806	150	368,219	137	297,153	116	259,31
Italy..............	14	21,385	5	10,425	352	587,052	130	239,079	131	199,55
Other countries.........	21	52,372	6	14,485	88	192,514	116	267,298	127	276,06
Parts of (except tires).dut..	......	$15,748	......	$20,408	......	985,638	......	$351,916	......	$304,14
Total automobiles, and parts of..............	......	$272,262	......	$121,335	......	$3,837,084	......	$2,250,759	......	$2,438,32

Water and Oxygen the Enemies of Aluminum—Centrifugal Oiling of Four Crank-pins—Radius Rods as Base for Chain Casings—Some Errors in Laboratory Tests—A Revision of Horsepower Formulas with Stroke Considered

CORROSION of Aluminum—Through an extended series of experiments at the Royal Prussian Station for the Testing of Materials some of the conditions have been determined which lead to a decomposition of aluminum. It had been observed that kitchen utensils made of this material in very numerous instances deteriorated rapidly even before they were taken into use, as when stored in the warehouses of manufacturers, but especially when they were used for cooking purposes. Such utensils are usually stamped cold from rolled plates or sheets. The efflorescences, scale formations and marks of decomposition are in some instances irregular or evenly distributed over the entire surface, but in many other instances run in streaks following the direction in which the metal has passed through the rollers. In some cases raised blisters covered efflorescences of the metal underneath. A chemical examination tended to show that the silicon content of the metal has nothing to do with the decomposition. Long exposure to the atmosphere, on the roof of the test station, and to changes of temperature, but with the exclusion of direct contact with water or snow, showed conclusively that the metal did not undergo any changes in appearance or weight under those conditions. On the other hand, constant exposure to the municipal water on tap at the institution showed very strong effects, and these were mainly local blisters and scales. The local attack was most pronounced with the hardest metal; that is, the metal which had been rolled under highest pressure and had received the smoothest finish. But the loss of weight was in those cases least pronounced. Tests with distilled water gave a larger total loss of weight, but the attack was never local, consisting mainly in transforming a film of the entire surface into hydroxide of aluminum.

The various forms of decomposition caused by the exposure to the municipal water were very similar to those observed on the used cooking utensils which had been sent in from various sources for test purposes. Tests consisting in exposure to air alternating with exposure to municipal water showed attacks which were mainly local like those resulting from constant exposure to the water alone, but they were less pronounced.

Further tests at which aluminum plates were submerged for 62 days in distilled water to which the oxygen of the air had no access, watergas being blown over the vessel for the entire duration of the test, showed no effects; and the municipal water under the same condition also failed to attack the metal. This demonstrated that the combined presence of water and oxygen is required to effect any decomposition, as in the case of iron, and also that the aluminum at house temperatures has no power to decompose the water. A special series of comparative trials proved that higher temperatures of the water and the presence of free carbonic acid gas, especially the latter, aggravated the decomposition of aluminum very much.—From *Werkstattstechnik*, July 15.

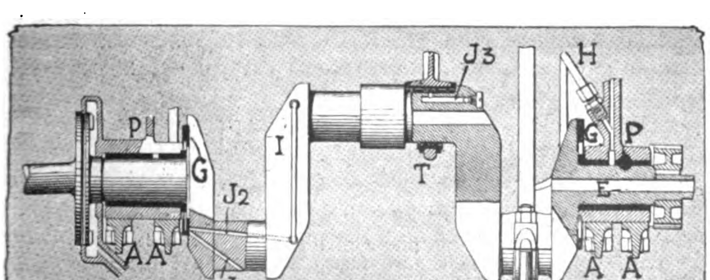


Fig. 1—Centrifugal oiling system for Delahaye 4-cylinder crankshaft

Delahaye Oiling System—The general plan of Delahaye cars is a model of conservatism, showing a typical shaft-driven car with a four-cylinder motor and the change-gear in the middle of the chassis. The 1912 date crops out in some of the details. The cylinders have a bore of 85 millimeters (3 2-5 inches) and a stroke of 130 millimeters (5 1-5 inches). The maximum torque is developed at 1400 revolutions. The monobloc motor casting encloses all cylinders and all the manifold piping for cooling water, gas intake and exhaust, which arrangement gives a clean-cut appearance and silence. The crankshaft is supported only in two bearings P, Fig. 1, but is short and thick and hollow. Its central bore E admits of increased diameter and rigidity with minimum weight and also serves as an air vent from the crankcase, relieving possible accumulations of air pressure therein, and has the advantage over the customary air risers that the air thrown out through this bore comes from the axial line of the mechanism where there is no oil mixed with the air, since oil is thrown to the circumference by centrifugation. The result is that the outside of the motor and the crankcase remain free from oily deposit. A little weight saving in the movable parts is effected by having the connecting-rod knuckle of the width of the crankpin only on the pressure side, where the force of explosions is taken up, while the semi-circular yoke T, which only takes care of compression and momentum, is considerably narrower, as shown in Fig. 1. The two end bearings of the motor shaft are supported by long bolts AAAA, which connect them direct with the flange of the motor casting, relieving the aluminum crankcase of working strains.

THE OILING OF THE CRANKPINS

Oil is sent from the bottom of the crankcase to the two end bearings of the shaft by means of a gear pump and the oil leads H. From each of these bearings it must then be sent to two of the crankpins, and this is done as follows; The oil which gets to the outside of the bearing bushing under pressure is gathered in an eccentric ring oiler or gutter G by centrifugal action, the gutter being attached to the outside of the crankarm, and at the point farthest from the shaft axis two holes are bored in the gutter registering with conduits J1, J2, bored in the crankarm and crankpin. One of these conduits takes the oil to the middle of the surface of the first crankpin, the other goes through to

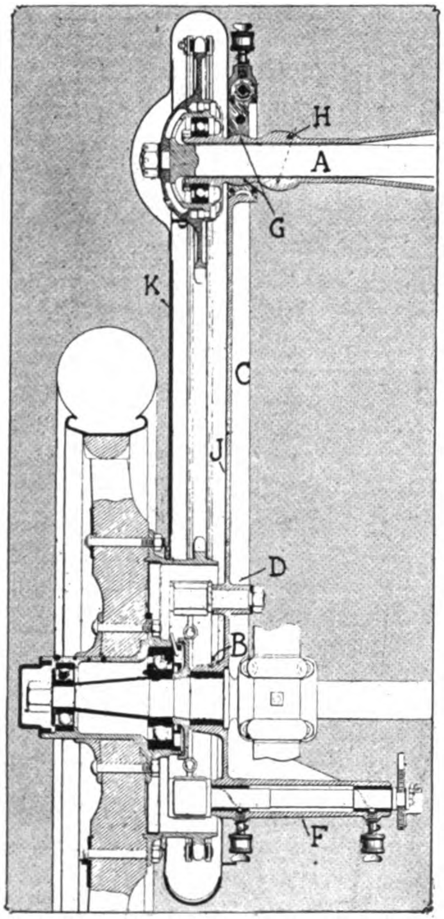


Fig. 2—Chain case and parts on which it is mounted, shown in section

the second crankarm, and is continued by an exterior tube I, which is bent in a curve and takes the oil to a conduit in the second crankpin—this conduit being similar to the conduit J3 shown in section in the third crankpin, which is reached with oil from the bearing at the other end of the crankshaft by exactly the same method. These canalizations are all laid out so as to lead steadily away from the axis of the construction to secure centrifugal action at all points. So that the short conduits to the crankpins nearest to the shaft bearings shall not rob the other conduits of their oil feed a little radial partition is placed at the most eccentric point in the ring oiler between the two holes from which the oil is taken, and when the oil is thrown out against the ring from the shaft bearing it gathers equally on both sides of this partition, assuring the same quantity of oil for each of the two conduits.

The overflow of oil from the crankpins which is scattered centrifugally in the crank case serves for the lubrication of the camshaft, the cylinders and the pistons. The latter carry a piston ring near their lower ends to obviate excessive cylinder oiling.—From *La Vie Automobile*, July 20.

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Charron's Chain Case Construction—The requirements of a chain casing are that it shall be dust, oil and water-tight, shall not interfere with the adjustment of chain tension, shall be substantially attached and neither vibrate or rattle, shall allow easy access to the chain for lubrication or replacement and shall accommodate itself to all the displacements to which the rear axle is subject without resisting them, suffering from them or ceasing at any moment from functioning as a protector of the chain. It is generally believed to have been shown by experience that in order to do all these things lastingly it must be rigid in itself but not quite rigidly mounted; also that it cannot be successfully made as an accessory adaptable to different constructions but must be designed especially for each type of car.

The design shown in Figs. 2 and 3 refers to such a special construction intended for Charron cars. The casing is mounted upon the radius rod, and this, which is of course also the chain adjuster, is of the special design illustrated in Fig. 3. Upon this departure from earlier methods the general interest in the construction principally depends. The radius rod C is pressed from sheet steel and is of flattened U-section. The large annular flange B near its rear end, which is lined with a bronze bushing, is journaled upon a bearing surface formed for this purpose upon the rear axle. The front end is formed as one-half of a collar, to which the corresponding other half is bolted when the mechanism is assembled. At the two sides of the rear-axle flange are smaller flanged apertures, D and F, one holding the pin upon which the brake shoes are pivoted and the other constituting a long bearing for the shaft by which the brake cam is forced against the free ends of the shoes. The four arms of the radius rod serve for the permanent attachment of a flat piece of sheet steel J, which forms the back of the chain case.

The collar at the front end of the radius rod clasps an eccentric disk which is formed of two halves pinned together upon the stationary tubular housing of the jackshaft A, the bore in the disk being concaved to fit a ball-shaped bearing G on this housing. A larger ball formation H on the same housing where it passes through the frame reach admits of some compensating action between the jackshaft and the vehicle frame when the latter is twisted. The middle portion of the circumference of the eccentric disk is cut with helical gear teeth with which meshes a worm mounted vertically in the collar of the radius rod and ending in a squared key, so that it may be turned with a spanner. A grease cup sends lubricant to this chain-adjustment gear by which the rear axle may be pushed back to make up for lengthening of the chain and which thus presupposes shackled suspension of the rear springs at both ends. The socket joint at the front end of the radius rod is, of course, intended to permit those misalignments which follow with the action of the vehicle springs when one of the rear wheels is raised higher from the ground than the other and to do this without setting up torsional strains in the radius rod or the chain case attached to it.

The flat plate J which is riveted to the radius rod has a narrow flange at the top and bottom and around its circular rear edge, and to this flange the main and rear part of the chain casing is secured by screws. It is made of thin sheet steel in two halves, which overlap along the dividing central line, and the fit around the brake drum is safeguarded by a packing ring. This portion is not intended to be removed unless the wheel is taken off, as all adjustments and the lubrication, as well as repairs of chain links, take place at the front part, which is separate and removable without effort. It extends from the middle vertical line through the collar with the eccentric, so far to the front that it can always be in the same position irrespective of the chain adjustment. The opening at which the chaincase is passed over the front chain pinion is completely covered at the back by the collar and the eccentric, and the back plate of the front portion of the casing fits up against this collar, while its curved-over edge can be sprung into the similarly curved-over edge of the main portion. A semi-circular cut-out in its face plate in conjunction with a similar semi-circular cut-out at the front edge of the main portion of the casing constitutes a circular opening corresponding to the location of the chain pinion, but this opening is covered with a saucer-shaped hood which at one-half of its circumference is riveted to the face plate of the detachable front portion of the casing—allowing the convex spider of the chain pinion to project into its curvature—while its rear edge is free and is passed under the edge of the semi-circular cut-out in the face plate of the main portion of the casing, against which it fits snugly. Above and below this bell-shaped cap, two clips secure the front face plate of the front portion of the casing to the face plate of the main portion. When access should be had to the chain for any purpose, these clips are unfastened and the whole front is drawn forward together with the cap. In this manner even the replacement of the chain pinion may be effected without dismounting the chain casing or removing any other part than the front lid, as it might be termed.—From *La Vie Automobile*, July 13.

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New Power Formulas—Owing to the general adoption of a lengthened stroke in French automobile motors and to the general advancement in design by which the efficiency of motors has been greatly increased, especially at high motor speeds, the need of new formulas for calculating motor power has been felt by the French government, with a view to establishing a scale for the taxation of automobiles somewhat in accordance with the power actually at disposal in the various vehicles, and for the purpose of arriving at such suitable formulas the co-operation of the technical committee of the Automobile Club of France was invited. This committee gathered data from the manufacturers relating to 95 different motors intended for pleasure automobiles, including 74 4-cylinder, 11 2-cylinder, 4 1-cylinder, 5 6-cylinder and 1 8-cylinder motors, besides 14 motor truck motors. In these data measurements of bore (D) and stroke (L) in millimeters are supplemented by test figures representing the horsepower (P) at a given number of revolutions per minute (w), to which corresponds in each case a certain linear piston speed (v) given in meters per second, and a mean effective pressure (p) which is calculated in kilograms per square centimeter. All the figures applied to motors of 1911 manufacture, and they were found to represent so many variations in design and working results that a division into four classes was called for. The division was made according to the linear piston speed of which the mean effective pressure is normally a function, and these factors, v and p, are therefore not represented in the formulas themselves. A division according to cylinder volume had first been found to result in the need of too many classes. The classes proposed were (1) ordinary automobile motors with piston speeds up to 6 meters, (2) automobile motors with a piston speed above 6 meters, (3) truck motors in which the mean piston pressure averages 5.8 kilograms, and (4) aviation motors in which the piston pressure is abnormally high.

By comparison of the dimensions and other figures given for the motors in each of these classes with the test figures relating to angular speed and horsepower which the manufacturers had guaranteed to be correct, the committee evolved four formulas rating the motors according to bore, stroke and angular speed and differing only in the numerical coefficient. Denoting the number of cylinders by n, the horsepower rating is obtained by multiplying $\frac{D^2Lw}{10^8}$ with $\frac{n}{2}$ for class 1, with $\frac{n}{2.9}$ for motors of class 2, with $\frac{n}{1.8}$ for class 3 and with $\frac{n}{1.6}$ for class 4.

These formulas were submitted to the government committee under the ministry of public works with the expectation that this body would endeavor to unify them into a single formula for taxation purposes.—From *Bulletin Officiel*, June.

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Errors in Motor Testing—The apparatuses used for measuring the power of a motor are nearly always either the (1) Prony brake machine or (2) the Renard mill. In the case of the test by brake one reads off the torque and the number of revolutions per minute and deducts the horsepower from the formula

$$P = 0.0014 \text{ w.f}$$

in which f is the number of kilograms placed on the end of a scale beam 1 meter in length and w is the number of revolutions.

With the Renard mill the motor power is measured by the resistance of the atmosphere to the rotation of the bar and the planes it carries, and the formula

$$P = aC\left(\frac{w}{1000}\right)^3$$

in which C is a constant determined by the position of the planes upon the bar and a is the weight of a cubic meter of atmosphere at the moment of the test. To simplify matters, tables have been compiled giving values for P at any number of revolutions for a barometric pressure of 760 millimeters and for a temperature of 10 degrees C., and, if the barometer and the temperature differ from these figures, corrections corresponding to the differences are read out of another table and are applied. The result is taken as an exact expression of the motor power.

If, however, a comparison is made between the figures obtained by these two methods of measuring, or even if a comparison is made between two tests made by the same method on two different days, or at two different hours of one day, the figures usually disagree, and it is customary to say that the motor power varies.

Nothing could be more erroneous. It is admitted and seems indisputable that, for the same motor and other things being equal, the power must be proportionate to the weight of the explosive mixture in the cylinders; in other words, to its density. And, in fact, it has been demonstrated by the systematic experiments of Sainturat that a motor loses 16 per cent. of its power when taken from sea level to an altitude of 1,000 meters, which means a difference of 90 millimeters in barometric pressure, the influence of temperature being ignored. When the power of an explosion motor is stated there should therefore be added: With a barometric pressure of 760 mm. and the thermometer at, say, 10 degrees C.

But in the case of brake tests no account is taken of these factors at all, with the result that two tests, of which one is made in the summer with the barometer at 735 and at a temperature of 45 (which is not rare in a testing room in summer) and the other outdoors in winter with the barometer at 780 and the thermometer at 5, vary widely.

When a Renard mill is used the results are still worse, for it is the invariable custom to correct the reading according to the barometric and the temperature conditions, and, in doing this, one falsifies doubly the final figure instead of correcting it. In reality it is the first reading which is substantially right, as will be perceived from the following:

With this style of brake which acts against the air, the torque and consequently the motor power is, other things equal, proportionate to the density of the air in the laboratory, since the resistance to the rotation of the planes grows with this density. But the weight of a cylinderful of explosive mixture is also proportionate to this density and grows with it. The correction relative to the state of the barometer and to that of the thermometer consequently makes itself automatically, and when the reference table has been established for a barometric pressure of 760 and a temperature of 10, by means of a dynamometric scale, the first reading from the table gives under all circumstances the power of the tested motor as it would be for the conditions expressed in these figures, provided of course the motor is an internal combustion motor.

It may not be strictly accurate that the power of the motor grows with the density of the explosive charge and that the variation in the latter compensates with exactness for variations in the density of the outside air which is beaten by the planes of the testing apparatus, but the error, if any, falls within the tolerance allowed for experiments, and in practice it may be said that:

(1) The gross reading given by a Renard apparatus gives without correction the true figure for the power of an explosion motor for certain atmospheric conditions accepted as standard, and

(2) The gross result given by a Prony brake test should be corrected according to the conditions of the atmosphere before it can represent the power of a motor under the conditions accepted as standard.

In other words, one should do exactly the opposite of what is customarily done. Then the final results will be found to bear comparison, as the author has found by practical tests.—A. Colmant in *La Vie Automobile*, July 20.

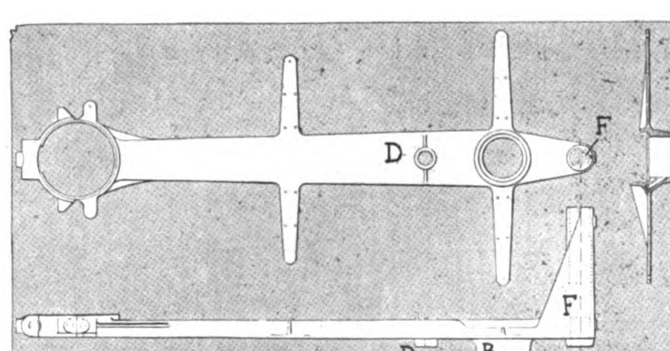


Fig. 3—Radius rod designed as foundation for Charron's chain case

The Warning Signal: Its Care and Repair

Importance of Maintaining Efficiency—How to Keep Motor-Driven, Vibrator and Exhaust Horns in Condition

Diagnosing the Troubles Peculiar to Each Type, and How to Apply the Proper Remedies

A TRIP through the testing and repair department of a manufacturer of warning signals would teach any automobilist a lesson of lasting value. If he could stand at the elbow of the factory expert and watch him at work with no tools but a screw driver and a small brush putting into perfect condition within five minutes' time horns which have been sent back to the factory as useless by car owners his eyes would begin to open. If he could see the letters of condemnation on perfect electric horns which would not operate because the batteries were run down and the owner did not know the seat of the trouble he would be still more surprised, and yet this and many parallel cases are the experience of all the large warning signal makers.

The study of the care of warning signals other than the bulb horn may be divided into three classes: the electric motor-driven horn, the vibrator horn and the exhaust type. The first consists of a motor with rotating parts, the second works on the well-known buzzer principle and the third are whistles of different styles which are blown by permitting the exhaust gases to pass through the proper channels.

In studying the repairs on each type of horn a representative make will be taken and fully described in detail and where radical differences are noted in other horns they will be mentioned.

Klaxon Troubles and Their Cures

More than 75 per cent. of the Klaxon horns returned to the factory for repairs have been damaged because the owners have neglected to attend to their lubrication. Short circuits claim the next largest share, about 20 per cent. of the total, while 5 per cent of the repairs are miscellaneous.

Once every month the bottom plate should be removed and the commutator surface cleaned with a small brush dipped in gasoline. A light film of vaseline or non-fluid oil is then applied to the commutator. The results of the neglect of lubrication are a decided falling off in the volume of sound which will take place in the early stages. After a month's use a black carbon deposit frequently gathers on the commutator surface and can be removed as stated. After a short time the carbon brushes become glazed and the motor will not run satisfactorily.

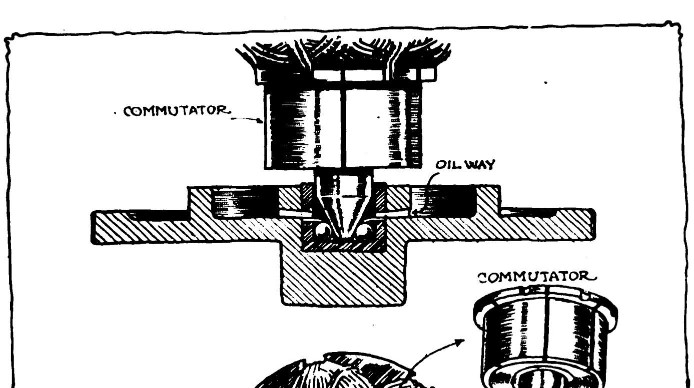


Fig. 1—Parts of Klaxon requiring owner's attention

When any trouble develops with a Klaxon the first thing to do is to remove the bottom plate and see if the commutator is dry. If so, the treatment with gasoline and vaseline will restore it if improper lubrication is the only trouble.

Short circuits in the Klaxon can be roughly divided into two classes: those in which the current passes to the horn casing and those in which the short circuit is in the commutator. If the bottom plate is removed and it is noted that the commutator is sufficiently lubricated and has not become dirty, the probabilities are that there is a short circuit. This can be found by first connecting one of the wires to a binding post and then touching the other along the casing. If a spark is noted it signifies that there is a short circuit to the casing. If there is no spark the other binding post may be tried with the casing grounded. When a spark is detected at either of the binding posts with the casing grounded the trouble will be found in a leaky insulation at the point where the binding post giving the spark passes through the casing. The washer at this point will have to be renewed unless the interior wire be disconnected, in which case the connection will have to be remade.

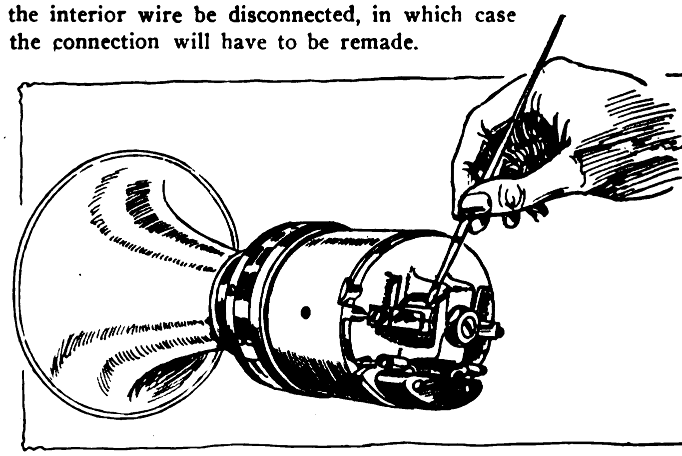


Fig. 2—A drop of oil here helps the Sireno

If the short circuit is not found in the casing, there may be one in the commutator. This can be found by slipping pieces of paper between the brushes and the commutator, grounding the casing with one wire and then trying for sparks with the other on the commutator. This is a matter of factory repair.

Motor-Driven Horns Require Oil

Several horns have been returned, where the owners have permitted the motor to run dry or have failed to operate owing to too tight an adjustment so that the motor was stalled and the owners have then tried them on a current of high voltage. In several instances a 210-volt lighting circuit has been put through the instrument and as a result the whole armature winding blown to pieces. Repairs for the burning out of the motor owing to the use of too high a voltage must be done at the factory. Many Klaxons are in use with the adjustment on the rotor too tight. This consumes much unnecessary power and at the same time cuts down on the sound efficiency. The rotor shaft passes through an eccentric bushing which, when turned around, controls the distance between the toothed wheel and the diaphragm anvil. When the wheel is too close to the diaphragm the latter is bent back, thereby reducing materially the distance through which it can vibrate in the first place and secondly opposing a resistance to the motor which may be so severe that it will stall. A stiff sound that cannot be mistaken when heard will appraise the vigilant automobilist that the adjustment is too tight. The correct note of the Klaxon involves what the makers call a tiger after the main note. It is a dying-away sound that is familiar to all those who have heard this signal. When the adjustment is too tight this "tiger" disappears. To make the correct adjustment if the sound is noticeably loose or tight, loosen the hexagonal lock-nut, located between the top of the motor and the diaphragm casing, by turning from right to left. Start the current rotating the motor until no sound is heard. Start at this point and turn the motor back slowly in either direction until the note is loud and clear. Set the lock nut, turning up tightly and being careful not to alter the adjustments just made. The note should be clear with a distinct "tiger."

It will occasionally happen that a very ragged sound will be given by the Klaxon. Unless it were known where to look for this trouble a novice might search a week without finding it. The two springs which hold the brushes against the commutator will sometimes be of unequal strength. When this occurs the sound of the horn is materially affected and as a result the ragged sound just mentioned is heard. It is very readily distinguished from the correct clear note. The cure is effected by bending back with a screw driver the spring which seems to project farther than the other. This is of course done with the bottom cover plate removed. It may be necessary to bend the spring back several times before the correct balance between the two screws is reached.

A rather weak sound, also of a somewhat ragged nature, is heard when the two brush springs are on the same side of the brush. Looking towards the outside of the commutator with the brushes vertical, the upper spring should be on the right of the upper brush holder while the spring is to the left of the lower brush holder. The spring can be turned about with a screw driver after the bottom plate is removed.

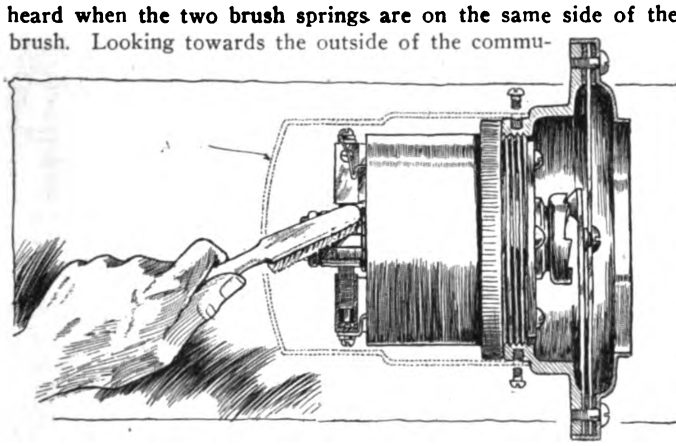


Fig. 3—Remove cover A, to reach commutator

Broken Parts Need Replacement

Some of the instruments returned to the factory for repairs come back because the owners have broken the screws either of the binding posts or of the commutator shaft. The remedy for breakages of this nature is obviously in replacing the broken parts. One broken or loose part which can be found by the horn giving forth a rattling sound is the anvil on the diaphragm. The toothed wheel strikes against this anvil which is riveted to the diaphragm. When the anvil is loose the diaphragm ceases to be positively driven and as a result the rattling sound is heard.

The current consumption of the signal should be watched at times. If the horn is in good condition it should draw from 6 to 7 1-2 amperes at 5 1-2 volts, while the Klaxonet should take about 2.4 amperes. If either of these instruments should draw a noticeable amount more current than what is required the car owner should send it back to the factory. It will occasionally happen that there will be a short circuit through several windings of the armature and that the efficiency of this will thus be materially cut down. This is immediately shown on the ammeter and is something which has to be taken up at the factory before satisfactory repairs can be guaranteed.

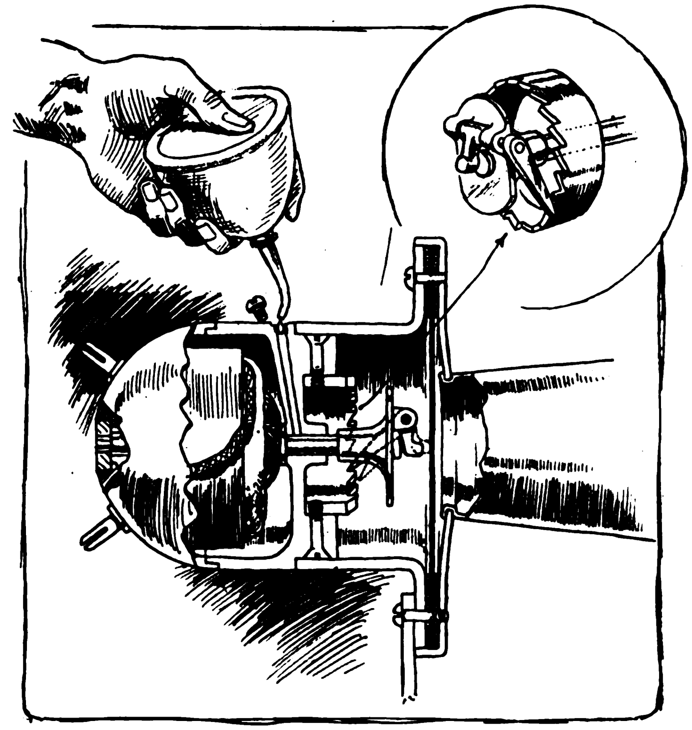


Fig. 4—Typhoon horn must be clean

All these difficulties, however, except the neglecting of the lubricating system and perhaps a slightly mal-adjusted rotor, are rare as compared with the number of times that the horn is suspected when the trouble really lies in the fact that the batteries are exhausted. If the batteries are kept up to the proper strength, splices in the wiring carefully made and two drops of cylinder oil put weekly into the oiler on the top of the case, there should never be any difficulty. The oiler takes care of the ball bearings in the cover plate which carry the shaft of the commutator.

Typhoon Horns Must Be Clean

What has been said regarding the care of the Klaxon could well be repeated in reference to the Typhoon horn. This excellent signal will suffer from a lack of oil in the same manner as any other motor. As may be seen in Fig. 4, special provision is made for oiling the shaft of the motor by removing the screw in the side of the case and allowing a drop of oil to flow down the channel depicted in the illustration. The bearing points are shown in the sketch so that it should be an easy matter for anyone to appreciate where the oil is needed. According to the makers of the Typhoon horn, the greatest trouble they have is that some of the users neglect to renew the dry batteries after they have once become exhausted. The same applies to storage batteries where they are employed. The tone of the horn will become weaker and weaker when the batteries are beginning to run out. A temporary cure for this lies in turning the contact screw on the back of the horn a short distance to the right. This will bring the contact points together and result in a louder tone for a short time. After a while, however, the tone will again run down. When the loudness of the note starts to diminish it is better to have the storage batteries recharged at once or, in case dry batteries are used, to renew these without delay.

Water will often get into a horn and rust the diaphragm, especially if used in the country near sea level. This may be replaced at a very slight cost and a better tone will result. The rusty diaphragm will give forth a heavy sound which is very much unlike the clear, penetrating note of a properly adjusted and clean horn. To remove the diaphragm, take out the small set screws which pass through the flange at the end of the projector and lift off the latter by a straight pull. This will expose the diaphragm, which can be taken off and replaced with

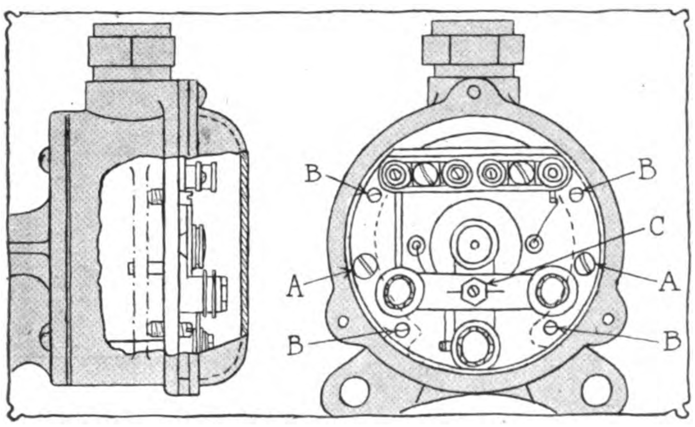


Fig. 5—Points of adjustment on Holtzer-Cabot horn

a new one at very small cost. Washers are put above and below the diaphragm to hold it away from the metal as shown in the illustration. These must be carefully replaced when the new diaphragm is inserted or the tone of the horn will be destroyed and any water that works its way into the horn when the car is being washed or is out in a rainstorm will get into the electric motor and wet the wiring, thus causing a short circuit; as the windings on the armature are not calculated to withstand the effects of moisture cleanliness should be the keynote in horns of this type and the same precautions should be taken as have been enumerated for the Klaxon.

Care of the Newtone Signal

The same directions will apply to the Newtone horn, another typical motor-driven warning signal. For cleaning these signals a toothbrush is a useful article. It should be dipped in gasoline and applied to the point shown in Fig. 3. The brushes become glazed if they are not cleaned occasionally and this insulates them from the commutator either wholly or partially so that the efficiency of the signal is destroyed. A little gasoline once a month will alleviate this and will keep the signal loud and clear. To remove the cover of the Newtone horn, this part being shown by the dotted lines in the illustration, it is only necessary to remove the little screws which are shown lifted from their position in the sketch. What has been said concerning proper battery strength on the other horns can be said regarding the Newtone as well as every other electric horn whether it be vibrator or motor-driven. A periodical inspection once a month of batteries and horn will keep them always in good condition. It will not take long; the only steps necessary are the removal of the cover and the brushes and then the use of the tooth brush with a little gasoline. Once a season some light grease should be applied to the ratchet behind the diaphragm. This can be reached by unscrewing the motor and removing it from the body of the horn. To adjust the sound to its desired pitch the motor is either screwed in further for a heavier sound or backed out for lighter sounds. When replacing the brushes care has to be taken that a substantial connection is made between the wire and the brush holder, as a poor connection here would result in an absolute failure of the horn in case the wires were shaken off the binding post.

Very similar in appearance, though in reality an entirely different type of horn, is the Sireno. When the cover is removed the commutator and brushes are exposed to view, as may be seen in Fig. 2. The directions as to keeping the horn clean at these points and maintaining the proper voltage in the batteries which are used for the purpose of driving the motor in the horn are exactly the same as for the other types of motor-driven horns which have been previously taken up. Repetition is unnecessary, although it may be said in passing that the diaphragm of this horn, being of an entirely different shape on account of the siren principle upon which it acts, needs different treatment. The diaphragm in this case rotates, the sound being given by a number of vanes in the diaphragm which send the air through perforations in the housing of the horn. These vanes and perforations should remain open and clean in order that the horn will reach its full efficiency, for the sound depends upon them to a great extent. They are not very apt to become clogged if the horn is mounted high, but should it be on the lower part of the car in reach of splashing mud, this warning should be borne in mind.

A point which the makers of motor-driven electric warning signals have found difficult to emphasize to a sufficient extent to cause the users to heed the advice is the matter of wiring. In the first place a set of at least five dry cells should be used with all these signals. They all work best with a six-volt current. But the mere connecting of five 1 1-4 volt cells in series will not assure the operator that he is going to get a current of proper strength at the horn. The wire must be large enough to carry the current, the connections must be perfect in order that there be no resistance of any importance in the circuit. Each poor connection will cut down the voltage to a remarkable extent and where one is dealing with a current of 6 volts to

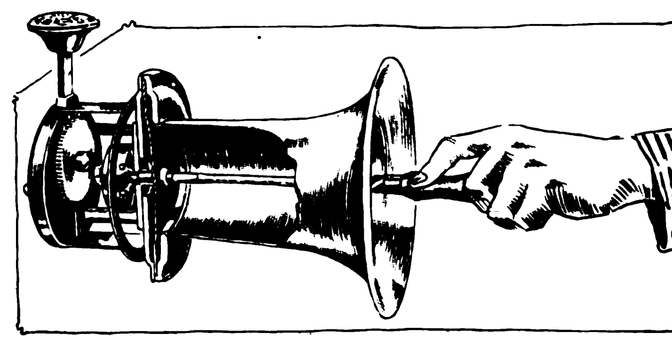


Fig. 6—Showing tone adjustment on the Long horn

start, it is an exceedingly easy matter to allow this current to drop to 3 volts by the time the horn is reached. Protected wire should be used, as there is always more or less chafing against projecting parts, and when the car is running rapidly for a distance it does not take long to penetrate the toughest insulation. It is always a good thing to have the battery near the horn. The loss of current between the cells and the horn will then be minimized. The button operating the horn should be placed so that it may be reached without taking the hands from the steering wheel. Obviously the placing of the horn button on the steering wheel is the most logical solution of the problem of finding a place where the electric horn can be operated at an instant's notice.

In summing up the care of motor-driven electric signals the following directions should be kept in mind: Keep the commutator clean by using a little gasoline on a brush once a month: a touch of vaseline on the commutator once a month will keep it in good condition; see that the internal connections do not permit of a short circuit within the instrument; do not use a higher voltage than the maker recommends; keep the sound adjusted to a proper pitch, in most motor-driven horns where the adjustment is too tight an unnecessary amount of current is consumed; see that both brushes bear equally hard against the commutator; make careful wiring splices; maintain the proper battery strength.

Caring for Vibrator Type Horns

Electric horns of the vibrator type are simple and efficient. They work on the same principle as the buzzer, a magnetic vibrator action actuating the diaphragm and thus producing the sound. The Tuto horn is an example of the vibrator type and is very representative of this class of horn. The mechanism is shown in diagrammatic form in Fig. 8. There is but one moving part and that is the armature. It is designated by the solid and dotted lines which show the path through which it moves. As may be seen, the armature is supported on a solid spring, which through its natural action allows the moving armature to impart a hammer blow to the rod reaching to the diaphragm. Each time the diaphragm is struck a sound is sent through the projector of the horn and the only thing necessary to maintain a solid stream of sound is to have the successive blows upon the diaphragm produced in sufficiently rapid succession. This is accomplished by the electro-magnetic or solenoid coil shown in the illustration. As the battery circuit is closed the current flows through the contact points and coil, magnetizing the bar of soft iron that is enclosed in the coil. The magnet attracts the armature sharply towards itself and causes the blow to be struck on the diaphragm stud as just described. In pulling the armature towards the diaphragm the connection at the contact points is severed and the circuit is broken. The soft iron core is demagnetized and the spring causes the armature to fly back to its original position, again closing the circuit and allowing the same cycle of events to again take place.

How to Adjust a Vibrator

With this explanation of the mechanism of the Tuto horn and all others of the vibrator type, it may be perceived that the factor of lubrication does not enter into this class of horn. There is one point, however, which will require adjustment from time to time. This is the contact screw, which has been specially designated in the illustration, Fig. 8. The screw is held securely against turning under the vibration of the car by a clamping screw which must be loosened before any adjustments can be made. This can be done with an ordinary screw-driver in a few minutes' time. Usually a quarter turn of the contact screw in a clockwise direction will be all that is necessary to compensate for the wear of an entire season. When this has been done the pressure of the push button will indicate whether

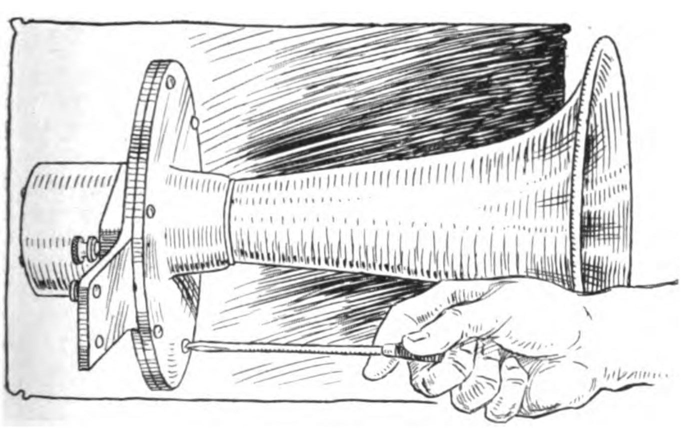


Fig. 7—Removing diaphragm from the Oneita vibrator

the adjustment is correct or not by the tone which is given forth. The low tone of the horn should be given instantaneously on the slightest pressure of the horn button, while the loud tone which is given when the button is fully depressed, should be smooth and clear as compared to the ragged tone noticeable with an incorrect adjustment.

The stud which transmits the blow of the armature to the diaphragm is fitted with an adjusting device which is more useful to the factory assembler than to the owner of the horn, for after it is once set at the factory there is hardly ever any necessity for the owner to touch it. The office of this adjustment is to regulate the length of the stud so that it is impossible for the armature to strike the pole pieces of the magnet. When this happens it is easily noticeable because the armature fails to produce a loud clear note, a ragged tone of very little penetration and loudness resulting. The adjustment is made by turning up or down as required, the hexagonal nut located on the end of the rod making the rod longer or shorter.

In the case of vibrating horns as well as for the motor-driven type it is well to get after the current consumption from time to time with an ammeter. Each horn is designed to draw a certain amount of current and when the current taken is above that quantity the reasons should be found, for not only is the horn costing more money to operate than it should, but it is no doubt delivering a tone which is not as efficient as it would be were the defective points corrected. Besides this, in most cases where too large an amperage is drawn, the life of the instrument is seriously threatened as matters go from bad to worse. The Tuto horn is designed to take not more than 1 ampere on the low note and not more than 2 amperes on the loud tone. A little less than this should be registered on the ammeter for either the loud or low tone, as these are the maximum allowable consumptions. When the amperage becomes high look at all connections and see that they are perfect; see if the contact points are adjusted properly and that they are flat and not ragged. A few touches with a fine file can easily regulate this.

A vibrator horn which has been carelessly constructed can give a great amount of trouble in spite of its simplicity. This statement is uniformly agreed to by the experts in the manufacturing plants of the better class of vibrator horns. The greatest trouble will be caused by the use of poorly selected or cheap materials. Some points which must be watched carefully can be here taken up.

The sticking of the contact points after the horn has been used for some time is often caused by the welding action of the heat generated by the electric arc which is drawn between them. Unless special precautions are taken at this point by using special metal which will not be so apt to soften materially under the influence of the current the operator will be surprised to note the sudden failures of the horn to work. Where good material is used, as in the several well-known vibrator horns now on the market, the hot electric arc instead of welding the points together will clean out the deposit of foreign material from between the points. Nevertheless these points should be kept clean by the owner of the horn for there will always be a deposit remaining even when the carbon is burned off the points. The inability of the vibrator horn to maintain its adjustment shows that the particular type of horn which gives this trouble has poor material in the contact points, and when this is noticed it may just as well be discarded. In the better types of horns there is sufficient contact material to last as long as the best cars if the adjustment is made occasionally. Wear is taken care of in the Tuto horn by the screw designated in the sketch. Other horns of the vibrator type all have some similar means of taking up what wear occurs in the contact points.

Monoplex Also Has Vibrator

There is no excuse for the breaking of springs in horns of this type, and cases of this kind occur only in the poorest horns. When it does happen the only remedy for the trouble is to buy a new spring and fit it in place. Where a spring should break in a vibrator horn, however, the purchaser should demand a new instrument. Cases of this kind never happen with the better grades of horns, and it is after all a matter of economy to purchase the best in this line, as the horn is an

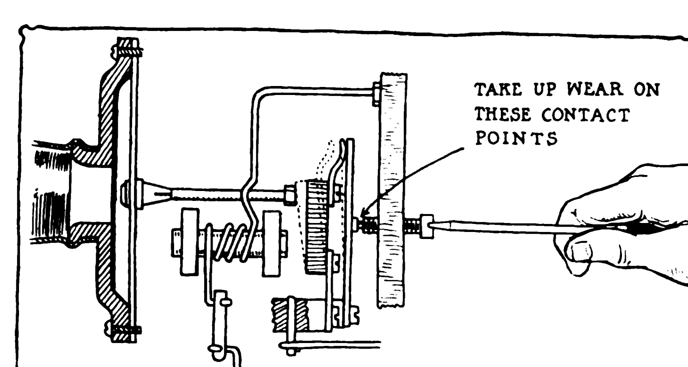


Fig. 8—Diagram of Tuto horn, showing contact adjustment

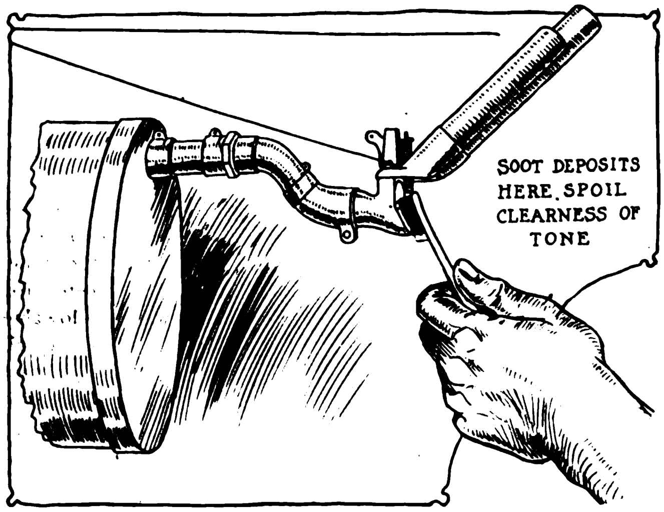


Fig. 9—Point to watch on Waymaker horn

accessory which may prove a friend in dire need and failure on its part in some such time may mean disaster. What has been said regarding the breaking of springs may also be noted regarding the failure of the diaphragm to retain its shape. The use of the best metal is necessary here in order to resist the crystallizing effect of the rapid succession of hammer blows.

As in the motor-driven horns, the advice given in regard to one signal applies perfectly to all the others of the same type. The care of the Monoplex horn does not involve any features which are not brought out under the discussion on the Tuto horn. The brass cap on this hoin is removed by taking out the small machine screw which will be seen on the side of the horn. The cover can then be pulled off, exposing all the mechanism, which can be taken care of by the owner. No more dissection than this should be practised on any horn if the owner does not desire to find himself in the position of the man who took his watch apart and when he had put it together again found that he had simplified the mechanism by having two wheels left over.

No lubrication is required for a vibrator horn. Most makers do recommend that the user employ a fine sheet of emery paper at the beginning of each season for the purpose of dressing down the contact points and making them flat and clean. This ought not to take anyone more than 5 minutes. After this is done and the contact screw taken up to its proper adjustment the horn should require no other attention during the season. Outside of the horn, however, the batteries and connections must be watched, as has been explained above.

Mesco Horn Has Unique Feature

The Mesco horn is distinguished in the class of vibrating horns for its four independent magnets. The armature is located above these and the vibration is set up in the usual manner by automatically interrupting the circuit. Good connections both within and outside the horn are necessary in order that the action be a success. To inspect the horn remove the four small screws in the cover and lift it off. The whole mechanism will then be open to view. The contact screw need not be turned more than once a season. At this time, however, they should be examined to see that they have worn flat and not round. There is an idea current that the points wear in the same way as a carbon in a lamp. That is, that one point becomes hollow or cup-shaped while the other acquires a point on account of the flow of metal betwen the two points. This may or may not be true, but the fact remains that the best way to maintain the horn at its best efficiency is to dress these points up at the time of overhauling the car.

The Holtzer-Cabot adjustments which are illustrated in Fig. 5 are like all the other vibrator horns in principle although the arrangement is a little different. Referring to the illustration, the method of procedure for adjusting the horn for tone and loudness would be to first loosen the screws shown at A, and then moving the plunger away from the diaphragm by turning in the set screws B. Each of these screws should be turned in an equal amount to secure uniform adjustment. The vibrator screw should next be adjusted until the proper speed of vibration is secured. The plunger is then gradually moved up closer to the diaphragm until maximum loudness is obtained. This is accomplished by turning the screws B in a counter-clockwise direction until the desired tone is obtained. To lock the adjustment the screws A are tightened up.

The diaphragm in the Holtzer-Cabot horn, as well as in practically every electric horn made, can be removed by removing the screws which surround it, as shown in Fig. 17, where the Oneita horn, a representative horn of the vibrator class, is depicted. The diaphragm on several of these horns is arranged with a small piece of metal in the center known as an anvil. Should the anvil become broken, bent or loose it is generally necessary to replace the whole diaphragm. This is very readily accomplished by taking out the screws designated in the illustration and lifting off the washers which are placed around the circumference of the diaphragm to hold it in place without metallic contact. New diaphragms are very cheap and are easily installed by simply laying them in place and replacing the screws.

Remove Soot From Exhaust Horns

The Long horn is a vibrator horn not operated by electricity but by pressure of the hand or elbow upon the plunger. The plunger actuates a gear wheel in the interior of the horn; this wheel rapidly revolves, being carried along by a heavy flywheel. The care of this horn is very simple and consists in a simple replacement of any part or parts which should become worn. The teeth on the ratchet of the plunger may be broken by a direct shock to the plunger, but with ordinary care and usage the horn should last as long as the car.

The next style of horn to consider is that operated by the exhaust gases. The Aermore, Jericho, Exo, Gabriel, Nightingale, Apco, and other types of exhaust horn all depend on the pressure of the exhaust gases for their operation. The two greatest problems to deal with in all exhaust horns is to keep them clean and to install them properly. Most of the things which crop up in the care of exhaust horns can be readily cured by means of a small brush and a little kerosene oil. The simplicity of this type of horn and the infrequent attention which it requires are among its commendable points, and the mere knowing how to get at the horn when it is fouled, as they nearly all become if the motorist has been burning too much oil for a long time, will go a long way in preventing trouble from the accumulated deposit.

A toothbrush forms a handy instrument to use in removing the carbon should it be found that the vents are choked with this most troublesome product. As long as the bristles on the

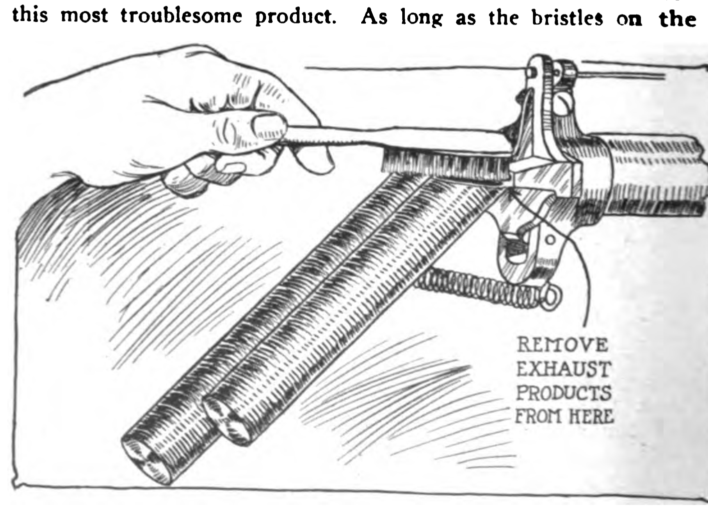


Fig. 10—Kerosene on a toothbrush helps the tone

brush are stiff, however, it will be satisfactory for this purpose. Either gasoline or kerosene will dissolve the products which gather in the pipes.

It often happens that the cut-out valve located in the pipe between the motor and the muffler becomes warped from the heat of the exhaust or seats defectively from some other cause. This will permit a large portion of the gases to escape at this point, and besides being noisy allows the pressure to fall off so far that the sound of the horn is impaired. In case trouble is had in getting insufficient sound it would be wise to thoroughly examine the muffler and its connections. It will very often be found that the joints are loose and that a large part of the gases escape through this means. This will necessarily interfere with the action of a horn that depends for its operation on the volume of the exhaust. In case cables are used in the operation of the horn there is always a possibility of stretching. The slack should be taken up as it occurs in order that there be no lag in the application of the signal.

Never use a file, screwdriver or other hard instrument of a like nature which is apt to bend or mutilate the language plate or lips of such horns as the Gabriel; a stiff brush with kerosene or a quill toothpick moved back and forth through the serrations in the edge of the language plate will restore the natural tone to the horn. Washing this type of horn with water for the removal of dust will do no harm, but the use of kerosene or gasoline is better as these are better solvents.

Jericho Automatic Has Magnetic Device

The Jericho Automatic horn is the same as the Jericho with the added feature of an electric magnet which serves to operate it. The horn, while it is actuated by the exhaust, is operated by a push button which may be placed on the steering wheel or any other desirable place. The electric magnet has a movable plunger attached to the hinged lid of the horn. When the operator desires to give a warning signal he presses the button which closes an electric circuit through a solenoid coil. This lifts the plunger which operates the horn by shunting the exhaust gases through the proper passage. The maintaining of the battery strength and the cleanliness of the horn is about the only care these horns need, except that careful wiring is necessary.

The bulb horn, in spite of its conceded simplicity, requires some care also if it is desired to maintain it in its proper condition. The worst enemy of the horn is water, which often enters while the car is being washed. When screens are used over the horn do not allow them to be caked over with metal polish or mud. Keep them clean.

While many automobilists do not expend much effort on the care of their horns, a little reasoning is bound to bring out the idea that such a course is a mistaken one. A good horn goes a long way toward avoiding accidents on the road and saving the car owner large sums of money which he would have to spend if personal or property injuries are caused by his car.

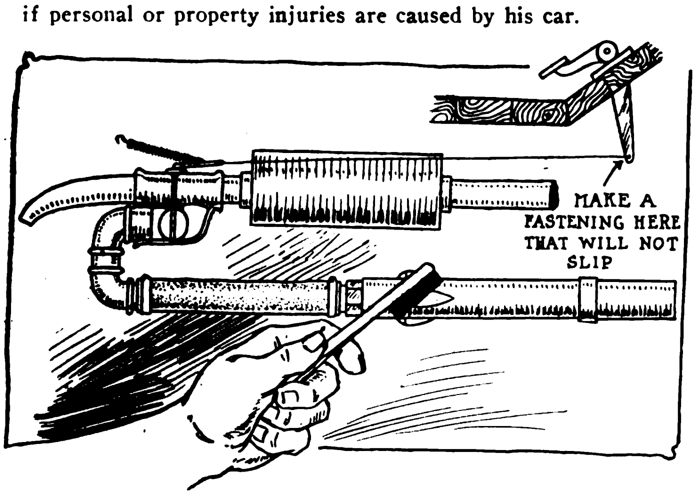


Fig. 11—Gabriel horns are benefited by cleaning occasionally

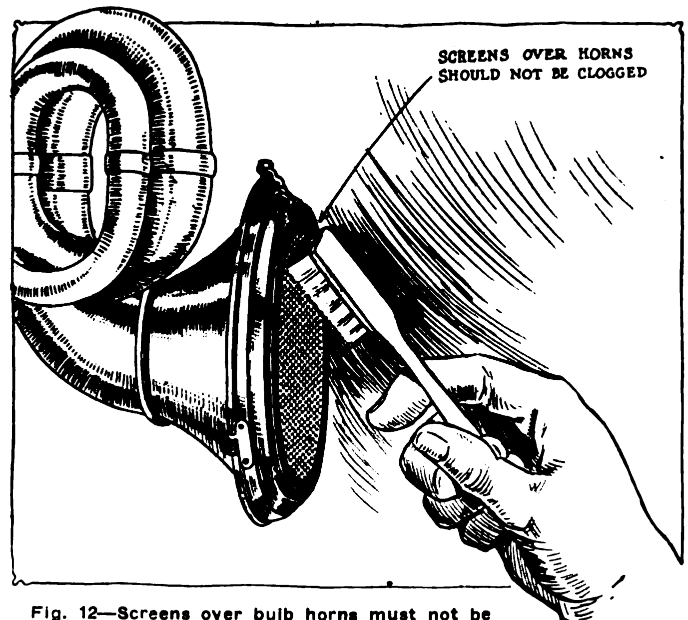


Fig. 12—Screens over bulb horns must not be clogged

Harking Back a Decade

FROM *The Automobile and Motor Review,* August 9, 1902:

The 100-mile endurance test held under the management of the Chicago Automobile Club last week was one of the most interesting, profitable and important events in the brief annals of western automobiling. There were twenty-eight starters. Only one serious mishap occurred and it was caused by fire which destroyed the Elmore contestant. The course was to Waukegan and return. Nine cars were awarded blue ribbons and the main cup was won by F. X. Mudd's Winton.

October 9 will see the start of the reliability test of the Automobile Club of America. This will allow the tourists to spend Sunday in Boston and start the return trip on Monday morning. The finish is scheduled for October 15. Secretary Butler is formulating rules to cover the contest.

One of the chief lessons learned in the recent Paris-Vienna race was that laxity in the application of the rules concerning controls is a serious matter. The fact of the arrival first at control was given a fictitious valuation and numerous violations of the rules in this respect were noted, especially where some contestant failed to stop at controls and then presented himself at the head of the line for final checking.

Cincinnatians have made a sharp market for automobiles this season, despite the hilly topography of their city. There are now ninety automobiles owned and driven in the Queen City.

Details of New Ford Racer

Details of the racer being made by Henry Ford have been given out. The car will have a four-cylinder motor with cylinders 7 1-2 by 7 1-2 inches, designed to be run up to 1,000 revolutions per minute. There is only one speed gear, but by throttling down, it is believed the car can be made to go as slow as 15 miles an hour at 150 revolutions. The maximum speed is problematical. The car is not intended for use on streets or highways.

Orders to sell the factory plant of the Gasmobile Company of America, located at Marion, N. J., have been signed. The unsecured creditors hold claims amounting to about $170,000.

Members of the Milwaukee Automobile Club have started a movement to train horses to familiarity with the motor vehicle. The plan includes the renting of vacant lots in the city where the horses can take instruction.

William K. Vanderbilt, Jr., recently made a flying mile in 48 2-5 seconds on the road near Chartres, France. This is 3 2-5 seconds lower than the former world's record held by Fournier.

Some Points Regarding Gasoline and Kerosene—Methods of Brazing Hard Metals—Adapting Six-Cylinder Magneto to Three-Cylinder Motor—Diagnosing Throttle and Spark-Plug Troubles—Some Tire Tips—Steering Gear Information

Two Pointers to Remember

EDITOR THE AUTOMOBILE:—I have a 5-passenger car which has given me a great deal of trouble. After having repeatedly balked I decided to thoroughly overhaul it. When I came to the switch block, I found a binding screw loose. The connection wire would fall from one side to the other and in this way would make contact at times.

Then a leak occurred in the gasoline line. In a short time I found that the three screws in the flange of the carbureter were loose. Now I have more trouble. If I run my car any distance and stop for 10 minutes or more, I have trouble in starting again. After filing the coil points, it will run again for a short while.

In a recent issue of THE AUTOMOBILE, a correspondent stated that it would help if the units or the wires were changed. How do you do this? I tried to change the wires from the timing post to the spark post on the coil, and the plug wires to the timer posts, but it would not spark.

Jacksonville, Ill. J. A. HASP.

—The wires need never be turned around on the vibrator points or any other tampering done if the proper adjustment is maintained at all times. The correct method of making the adjustment is outlined in another letter in this issue entitled, "Motor Won't Throttle Down."

Regarding Hydro-Carbon Fuels

Editor THE AUTOMOBILE:—Will you kindly answer the following questions?

1. What is the viscosity of 68-degree gasoline as compared with water?
2. What is the viscosity of kerosene as compared with that of water?
3. What is the accepted chemical formula, or rather the formulas, of the constituents of gasoline?
4. What is the formula or formulas of the constitutents of kerosene?
5. I understand one volume of liquid gasoline and about 11,000 volumes of air make the highest explosive mixture. Is this correct?
6. What relative volumes of liquid kerosene and air form the most explosive mixture.
7. What temperature is the boiling point of gasoline?
8. What temperature is the boiling point of kerosene?
9. How many B.t.u. are in a gallon of 68-degree gasoline?
10. How many B.t.u. in a gallon of kerosene?
11. What is the average specific gravity of the kerosene now obtainable?

Owensboro, Ky. A. READER.

—The following are the approximate values which you desire: (1) 0.8; (2) 2.5; (3) C^7H^{16}; (4) $C^{11}H^{24}$; (5) Yes; (6) 1 to 13,000; (7) 120 degrees Fahrenheit; (8) 300 degrees Fahrenheit; (9) 124,000; (10) 134,000; (11) From .800 to .806.

For Brazing Hard Metals

Editor THE AUTOMOBILE:—Would thank you for the following information: What is used for brazing hard metals such as cast or other hard chilled metals?

Donnellson, Iowa. W. J. SCHMITT.

—The method employed with such metals first thoroughly clean by scraping and filing the two surfaces to be brazed together. Borax is then brushed on the surface to prevent oxidation. The parts to be joined are then pressed tightly together and the heat applied by means of gas flame in a built-up brick oven or any other method the repairmen desires to use. Where the joints do not have to stand a heavy strain use four parts copper and three parts zinc for your spelter. If considerable strain is to be borne, use three parts copper to one part zinc. For average work use equal parts copper and zinc.

Can Use Six-Cylinder Magneto

Editor THE AUTOMOBILE:—I have a three-cylinder, two-cycle engine which has stood some very hard service and have no trouble except with the battery-and-coil ignition system.

I have a six-cylinder, four-cycle magneto. I would like to install and would like your opinion as to whether to run the magneto twice engine speed and use two sets of spark-plugs. What effect would the former have, as I am afraid the latter would run

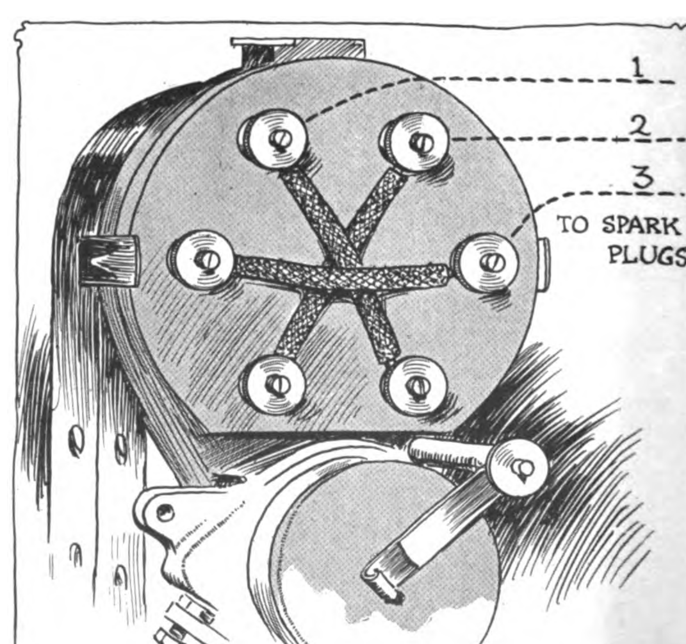


Fig. 1—Cross-connecting points on six-cylinder magneto to adapt it to a three-cylinder motor

the magneto too slowly? Kindly give the information in an early issue of The Automobile.

Chicago, Ill. L. G. Burke.

—You can use the six-cylinder magneto by cross connecting the points on the distributer which are diametrically opposite Fig. 1. This will give you three leads to the spark-plugs and you could use three plugs instead of six. The magneto should be driven at 1 1-2 times the engine speed. The gear ratio of armature to distributer is 3 to 1 so that you would get the spark at every 120 degrees which is the correct crank angle for a three-cylinder motor.

Motor Won't Throttle Down

Editor The Automobile:—I have seemingly a difficult problem on my automobile.

A Ford car, No. 34940, model 1911, was always rather hard to start, but by priming carbureter (Kingston), and turning needle valve open a half or full turn, could usually be started except in very cold weather by a few turns of crank. For a few weeks it has been impossible to start it except by injecting gasoline directly into the cylinders. After being started it will run fairly well from fifteen miles an hour up, but if throttled below that point the motor dies. Mechanics here are nonplussed. Ignition has been thoroughly gone over and tested, new batteries, installed, to try and facilitate starting, commutator taken off and cleaned, cylinder head taken off and carbon removed and valves ground. Timing gear was inspected and marks on gears found to correspond. Latter had not been touched since car left factory. We turned motor slowly to see if valves seemed to be properly timed. Previously we tried a brand-new Holley carbureter, and if there was any difference, the motor was even harder to start. When the air was shut off and the engine cranked there would be a suction immediately followed by a blowing out of gas from the carbureter. With the Kingston the spray blows out of the air intake. Have wound intake manifold and saturated with gasoline hoping to detect a leak. No discovery. The cylinder head joint leaks a little oil and water though bolted down tightly, but gasket seems in good condition.

Watertown, N. Y. A. C. J.

—In the first place the probabilities are that you have the contact points on the vibrator adjusted down too tightly. The screw which regulates the vibrator should be turned down until there is no vibration at all between the two points and then turned up until it just begins to vibrate. After it has reached this point give the screw an eighth of a turn more which will give a light adjustment and one which will not cause the contact points to burn out quickly and will enable you to start without racing the motor. The carbureter adjustment is also possibly incorrect. It must be remembered that the carbureter should give a rich mixture to start and if it fails to do this will always render starting difficult.

Offense Punishable in All States

Editor The Automobile:—Are there any states that make it a misdemeanor, punishable by fine, or imprisonment, or both, to throw broken glass or bottles in public highways? It seems to me that some action ought to be taken in the matter, in this part of Virginia, at least. Motoring is getting to be one continual eye strain to avoid broken bottles that appear to have been thrown in the road for the express purpose of ruining someone's tires. This is a small town, 6 miles from a railroad and we have had running now, about two months, a 2-ton Packard truck that makes the round trip daily between this place and Roanoke, our nearest town, 18 miles distant. The truck carries both freight and passengers, and so far has proved to be one of the greatest conveniences this place has ever enjoyed. I saw, yesterday, a chunk of rubber that would weigh at least 4 or 5 pounds that was cut completely out of one of the dual rear tires by a beer bottle that had been thrown in the road by some hoodlum possibly for that identical purpose.

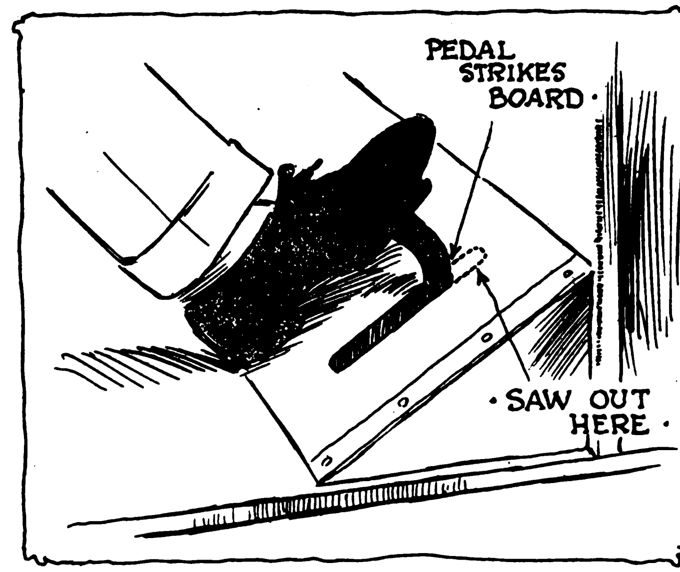


Fig. 2—Cutting away floorboard to allow of free movement of clutch pedal

Surely motorists are due some consideration from the general public and should not be subjected to these needless and costly annoyances.

Fincastle, Va. E. M. Miller.

—Even though the offense is not specifically mentioned in the statutes there is some law in any state by which an offender of this nature can be brought to justice if detected.

Had to Cut Away Floor Board

Editor The Automobile:—I saw in a recent issue of the The Automobile that you advised a reader to examine the floor board and see if the slot was deep enough to allow him to fully disengage his clutch. As I had the same trouble I looked at the floor board on my car and found that it had to be cut away as shown in the sketch, Fig. 2. It is remarkable how one will overlook the obvious when searching for troubles in a motor car. I had not been able to shift gears satisfactorily because the clutch lagged a little and I could not find the trouble until I noticed it mentioned in your columns.

New York City. Interested.

One Spark-Plug Gives Trouble

Editor The Automobile:—I have a 1911 high-grade car which has been giving me trouble since I purchased it new about a year ago. The spark-plug in the third cylinder persists in oiling up, while all the others remain perfectly dry and clean. A change of the plugs or the use of new ones makes no difference. A test shows the current to be just as strong on this cylinder as the others. The oiling system is a force-feed and this cylinder receives exactly the same amount of oil as the others. The cylinder seems to fire until it becomes too much chocked with oil and then a cleaning out with a little gasoline rectifies it.

I finally concluded that the cylinder might be scored or cracked, and for that reason was letting up too much oil. So the engine was taken down and a new cylinder and rings were put in, but the trouble still remained. Can you give me a possible solution of the difficulty?

Ignition is by Bosch high-tension magneto. No batteries are used. A Hancock oiler with sight-feed to each of the internal case-bearings is used, from which the oil flows through the hollow crankshaft to the connecting rod bearings where it is thrown off and lubricates the cylinders, next to the bottom of the crank case, where it is taken up by splash. The compression on all cylinders seems alike.

Which is the best for the motor; using a mixture as lean as possible, just so there will be no popping back to the carbureter,

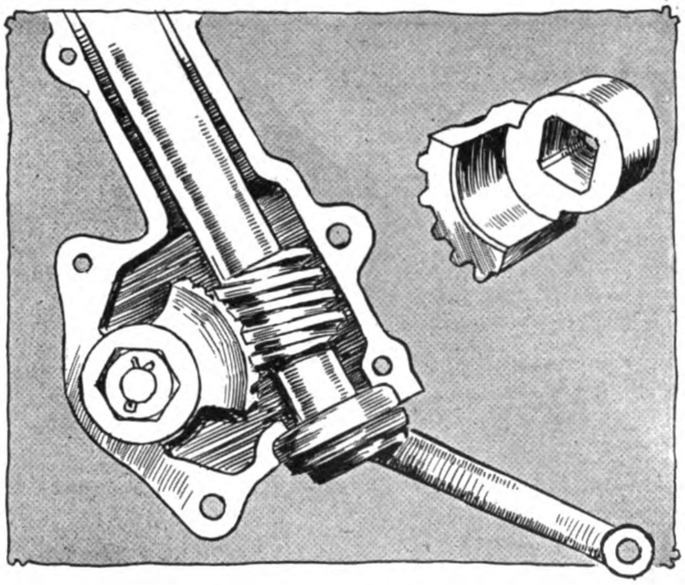


Fig. 3—Illustrating operation of worm-and-sector steering gear

or the use of a mixture which gives a maximum of power.

Round Top, N. Y. J. F. W.

—You can be reasonably sure that the oil is getting past the piston and working its way up into the combustion space. If a new cylinder did not cure the trouble it would be advisable to get an oversize piston as the fit between piston and cylinder is evidently at fault. Any looseness existing at the lower connecting rod bearing might also cause too much oil from the pressure feed to be thrown up into the cylinder. It would be well to examine this before changing the piston, although the probabilities are that you have an undersized piston which passed the inspection department without being caught.

Skips When Running Slowly

Editor The Automobile:—I have a 4-cylinder motor that skips when throttled down, but runs all right when opened up. Can you tell me the cause?

Worcester, Mass. W. A. D.

—The trouble is either in the carbureter adjustment or in the magneto. If you will try the car on both the batteries and magneto and see if it skips only on one of the two ignition systems you will eliminate one of the two possibilities. Should the trouble only appear when operating on the magneto you will know that the magnets require recharging, for the spark generated at low speeds is not hot enough to fully ignite the charge. Should the trouble still continue whether you run the car on battery or magneto, you will know that you are not getting a rich enough mixture at low speeds. As you do not mention what make of carbureter you are using it is not possible to advise you how to make the adjustment beyond the fact that the spray aperture should be opened a little.

Asks a Few Tire Questions

Editor The Automobile:—Will you kindly answer the following?

1. Does it do a tire (molded or wrapped tread) any good or harm to use a tire paint?
2. What is the proper size tire to use on a car weighing 4,100 pounds?
3. How much air should they have in them?
4. What is the best way to carry tubes in a tire trunk?
5. Would it do to wrap them in paper?

San Francisco, Cal. J. Jenson.

—(1) It does not do the tire any damage and certainly increases the good appearance, making the tire look bright.

(2) Anything from a 34 x 4 1-2-inch up.

(3) A pressure of 90 pounds per square inch.

(4) Carry them flat in a box or wrapped in paper and keep them liberally sprinkled with soapstone, graphite or tire talc.

(5) This question is answered under (4).

Some Steering Gear Questions

Editor The Automobile:—In reading over the 1913 car announcements in your paper I find that some cars are using the worm-and-sector, while others are using the worm-and-gear types of steering mechanism. Will you kindly explain the difference between them? I should also like to know what the word irreversible means when used in connection with a description of a given form of steering gear. Is there any confusion on these names?

Tenafly, N. J. F. H. Varian.

—The difference between worm-and-sector and worm-and-gear steering is just exactly as the name suggests. A sector is a portion of a circle while the gear is the whole circle. It is cheaper to make a worm and sector because it is not necessary to cut teeth all around the wheel while the gear has the advantage that when some of the teeth are worn the gear can be moved around and a fresh set brought into action. The two types are illustrated in Figs. 3 and 5 which explain the difference better than words. The word irreversible used in connection with steering gear signifies that the road shocks will not turn the wheels out of the line in which the driver holds them by means of the steering gear. There is no confusion of terms regarding the nomenclature of the steering gear and its parts.

Has an Old 1902 White Steamer

Editor The Automobile:—I have a 1902 White Steamer, seating 5 passengers, and would like to know the following:

1. How many miles an hour was it supposed to run when new?
2. Had it power to run over a sandy road?
3. How many pounds of steam was required to run it?
4. Was that style car a success?

Trenton, N. J. J. McCormack.

—(1) It could go 15 miles an hour over any passable road.

(2) Yes.

(3) It took 300 pounds pressure.

(4) For that time it was a distinct success, especially in that it made use of a condenser which reduced the water consumption to a marked extent.

The greatest success of the White car was reached in the 100-mile A. C. A. run held on Memorial Day, 1902. In this event the consumption of fuel and water were as important as the time spent upon the road and great surprise was occasioned at the small amount of water required to operate the car. At one of the controls the White took on 8-10 cubic foot while the nearest competitor required over 4 cubic feet. The secrets of the success of the White car were the series of coiled pipes which resembled the water-cooling system of a gasoline car and which greatly mystified the officials of the contest until it was discovered that these pipes formed a condenser which allowed the car to operate at a much higher fuel efficiency than had been obtained in any previous car. Dry superheated steam is generated from a boiler which is composed of twelve layers of helically coiled pipes. The temperature of the steam is generally about 800 degrees Fahrenheit.

Horsepower of the R-C-H Motor

Editor The Automobile:—What would be the actual horsepower of an engine with the same bore and stroke as the R-C-H 3 1-4 by 5?

Is the 2-bearing crankshaft as desirable as the 3-bearing shaft?

Wyandotte, Okla. C. R. S.

—The brake horsepower of the 3 1-4 by 5-inch motor, which was obtained from tests made with the motor driving an ordinary two-blade fan dynamometer at the R-C-H factory, was calculated as follows:

The blades were 10-inch x 14-inch and were set at varying center distances, and the horsepower developed at a speed of 1,750 revolutions per minute was 26.

This recorded horsepower did not consider the friction loss in the dynamometer driving shaft, which must have been considerable because of its insecure mounting and excessive vibration at high speeds. On account of the impossibility of setting the fan blades close together, it was impossible to run the motor at a higher speed than 1,750 so that the power developed above this point has not yet been determined.

The two-bearing crankshaft is not as stiff as the three-bearing and therefore the extra bearing length in order to eliminate the tendency toward whipping in a shaft of this nature will have to be made up by the increased length of the two end bearings. Where the bearings are of generous length and the lubrication of the long bushing necessitated by this arrangement is adequately taken care of it would be difficult to say that the advantage rested with either. A two-bearing crankshaft in which the bearings were too short would not last any length of time as it would be impossible to hold the correct alignment.

Wants to Become Racing Driver

Editor THE AUTOMOBILE:—I have driven cars over 40,000 miles and desire to become a racing driver. Could you give me any help?

Chicago, Ill. A. N. J.

—Apply to the Contest Board of the American Automobile Association, Fifth avenue and Thirty-ninth street, New York, for a racing driver's license. You will have to state your experience and answer the questions they put to you. After you have done this and secured your license it is a mere matter of looking for a job.

Plaster of Paris Replaces Confetti

Editor THE AUTOMOBILE:—I have taken great interest in the articles on women drivers, and am therefore sending an account that may be of value to the other readers.

On a 108-mile run, from Camden to Wildwood by the Sea, N. J., only one woman out of eighty-four entrants started. Her passengers were all women. She won third prize, a silver cup, given by the proprietress of the Wildwood Manor.

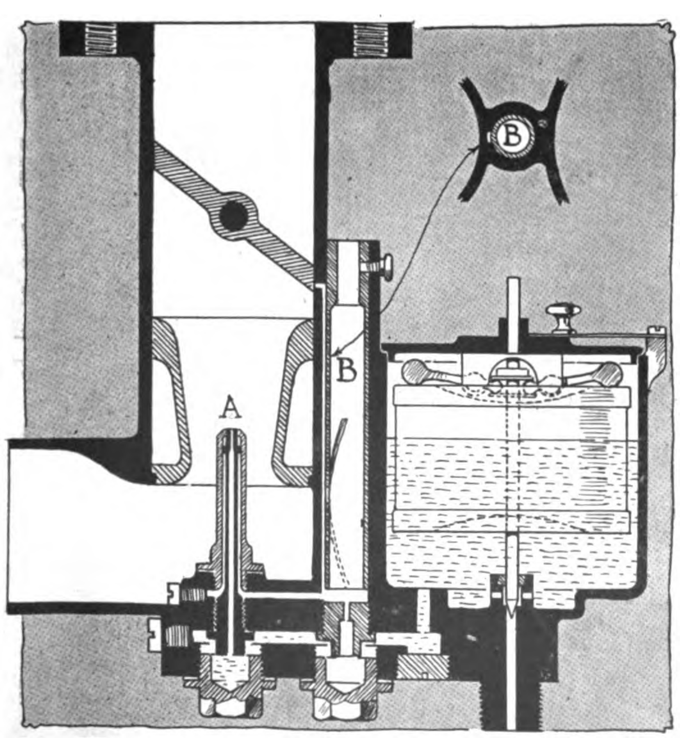


Fig. 4—Cross-section of Zenith carbureter, showing concentric jet

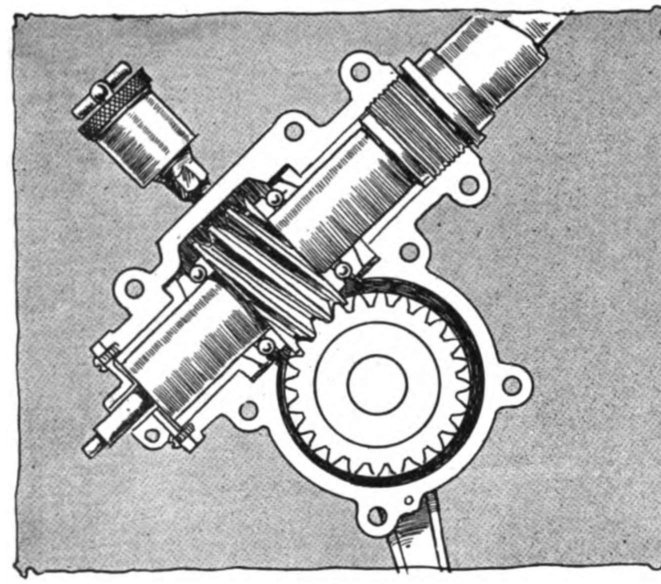


Fig. 5—Illustrating operation of worm-and-gear steering

I have been on all the runs in Philadelphia since the very first and have seen many different methods employed to mark the course, but after a trial on this run, plaster of Paris was found to be perfect, in that it does not blow away like confetti and children cannot pick it up. It will not disfigure the streets and it can be seen a block away, giving an entrant time to slow down for the turn.

Philadelphia, Pa. MARY W. HARPER.

Operation of Zenith Carbureter

Editor THE AUTOMOBILE:—Would you kindly explain to me the action of the Zenith carbureter? I have a car fitted with one of these carbureters but do not quite understand its action, although it is very satisfactory and gives no trouble.

New York City. J. G. RITZ.

—The Zenith carbureter is distinguished from all others by its double concentric jet which is shown at A, Fig. 4, and also by the tube B, a feature which is especially designed for the purpose of rendering starting easy. When the motor is stopped, a supply of gasoline rushes into the tube and remains there until the motor is again started. The level of the gasoline in the tube while the motor is idle will naturally be the same as that in the float chamber. When cranking the motor with the throttle very slightly opened the suction around the edge of the butterfly valve is strong enough to draw the gasoline in the tube through the opening at the edge of the butterfly, making starting very easy. This tube also comes into action at very low speeds, as the suction of the motor is not great enough to keep the gasoline exhausted and, as a result, there is a spray at the inlet near the butterfly valve which really takes on the importance of a third spray-nozzle. The amount of gasoline passing around the tube can be regulated by turning the tube on its axis. The auxiliary jet comes into action after the motor has speeded up sufficiently to suck the gasoline through the passage below the tube besides through the main jet. The faster the motor is running the lower will be the level of the gasoline in the tube B.

Letters Should Be Signed

[THE AUTOMOBILE is holding a few queries and communications which have been received unsigned. If a correspondent does not wish his name published it is merely necessary to state this fact in the letter and a nom de plume will be substituted. As an evidence of good faith, however, it is required that all communications be signed. Those which have been received up to date will be held until the identity of the sender is known. All communications will be answered strictly in the order in which they are received.—EDITOR.]

Great Western Adopts L-Head Motor

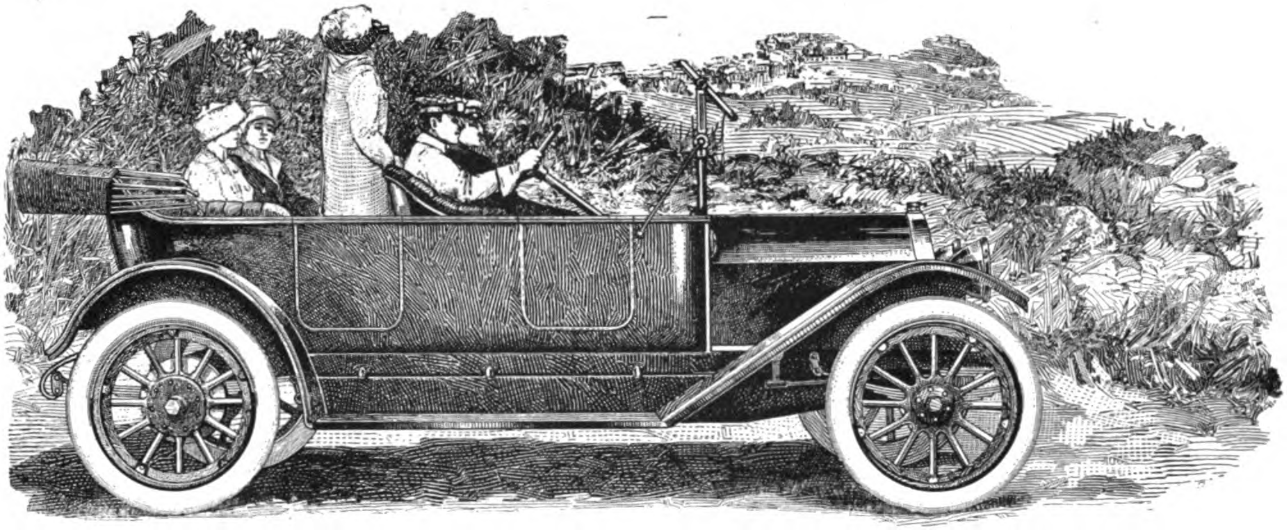


Fig. 1—Touring body fitted to the 1913 chassis brought out by the Great Western Company

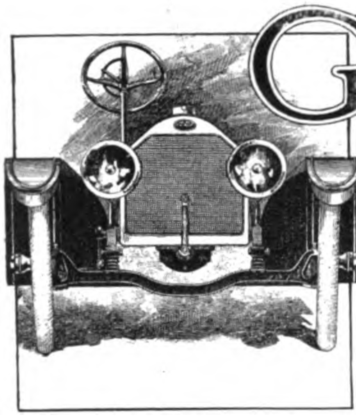


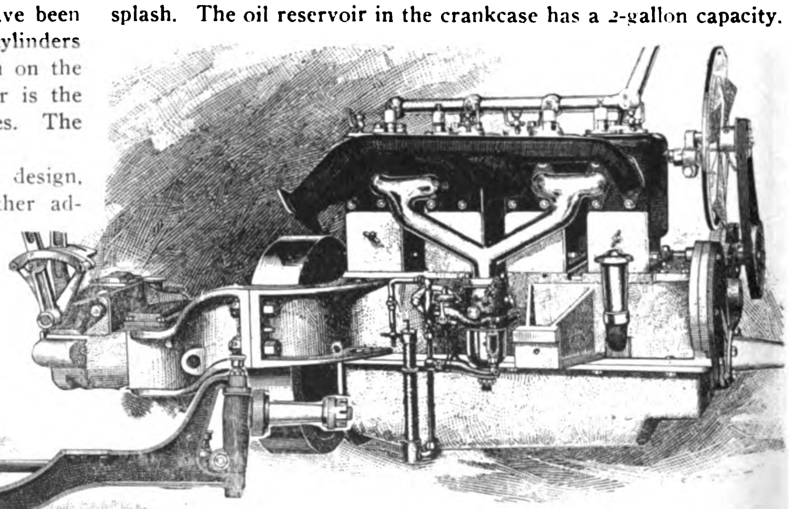
Fig. 2—Front view of Great Western

GREAT WESTERN cars for the season of 1913 will consist of four body types, the chassis for all being identical. It will be known as the 40, the same name which has distinguished it during the past two seasons. One radical change marks the introduction of the new cars to the market for the coming year: the Great Western of next year will have an L-head motor. In previous years the inlet valves have been in the top of the cylinders and the exhaust valves on the sides; they are now both on the right side of the motor. Another change in the motor is the lengthening of the stroke to 5 1-2 inches from 5 inches. The bore, however, remains unchanged, being 4 1-2 inches.

The change of stroke did not necessitate a change in design, but besides the advantage of covering the valves another advantage has been taken of the change in the operating mechanism; that is, to use roller valve followers, a step which will tend towards silence. The stems of the valves are of nickel steel, to keep wear at a minimum; while the heads of the valves are of grey cylinder iron. The two parts of the valves are welded electrically.

The Great Western power plant is of unit type. Each of the four cylinders is cast separately. The pistons are of grey iron and have convex heads. Four eccentric rings are on each piston. With the separately cast cylinders plenty of room is left for five generously dimensioned crankshaft bearings, a feature which has characterized the Great Western product of former years. The main bearing surface totals up to 15 11-16 inches. The crankshaft is slightly offset and has its bearing provided with the die-cast babbitt. The camshaft is a solid drop forging. Accessibility of the crankshaft and camshaft bearings has been taken into account by placing hand-hole covers in the lower part of the crankcase just above the oil reservoir, which is located in the bottom of this casting.

The lubrication of the motor is by circulating constant-level splash. The oil reservoir in the crankcase has a 2-gallon capacity.



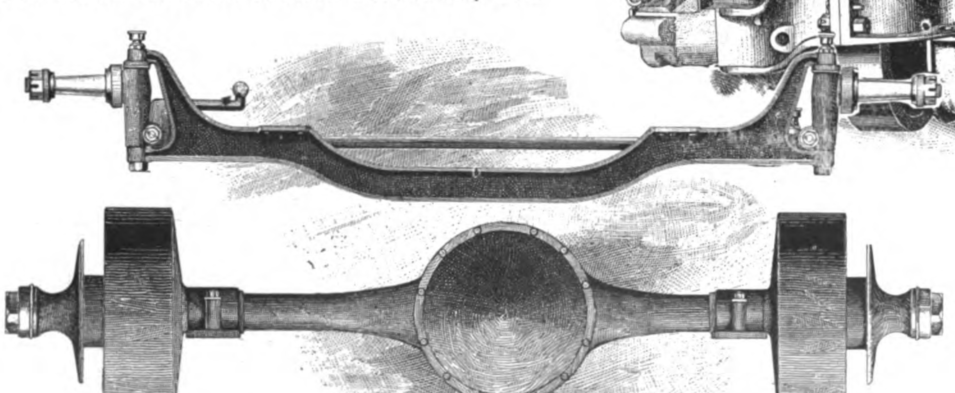


Fig. 3—Front and rear axles with steering connections

Fig. 4—Right or intake side of motor; note unit construction

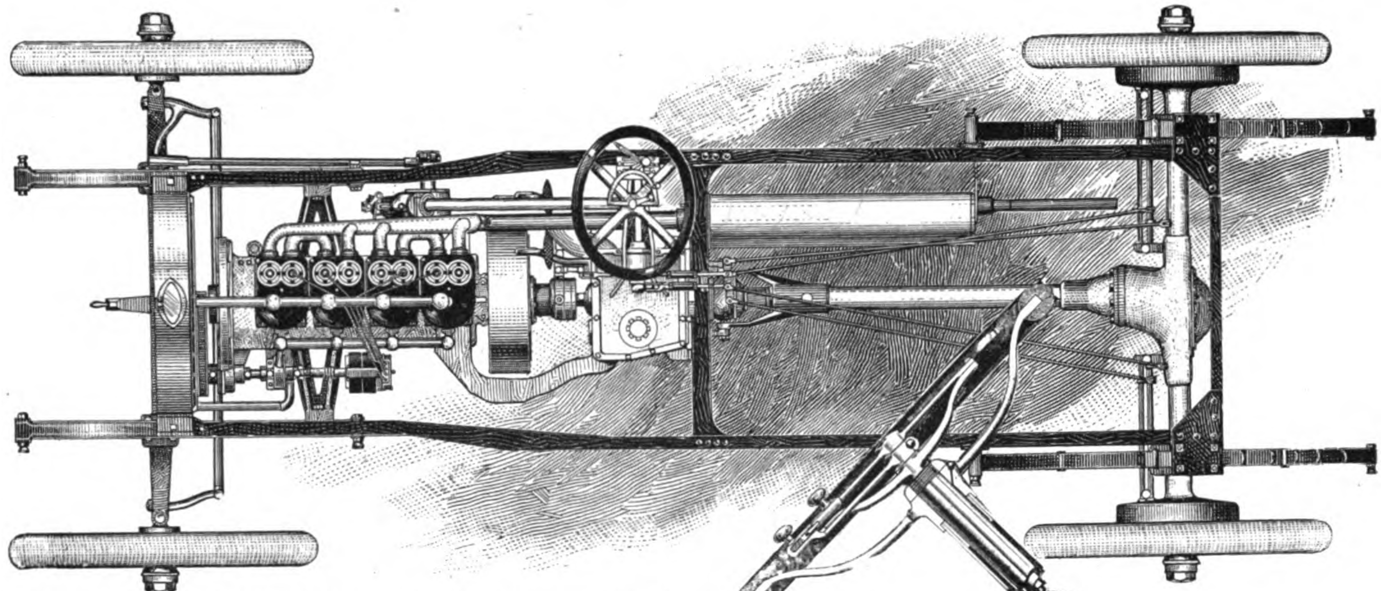


Fig. 5—Plan view of Great Western chassis, showing suspension of motor and drive

A plunger pump driven by one of the cams on the camshaft lifts the oil to the splash troughs in the upper part of the crank-case, where the lower ends of the connecting rods splash into it and throw the oil up into the cylinders. The oil pump is of such capacity that it refills the troughs faster than the oil is taken by the scoops, and as a result there is always an over-flow which finds its way back into the lower part of the crank-case again. After passing through a screen it reaches the pump and is again circulated through the motor.

The cooling, carburetion and ignition systems are all the same as the 1912 model. The water is circulated by means of a centrifugal pump located on the same shaft as the magneto through aluminum pipes to the water jackets and thence to a honeycomb radiator which is hung on the frame by brackets which are not in contact with the radiating surface. A Schebler model L carbureter is employed, while the ignition apparatus is of the Remy dual type with concealed coil and dash kick switch with lock.

The clutch is of the cone type. A change since the 1912 model has been made here in that the angle or the cone has been decreased so that engagement will be more easy and the action will be more gentle. The cone is faced with copper-woven Raybestos and there are six flat springs beneath the facing for easy engagement.

A three-speed gearset is used which runs on a double row of New Departure ball bearings. Ball universal joints are used in the propeller shaft, which is enclosed in a torque tube which connects the gearbox and the differential housing. A floating axle completes the rear system. Hyatt roller bearings are used in the differential and New Departure balls are in the axle. The springs are semi-elliptic front and three-quarter elliptic rear, 40 and 47 inches in length respectively. Double internal brakes are used on the 12-inch drums and equalizers are fitted on the brake rods. Instead of a 114-inch wheelbase, as for 1912, a 4-inch increase has been made. It is now 118 inches. As seen in Fig. 6, the steering gear is of the worm and gear type. Right control and drive has been retained.

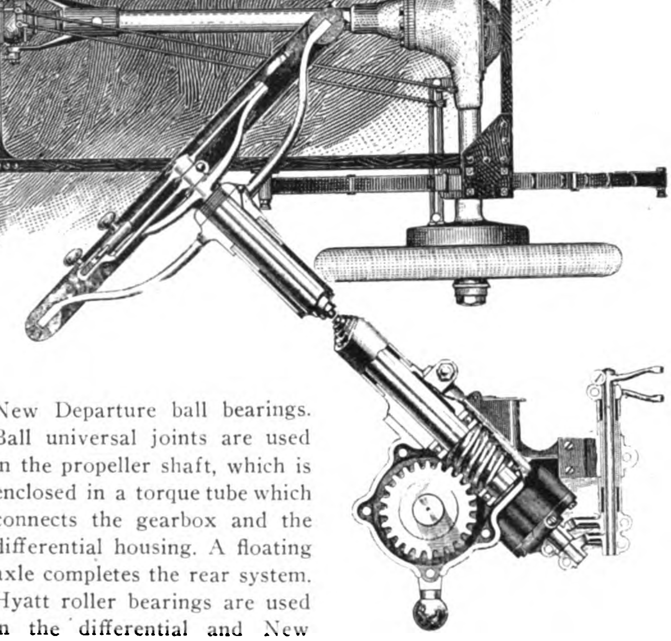


Fig. 6—Worm and gear steering mechanism

The bodies are made of a combination of steel and wood and are upholstered in hand-buffed leather. The five-passenger ton-neau is 45 inches wide. It has a small compartment between the two front seats for memoranda and the door hinges are con-cealed, giving a thoroughly up-to-date construction. The two-passenger roadster has a luggage compartment back of the seats and the four-passenger car has a removable tonneau.

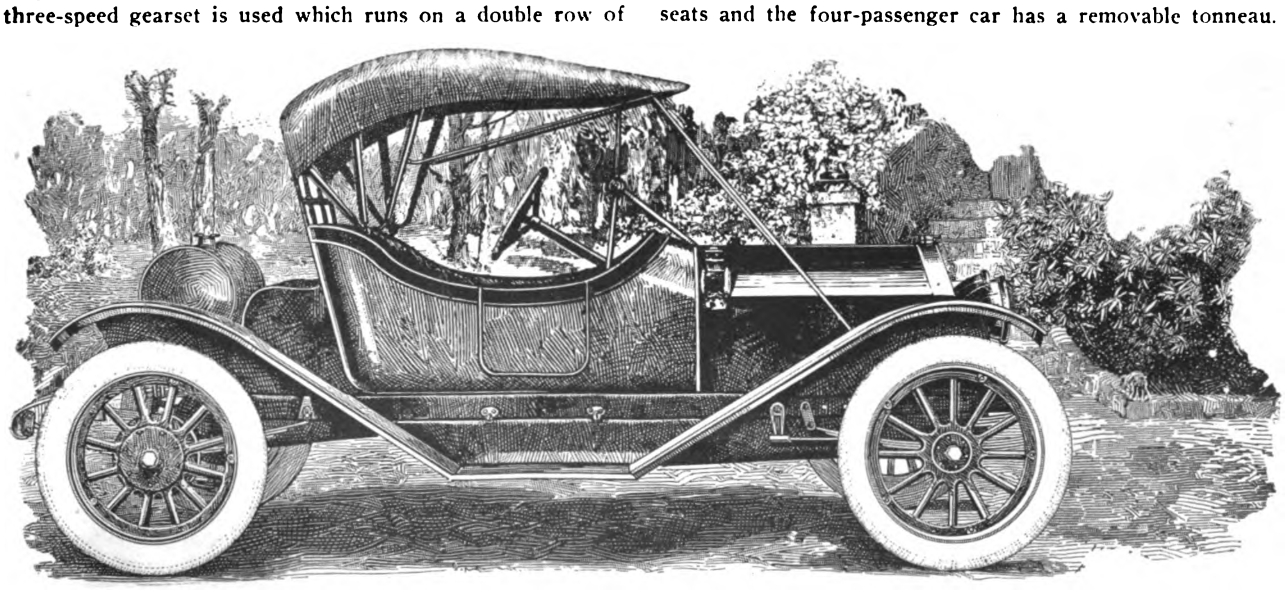


Fig. 7—Great Western Roadster fitted on the standard 1913 chassis

Four Stoddard-Dayton Models for 1913

THERE will be four Stoddard-Dayton models on the market for 1913. One of these will have a Knight motor; another, the valve-in-head plant which has distinguished the Stoddard line for 8 years, while the remaining two will embody motors of the en bloc type. The Knight motor is rated at 70 horsepower. It has six cylinders and will be placed in a chassis having left drive and center control, the same as was employed this year. The valve-in-head motor is rated by the manufacturers at 48 horsepower. All types of bodies are fitted to this model chassis, and right drive and control is used. The two en bloc motors are rated at 38 and 30 horsepower respectively. All standard types of body will be fitted to the 38, while the 30 equipment is limited to touring and compartment roadster bodies. Wire wheels are among the options for the six.

All the changes for next year are of a minor nature. Perhaps the most important change is the redesigning of the steering gear in the Knight car. This is now mounted on roller bearings and is of the worm and sector type W and S, Fig. 3. The shape of the front axle has also been changed, it now having but a single drop in place of the double drop of the 1912 cars. The cellular type of radiator has been retained, but in order to secure greater cooling efficiency it has been enlarged. The wheel hub bearings have also been made larger.

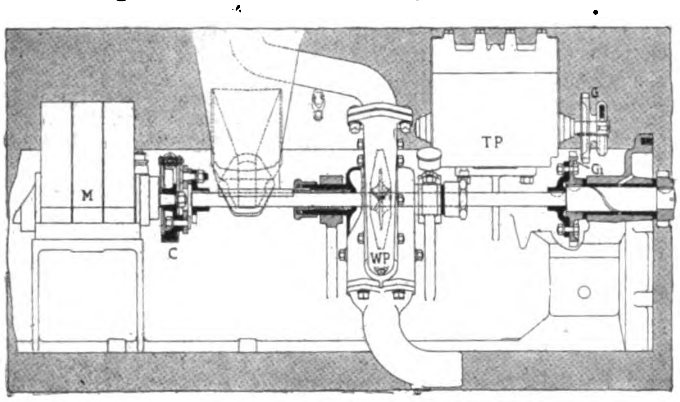


Fig. 1—Magneto and water pump shaft with tire pump on 1913 Stoddard

Valve-in-the-Head Type Will Be Continued in One Model; Two Others of Block Motor Design

The changes in the 48, 38 and 30 are negligible, being very slight and consisting only of sliding front seats which permit of adjustment for any leg-length in the case of the 48. On all the poppet-valve models the bodies are mounted upon rubber blocks to prevent squeaking and to eliminate vibration to a large extent. In fact, all through the Stoddard line the 1913 cars are distinguished more by alternations in body shapes and in added body comfort than by mechanical changes. The bodies are all longer, and in the touring style of the Stoddard-Knight two extra tonneau seats are arranged so that they can be folded into the backs of the front seats and this be out of sight when they are not required. The body presents a straight-line appearance, and the side lamps are fitted in the center of dash ventilators.

The Stoddard-Knight motor has a bore of 4 1-2 inches and a stroke of 5 1-2 inches, giving a stroke-bore ratio of 1.22. The cylinders are cast in two groups of three, the casting being so arranged as to provide for a seven-bearing crankshaft. The motor throughout is of the conventional Knight type, the two sleeves being driven by eccentrics from a longitudinal shaft which is enclosed in the crankcase and driven by a silent chain.

Splash Lubrication Retained

Lubrication of the motor is by self-contained splash with movable troughs. All six troughs are hinged to a single shaft and by a system of linkage inter-connected to the throttle. When the throttle is opened the troughs are automatically raised about their respective hinges allowing the scoops on the bottoms of the connecting rods to plunge to a greater depth into the oil contained in the troughs and to throw more up into the cylinders and over the sleeves for this reason. The sleeve valves are grooved circularly on their outside surfaces for the purpose of distributing the oil thrown upon them by the splash, while to still further aid in this purpose the grooves are supplemented with small holes. An oil pump keeps the troughs constantly full and overflowing, the surplus oil draining back to the reservoir in the lower part of the crankcase whence it is again circulated through the system. In this system the aim has been to follow the practice of keeping the amount of oil supplied in exact proportion to the work done by the motor, this plan making for greater economy and efficiency.

While 916 feet per minute piston speed is reached at 1,000 revolutions per minute, the stroke of each sleeve valve is 1 1-8 inches and at 1,000 revolutions the linear speed of the sleeve is 93.7 feet per minute. The slow movement of the sleeves is relied upon to a great extent

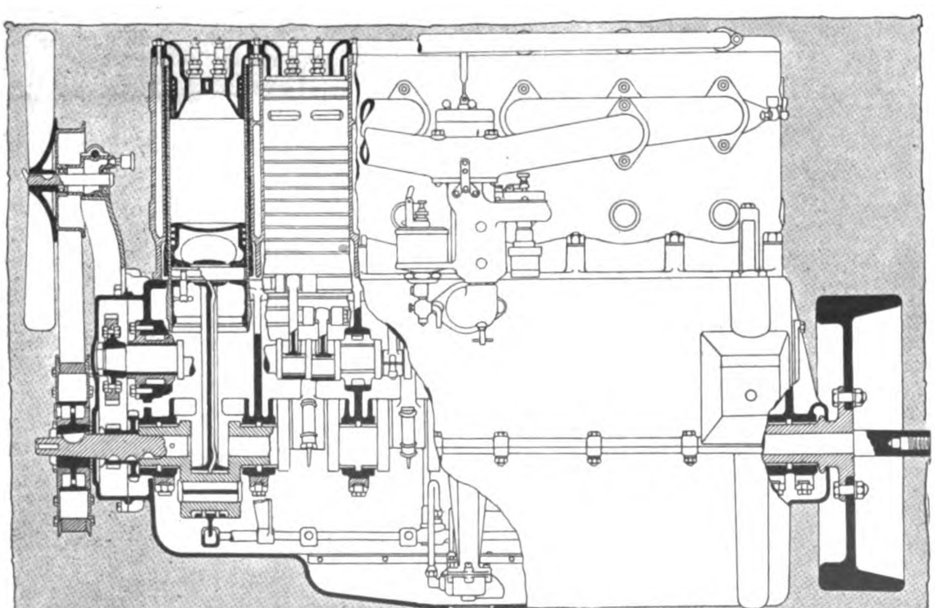


Fig. 2—Partial section of the six-cylinder Stoddard-Knight motor

Knight Sleeve-Valve Type Will Be Leader

Most Important Change is the Re-Designing of the Steering Gear—Wire Wheels Among Options

in aiding the lubrication by distributing the oil between the sleeves themselves and between the sleeves and cylinder wall.

The same ignition system which has been used on the Stoddard-Knight since its inception will be seen on the 1913 cars. It is a high-tension system acting simultaneously through two sets of spark-plugs and operated from one switch and coil on either magneto or battery. A starting vibrator is fitted to the coil which gives sparks all through the firing stroke but which does not fire the charge until the starting button has been pressed. On the magneto shaft is the tire pump, T P, and the water pump, W P, Fig. 1.

Other features of the car are the leather-faced aluminum clutch which has in addition to the leather facing a number of flat springs; the three-speed selective gearset composed of chrome nickel steel running in oil; single universal joint on the forward end of inclosed propeller shaft; bevel type of differential in floating rear axle, and two sets of 2 1-2 by 16-inch brakes. The spring suspension is semi-elliptic front and three-quarter elliptic rear; 2 1-2-inch leaves are used in the spring, giving a broad but shallow construction. The wheelbase is 133 inches and the tread the standard 56 inches.

Valve-in-Head Motor Continued

The equipment is a little more complete than ever before, consisting of best quality mohair top, top boot, storm curtains, windshield, seat covers, electric horn, trunk rack, speedometer, shock absorbers, demountable rims, aluminum running-board tool boxes, robe rail, foot rest, tire holders, tire irons, tire repair kit, a complete set of tools and extra demountable rim.

The 48-horsepower valve-in-head motor has been gradually developed by the Stoddard concern for the past 8 years, and the 1913 announcement shows no changes in the details of its construction. The bore of this motor is 4 3-4 inches and the stroke 5 inches. The four cylinders are cast in pairs, with the valve operation, as the name suggests, entirely in the head of the motor. The valves open inward into the combustion chamber and are actuated by rocker arms which reach across the tops of the cylinders. This motor has been installed in a chassis with a wheelbase of 122 1-2 inches. The two other motors are distinguished by having their four cylinders cast en bloc. They are of the L-head type and are rated at 38 and 30 horsepower respectively. The bore of the larger motor is 4 inches and the stroke 4 1-2 inches and of the 30, 3 3-4 inches and 5 1-8 inches. The wheelbase of the 38 chassis is 114 inches and that of the 30, 106 inches, the tread being standard at 56 inches.

The chassis details of these cars are practically identical. Leather-faced cone clutches with flat springs beneath the surface are used on all types. Ball bearing thrusts are used to destroy any harmful effects resulting from an end thrust on the crankshaft while the motor is running. The gearset on all these cars is of the three-speed selective type, the metal used in the construction of the gears and shafts being in all respects the same as that employed in the Knight car. A different feature, however, in this car is that drive and control are both right side.

A floating rear axle is used as in the Knight model, while the suspension is also the same with semi-elliptic front and three-quarter elliptic rear springs. The equipment is made as complete as can be desired for the 1913 cars, consisting of quick-detachable, demountable rims, mohair top and top boot, storm curtains, windshield, shock absorbers, tire irons, robe rail, foot rail, tool boxes, gas tank, gas headlights, oil side and tail lights and horn.

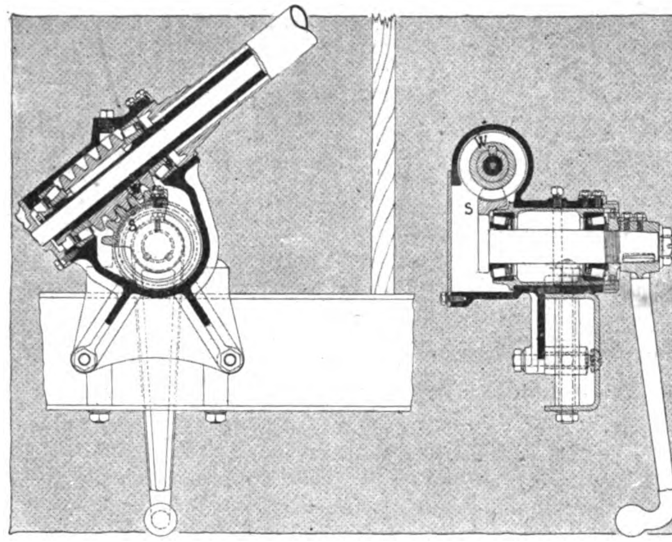


Fig. 3—Transverse and longitudinal sections through Stoddard steering gear

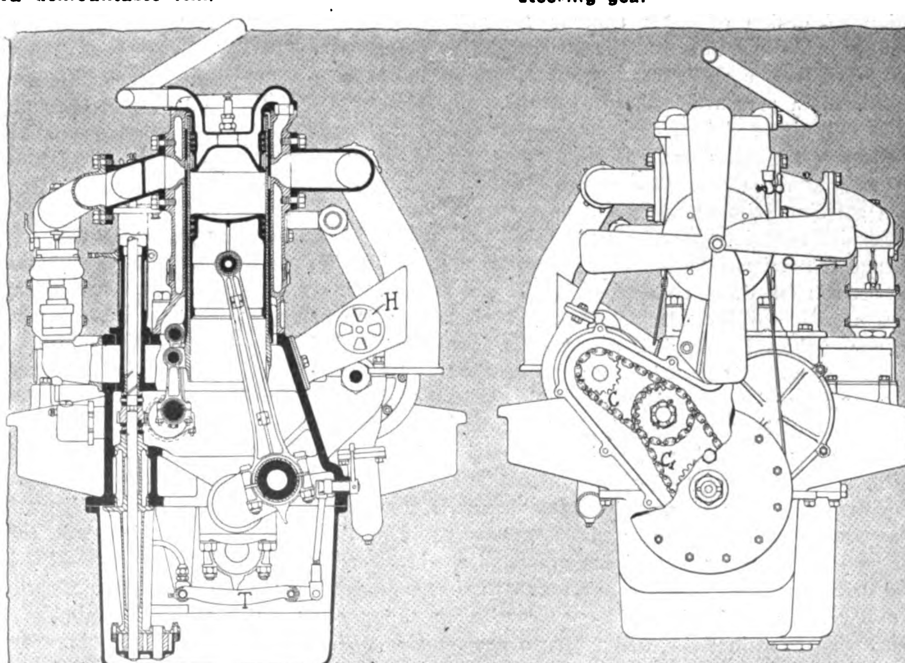


Fig. 4—Transverse section through Knight motor and view of chain drive to magneto shaft

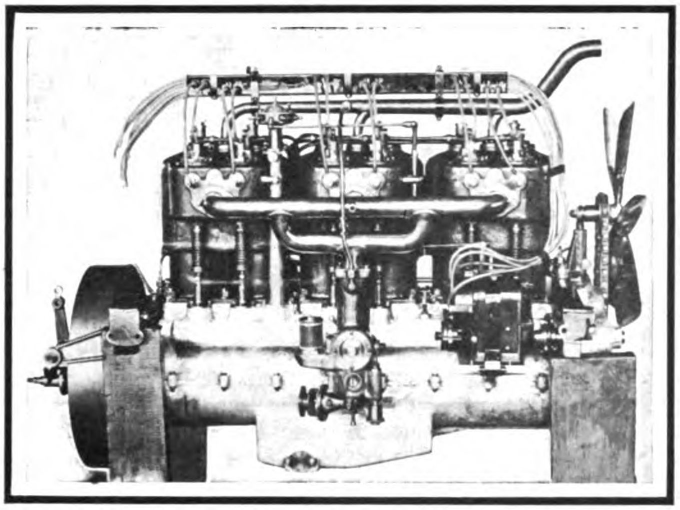


Fig. 1—Right side of Pierce motor, showing arrangement of carbureter and magneto

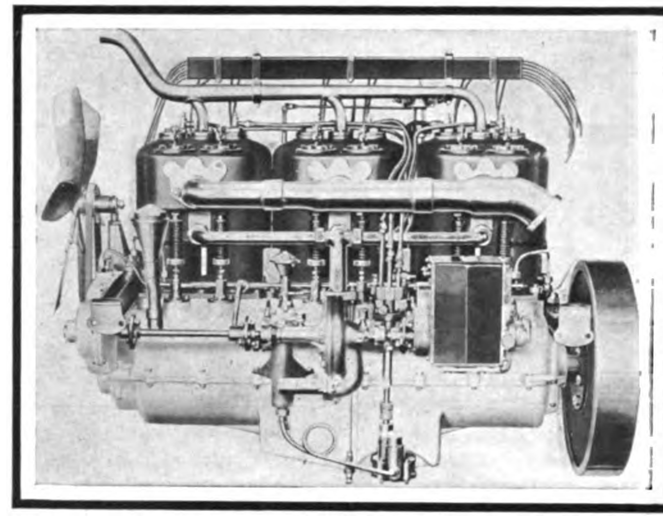


Fig. 2—Left side of motor, illustrating air pump and distributer valve of starter

1913 Pierce-Arrow

Company's Line Will Include Three Models, All of the Six-Cylinder Type—Mechanical Changes Numerous

Gravity Lubrication Succeeded by Force-Feed—New Double-Jet Carbureter on All Models

FOR next year the Pierce-Arrow line of three models will be continued, all being six-cylinder types much altered from the 1912 models. A careful analysis of these three models shows that more mechanical changes have been made for next season than have been made for several years past. The changes made are typical of the three models, so that there is a standardization of design of parts running through them all. These changes, while not affecting the general design or appearance of the parts, are nevertheless important. The motor has been fitted with a pressure-feed oil system to all of the crankshaft and connecting-rod bearings, thus doing away with the gravity tank above the cylinders; a two-jet carbureter has been fitted; a compressed-air starting system has been installed, supplemented by a gasoline priming equipment as used this year; a generator to furnish electric current for the lights and also to charge the storage battery has been fitted; a new four-cylinder air pump has been installed on the gearbox for air pressure on the starting system, and also for tire inflation; there is a new fan belt adjustment; the cone clutch is now leather-faced with cork inserts instead of with German bronze; the gearbox is located farther to the rear, and a splined mainshaft is used; the propeller shaft is a tubing of large diameter instead of a solid bar; the rear axle has been generally altered, making the drive shafts removable, using stuffing boxes to prevent oil leakage and fitting larger bearings; the Pierce-Arrow demountable rim is standard; bodies are generally 2 inches lower; wheelbases are 7.5 inches longer on the seven-passenger types, giving greater space between the dash and driver's seat, and also in the tonneau; sheet aluminum takes the place of cast aluminum in open car bodies, the cast product being continued in the closed types; a new muffler without cut-out has been fitted; there has been a general improvement in the accessibility of parts, some examples being the location of the gearbox 4.5 inches farther to the rear to permit of clutch removal without interfering with the gearbox, mounting the tire pump on the forward end of the gearbox, fitting the double universal between the clutch and gearbox and making drain and test cocks on the motor oiling system more accessible.

The horsepower has been little changed except in what is known this year as model 36, but which has been changed to 38-C for next season. In this the cylinders have been increased from 4 by 5 1-8 inches to 4 by 5.5 inches, with larger valves and larger diameter crankshaft. The motors in the other two models remain unaltered, but their model numbers have been changed by the addition of a letter and now are 66-B, 48-B, and 38-C. In addition, the company is marketing a 48-D model, which is practically the 48 of this year with a Disco self-starter, the Adlake electric lighting system and the 1913 equipment added.

The motor sizes, horsepower, crankshaft speed, and piston displacement of the various models are as follows:

Model	Bore	Stroke	Horse power	Piston Dis.
66-A	5	7	66	825
48-B	4.5	5.5	48	525
48-D	4.5	5.5	48	525
38-C	4	5.5	38	339

While this table shows the factory horsepower ratings, the dynamometer tests show ratings much in advance of these. Model 66-A dynamometer test is 76 per cent. higher than S.A.E.; 48-B is 60 per cent. higher, and 38-C, 47 per cent. higher. The maximum crankshaft speed of 66-A is 1,700 revolutions per minute, and of the other models, all having the same stroke, it is 1,800 revolutions per minute. These speeds give piston speed in feet per minute as follows: 66-A, 1,966; 48-B and 38-C, 1,568 feet.

Changes Are Mostly Mechanical

Externally the 1913 motor bears a strong resemblance to that of this year barring the elimination of the gravity oil tank and the extra piping occasioned by the compressed air starter. Cylinders are made in twin castings with opposite valves and exposed tappets and valve springs. On the right side are the carbureter and magneto, the latter on the forward motor arm; on the left are four units: waterpump, oilpump, starter distributer and Westinghouse generator for lighting and battery charging. Leather disk couplings are used in the magneto, water pump and generator shafts. The disk on the magneto shaft is 4 inches in diameter and 1-4 inch thick and in the water pump shaft 3 inches in diameter and of the same thickness. The seven-bearing crankshaft is continued. The weight of connecting rods and other reciprocating parts is reduced, a connecting rod with its bushings in the 48-B weighing 4 pounds 4 ounces.

The most important change is in the lubricating system. This company was a pioneer in the non-splash circulating system, using as it did a crankcase gear pump to elevate the oil into a large gravity tank above the cylinders. For next year this gravity system has been eliminated and now the oil pump feeds direct to the crankshaft bearings, to the lower connecting rod bearings and to the upper connecting rod bearings or wristpin bearings, as they are frequently designated. The oil pump OP, Fig. 3, delivers through a duct L to filter L1 and thence to a distributer pipe L2 lying along the top of the crankcase. This distributer delivers through a branch 1 to the timing gear, through a branch 2 to the front crankshaft bearing, through a branch 3 to the middle crankshaft bearing, through a branch 4 to the rear crankshaft bearing, and through a continuation 5 to the pressure gauge on the dash. The pump gives a pressure of 20 pounds to all parts. Each connecting rod is fitted with a small copper tube which leads the oil to the hollow wristpin. The crankshaft is liberally drilled so that branch No. 2 supplies the wristpins for cylinders 1 and 2 and also the bearing B2. Branch No. 3 supplies oil to bearings B3 and B4 as well as to the connecting rods for the middle cylinders. Branch No. 4 supplies for crankshaft bearings B6 and B7 and also for the connecting rods for the two rear cylinders. While there are three oil feeds, namely, branches 2, 3 and 4, to three of the crankshaft bearings, it has been demonstrated that one branch is sufficient to furnish oil for all of the crankshaft bearings and the six connecting-rod bearings, this being due to the continuous oilway from end to end of the crankshaft and the pressure of 20 pounds generated by the pump. A double precaution has been taken in the matter of screening the oil between successive circuits of the motor. There are two strainers, S1 surrounding the suction pipe through which the pump draws its supply and SL in the discharge pipe. Both can be readily cleaned, that on the suction side of the pump by removing a plug in the face of the crankcase and the strainer SL by the hinged cap of the chamber L1 in which it is located. Heretofore the Pierce company has used baffle plates in the open ends of the cylinders to prevent an excess of oil being splashed, which might result in carbon deposits; but for 1913 these baffles will not be used, the reason being that with a new pressure oiling system delivering oil up the connecting rods there will not be that amount of oil thrown off the crankpins, and so an excess will not reach the cylinders.

Two commendable improvements in the field of accessibility are noticed in the carrying of the shaft for the drain cock up to the top of the crankcase at H1 and also that for the oil level test cock up to the point H2, making it possible to open each of these without having to reach down among the motor parts. The oil pump is external and is removable by means of the jaw coupling J. Its shaft carries on its upper end the air distributer.

Double-Jet Carbureter Adopted

A new carbureter is used on all models. It is a double-jet type, the first time one of this type has been used by the company. The entire mixing chamber is water-jacketed and the water jacketing extends twice as high as formerly. The two nozzles N and N1, Fig. 4, are located respectively in the center of the concentric float and in the auxiliary air passage. Both are

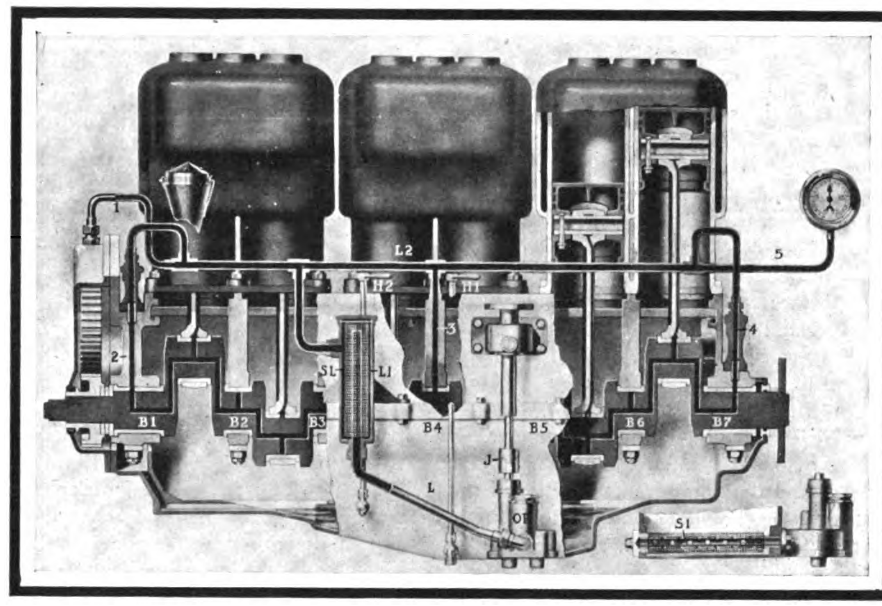


Fig. 5—Force-feed oiling system of Pierce motor, showing bored crankshaft and other oil leads

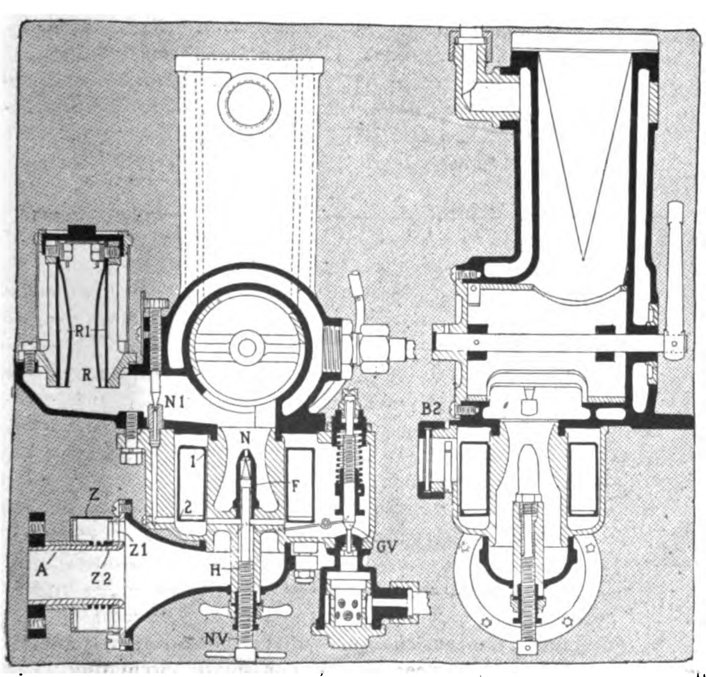


Fig. 6—Double concentric jet carbureter used on Pierce motors

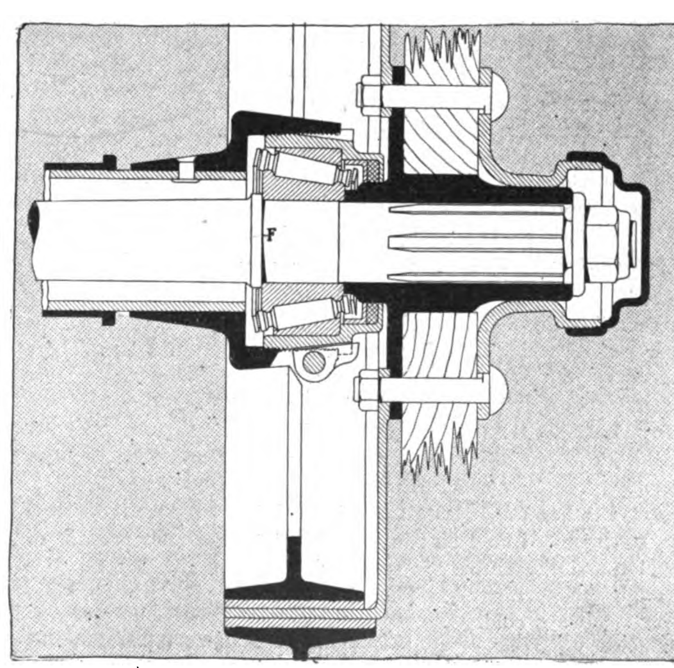


Fig. 7—Section of Pierce rear wheel, showing roller-carried hub

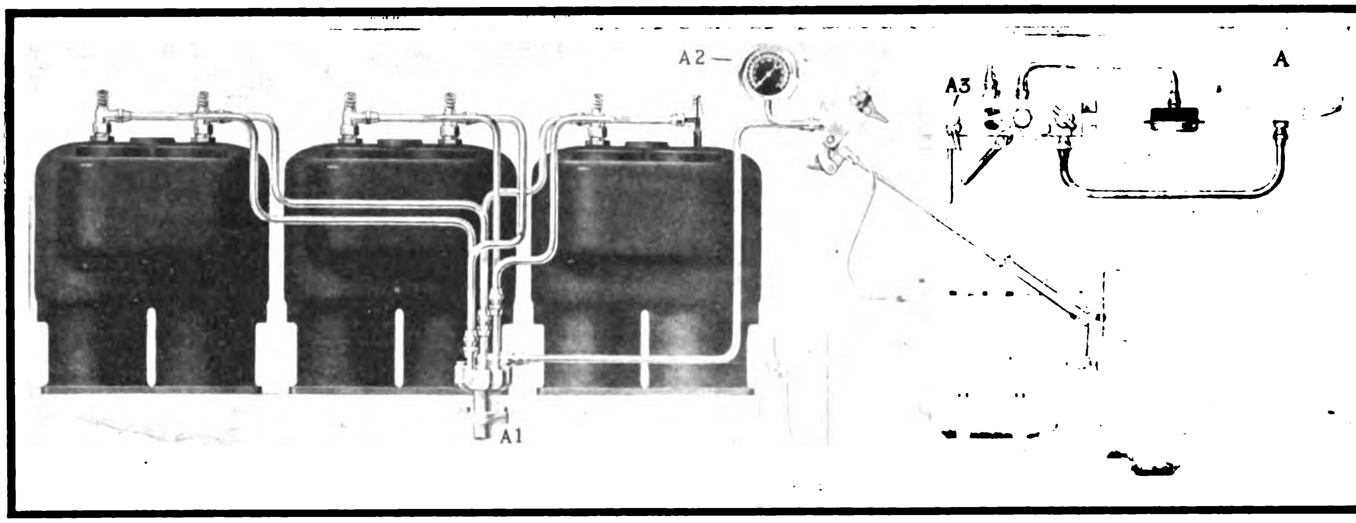


Fig. 3—Schematic view of self-starter and location of pump, air tank and distributer

controlled by hand-adjusted needle valves and are so positioned that the auxiliary nozzle does not come into use until a speed of 800 revolutions per minute is obtained and the auxiliary air valve has opened. Using the two nozzles gives a better carbureter performance on low-speed work and also on high-speed work, than was obtainable with the single-jet used to date. Thus there is a high general average on low, medium and high speeds due to the double-jet combination.

An admirable improvement has been made in the needle valve in the main nozzle. This valve has a 19-degree taper on its upper end and to protect this taper there is an enlarged fluted portion F serving as a guide to insure the point of the needle centering in the opening of the nozzle. There is a second protection for the coned tip by way of a shoulder H on the valve. The valve is a double-threaded diameter, the portion above the shoulder of small diameter, that beneath the shoulder of larger diameter, and the shoulder so positioned that when the valve is set tight on the shoulder the tip of the cone is in its proper closest adjustment. This protection removes the possibility of destroying the cone tip by screwing it up against the opening in the nozzle.

The auxiliary nozzle is a similar cone-tipped, hand-adjusted needle valve. The operation of this nozzle is closely connected with the auxiliary air valve, which has not been changed. This valve consists of two sets of reeds or vertical leaf-shaped springs. The outer set R1 is the weaker and opens partially. For further opening the reeds bear against the inner set R, which are stiffer, thereby giving a progressive opening to the auxiliary air supply. A still further progression is obtained in that one of the reeds R1 is weaker than the other, thereby opening slightly in advance. This is also true of the two reeds R.

Not Affected by Weather Changes

The main air system can be regulated for hot and cold weather. To the pipe A a tube from the muffler pipe connects. Surrounding this is an annular space formed by a housing Z, the inner end of which has a series of circular openings Z1. There is a corresponding circle of openings in the carbureter horn at this point so that by seizing the housing Z by hand and pulling outward against the tension of the spring Z2 the two sets of holes can be locked in different degrees of register and thus regulate a supply of cool air which enters through openings in the housing. In hot weather the holes Z1 are in complete register, admitting the maximum of cool air; in cold weather the holes are out of register and the entire air supply taken from the hot air pipe through the opening A. The air supply through the auxiliary valve is always cold.

The gasoline system in the carbureter remains much as heretofore, but the controlling valve has been re-designed. It has a beveled seat GV with a vertical small-diameter guide projecting downward from it. This seat rests in a corresponding bevel in the casting. Both valve and seat are ground with pumice stone. The valve is of meteor metal, which is largely nickel, much harder than brass, thus being proof against cutting or wearing. To show the gasoline level a bull's eye BZ is placed in the side of the float chamber and in it is a vertical gauge rod on which the proper level of gasoline is indicated. The float is a hollow brass piece soldered at diagonal corners 1 and 2.

Self-Starter on All Models

The company is using for the first time a compressed air-self-starter on all three models, the air pressure coming from the four-cylinder air pump located on the forward end of the countershaft of the gearset and so arranged as to be thrown into operation by pedal at the driver's will. The air from this pump is delivered into the air reservoir A, Fig. 6, where it is held at a pressure of 200 pounds. From this tank it is led to the air distributer A1 located on the left side of the motor between the water pump and lighting dynamo and driven by a continuation of the vertical oil pump shaft. From the air distributing housing piping leads to special connections in the cylinder heads, each of these containing a check valve. The control of the apparatus is from the floor board, where there is also located a gauge A2 to show the air pressure in the tank. A3 shows the control for cutting the air pump in or out of service, and to its left are the other control parts, this illustration being a top view of the control parts. The air distributer is a rotating disk having an oblong circumferential slot. The air supply enters the cover of the distributer centrally and the air delivery pipes enter the distributer case beneath the disk. As the disk rotates its slot

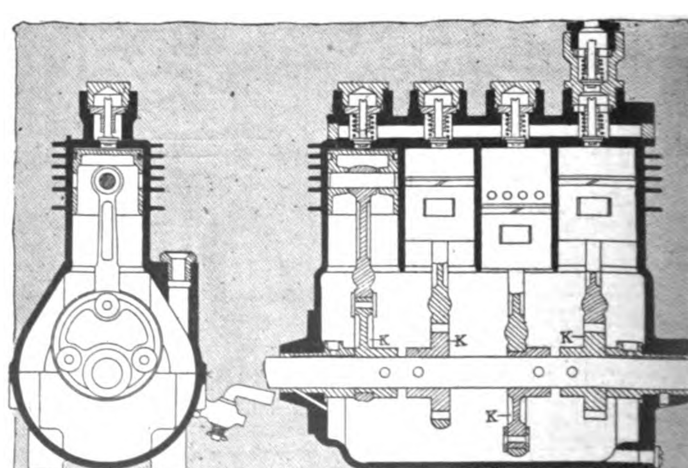


Fig. 4—Cross and longitudial section of Pierce motor

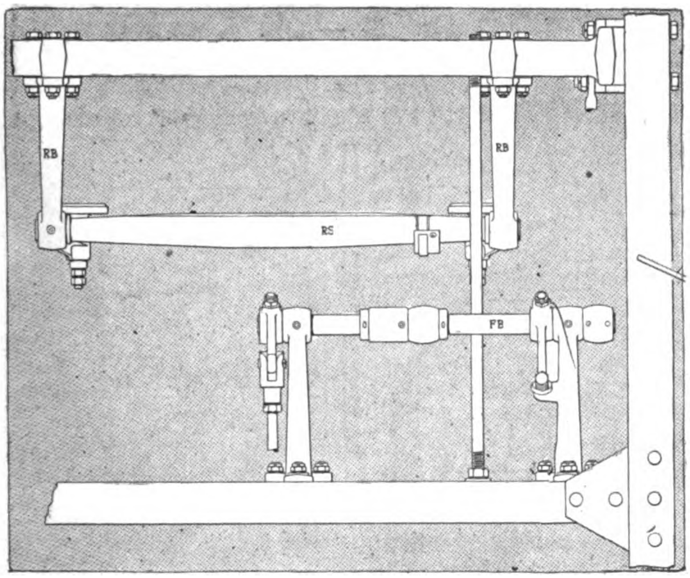


Fig. 8—Method of supporting the clutch rocker shaft on the frame

registers in firing order with the different cylinders delivering the air pressure to the one on suction stroke and to the others in sequence, so as to give a continuous turning movement to the crankshaft.

Tires Are Inflated by Power

A new design of power air pump is used for tire inflation and also to furnish the 200 pounds air pressure needed for the self-starting reservoir. The pump is a Pierce product and is a four-cylinder air-cooled design located at the forward end of the countershaft of the gearset and controlled by clutch mechanism with operating parts on the dash so that the pump only operates when the driver wants it to. The cylinders, of 1 7-16-inch bore and 1 1-4-inch stroke, are formed in one casting which is integral with the upper half of the crankcase. The crankshaft is a 5-8-inch bar on which are mounted the four eccentrics K, Fig. 7, which take the connecting rods. The pistons carry one eccentric ring with diagonal split at the upper end and have large rectangular perforations midway of their height. In each cylinder head is an automatic discharge valve forming a connection between the pump cylinders and the collector tube in the casting head. There is a fifth automatic valve in the delivery tube to the tank reservoir, this valve being located immediately above the valve for the front cylinder.

The pump operates on the two-cycle principle, there being drilled in the cylinder walls a series of small holes at a point immediately above the piston head at the lowest point in its stroke, these holes appearing in the second cylinder in the illustration. The pump has an overall length of 10 inches and a height of 8 inches.

For tire inflation work it is recommended to take the air direct from the pump instead of from the 200-pound reservoir located on the chassis over the muffler, this being due to the possible danger of bursting tires by using the reservoir pressure. Inflating direct from the pump can be done in a 38 by 5 1-2-inch tire in 7 minutes.

Details of Clutch and Gearset

In manufacturing the pump every care has been exercised in the finish of the cylinders, pistons and rings. It operates at one-half crankshaft speed.

Fig. 9 shows the clutching mechanism at the forward end of the gearshaft. The housing G extends and to this bolts the corresponding housing on the pump. The forward end of the countershaft has a jaw clutch G1 with which is engaged a corresponding sliding clutch G2 on the pump shaft.

The four-speed gearbox, which has been a standard of Pierce construction for several years, is continued in improved form. The main shaft MS, Fig. 9, is a fluted design, having six flutes. The rear end of this shaft, where it takes the universal joint member, is also similarly fluted. Both ends of the shaft are provided with self-adjusting glands to prevent oil leakage. These consist of a packing G compressed by a small plunger backed up by spring G1. The entire stuffing box construction is contained within a cap K holding the bearing in place. Similar stuffing boxes are not used on the countershaft for the reason that there is a bearing cap K1 at the rear end which does not offer any chance for oil escaping and at the forward end of this shaft the housing G containing the air pump clutch forms an oilproof connection with the air pump housing.

A new form of interlocking device is used to prevent the engaging of two trains of gears at the same time. This is an automatic arrangement consisting of a small vertical roller R located between the two shifter rods R1 and R2. A slight groove is cut in the adjacent side of the shifter bars at this point, and the width of the roller is such that when resting in one groove the

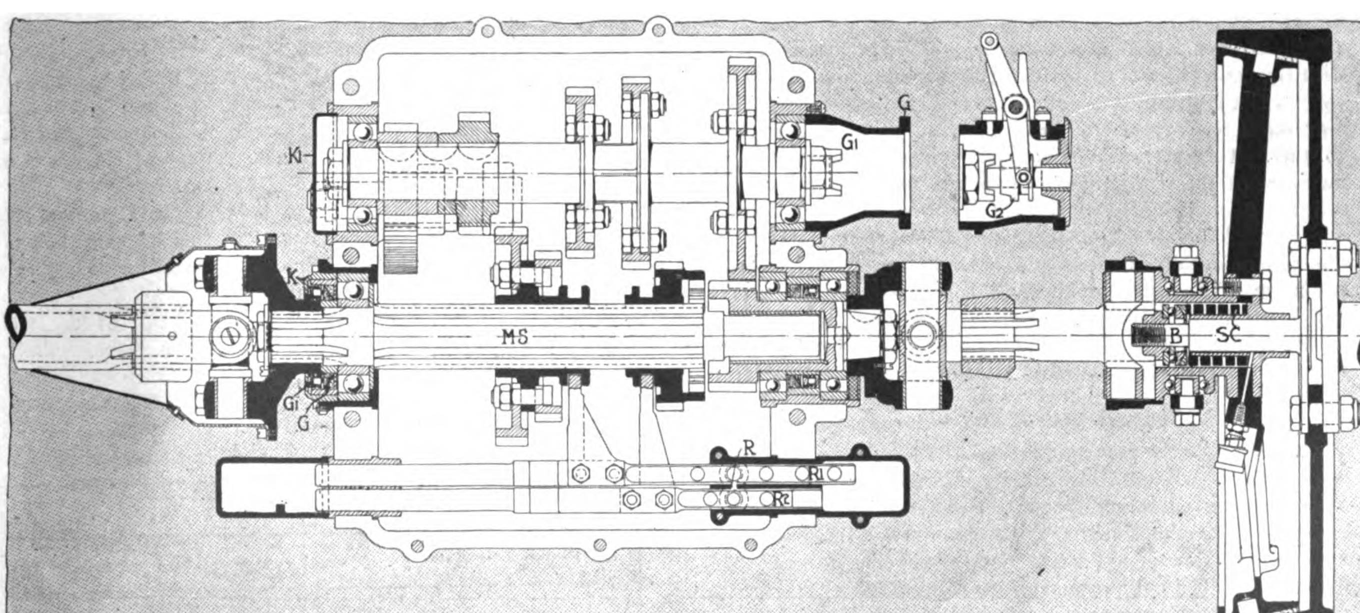


Fig. 9—Sectional view of the four-speed gearset and cone clutch. Attention is called to the arrangement which prevents simultaneous meshing of different gear trains

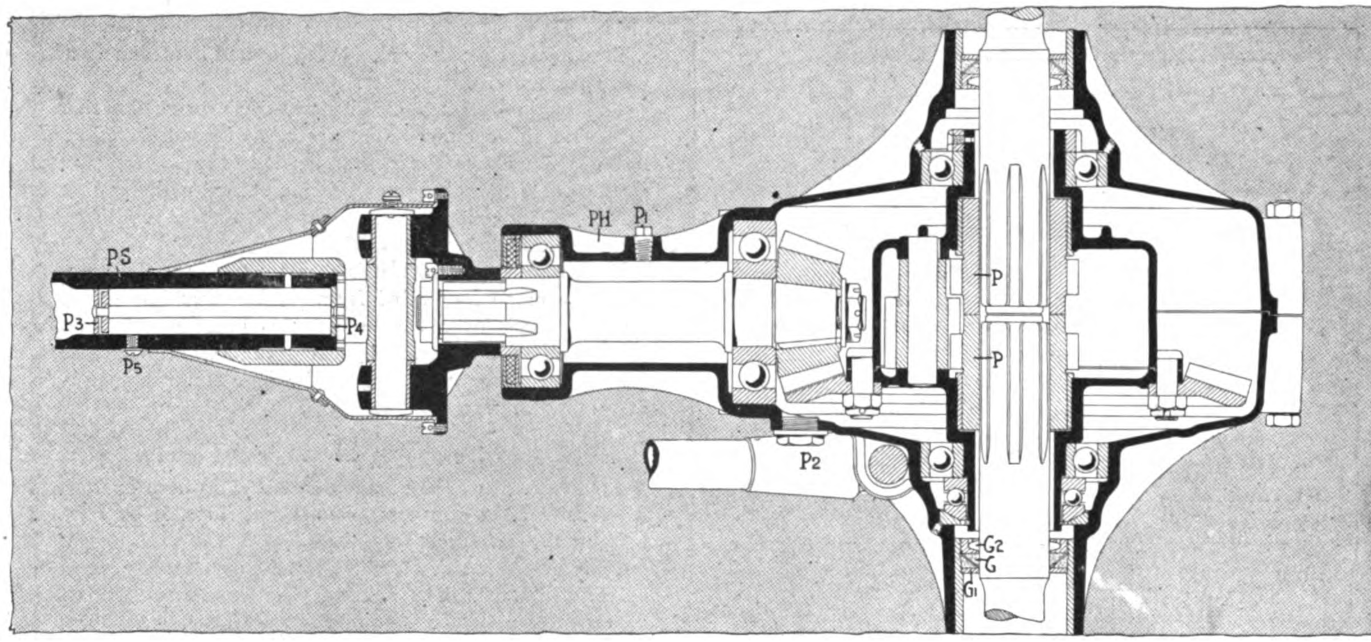


Fig. 10—Horizontal cross-section through end of propeller shaft and differential gearset

other shifter bar is free to move, but there is not sufficient room for the roller should both bars be removed at the same time. With this simple protective measure the old form of interlocking bolt and quadrant type used to insure the clutching being disengaged before gears could be shifted has been eliminated. There was a time when the company considered such protection necessary, but that time is now past.

An important clutch change has been made, in the form of using a leather facing on the cone with cork inserts. Heretofore a German bronze composition has been used. In clutch engineering the aim is to reduce weight to the minimum in the cone itself. This is done to prevent grating and grinding when shifting gears. The leather with cork inserts is lighter than the bronze facing. The clutch is a 13-degree cone angle. The engaging spring SC, Fig. 9, is entirely enclosed and its end thrust is taken by a self-centering thrust bearing B, the self-centering factor being the arc of curvature on the inner thrust plate. There is 4 1-2 inches more space between the clutch and gearbox than this year, making it possible to remove the clutch without interfering with the gearbox. This additional space permits of the use of a double universal joint at this point.

Still another clutch improvement, which is closely associated with the control parts of the car, consists in mounting the clutch rocker shaft RS, Fig. 8, on two brackets RB attached to the rear cross support of the motor, this support being an I-beam forging. This year this rocker shaft is supported on the side members of the frame, but in its new position its easy operation is insured in that should the side members of the frame warp, due to road irregularities, there is no danger of it interfering with the easy operation of the clutch. Hand in hand with this is the mounting of the foot brake shaft FB on similar brackets supported on the cross member of the frame instead of mounting it on the side members. The same object has been in view, namely, the preventing of frame strains interfering with brake operation.

Accessibility of the Rear Axle

On all models the rear axle driveshafts X, Fig. 14, may be withdrawn without dismantling the housing. Heretofore on all models excepting the 66 the differential pinions P have been keyed to the shaft, making withdrawal impossible. The new construction is a floating design, but the removal of the driveshaft calls for the removal of the road wheel together with the Timken bearing supporting the outer end of the axle. Fig. 5, shows the flange F against which the bearing rests and by means of which the end thrust is absorbed. Axle driveshafts are 1-8 inch larger in diameter and they are fluted at the inner and outer ends instead of being keyed at the inner ends and provided with taper and key at the outer end. On Model 66-A ten splines are used on either end of the shaft, whereas models 38 and 48 use six splines.

For 1913 all models will use a heavy black liquid oil for the bevel gears instead of axle grease. This has called for the introduction of packing glands at either side of the differential to prevent oil working out and getting on the brakedrums and wheels. There is a gland at each side consisting of No. 109 Crandell diagonal packing G held between a steel washer G1 resting against a shoulder in the axle sleeve, and a threaded nut G2 at the inner side. As the nut is threaded against the packing the diagonal split allows the halves to gradually slide up against each other forming a tighter joint. The use of liquid as lubricant is due to the fact claimed that with axle grease under continuous running at high speeds the grease is thrown off the pinions by centrifugal force and has not time to come back to them.

Tubular Propeller Shaft Used

The axle housing remains practitcally as heretofore and consists of bell-shaped halves to take the differential, these being steel castings, into which Shelby steel tubing, which forms the axle sleeves, is brazed and riveted in place. A new and longer pinion housing PH is used and is fitted with two Hess-Bright bearings to support the shaft. These bearings are now farther apart, and the rear one, a No. 409, is larger than in previous years, this being done to hold the bevel pinion better up to its work. Axle grease is used in this housing, being inserted through the plugs P1, while P2 serves for inserting the liquid lubricant for the differential bevel.

This illustration shows how the forward end of the pinion shaft has a six-spline ending to take the universal joint. It further shows the use of the tubular propeller shaft PS, which is new on all models. The tubular construction has been used because of lighter weight and greater strength, there being a reduction of 15 per cent. in the weight when compared with solid

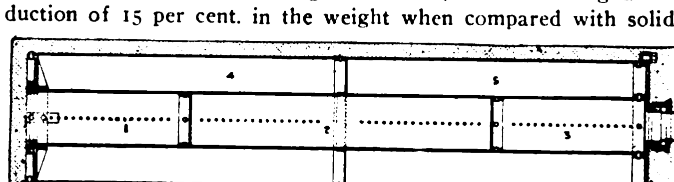


Fig. 11—Double concentric tube muffler giving silence and minimum of back pressure

shafts with increased strength. The added strength is due to the larger diameter which prevents whipping of the shaft and thereby eliminates chattering in the universal joints as well as in the gearbox. On Model 66-A the tubing is 2 1-8 inches in diameter and of 5-16 stock.

A neat method of lubricating is employed for the rear end of the shaft where it takes the sliding joint. The shaft carries six flutes or splines and within it is a packing piston, the forward end P3 being made up of a leather disk between two metal washers, while the rear end is a metal plate P4 fitted against a shoulder on the end of the shaft. Through a plug P5 the chamber between these ends is filled with lubricant which works out through the drilled holes in the shaft. In this particular the hollow propeller shaft is of special merit as it facilitates and insures adequate lubrication of the slip joint.

The Pierce engineers have recently installed a special testing machine to discover amount of backlash in the differential planetary gears. The axle is mounted in its housings and the large spur gear locks. An 18-inch crank is attached to the outer end of one driveshaft. An indicating pressure gauge is adjusted so as just to bear upon this crank. The tester seizes the end of the crank and moving to and fro discovers through the reading of the pressure the exact amount of backlash. In order to guard against backlash the six spur pinions of the gearset are carefully selected with reference to one another, and are retained in sets. If, however, when the final test is made there is too much backlash an entire new selection is made. The reason for special care in the elimination of backlash is that according to the Pierce engineers it is largely responsible for noises which are transmitted to the gearbox, and it also increases tire wear.

Muffler Reduces Back Pressure

The new muffler, Fig. 11, consists of two concentric tubes, the inner tube, 2 3-4 inches in diameter, divided longitudinally into three sections 1, 2 and 3, and the outer one, 6 1-2 inches in diameter, into two sections 4 and 5. Gases enter No. 1 division and escape through openings and expand into No. 4 division. They progress from No. 4 into No. 2, which is double the length of No. 1, and again expand into No. 5 and finally escape through No. 3 to the muffler tail pipe. Back pressure on the motor has thus been reduced to a minimum, as demonstrated by the slight differences when a cutout is used and when not used, the factory conclusion being to discontinue the cutout.

The Westinghouse generator mounted on the left rear side of the motor and driven through a continuation of the waterpump shaft runs at crankshaft speed and will generate sufficient current at 12 miles per hour to supply the lights. The generator weighs 38 pounds and is so compact as not to interfere with valve spring accessibility for the front cylinder casting. The generator discharges into an 80-ampere-hour Exide battery and supplies a lamp equipment made up of 20-candlepower headlights, 4-candlepower dash lamps, one 4-candlepower tail lamp, a 4-candlepower license lamp and a 1-candlepower gauge light on the dash. All lights take a 6-volt current. The generator is fitted with a magnetic clutch which prevents the battery discharging through the generator when idle. On open cars the amperage consumption for the entire lamp equipment is 10.5 amperes and on the enclosed and suburban types, which have dome and side-door lights, the consumption is 11.75 amperes. The wiring is all in copper tubes and the single-wire system is used, that is, the wire leads to the lamp filament and the other end of the filament is grounded. This wiring system for lights is simpler than the double-wire one and permits of a stouter bulb construction. A feature of the generator is that the current is sent through an iron resistance which regulates the voltages and thereby protects the bulbs. On the dash is a voltmeter connected across the battery. The battery in addition to furnishing light is also used for ignition in starting and in emergencies.

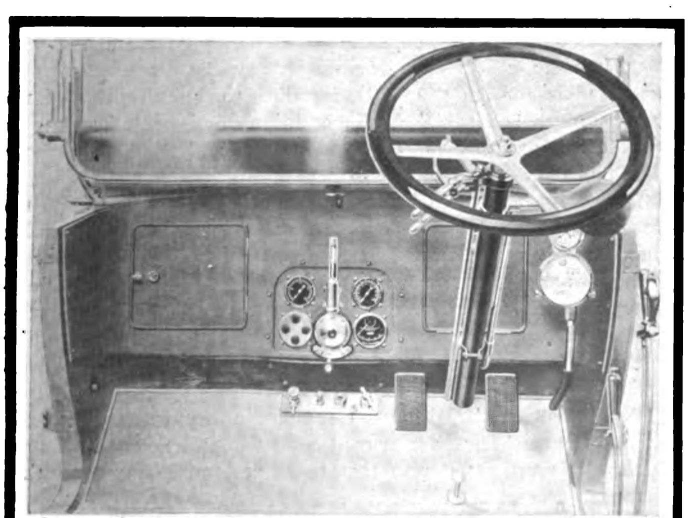


Fig. 12—The appearance of the Pierce 1913 dashboard is simple

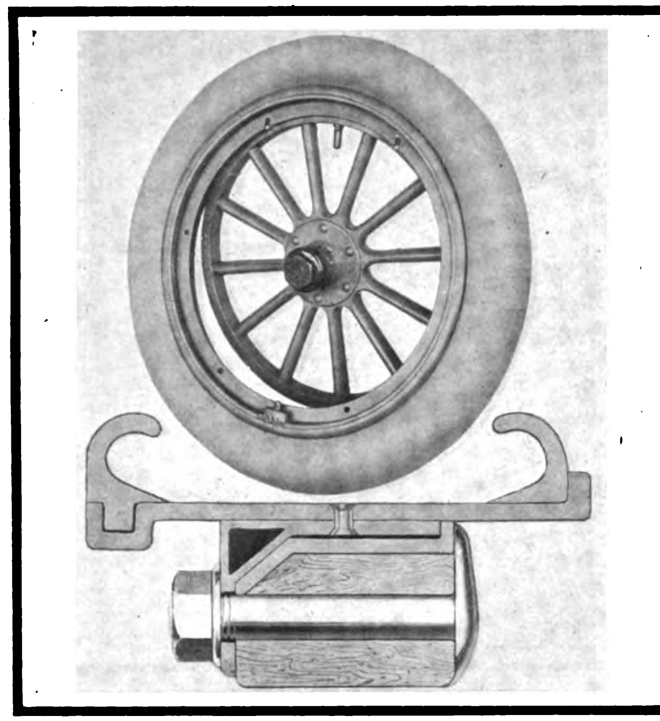
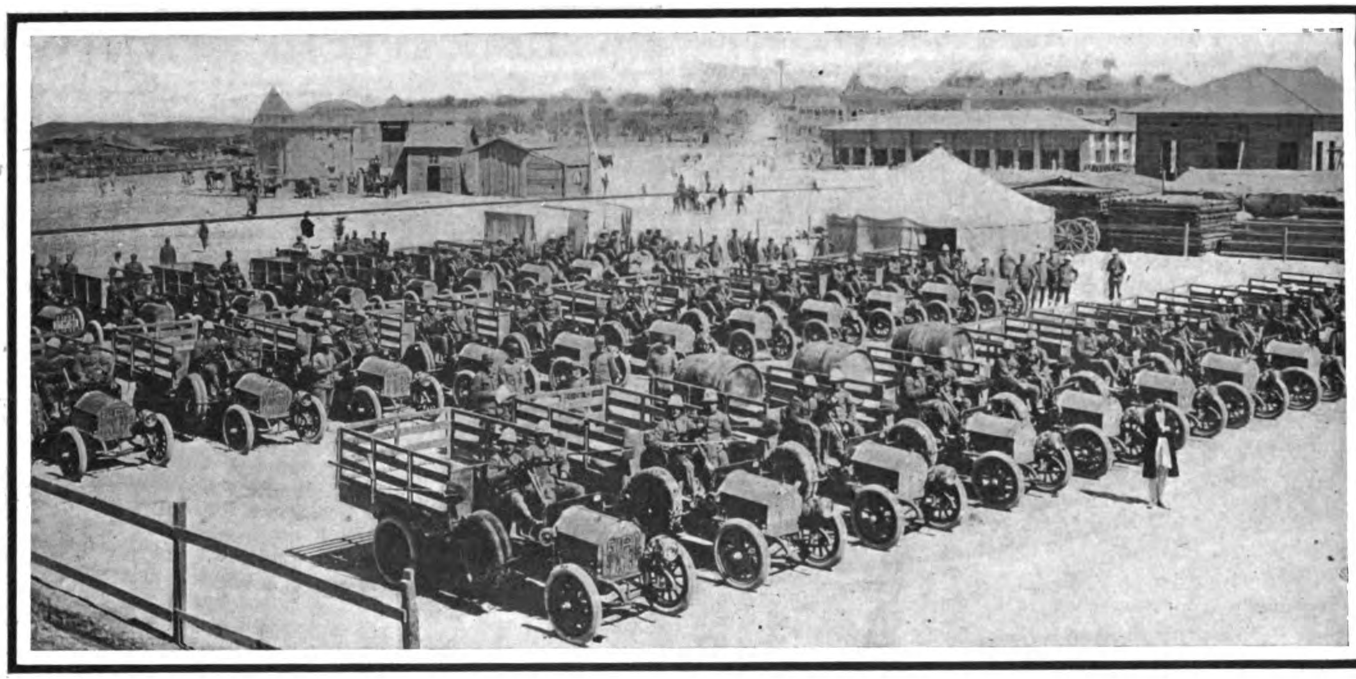


Fig. 13—Rim of Pierce-Arrow cars takes demountable or quick-detachable tires

The 1913 braking system is the same as at present, consisting of internal and external sets on the rear hubs. The expanding set is faced with German bronze and the contracting set with asbestos fabric. The bronze has been used by the company for several seasons and gives 15,000 miles service without adjustment. The fabric for emergencies is used so as to have two different brake surfaces; should the metal be affected by heat, the fabric remains in working condition. Drum sizes are the same as before.

Pierce Company Has Own Rim

The company fits its own demountable rims, which will take any type of quick-detachable tires. The wood felloe is bevelled to approximately 45 degrees at one side, this bevel extending one-third distance across the felloe top. Over this is fitted a metal band which receives a corresponding band electrically welded to the inner side of the rim taking the tire. A series of six transverse bolts draws the rim's beveled surface up on the band bevel so that the transverse bolts are not called upon to carry any of the radial load. There is a radial projection on the rim bevel which is brought up tight against the outer side of the wood felloe and at the same time the rim is brought up against a shoulder on the felloe band at the inner side of the felloe. The transverse bolts are made with large, strong heads.



An encampment of motor trucks in the Tripoli war district—These trucks have all been requisitioned from their owners in Italy

Motor Trucks in Tripoli

Fleets of Home-Built Vehicles Enable Italians to Wage Effective War in Enemy's Country

Specially Equipped to Carry Water, Provisions, Baggage, Ammunition and Other Necessities

NEVER has a modern war been conducted with so little publicity as that which Italy wages against the Turks in Tripoli and Cyrenaica, those once fertile and prosperous provinces along the African coast of the Mediterranean Sea where the suzerainty of the Sultan of Turkey over the native Arabs for many years has been maintained only in name and by the religious bonds which unite all of Islam. Japan's example in successfully excluding the war correspondents from all early and real knowledge of the war movements in its recent war with Russia has, it is supposed, had much to do with the policy of silence which Italy has adopted, but still more powerful in this respect has been the desire of the Italian army and navy departments to keep all which might be learned with regard to the use of automobiles and aeronautic war equipment for themselves. From such sporadic accounts as have leaked out, it appears, however, that the passanger automobile has not so far proved itself of great utility, the war being one of slow penetration and occupation in which the rapid movement of troops has counted for so much less as the roads were mostly non-existent when the war began over a year ago and could be built and pushed forward only in the measure as the occupation proceeded and was safeguarded against the guerrilla attacks of the intrepid Arabian tribes. In the reconnoitring service aeroplanes were hit and brought down with rifle bullets whenever the pilots ventured near enough to the ground to make an intelligent croquis of the situation, but the dirigible balloons, on the other hand, being not forced to maintain themselves in the air by high speed and being able to carry a larger number of competent observers, are reported in several instances to have brought home valuable tactical information gleaned from an altitude of 6,000 feet above the territory which it was the intention to occupy next.

The transportation of materials wherewith to fortify and secure every advance gained by the infantry has in this slow conquest played an important part, and for this reason the motor truck has been much more conspicuous than the automobile of the passenger-carrying type. But the motor truck has no more been in the foreground of events than its lighter and faster kin. Its mission has been to carry the supplies from one camp already established and secured to another next in order to be prepared as a permanent fort in this campaign of forcible colonization, by which Italy hopes to keep her sons under her own jurisdiction and stem the flood of emigration to the United States. The accompanying illustration shows a division of these motor trucks, all of Italian manufacture, parked in safety and ready for their next errand of peaceful carrying of useful loads.

Foreign Markets for Motor Vehicles

Washington, D. C., Aug. 3—The fact that the motor car makers of the United States are annually making enormous strides in their invasion of the foreign markets is brought out forcibly in a monograph entitled "Foreign Markets for Motor Vehicles," just issued by the federal bureau of manufactures. This publication is a compilation of reports from American consuls stationed in every part of the globe, and is arranged with the particular end in view of aiding American manufacturers to extend their foreign sales. It describes the peculiarities of the various markets, special local conditions and prejudices to be considered, foreign competition to be met and the best methods of selling cars.

Canada is the United States' best market, the majority of the cars in use in the territory of our northern neighbor being either made entirely in the United States or made by Canadian branches or affiliations of American firms. The high-road clearance, flexibility and moderate price of the American car are steadily winning it favor in regions where highway conditions are similar to those in the United States. The market in Australia and New Zealand is already being well cultivated by American exporters, while Argentina, Brazil and Uruguay in South America, and British South Africa are named as promising fields for future sales. It is estimated also that there are more American than European cars in use in Mexico.

In the Far East, Ceylon, India, Japan, Siam, and the Straights Settlements are the most likely markets. China has little use for motor cars, as most of the roads of that country do not permit their use. The reputation of American-made cars in India suffered some years ago because some inferior cars were sent among the earlier shipments to that country, but the cars brought from the United States recently have been of such high grade as to dispel this prejudice. In the Straights Settlements the principal buyers are wealthy Chinese, who demand comfort and luxury in their cars rather than high power. As a result, low-hung, smooth running cars are the most popular, and the local trade often demands that each car be fitted in accordance with the individual taste of the owner. Right-hand drive is essential there, as in the Orient all traffic turns to the left, instead of to the right, as in the United States.

The United Kingdom has been and continues to be an excellent market for American cars, ranking next to Canada in purchases from the United States, but the sales in continental Europe have thus far not been extensive. The excellent roads of most of the European countries permit the use of a heavier, lower-hung car than is found commonly in the United States. In England, however, the low prices and complete equipment of American cars are fast increasing their popularity, while they are rapidly overcoming the prejudice against them, caused by doubt as to their durability due to the sale of many cheap, unsubstantial American-made bicycles in England some years ago. The method of American makers in putting their cars on the market fully equipped is in strong contrast with the practice of continental makers, who quote prices on the chassis only, with the body and all equipment listed as extras.

New York's Fire Rules Revised

The first revision of the rules of the New York Fire Department has been made since 1905 and a neat little manual has been issued to govern the department. There is surprisingly little mention of automobile fire apparatus, considering that such a large fraction of the fire-fighting machines installed in New York is composed of motor-driven vehicles.

Among the rules specifically directed at the automobile apparatus are the following:

In section 34 it is ordered that the company commander shall ride alongside the chauffeur. Section 75 provides for special reports as to the effect of inferior gasoline upon motors. Section 112 forbids any member of the department to ride in an automobile not the property of the department and requires all members to prevent any person not a member of the department from riding on a department automobile.

Several of the rules provide for maintaining and caring for motor apparatus, but there is nothing different in their language than in that applied to the horse-drawn engines.

The department is organized under the new rules as a military body with Commissioner Joseph Johnson as honorary colonel and Chief Kenlon as colonel commanding.

Canadians After Car Smugglers

MONTREAL, Aug. 1—Wholesale smuggling of automobiles between the United States and Canada has been going on this summer, and the Canadian customs officials have already punished several offenders, while the Canadian manufacturers are bitterly protesting against American-made cars being brought into Canada without payment of duty.

Naturally the majority of dealers in the city who represent United States firms either deny the charge or refuse to discuss it at all; but the fact remains that a special customs officer has had a busy time of it all summer working up evidence upon which seizure could be made, and at least one agent, who is interested in a Canadian make of car, admits it.

"It is simply a question of some of the United States automobile manufacturers getting even with some of the Canadian fur and clothing manufacturers who for years have sold goods to the United States visitors with the understanding that they are to

Calendar of Coming Events

What the Months Ahead Have in Store for the Automobilist—Shows, Conventions, Race Meets, Etc.

American and Foreign Fixtures of Importance Set Down in Chronological Order

Shows, Conventions, Etc.

Sept. 17-20........Denver, Col., Convention International Association of Fire Engineers.
Sept. 23-Oct. 3....New York City, Rubber Show, Grand Central Palace.
Dec. 7-22..........Paris, France, Paris Automobile Show, Grand Palais.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 11-25, 1913...New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Feb. 1-8...........Chicago, Ill., Annual Automobile Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 24-March 1...St. Louis, Mo., Annual Automobile Show.
March 3-8..........Pittsburgh, Pa., Annual Automobile Show.
March 8-15.........Boston, Mass., Annual Automobile Show.
March 17-22........Buffalo, N. Y., Annual Automobile Show.
March 19-23........Boston, Mass., Annual Truck Show.
March 24-29........Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Aug. 8..........Minneapolis, Minn., Annual Tour Minnesota State Automobile Association to Winnipeg.
Aug. 8-9..........Chicago, Ill., Banta Trophy Match, Chicago Motor Club.
Aug. 8-10.........Galveston, Tex., Beach Meet.
Aug. 10.......... Whittier, Cal., Hill Climb.
Aug. 30-31........Elgin, Ill., Road Races, Chicago Automobile Club and Elgin Automobile Road Racing Association.
Sept. 1-2..........St. Louis, Mo., Track Races, Universal Exposition Company.
Sept. 2.......... Indianapolis, Ind., Speedway Meet.
Sept. 2.......... Winnipeg, Man., Track Meet.
Sept. 3-6........ Chicago, Ill., Commercial Vehicle Reliability Run, Chicago Motor Club.
Sept. 17..........Milwaukee, Wis., Grand Prize Race.
Sept. 20..........Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.
Sept. 21..........Milwaukee, Wis., Vanderbilt Cup Race.
Sept. ....Washington, D. C., Reliability Run, Automobile Club of Washington.
Oct. 7-11.........Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 12...........Salem, N. H., Track Meet, Rockingham Park.
Nov. 6............Shreveport, La., Track Meet, Shreveport Automobile Club.

Foreign.

Sept. 26-Oct. 6....Bourges, France, Agricultural Motor Car Exposition.
Nov. 8-16.........London, England, Olympia Automobile Show.
Jan. 11-22.........Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.

be delivered into the United States without paying duy," said he.

"To deliver an automobile free of duty is a big thing, for the duty upon autos from the United States amounts to about one third of their value. Naturally leaving the question of deceiving the Government out altogether, the smuggling of automobiles is decidedly unfair to the Canadian factories."

Custom house officials decline to discuss the matter, but admit that a number of automobiles manufactured in the United States have been seized here for non-payment of duty.

The total number could not be ascertained, nor the names of the purchasers, but one customs man said "The number is very large."

It was also ascertained that while the customs people were not anxious to hold the sinners in this matter up to public opprobrium, they have, by order from headquarters in Ottawa, treated them severely, and have in each case given them the choice of losing their car or paying its equivalent in money, according to the listed price, to the Treasurer of the Dominion.

As imported cars are seldom listed under the $1,000 mark, but more often up to the $4,000 and $5,000 figure, it is easy to see that the amount of seizure money climbs up pretty fast.

As another customs official said, the smuggling of automobiles is a most difficult thing to guard against on account of the tremendous length of the border line.

THE AUTOMOBILE

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A Virgin Field

TO manufacturers branching into the commercial car zone there is not any greater opportunity than that offered in the agricultural field for a gasoline tractor selling at $1,200 or $1,500 at the outside. Today the makers of agricultural tractors have been building for the $2,500 field and up, and while the demand is large it is nothing compared with that for a machine at approximately half that price. A tractor selling for a little over $1,000 has an unlimited field. Every owner of one-quarter section of land, 160 acres, and up is in the market for such a machine. They are in the market in this class because the present machine is too high-priced for their holdings.

The expansion of many agricultural tracts is so great today that motor-propelled machinery is the only solution. The people are waiting for the machine and the opportunity is offered as never before: The missionary work has already been done. For years the builders of steam engines catered to the agricultural field, but in a very limited sphere because of the excessive weight of the product. For a decade the gasoline engine maker has been exploiting this fruitful territory; and for several seasons the interest has been sufficiently great to promote annual contests for the education of the agriculturists and greatly to the benefit of the maker. There is today a wider market for the $1,000 tractor than there is for any type of pleasure car.

Improving Lubrication

Pressure Feed Being Used

NEARLY every automobile maker has announced several changes in the motor lubrication for his 1913 models, and while the general plan with many of them remains unaltered there have been minor changes which indicate a feeling of uncertainty as to the adequacy of previous systems. One maker who relied on the splash system has installed a positive feed system to all of the crankshaft and connecting rod bearings; another that used a pressure feed to the crankshaft and lower connecting rods with splash to the wrist pins and cylinder walls has eliminated the splash and now feeds by pressure up the connecting rods to the wrist pins, the overflow reaching the cylinder walls. Another maker has added an interconnection between the throttle and the lubrication feed, insuring more oil to the bearings with a wider opening of the throttle and vice versa. Still another maker, who made use of baffle plates in the open ends of the cylinders, has eliminated them. A score of makers have wrestled with the problem of eliminating smoking on closed or partially closed throttle: So the program of changes proceeds, all indicating an unsettled situation, due primarily to the greater requirements on the oiling system because of higher crankshaft and piston speeds as well as increased motor efficiency. In a word, the maker has learned that when the power output of the motor has been increased by larger-diameter valves, by lighter pistons and connecting rods, by larger-diameter crankshafts, by stouter crankcase and cylinder casings, by multi-point ignition, by improvements in carburetion, there must be commensurate improvements in the oiling system, because truly it is the lubricant that keeps the motor working.

There have been several makers who for the present season overlooked the question of perspective between the lubrication system and the other systems of the car. Heretofore the lubrication one had been the acme of satisfaction and they concluded that it would continue so, but discovered an error. It lagged behind. They learned the lesson that perspective enters into every department of the motor and chiefly into the lubrication system. After discovering their error some of them added auxiliary systems, only to incorporate them into the car total at the first opportunity.

Not only have the improvements in motor design placed a heavier load on the oiling system, but municipal regulations against smoking have rendered higher efficiency imperative. This has introduced the problem of good lubrication at slow speeds, and chiefly with partially closed throttles. To handle this question called for action based on the fact that with the throttle in a partially closed position there is more of a vacuum created above the piston and consequently a stronger tendency to pull the oil up the cylinder walls past the piston and into the combustion chamber, where it is burned and passes through the exhaust system as smoke or rests as carbon in the combustion and valve chambers. Various schemes have been utilized to counteract this suction, if the expression may be used. A common one has been the scraper groove in the piston in conjuction with holes drilled from this groove to the inside of the piston thereby setting up an equilibrium of pressure in the space beneath the piston and whatever space there remains between the piston and the cylinder wall. This has given special satisfaction in many places. The anti-smoke crusade has also brought improvements in testing the oil level in the crankcase as well as in giving greater accessibility to the drain cock of the crankcase and also the overflow cock. Both of these are now in many cars, fitted with upwardly extending handles, permitting of their operation without having to reach down to the base of the crankcase or make use of a special door in the underpan.

Extra life has been given the oil used in many motors by the discontinuance of the splash system, which has been gaining followers each season for several years. With the big lower end of the connecting rod dipping into the oil level the lubricant was unnecessarily churned and only a very small percentage of that splash reached the desired points. The viscosity of the oil was needlessly lowered. To avoid this the trough oiling system was introduced with the small scoop on the end of the connecting rod. Even with this the adequacy was not what was at all times desired, and the next step taken by many makers was the entire elimination of the splash and the adoption of the pressure system, a trend of progress which has been carving its way in Europe for the last 5 years. It is a certainty that 1914 will witness vast strides in this direction.

S.A.E. Detroit Branch Meets

Decides That Negotiations With Bureau of Standards Be Left to National Council—Discuss Bearing Standards

DETROIT, MICH., Aug. 3—The keynote of the meeting of the Detroit Section of the Society of Automobile Engineers held on August first was the discussion of the proposed standards work to be done for the automobile industry by the Bureau of Standards at Washington. It was the general sentiment of the members of the section present that any negotiations which are to be carried on with the Bureau should be done by the national council of the Society, since the communications of this body would carry more prestige than would those of any local branch of the Society. A motion made by H. W. Alden discharging the Detroit committee which was appointed to confer with the officials of the Bureau of Standards and recommending that the work be carried on by a committee appointed by the National Council of the Society, was carried. It was also recommended that J. O. Heinze and E. J. Stoddard be placed on this national committee.

D. F. Graham, expert on bearings, stated that one thing which could be standardized to immense advantage and on which there is a wide difference of opinion is the exact size of gauges and plugs for accurate measurements. There is a difference in the manner of use of micrometers, which often results in varying ideas of the same accurate dimension. It is hard to tell just what the size of a hole or the diameter of a piece is. Standards for such measurements should all agree, and since each manufacturer can not afford to carry such a set, due to its expense, one set should be kept for the use of all.

In further discussing the subject, Mr. Heinze made the Society's position clear by stating that it should ask the Bureau of Standards to tell it only those things which it cannot find out for itself, due to the lack of apparatus for such research, or to lack of time to carry on such exhaustive tests as were necessary.

In speaking of the proposed testing laboratory in Detroit, for the joint use of all automobile manufacturers, as proposed at the summer meeting of the entire Society, Mr. Heinze stated that while some of the privately owned laboratories now existing are good, none of them are complete. If there was one which had some eminent professor in charge who was unbiased by commercial considerations, and who had all the time he needed to do his work, such a laboratory would be of great benefit. The expense of such an institution would be much less than the total cost of operating individual laboratories. The project would cost about $100,000, and Mr. Heinze stated that unless it could be carried out as it should be, it would better be left alone.

Hub After Joy-Ride Officials

Investigation Shows That City Spends More for Maintenance Than Cars Cost Originally—Municipal Garage Possible

BOSTON, Aug. 2.—Following the discharge of Chief Clerk Casey, of the School Commission, of a charge of joy-riding in using the motor car belonging to the commission, the Boston Finance Commission has inserted its probe into the care and maintenance of the city motor cars. It was Casey's second offense, and the first time he suffered a reduction in salary of $500 a year. It is expected that when the report of the Finance Commission is made public some startling figures will be given out and there may follow some drastic action. According to the City Auditor's books $89,473.35 was spent during the past fiscal year on the 54 cars and trucks in the service of the city. The figures show that the Public Works department spent the larger amount, but as it has 17 cars this is not surprising.

Mayor Fitzgerald, although he has but one car, has spent $5,494.09 for its maintenance, or more than the car cost the city new. This is nearly as large as the amount spent for the maintenance of all seven cars by the Police Department. The Mayor has just bought a new car for $3,200. The cost of maintenance for the departments follow: Bath department, three cars, $6,845.07; park department, four cars, $7,781.67; health department, four cars, $3,327.04; school department, two cars, $4,505.48; public works department, Central office, one car, $1,162.31; bridge and ferry division, three cars, one out of use, $4,755.66; paving division, three cars, $5,706.29; sanitary division, two cars, $1,947.87; street cleaning division, two cars, $3,981.50; sewer division, four cars, $4,004.24; water division, three cars, $7,989.17.

That some of the cars are used for evening and Sunday outings is well known. When the matter of joy-riding came up before the council passed an order to have all city cars marked, but this is a joke, for the cars bear little metal plates a few inches square with initials only on the sides near the running boards where they are not noticed. It is expected that following the Finance Commission's report there will be established a municipal garage where a check can be kept on all cars. Now they are kept anywhere and the chauffeurs can get them any time they want them and the officials get the cars, too, at any old time.

NEGOTIATIONS have been completed for the purchase of the E-M-F Studebaker plant at Port Huron, Mich., by the Havers Motor Car Company, which has met with much success in the building of moderate-priced six-cylinder cars. The Havers company will take immediate possession and push its plans for the greatly increased output for 1913.

London's Rubber Market

Prospects of Artificial Product Has Depressing Influence During Trade Period Ending June 30

Cheaper Rubber Does Not Necessarily Mean Cheaper Tires—Production Figures and Prices

LONDON, Aug. 1—Plantation rubber had a cheerful effect on an otherwise dull market, considering the commercial period ending June 30. The synthetic rubber scare, as it was called, depressed rubber shares and it was on that account that a strong demand, as shown at the plantation auction of the end of June, was so cheering. The lack of stability of the rubber market is adequately reflected in the effect of the synthetic rubber announcement, which almost precipitated a panic. In the interim crude rubber is in fair demand, selling at 4s. 6 3-4 d. ($1.13 1-2) per pound. But this showing merely indicates something of the extent to which rubber enters the arts. Those who have occasion to use rubber, if they run short, find it expedient to replenish the supply in their vaults, and when the synthetic scare struck the market, purchasing of crude was the natural order of the day. The result of this heavy buying movement was favorable to a hardening market, but there is nothing in this situation which would lead one to believe that plantation (rubber) shareholders feel very comfortable.

There are two possibilities in conjunction with the announcement of synthetic rubber, *viz.*, that plantation rubber is likely to get a severe setback, and that British tire makers are confronted by a demand for lower prices for their wares—the average Britisher still believes that the prices are high for the tires, due to the high price of crude. The more enlightened English motorists, however, point out that the percentage of actual rubber in a tire is very low. They also say: the fabric, if it is of the best grade, and the expenditure represented in the cost for skilled labor employed in tire making, coupled with a rather heavy selling propoganda, are sufficient grounds for believing that the cost of tires to motorists here will scarcely be lowered, even assuming that synthetic rubber takes hold of the market to the extent of supplanting plantation products.

It is pointed out that tire makers have but themselves to blame for the rather awkward situation which confronts them. The average man thinks that it is the high price of crude which serves as the foundation for the high price for tires. Naturally these mistaken individuals, of which there is a legion, will clamor for a reduction in the price of tires, the very minute that the cost of crude is tapered down. That they will be disappointed, is almost certain. In order to balk an awkward situation, it is claimed in some quarters that tire makers are depreciating the claim that synthetic rubber is in the nature of a great discovery. One individual has expressed the opinion that synthetic rubber has a very high nuisance value. Whether or not the users of rubber would prefer to pay enough to suppress the production of rubber on a synthetic basis, remains to be seen.

Deep Price Cuts Not Probable

For the near future, it is claimed that the market position of Para rubber is secure. One feature which supports Para crude is the progressive consumption of rubber. One point is overlooked in the attack which is being made upon synthetic rubber by tire makers in England, viz.: When it is said that synthetic rubber will fall below the quality required in the manufacture of tires, no mention is made of the possibility of relieving the pressure on Para, through the simple expedient of employing synthetic rubber in the many situations which now command the use of either Para crude or seed crude *via* plantations.

There is one thing which cannot escape the notice of the market. The synthetic rubber scare is almost sure to snub plantation effort. This, in the face of a progressive demand, spells stability of Para for several years to come if synthetic rubber fails to take a strong production position in the near future. Indeed, it is quite plain that the three forces here in operation must lead to a famine of the best grades of crude. The three forces are: Increasing rate of demand, reduced plantation output, and the failur (if it does fail) of synthetic rubber to make up for the deficit. All of which, taking it for granted that Para output will hold its own, but no more.

The output of Para crude at the present time is reported statistically, about as follows:

From Brazil, for 12 months ending June 30, including Cancho, 32,360 tons. Just to show that this source of supply is not progressive, it is only necessary to state that the output from these sources was 37,565 tons and 32,140 tons respectively for the two preceding seasons.

At the end of this year (June 30) the stock of crude in hand, but not shipped, at the port of Para, was 3,050 tons. This is in the nature of an actual reduction of the Para annual hold-over of crude by some 1,500 tons as compared with last year.

The reduction in crop hold-over at Para of 1,500 tons is offset by the lower production of one of the two preceding years, whereas a progressive demand for crude is shown, not by any increase of movement in Para deliveries, but in the movement of plantation crude. In this connection it is pointed out that, if tire makers do not support the plantation market, it is then, quite evident that plantation crude enters into the other arts, relieving Para to that extent, thus enabling tire makers to monopolize Para in their more exacting requirement.

Referring specifically to plantation production of crude, it is reported from the Federated Malay States that over 542,877 acres of land are now devoted to rubber cultivation. This grand total of acreage was due to an increase of upwards of 70 per cent. increase in Malay production between 1910 and 1911, the latter being the date of the last authentic acreage report from these states.

The conditions at Ceylon are backward as compared with the progress which has been recorded for Malay. It follows, therefore, that synthetic rubber will strike the hardest blow at Ceylon. But the Ceylon planters go in for supplementary crops of tea, coffee, and cocoa. In this way expenses are kept down and the effect of a depressed rubber market will scarcely be so pronounced.

Synthetic Bogy May Scare Investors

In the Straits Settlement, if financial tinkering in London is a reflection plantation rubber is seeking additional financial support, just at a time when this support is lacking. In the same way, Kepitigalla rubber conditions are somewhat backward. The rubber output, as reported by the Kepitigalla Estates during the year ending March 31, was 90,025 pounds. But there is a certain measure of consolation in this report, due to the actual increase of 48,601 pounds for last year over the previous year. Then, too, these estates score on tea and pepper. The actual results of the combined efforts at rubber, tea, and pepper growing enabled these estates to declare a 4 per cent. dividend on the capital stock this year, this being an increase from the dividend of 2 1-2 per cent. which was declared last year. The rubber produced brought an average price of 4s. 2d. ($1.12) at the English auction, this being low in view of the higher average price of 5s. 7 1-2d. ($1.40) for the previous year.

It would scarcely be of interest to bring these matters of the rubber market to the attention of the average automobilist in the ordinary sense, but it is worthy of note that plantation rubber promised to serve as the balance wheel for Para, and, with a synthetic scare confronting them, it is more than likely that British investors will withdraw their support, letting plantation enterprises sink or swim as best they can. It is feared in some quarters that plantation enterprises are not sufficiently advanced to strike out, unbuoyed by outside financial aid.

New York Rubber Show

Twenty-two Nations Represented in Exposition Which Will Open Next Month in the Palace

Comparisons To Be Made of the Value of the Indigenous and the Plantation Products

UNDER the auspices of twenty-two governments, each of which will be officially represented by accredited delegates, the International Rubber and Allied Trades Exposition will open September 23 at Grand Central Palace and will remain open until October 3. Most of the twenty-two governments concerned in the undertaking are states of the British empire, South and Central American republics and territories of the United States, The list includes the following: Ceylon, Straits Settlements, Federated Malay States, British Guiana, Jamaica, Dutch Guiana, Belgium, France, States of Para and Manaos and the Republic of Brazil, Southern India, Mexico, Portugal, Honduras, Costa Rica, Indo-China, Lower Burma, Hawaii and the Philippines.

Already the booths are being prepared to house the exhibits although 6 weeks will elapse before the opening of the show.

The general plan of the expositions is comprehensive and is being carefully worked out. In the main exhibition hall of the Palace, where the automobile show was held last winter, will be installed the exhibits of rubber-making machinery and rubber manufactures. Here will be given actual demonstrations of the various processes that lie between the collection of latex to the production of automobile tires and other finished goods.

The lobby, entrance, grand stairway and even some of the pavement in front of the building will be covered with rubber to demonstrate the value of the substance in that way.

The mezzanine floor, where the commercial cars were shown last winter, will house the exhibits showing the reclaiming of rubber, compositions and chemicals.

Hawaiian Product Will Be Shown

The floor above will be devoted to exhibits of crude rubber in various shapes and forms. Brazil will have an immense booth showing the importance of the indigenous production and close by will be the exhibit of Ceylon, depicting the condition of the plantation industry.

One of the most interesting sections of the show will be the exhibit from Hawaii. Recently the cultivation of rubber in the Hawaiian archipelago was rewarded by success and 1 ton of plantation rubber grown from seeds of the Hevea Brasiliensis will be shown. The industry has not made very satisfactory progress in the Philippines, having had a poor start.

Probably the most valuable and illuminating feature of the show will be the comparison that will be made of the relative value to the industry and public at large of the indigenous and plantation product. Mr. Manders called attention to the fact that the plantation rubber marketed so far this year in the regular fortnightly auctions in London is far in excess of the 1911 figures for the same period.

He looks for the maintenance at least, of the indigenous yield and consequently expects a tremendous increase in the volume of crude rubber susceptible to manufacturing uses of the industry.

Mr. Manders says that with the increase in the volume of crude rubber, thousands of things not made of rubber at present will be made of rubber then and that fully 1,000 new uses will be found for the substance.

In spite of the large additional demand, he states that he expects a gradual reduction in the price of crude because of the augmented supply from the plantations which can produce rubber at a profit at 25 cents a pound.

Doubtful as to Artificial Rubber

He holds that synthetic rubber has made no material advance in 20 years, but that it may come eventually. In his desk at the Palace he has a bit of vulcanized synthetic rubber which he says cost $120 a pound to make out of Russian turpentine. In appearance and resilience this bit of rubber seems like ordinary vulcanized Para. As to its values as a commercial proposition he is not enthusiastic.

"I hope it can be made on a commercial basis," said Mr. Manders, "because it might prove valuable as a mixture with gum rubber for certain uses. Every factor in the problem is important enough to deserve close study, because the discovery of an element that can serve to supply a need of the public is always important and if the mixture of synthetic rubber with natural gum will serve to release some of the present or future demand for natural gum, it will release a certain amount of crude rubber from its present uses and allow of its being used in some other direction."

During the exposition an International Rubber Congress will be in session for at least a week. The convention hall will be located on the fourth floor of the Palace above the crude rubber floor. Planters, scientists, chemists, manufacturers and others will attend the congress which will be presided over by Henry C. Pearson.

President Taft has agreed to act as patron of the exposition on account of the tremendous importance of the rubber industry to the United States. There are seventy prominent American business men on the advisory committee, including representatives of the United States and practically every republic and dependency on the western continent. A. Staines Manders, who managed the London expositions, is in charge.

The conclusions reached among the men who make it a point to see into the future of market situations, may be summed up as follows:

A—Tire makers have little to fear from any of the causes which so convulse the rubber market, due to the small percentage of actual rubber used in tire production.

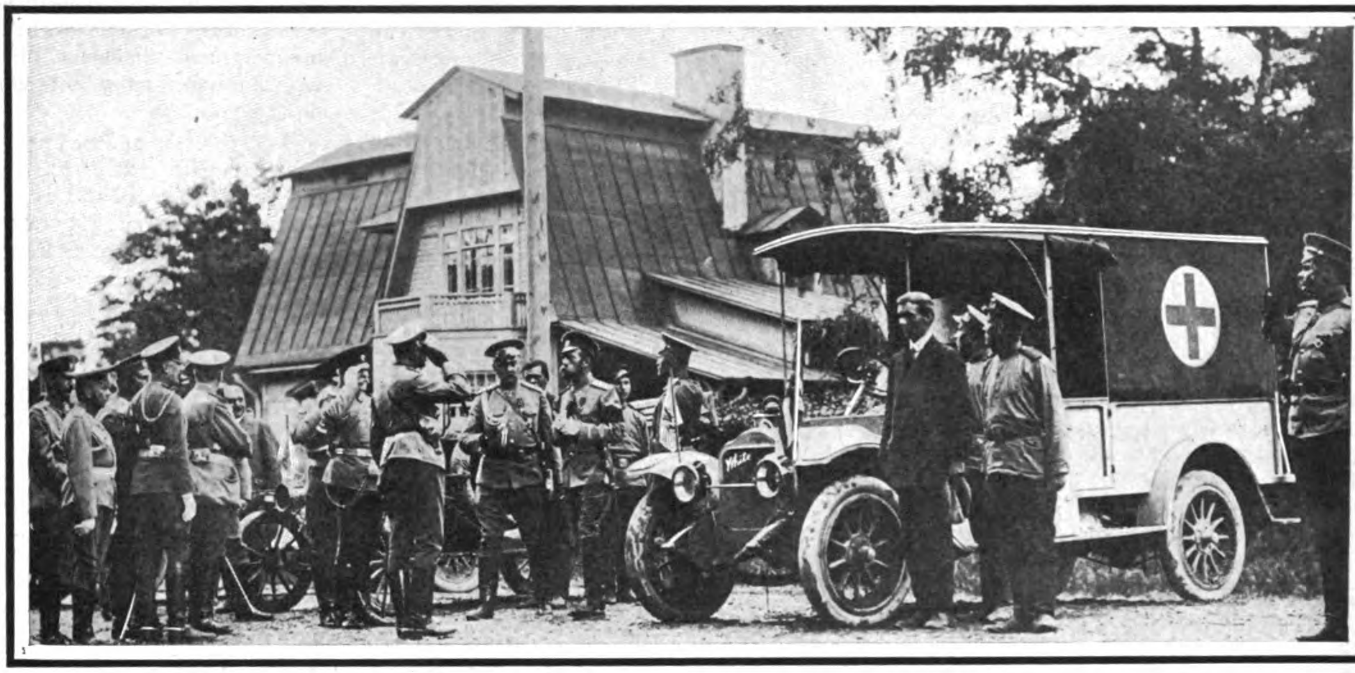
B—The commercializing of synthetic rubber production will take considerable time, and, in the interim:

C—Plantation enterprises will suffer, due to lack of British financial support. In the meantime:

D—Para will remain, as it always has been, the source of fully 90 per cent. of the actual supply of quality crude.

Referring to synthetic rubber, that recently discovered compound, representative of one of nature's strange substances which, fortunately or otherwise, has strayed into the world of mechanics, the strength of its possibilities is reflected in the savage way that certain of the tire interests attack it; the best argument that they present is that synthetic rubber is another echo of an old story. In the meantime the compounding of this product has been accomplished on a definite basis.

The process seems to be capable of perfection on a commercial basis, and fortunately, the raw material required in the process is abundant in nature and low in price. In the process as it has been outlined, there is no waste products. The two outputs are (a) synthetic rubber and (b) alcohol (fuel). The synthetic rubber is in two grades—(1) of a fluid consistency, and (2) a solid residuum. The grade 1 latex, if such it may be called, is for use in the production of rubber products in the ordinary way; the grade 2 solid constituent serves as a foreign substance, so called to put into a batch of natural rubber latex, to form a tough compound, as the treads of tires, where great toughness is the prime requisite. The fuel by-product may not be of present great value, but gasoline in England is either scarce or controlled as to price; at all events it would take the acumen of a Yankee to make a purchase of gasoline at a shilling (about 25 cents). The ruling price at supply stations is variable, at over a shilling per gallon. As a rule, the retail price of gasoline in England is about double what it costs in the United States.



The Czar of Russia inspecting the fleet of White vehicles which took part in the recent military maneuvers

WHITES Bought By Russia—Russia has bought the five White cars which went through a test arranged by the Russian Government to determine the adaptabilty of motor vehicles for army service in all of its branches. A reliabilty run of 1,960 miles over very hard roads was held, in which the pick of European cars and the five Whites entered. After a rigid examination, the White cars were found to be in perfect condition.

Ruby Chemical Company Moves—After July 15, the Ruby Chemical Company will be located at 157 West State street, Columbus, O.

White Handles Marion Advertising—Mr. W. McK. White has moved to Indianapolis, Ind., to become advertising manager of the Marion Motor Car Company.

Stratton Joins the Everett—Mr. E. Vincent Stratton has resigned as sales manager for the Packard Dealers at Albany, N. Y., to affiliate himself with the new Everett organization.

Brown Designs Motor Truck—Mr. J. Grave Brown, of Groton, N. Y., formerly chief engineer of the Monarch Roller Company, has designed a motor truck especially adapted for contractor's service.

Hupmobile in New Quarters—Frank P. Anderson, Syracuse agent of Hupmobile cars, has removed to his new location at No. 600 South Salina street, taking the garage formerly occupied by the Joseph J. McCarthy Taxicab Company.

Kelly Truck Shows Speed—A fire occurred recently at Mr. E. S. Kelly's residence, Whitehall, Pa., which is about 10 miles away from the nearest fire engine house, and was practically saved by the quick work of the Kelly truck, which made the trip in 14 minutes.

Cole Adds to Service—C. J. Corkhill, a Middle West automobile man with experience, has been appointed assistant sales manager of the Cole Motor Car Company, with headquarters at Omaha, Neb. J. R. Moler is to hold a similar position in the territory west of the Rockies, up and down the coast. His headquarters will be with the main Cole distributors, but he will do continual traveling among Cole agents. J. R. Hamilton will be associated with Mr. Moler as the west coast Cole service expert. W. B. Lacer is second Cole service expert added.

Indianapolis Tire Men Activities—The Indianapolis sales and Indiana distributing branch of the Diamond Tire Company has moved to 431-433 North Capitol avenue, Motor Row, Indianapolis. A new three-story building has also been completed at Capitol avenue and Michigan street and has been occupied by the sales branch of the Goodyear Tire Company, the Carl Fisher company, which has the agency for the Stutz and Packard, the Archey-Atkins company, distributors of the Pierce-Arrow, Detroit electric and Hudson, and the Ideal Motor Car Company.

Wheel Tax Repeal Asked—Repeal of the wheel tax on automobiles is urged by the commissioners in Washington, D. C., and W. P. Richards, assessor of the district. The officials declare the tax to be unjust and unequal in its workings, as it was imposed by Congress without request of the municipal authorities for an option as to its advisability. At present there are four charges against motor vehicles. First—an operator's permit must be obtained for which a fee of $2 is charged; second, an identification tag is required at a cost of $2; third, a wheel tax is assessed against all automobiles; fourth, should the automobile be a public vehicle, a special tax license is required for each vehicle not exceeding ten passengers.

Overland Enlarges Salesroom—The Northwestern Overland Company, of Minneapolis, Minn., has added to its salesroom so as to facilitate better handling of its goods.

Automobile Club May Buy—The Cincinnati Automobile Club, Cincinnati, O., is negotiating for the property known as the Williamson farm on Colerain pike near Groesback.

Paris Resigns from Olds—Rupert E. Paris, general sales manager and assistant manager of the Olds Motor works, has resigned. His resignation is to take effect September 1.

Tags for 75,000 Motors—Pennsylvania will order 75,000 license tags for the year 1913, and increase of 15,000 over the present year. The color adopted for 1913 is olive-green with white letters and figures.

Bonness Takes Miller Tire Agency—C. J. Bonness, formerly with Chancelor & Lyon, more recently with the U. S. Tire Company, has taken the agency for the Miller tires in Seattle, Wash.

Nichols Assists Percy Owen—F. W. Nichols, former manager of the Whitten-Gilmore Company, of Boston, has been made assistant to sales manager Percy Owen, of the Chalmers Motor Company, Detroit, Mich.

Schmelz is Now With Poss—W. F. Schmelz, formerly with the Detroit Steel Products Company, has been made special sales representative for the Poss Motor Car Company, with territory in Kentucky, Indiana and Ohio.

Dallas Studebaker Branch Expands—C. W. Hartman, branch manager for the Studebaker Corporation at Dallas, Texas, has had his territory extended somewhat. A subsidiary distributing point to this branch has been opened at San Antonio.

Barnesboro's Automobile Tour—The business men of Barnesboro, Pa., will conduct an automobile tour through Indiana county August 1. The purpose of the tour is to boom Barnesboro and the fourth annual street fair to be held August 12 to 19.

East Takes Olds Advertising Reins—G. L. East, former advertising manager of the Olds Motor Works of Lansing, Mich., has taken a similar position with the Amplex Motor Car Company, of Mishawaka. His headquarters will be in Chicago, however.

Bacon to Join Packers Service—Mr. Carter M. Bacon, former inspector for the American Locomotive Company of their own Alco cars, at their factory in Providence, R. I., will join the Packers service in the capacity of service department manager.

Automobile Plates for 1913—Secretary of State Lazansky has contracted for 90,500 pairs of automobile license number plates for 1913. The contract, for which bids were invited, was awarded to the Manhattan Supply Company, of New York, which furnished the plates used this year.

Utah Club Helps Transcontinentalists—The Automobile Club, of Utah, has opened a free bureau of touring information at 251 South State street, Salt Lake City, Utah. Tourists are handed cards and asked to write back to the club giving road conditions and information for others following.

Getting Ohio Show Ready—Dealers in automobiles in Columbus, O., and some of the manufacturers of both pleasure cars and motor trucks are preparing to have a large exhibit at the Ohio State Fair and Columbus, O., Centennial Celebration which will be combined and will take place August 26 to 31.

Indianapolis Wants Motor Equipment—The city authorities of Indianapolis have under consideration the adoption of motor equipment in the street cleaning department, to include several motor driven sweepers and sprinklers. Concerns manufacturing such apparatus are being communicated with by the board of public works.

Slater Joins Mighty Michigan—The latest addition to the forces of the Michigan Buggy Company is William J. Slater, of the Firestone Tire & Rubber Company. He becomes assistant sales manager of the Michigan. Mr. Slater was advertising manager of the Firestone Tire & Rubber Company prior to coming to Kalamazoo.

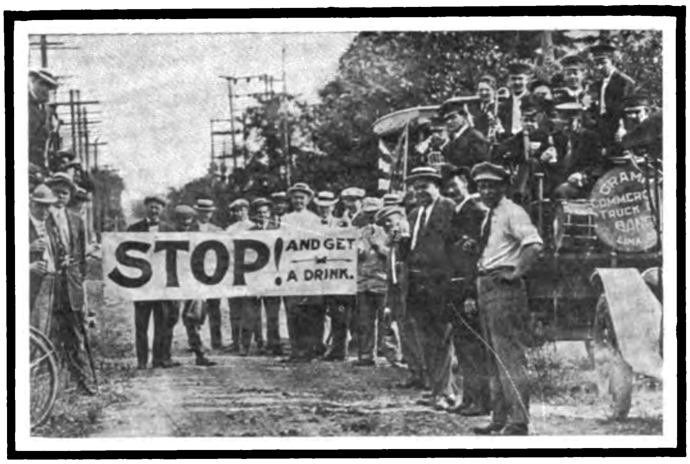
Banquet at Nyberg Plant—After a parade around the city of Anderson, Ind., the employees of the Nyberg Automobile Works gathered around a banquet table in one of the large buildings of the Nyberg plant, in celebration of the splendid record made by Nyberg cars in the recent tour of Indiana-made automobiles through four states.

Yosemite Park's Bad Roads—Despite the requests of several California Congressmen, that automobiles be allowed in Yosemite Park this year, Secretary of the Interior Fisher has ordered that motor cars be not allowed in the park. The superintendent has reported that the roads are too narrow and steep for safety. Legislation is to be pushed at the next session to improve these roads.

Selling Electrics in Fleets—The Waverley Company of Indianapolis, Ind., has recently filled an order from the Louisville Lighting Company of Louisville, Ky., for six Waverley Electric roadsters for the use of the latter's trouble and repair departments. These are in addition to four light delivery wagons of the same make and for the same service. The picture on this page represents these roadsters drawn up before the Waverley office and the factory ready for shipment. The light delivery wagons will be forwarded in a later shipment.

Packard Engineering Force Developments—The engineereing forces of the Packard Motor Car Company, Detroit, Mich., have been added to, J. G. Vincent having resigned as assistant engineer to Howard Coffin, of the Hudson company, to take an engineering position with the former concern. Russell Huff has been made consulting engineer and C. J. Moore manufacturing engineer, of the Packard Company. These two men, together with Mr. Vincent, will form an advisory board, which will have general supervision of the engineering affairs of the company.

Fleet of Waverley electrics now in the service of the trouble and repair departments of the Louisville Lighting Company



Four-States tourists were held up by the Gramm Company

Hupp-Yeats Electric in South—Hupp-Yeats electrics will be represented in the South, A. J. Carter having been appointed southern wholesale representative.

Texas Studebaker Dealers Co-operate—The Studebaker Automobile Dealers of Texas have organized. The stated object of this organization is that the Studebaker dealers of Texas may co-operate for the further distribution of the cars in the state.

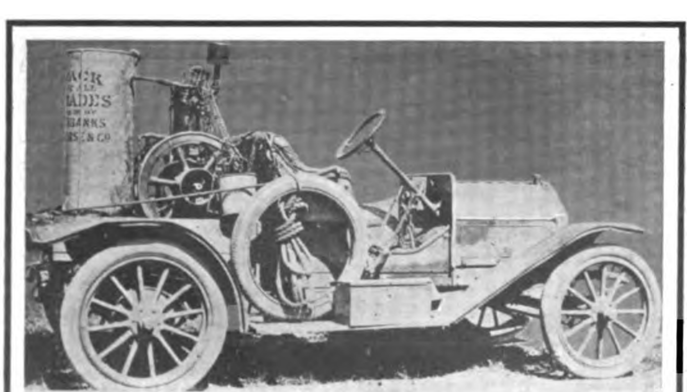
Lexington Selects Boston Quarters—The Lexington Company, of New England, has leased the building on Northampton street, Boston, formerly occupied by the Premier branch as a service station, the former company using it for the same purpose.

Clark-Carter 1913 Plans—The factory of the Clark-Carter Automobile Company, Jackson, Mich., manufacturer of Cutting cars, was recently visited by a number of dealers who inspected the plant, talked over the 1913 campaign and renewed their contracts.

Giltner Goes to Plow Maker—C. E. Giltner, who for several years has been manager of the Omaha branch of the Rambler factory, resigned August 1 to go to Moline, Ill., to become manager of the Velie automobile department of the John Deere Plow Company.

Wiles Experiment Superintendent of Velie—E. H. Wiles has accepted a position with the Velie Motor Vehicle Company, Moline, Ill., being appointed superintendent of experimental work, a department which is meeting with special attention from the Velie company.

Taxi Motor Cab Company Grows—The Taxi Motor Cab Company, of Boston, has just installed fifty new cabs, all painted light gray. They are larger than the old machines formerly used by the company, having a seating capacity of five instead of four, and electric lights to replace the oil lamps.



Studebaker 30 which replaces forty-six horses on Wyoming ranch

Baltimore Locomobile Branch Moves—The Locomobile Company, of America, Baltimore, Md., is now in its new branch house 109 to 121 West Mount Royal avenue, formerly headquarters of the Stoddard-Dayton Auto Company branch. T. W. Wilson is manager of the local branch of the Locomobile company.

Shur-Go to Make Its Starter—Announcement has been made by the Shur-Go Starter Company that it has purchased the patents and equipment required in the manufacture of its self-starter, and contemplates the manufacture of the device in New York. It is stated by the company that deliveries will be made by September 1. The officers of the new organization are: James E. Taylor, president; W. G. Rand, vice-president and general manager and E. Chamberlain, secretary and treasurer.

Automobile Incorporations

AUTOMOBILES AND PARTS

Boston, Mass.—Elliott Motor Engine Company; capital, $300,000; to manufacture engines. Incorporators: G. R. Elliott, F. P. Harris.

Brooklyn, N. Y.—Penn Automobile Company; capital, $5,000; to engage in automobile business. Incorporators: L. Wendell, H. Partridge, M. Wolf.

Brooklyn, N. Y.—Cold Radiating Company; capital, $250,000; to manufacture radiators. Incorporators: F. Baker, Irene I. McCarthy, R. L. Weaver.

Buffalo, N. Y.—Mutual Motor Car Company; capital, $125,000; to manufacture motor cars. Incorporators: Albert Poppenberg, F. C. Carter, O. E. Yeager.

Cambridge, Mass.—Blake Automobile Company; capital, $100,000; to engage in automobile business. Incorporators: E. C. Blake.

Camden, N. J.—Service Motor Truck Company; capital, $50,000; general automobile business. Incorporators: R. L. Smith, C. D. Hackett, E. J. Eldridge.

Cedarburg, Wis.—A. H. Meyer Motor Car Company; capital, $25,000; to manufacture automobiles. Incorporators: J. Armbruster, J. Dietrich, J. F. Bruss.

Cincinnati, O.—Welbon Motor Car Company; capital, $25,000; to manufacture automobiles. Incorporators: W. E. Welborn, H. S. Leyman, C. D. Wilson, C. W. Shepler, H. S. Welbon.

Cincinnati, O.—Cincinnati Motor Car Company; capital, $10,000; to manufacture automobiles. Incorporators: C. D. Wilson, H. E. Heisey, C. W. Shepler, J. C. Miller.

Cincinnati, O.—Central Automobile Company of Kentucky; capital, $25,000. Incorporators: W. Dickerson, G. Koehler, M. Emrich.

Cleveland, O.—Arter Automobile Carriage Company; capital, $20,000; to manufacture automobiles. Incorporators: J. S. Arter, B. Hexter, J. B. Buhl, C. A. Chapman, C. B. Lammon.

Columbus, O.—Central Motor Car Company; capital, $25,000; to manufacture automobiles. Incorporators: Anna Herr and others.

Detroit, Mich.—Ford Motor Car Company; capital, $750,000; to manufacture automobiles.

Detroit, Mich.—Manufacturers' Sales & Engineering Company; capital, $1,000; to deal in automobiles.

Detroit, Mich.—Hercules Motor Truck Selling Company; capital, $50,000; to engage in automobile business. Incorporators: A. Smith, J. O. Murfin, W. E. Webb.

Detroit, Mich.—Durham Easy Truck Company; capital, $50,000; to manufacture trucks. Incorporators: J. M. Mackey.

Kansas City, Mo.—Hudson Latham Company; capital, $100,000; to manufacture motors. Incorporators: W. A. Latham, C. B. Boyd, W. M. Boyd, B. Downing.

Jamesburg, N. Y.—Ex-Cel Motor Truck Company; capital, $250,000; to conduct a general automobile business. Incorporators: T. C. Corwin, A. Englehart, A. A. Kelley.

Newark, N. J.—Sullivan Automobile Company; capital, $25,000; to engage in a general automobile business. Incorporators: J. Sullivan, C. Bagnole, W. N. Frankel.

New York City.—Standard Automobile Company; capital, $10,000; to deal in automobiles. Incorporators: E. H. Erichman, H. D. Chapin.

New York City.—Wallace Automobile Company; capital, $300,000; to manufacture automobiles. Incorporators: S. E. Robertson, H. W. Davis.

Reno, Nev.—Mack Auto Company; capital, $50,000; to engage in the automobile business. Incorporators: M. J. Mack and others.

South Bend, Ind.—South Bend Auto Body Company; capital, $20,000; to manufacture automobile bodies. Incorporators: V. E. Paxson, S. W. Nicholson, J. C. Paxson.

St. Louis, Mo.—Burns Ramsden Motor Car Company; capital, $10,000; to manufacture and deal in automobiles. Incorporator: Louis N. Burns.

St. Louis, Mo.—Model Auto & Sales Company; capital, $3,000; to engage in the automobile business. Incorporators: Oscar Sonntag, Roy E. Stutts, Otto F. Karbe.

Toledo, O.—W. H. McIntyre Company; capital, $10,000; to engage in the automobile business. Incorporators: W. H. McIntyre, William Vollmayer, Frank Carabin, Edward Lakey, Frank Kelly.

Westfield, N. J.—Darby Motor Car Company; capital, $25,000; to engage in the automobile business. Incorporators: L. D. Darby, H. C. Darby, A. B. Darby.

GARAGES AND ACCESSORIES

Akron, O.—Akron Airless Tire; capital, $56,000; to manufacture puncture-proof tires. Incorporators: W. S. Brooks, T. N. Thompson, F. H. Beyea, H. L. Cole.

Akron, O.—Majestic Rubber Company; capital, $3,000; to manufacture and deal in tires and rubber goods. Incorporators: A. L. Neiswanger, O. W. Baum, J. H. Ault, J. A. H. Myers.

Baltimore, Md.—Jewell Electric Company; capital, $10,000; to manufacture electrical devices. Incorporators: J. C. M. Lucas, H. Percy Lucas, Clay Jewell.

Boston, Mass.—Maiden Gas & Electric Company; capital, $15,000; to manufacture electrical devices of all kinds.

Will Inspect European Branches—W. H. Lalley, foreign sales manager of the Studebaker Corporation, will leave Detroit this week for a tour of inspection of the firm's European branches.

Australian Visits Studebaker Plant—R. E. Kemsley, Studebaker distributer for Australia, New Zealand and Tasmania, with headquarters at Melbourne, Australia, was a recent visitor to the Detroit plant.

Groff Takes Boston Paige—H. M. Groff has been sent to Boston to take charge of the New England branch of the Paige-Detroit car, and he will make his headquarters in Boston at the local agency on Hereford street.

King Appoints Canadian Agent—The King Motor Car Company has designated the Matheson Automobile Company, of Toronto, Canada, of which Scott Innes is manager, as its sales agent for a large part of Ontario.

New concrete building of Firestone Tire Company in St. Louis

Automobile Incorporations

Yonkers, N. Y.—International Auto Lamp Manufacturing Company; capital, $50,000; to manufacture automobile lamps. Incorporators: Hyman Age, Thomas Cunningham.

Buffalo, N. Y.—Hall Automobile Coupler Company; capital, $250,000; to manufacture a patent hose coupling. Incorporators: John W. Blackman, Lucas M. Hall, Edward S. Hall.

Cincinnati, O.—Oil Industrial Company; capital, $10,000; to deal in oils, greases, belt dressings, etc. Incorporators: E. G. Holden, John C. Rogers, Ezra H. Passel, George C. Schmidt, Jr., E. R. Heisel.

Cincinnati, O.—Swing Wheel Company; capital, $50,000; to manufacture automobile wheels. Incorporators: Richard E. Werner, Rupert H. Langdale, C. A. Bickett, Richard A. Bickett.

Cincinnati, O.—Victor Auto Parts Company; capital, $20,000; to make automobile accessories. Incorporators: William J. Corcoran, Edward B. Corcoran, John L. Corcoran, Harvey R. Corcoran, H. R. Kerans.

Cleveland, O.—Knox Rubber & Supply Company; capital, $10,000; to manufacture rubber goods, tires, etc. Incorporators: R. A. Lang, C. S. Wachner, H. H. Burton, A. S. Dael, P. F. Blaine.

Dayton, O.—Automobile Lamp Control Company; capital, $15,000; to make automatic lamp-control devices for automobiles. Incorporators: Henry Ehlen, Ernest A. Eastman, William B. Meeker.

Detroit, Mich.—Detroit Battery & Ignition Company; capital, $200,000; to manufacture storage batteries, automobile lighting and ignition devices, etc. Incorporators: Charles R. Baxter, Louis C. Knop, Charles L. Tomlinson.

Detroit, Mich.—Kenyon Searchlight Company; capital, $75,000; to manufacture searchlights and other automobile accessories. Incorporators: H. B. Kenyon, H. E. Bloomingdale, C. F. Bloomingdale.

Detroit, Mich.—Michigan Motor Specialties Company; capital, $20,000; to manufacture automobile accessories. Incorporators: Nellie M. Beck, Charles W. Beck, Charles Wright, Jr.

Detroit, Mich.—Mote Demountable & Detachable Rim Company; capital, $30,000; to manufacture rims. Incorporators: Herman Mote, H. L. Beck, W. M. Elliott.

Dunkirkville, Ind.—Anto Transportation Company; capital, $85,000; to engage in the transfer and transportation business. Incorporators: G. W. Carr, J. H. Prescott, Thomas E. Boyd, F. Bertolette.

Hudson, N. Y.—Warren Street Garage Company; capital, $3,000; to engage in the garage business. Incorporators: John T. Hester, Henry B. Hester, Dennis Hester, Jr.

Middletown, Pa.—Middletown Auto Club; to advance the interest of local automobile owners. Incorporators: D. W. C. Laverty, A. H. Luckenbill, I. O. Nissley, W. P. Evans, T. M. Yost.

Nashville, Tenn.—City Taxicab Company; capital, $3,500; to operate taxicabs. Incorporators: E. D. Dakin, T. O. Perkins, J. D. Andrews, W. V. Andrews, F. M. Swann.

New York City.—Automobile Importers Alliance; capital, $750; to look after the interests of automobile importers. Incorporators: George J. Ginsburg, Bernard C. Wyner.

New York City.—Protective Auto League Company; capital, $1,000. Incorporators: I. Fogg, D. G. Hopkins, G. W. Dillman.

New York City.—Wadsworth Garage, Inc.; capital, $9,000; to conduct a garage. Incorporators: William Daly, Albert C. Christian, George A. Boyd.

Paterson, N. J.—Paterson & New York Motor Express Company; capital, $50,000; to conduct a general transfer and express business. Incorporators: J. M. Simpson, M. Brooks, H. Smith.

Racine, Wis.—Faultless Starter Company; capital, $10,000; to manufacture a self-starter. Incorporators: D. I. Shoop, Samuel Hansen, Morton Walker, J. Barker.

St. Louis, Mo.—Pugh Auto Chain Company; capital, $5,000; to manufacture and deal in automobile chains. Incorporators: John Schulz, Webster Groves, Arville A. Van Cleave, Edward Brockschnitt.

Trenton, N. J.—M. & M. Tire Company; capital, $20,000; to manufacture rubber goods and tires. Incorporators: William McGinnis, Edgar W. Greene, Walter A. Wood.

Washington, D. C.—Automobile Engineering College; capital, $5,000; to educate chauffeurs. Incorporators: Frank N. Justice, Edgar L. Turner, Thomas W. Smithfield, Garfield H. Street.

CHANGES OF NAME AND CAPITAL

Cleveland, O.—Cleveland Auto Starter Company; capital increased from $25,000 to $50,000.

Detroit, Mich.—English Company; capital increased from $5,000 to $100,000.

Monroe, Mich.—Elkhart Manufacturing Company; capital increased from $60,000 to $110,000.

Racine, Wis.—Racine Rubber Company; changed name to Belle City Rubber Company.

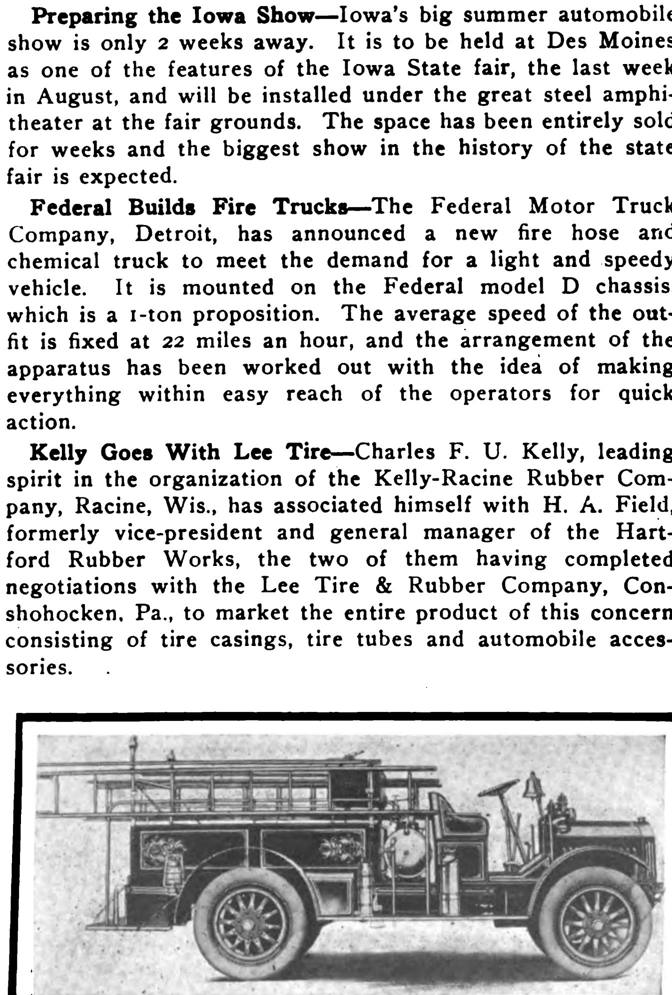
Hall Now Olds Sales Manager—J. V. Hall, formerly manager of the Oldsmobile Company, of Illinois, has been appointed general sales manager of the Olds Motor Works, of Lansing, Mich., to succeed R. E. Paris, resigned. Mr. Hall will assume his duties at Lansing on September 1.

Oakland Sales Branch in Detroit—The Oakland Motor Car Company, Pontiac, Mich., has opened a sales branch in Detroit with William R. Tracy, for the past two seasons sales manager of the Oakland Sales Company, Ltd., as its manager. J. F. Montgomery has resigned from the Bemb-Robinson Company to take a sales position with this new firm.

Preparing the Iowa Show—Iowa's big summer automobile show is only 2 weeks away. It is to be held at Des Moines as one of the features of the Iowa State fair, the last week in August, and will be installed under the great steel amphitheater at the fair grounds. The space has been entirely sold for weeks and the biggest show in the history of the state fair is expected.

Federal Builds Fire Trucks—The Federal Motor Truck Company, Detroit, has announced a new fire hose and chemical truck to meet the demand for a light and speedy vehicle. It is mounted on the Federal model D chassis, which is a 1-ton proposition. The average speed of the outfit is fixed at 22 miles an hour, and the arrangement of the apparatus has been worked out with the idea of making everything within easy reach of the operators for quick action.

Kelly Goes With Lee Tire—Charles F. U. Kelly, leading spirit in the organization of the Kelly-Racine Rubber Company, Racine, Wis., has associated himself with H. A. Field, formerly vice-president and general manager of the Hartford Rubber Works, the two of them having completed negotiations with the Lee Tire & Rubber Company, Conshohocken, Pa., to market the entire product of this concern consisting of tire casings, tire tubes and automobile accessories.



Kelly chemical wagon loaned to the Springfield, O., fire department

Factory Miscellany

Plant of the Keeton Motor Company, at Wyandotte, Mich., to be devoted to the making of six-cylinder cars

Keeton Buys Seitz Factory—The plant of the Seitz Automobile & Transmission Company, Wyandotte, Mich., has been acquired by the Keeton Motor Company. The building, which is shown on this page, will be equipped by the purchaser for the manufacture of six-cylinder cars.

Austin to Build Factory—The Austin Automobile Company, Grand Rapids, Mich., has bought 6 acres of land upon which it will soon erect a factory.

Kisselkar Plant Being Increased—The Kissel Motor Car Company, Hartford, Wis., has just begun the erection of an addition to its automobile factory.

Chalmers to Add to Plant—An addition to the Chalmers factory is being planned, which is to enable the company to cope with the growing demand of cars.

Longstreth Company Negotiating for Plant—The Longstreth Motor Car Company, Philadelphia, Pa., has opened negotiations for a building at 2126 Market street.

Canadian Factory Being Built—A contract for the construction of an Amherst, N. S., factory of the Nova Scotia Carriage & Motor Company has been awarded to a firm of contractors of that town.

Stewart Iron Works Resurrection—The burned-down plant of the Stewart Iron Works Company, Cincinnati, O., which was recently destroyed by fire, will be replaced by a new structure having 100 by 415 feet floor space.

Toronto Gets New Factory—A new factory for Toronto, Ont., will be erected in the near future by the Russell Motor Car Company on North Keele street. The building will be of reinforced concrete and cost approximately $75,000.

Parr Company Buys Land—The Parr Wagon Company, South Greensburg, Pa., has bought 3 acres of land on which stands a large factory building. The company will soon begin to manufacture trucks and automobiles in the new plant.

Clark Brothers Rebuild Plant—Clark Brothers, whose factory at Belmont, N. Y., was burned recently, have completed their plans for the erection of a new factory which will comprise two steel-and-concrete structures covering 100 by 300 feet each.

Buick Plant Bought by Jackson—The Jackson Automobile Company, Jackson, Mich., is said to have acquired the plant of the Buick Motor Company located in that city. This deal places the Jackson concern in the possession of two modern factories in the same city.

Corcoran to Manufacture Accessories—The manufacture of tools and accessories is the object of the Corcoran Manufacturing Company, Cincinnati, O. The company has leased a five-story plant at Second and Elm streets, which will soon be equipped so that manufacturing operation may be started.

Overland Factory Is Improved—Improvements, the cost of which aggregates about $45,000, were begun last week in the Willys-Overland Company's plant at Toledo, O. The changes comprise a new blacksmith shop and an addition to the repair shop. The A. Bentley & Sons Company has received the contract for the work.

Leech Company Will Manufacture—A new type of gasoline engine will soon be manufactured by the Leech Automobile Company, Lima, O., a newly founded $100,000 corporation.

Long Has Factory Constructed—The contracts for the erection of a $50,000 factory of automobile parts has been given out by the Long Manufacturing Company, Detroit, Mich.

Lumen Factory Being Enlarged—An addition to the factory of the Lumen Bearing Company, Buffalo, N. Y., is under way. The company at present has a manufacturing floor space of 70,000 square feet and the addition now planned will comprise a two-story machine shop, which will make the firm's plant one of the largest establishments of its kind in this country.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Albany, N. Y.	R-C-H	James N. Kemp Mach. Wks.
Almont, Mich.	R-C-H	Chas. B. Scully.
Atchison, Kan.	R-C-H	George C. King.
Baltimore, Md.	Cartercar	Winterson Auto Co.
Baltimore, Md.	Marathon	Marathon Motor Sales Co.
Baltimore, Md.	Stoddard-Dayton	H. Block.
Baltimore, Md.	White	White Automobile Co.
Bessie, Okla.	R-C-H	Bessie Mercantile Co.
Bloomington, Ill.	R-C-H	J. E. Hatfield.
Booneville, Mo.	R-C-H	H. E. Sombart & Son.
Boston, Mass.	American	Roberts & Sherborne.
Brockton, Mass.	R-C-H	Wm. F. Holmes.
Brookhaven, Miss.	R-C-H	J. W. Day.
Buffalo, N. Y.	Marathon	Mutual Motor Car Co.
Buffalo, N. Y.	Paige-Detroit	Barrett Motor Car Co.
Buffalo, N. Y.	R-C-H	A. Judson Wells.
California, Mo.	R-C-H	O. E. Houser.
Caseville, Mich.	R-C-H	C. Crawford & Son.
Chagrin Falls, O.	R-C-H	Carl W. Patch.
Chicago, Ill.	R-C-H	John Rehm.
Chicago, Ill.	R-C-H	A. Vincent & Sons Co.
Cleveland, O.	Apperson	Eiseman Automobile Co.
Colorado Springs, Col.	R-C-H	Russell Gates Mercantile Co.
Crown Point, Ind.	R-C-H	Meeker & Claussen.
Dallas, Tex.	Chalmers	Halff Co.
Des Moines, Ia.	Locomobile	Iowa Auto & Supply Co.
Des Moines, Ia.	Petrel	Geo. F. Lichty.
Fort Plain, N. Y.	R-C-H	Philip Marsh.
Fort Wayne, Ind.	R-C-H	Randall Motor Car Co.
Greencastle, Pa.	R-C-H	Petrie & Morganthall.
Hugo, Okla.	R-C-H	George W. Chandler.
Le Sueur, Center, Minn.	R-C-H	Louis Prchal.
Los Angeles, Cal.	Moline	Ben-Rick Auto Co.
Lumberton, Miss.	R-C-H	Hinton & Byrd.
Lynn, Mass.	R-C-H	C. E. Whitten.
Macon, Mo.	Moon	Macon Garage Co.
McCool, Ind.	R-C-H	Robbins & Johnson.
Milbank, S. D.	R-C-H	Farley Auto Co.
Minerva, O.	R-C-H	Minerva Hardware Mfg. Co.
Morgan, Minn.	R-C-H	Geo. H. Thompson.
New Orleans, La.	Hudson	H. A. Testard.
New Richmond, Wis.	R-C-H	Bell & Webster.
New Ulm, Minn.	R-C-H	Meuller & Aab.
Omaha, Neb.	Little Four	Doty & Hathway.
Peotone, Ill.	R-C-H	Hennry Koenning.
Pittsburg, Kan.	R-C-H	James Jepson.
Pittsfield, Mass.	R-C-H	Louis L. Lourouche.

PLEASURE CARS

Place	Car	Agent
Pleasanton, Kan.	R-C-H	Arthur L. Thomas.
Plymouth, Pa.	R-C-H	Frank Martz.
Pomona, Cal.	R-C-H	T. Clark.
Portland, Ore.	Briggs-Detroiter	H. L. Keats.
Red Lake Falls, Minn.	R-C-H	Findeisen Auto Co.
Rosenberg, Tex.	Moon	Rosenberg Motor Car Co.
Richmond, Va.	R-C-H	W. C. Smith & Co.
Salem, Mass.	R-C-H	Motor Sales & Service Co.
Salem, Va.	R-C-H	M. L. Shanks.
Seattle, Wash.	Detroiter	Olympic Motor Car Co.
Seattle, Wash.	Franklin	W. A. Wicks.
Shreveport, La.	R-C-H	Orme Mot. & Transfer Co.
Sioux City, Ia.	Moon	Bennett Automobile Sup. Co.
St. Clair, Pa.	R-C-H	S. H. Daddow.
St. Louis, Mo.	Cartercar	Cochrane Motor Sales Co.
St. Louis, Mo.	Henderson	Model Automobile Sales Co.
Syracuse, N. Y.	Haynes	A. E. Wheeler.
Syracuse, N. Y.	Little Four	James Automobile Co.
Syracuse, N. Y.	Stoddard-Dayton	A. E. Wheeler.
Syracuse, N. Y.	Velie	Ferdinand Crosby.
Toledo, O.	Michigan	Ford Bros. Auto Sales Co.
Washington, D. C.	Pierce-Arrow	Foss-Hughes Co.
Washington, D. C.	R-C-H	G. R. Cowie Co.
Watertown, S. D.	R-C-H	Wolf Auto Co.
Webb City, Mo.	R-C-H	M. H. Wood & Co.
West Chester, Pa.	R-C-H	Geo. J. Moses.
Wheaton, Ill.	R-C-H	E. M. Ferry.
Wilkes-Barre, Pa.	White	Frank Martz.
Wilmington, Del.	Columbia	F. W. Ayers.
Wilmington, Del.	Maxwell	F. W. Ayers.
Wilmington, Del.	Stoddard-Dayton	F. W. Ayers.

COMMERCIAL VEHICLES

Place	Car	Agent
Cincinnati, O.	Universal	Payne Brothers.
Cleveland, O.	Hatfield	A. W. Hall Automobile Co.
Cleveland, O.	Sanford	W. H. Atkinson.
Dallas, Tex.	Mack	Halff Co.
Dallas, Tex.	Saurer	Halff Co.
New York City, N. Y.	Stegeman	American Marion Sales Co.
St. Louis, Mo.	Universal	Lindsay Motor Car Co.
Syracuse, N. Y.	Grand	A. E. Wheeler.
Tokio, Japan	Federal	Futabaya & Co.

ELECTRIC CARS

Place	Car	Agent
Dallas, Tex.	Flanders	Halff Co.
St. Louis, Mo.	Detroit	Detroit Electric Car Agency.

Minneapolis Republic Company Will Build—The Republic Motor Company, of Minneapolis, Minn., has secured a site for a factory building to be erected in the near future.

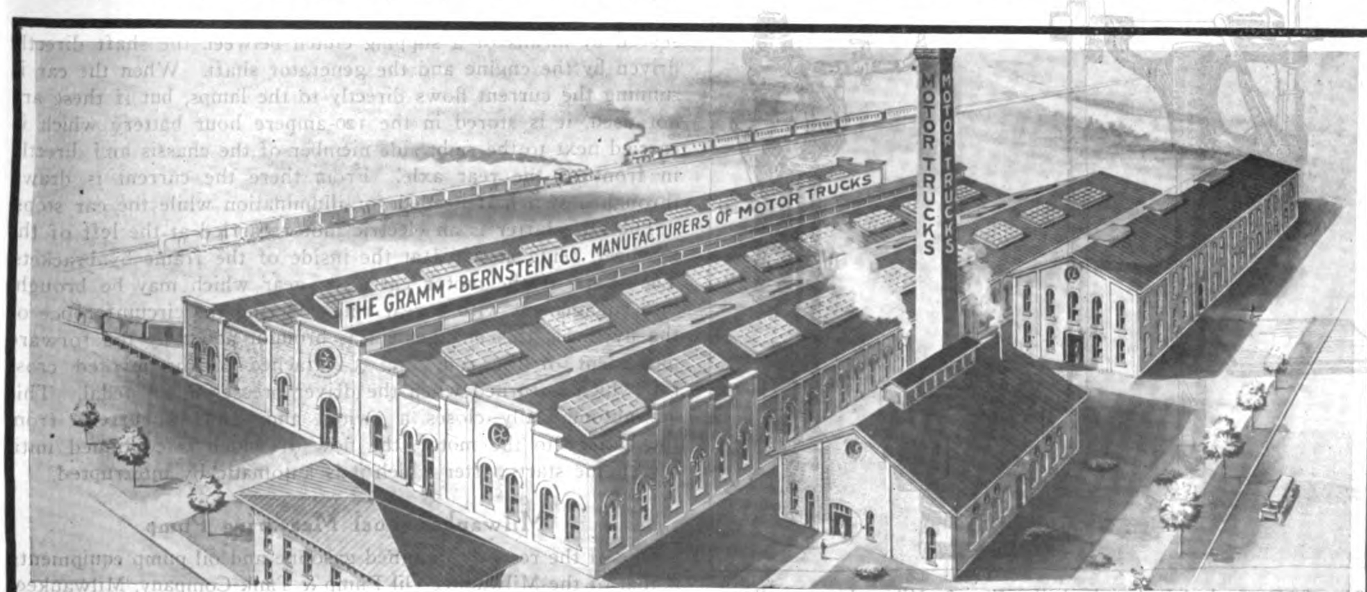
Geneva Supply Factory Building—Karlsene & Skarin, Geneva, Ill., are getting ready to construct a factory building, 50 by 65 feet, where automobile supplies will be manufactured.

Ford Minneapolis Plant Being Rushed—Kees & Colburn, the Minneapolis architects who have received the contract for the erection of a factory of the Ford Motor Company, are making haste in preparing the plans for this work.

Cutting Factory Increases Capacity—The Clark-Carter Automobile Company, Jackson, Mich., has now almost completed a four-story addition to its present plant, which will enable it to considerably increase its output for 1913.

Harris to Build Wheels—The mill building at the junction of Union street and Payson avenue, Easthampton, Mass., owned by Dibble & Warner, has been purchased by Charles Harris, who is to use it in which to manufacture automobile wheels.

Fitchburg Seeks Durant's Factory—R. D. Redfern, industrial secretary of the Fitchburg, Mass., Board of Trade, has got into communication with W. C. Durant, who is the head of the Republic Motor Company, and has made him an offer to establish one of the company's plants in that city.



New plant of the Gramm-Bernstein Company which makes motor trucks, at Lima, Ohio

Electric Bench Drill; Explosion-Proof Garage Heater; Powerful Self-Starter; Gasoline Equipment; Economic Electric Headlight; Rear View Mirror; Floorboard Material; Spring Shock Absorber; Lamp Lighter; Enriches Gasoline

Deer Electric Bench Drill

AN electric bench drill having an 8 1-4 by 10 1-2 table is made by the A. J. Deer Company, Hornell, N. Y. The drill, Fig. 1, is a simple design and all its moving parts are made of high-speed tool steel. The vertical movement of the drilling spindle is 2 1-4 inches and the space of vertical adjustment of the table 8 3-4 inches. From the center of the spindle to the column it is 5 1-4 inches, and from chuck to table 8 3-4 inches. The drill capacity of the machine is 1-4 inch. It may be operated at five different speeds, being driven by either an alternating or direct-current motor using 110-220 volt current. The net weight of the drill without the motor is 120 pounds.

Scientific Garage Heater

The Scientific Heater Company, 2123 East Second street, Cleveland, O., manufactures a small and safe garage heater which, when once lighted, serves an establishment throughout a season without requiring any further care. The device, Fig. 7, is square in shape, 39 inches long, 38 inches high and 12 1-2 inches wide; it is preferably attached to the wall and can be located at any suitable height. The fuel for the garage heater is city gas or natural gas. To start the heater the fire door, so-called, is opened and a match applied to pilot light. Then the fire door is closed and by turning a valve the gas is admitted to the burner, where it is ignited. The necessary air is now drawn in through a close wire-mesh screen which insures the safety of the lamp in the same way as it guarantees that of a Davy lamp used by miners.

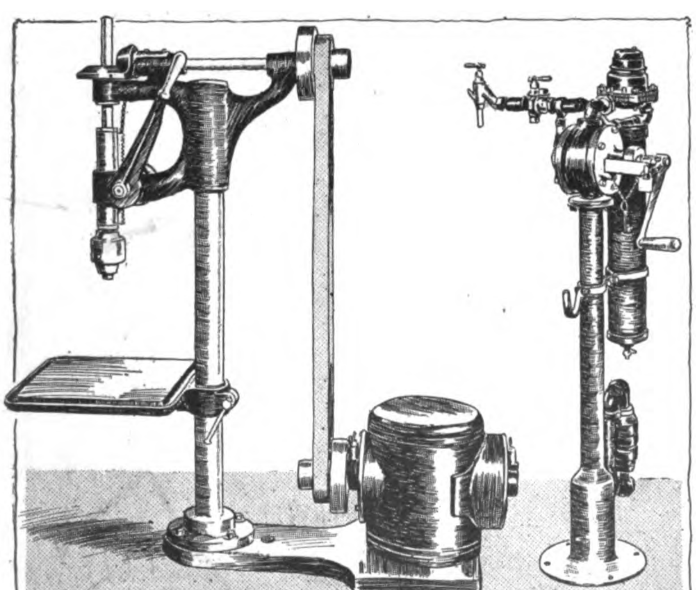


Fig. 1—Deer electric bench drill. Fig. 2—Milwaukee gasoline measuring pump

Peerless Electric Self-Starter

The Peerless Motor Car Company, Cleveland, O., is equipping its 1913 product with a complete electric starting and lighting system made by Gray & Davis, Boston, Mass. The lighting generator of this system, which also produces the current used afterward for starting the engine, is mounted adjacent to the engine and is driven therefrom at constant speed which is pre-

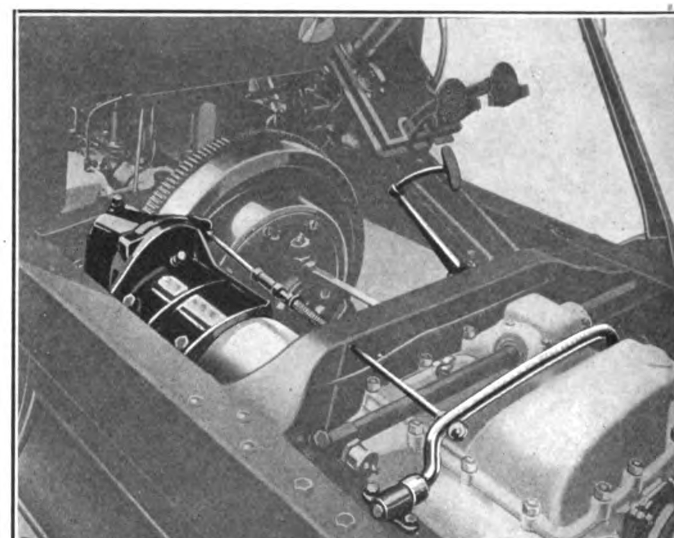


Fig. 3—Gray & Davis self-starter with which 1913 Peerless cars are fitted

served by means of a slipping clutch between the shaft directly driven by the engine and the generator shaft. When the car is running the current flows directly to the lamps, but if these are not used, it is stored in the 120-ampere hour battery which is carried next to the right side member of the chassis and directly in front of the rear axle. From there the current is drawn through a switch if needed for illumination while the car stops.

The self-starter is an electric motor carried at the left of the flywheel, being attached at the inside of the frame by brackets. The shaft of the motor carries a gear which may be brought into engagement with a gear ring covering the circumference of the flywheel; this engagement is brought about by the forward movement of the rod, Fig. 3, attached to the pivoted cross rail which is turned when the driver presses down pedal. This act automatically closes a switch and sends a current from the battery to the motor, the flow of which is continued until the engine starts, after which it is automatically interrupted.

Milwaukee Fuel Measuring Pump

One of the recently designed gasoline and oil pump equipments is that of the Milwaukee Oil Pump & Tank Company, Milwaukee, Wis., Fig. 2. This outfit consists of a measuring pump and a tank; the pump is of the plunger type, but no leather washers or valves are used inside the pump cylinder. All the working parts are made of bronze. The pump may also be used for the handling of thick liquids such as varnish; it is furnished with a seamless steel tank. Furthermore the equipment ordinarily includes a filter, meter and nozzle, which, however, may be omitted if the purchaser so desires.

New Automobile Mazda Lamp

The General Electric Company, Schenectady, N. Y., has just put on the market a new type of Mazda lamp specially designed for automobile headlights. This lamp, Fig. 4, has a tungsten filament formed in a coil without an anchor, making it very compact and strong and sending out all the light from a very small space, so that the total volume of rays may be brought into the focus of a parabolic lamp. The lamp is made in sizes ranging from 9 to 24 candlepower. It is claimed that this lamp gives over twice as much light as a carbon lamp consuming the same amount of current.

The Eclipse Rear View Mirror

A new model of the Eclipse rear view mirror, made by the Eclipse Specialty Company, 250 West Fifty-fourth street, New York City, is shown in Fig. 5. While the shape and appearance of the mirror remain the same as formerly, the method of attachment has been modified and improved. Instead of using the ball-and-socket joint of the old model, the new type uses a bracket which is clamped by a thumb screw to a horizontal rod which is turnable around its axis and around the vertical support to which it is attached. The mirror comes in brass, nickel and black finish.

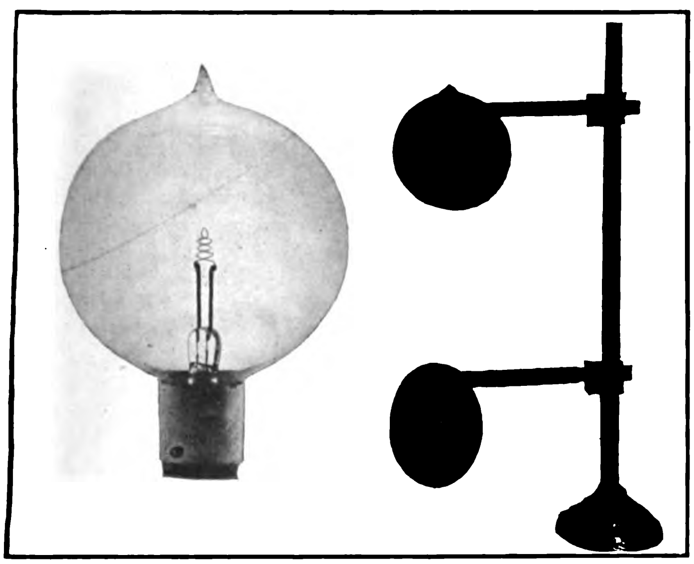


Fig. 4—G. E. Mazda automobile headlight. Fig. 5—Eclipse rear-view mirror

Acetrol Fuel Enriching Mixture

Utilizing the solubility of acetylene in acetone, which is used in filling gas tanks, the Acetrol Manufacturing Company, Milwaukee, Wis., has put on the market a mixture which is said to considerably increase the fuel value of gasoline, if 1 pint of it is mixed with about 16 gallons of gasoline.

Goodnow Gasoline Tank Gauge

A gasoline gauge of the stick type is being marketed by the Goodnow Manufacturing Company, 754 Old South Building, Boston, Mass. The gauge is a black stick of square section, upon which twenty brass markers are slidably arranged. Each marker carries a number, ranging from 1 to 20, and by filling the gasoline in a tank gallon by gallon and adjusting the gauge to the varying level of the fuel in the tank, the gauge may be used for any shape of container, be it square, oval or irregular. The gauge is also made with thirty markers for the use in connection with specially deep tanks.

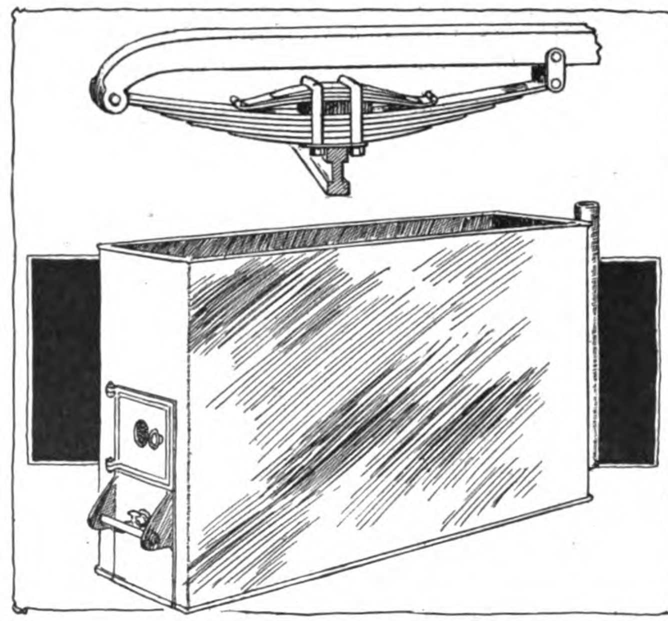


Fig. 6—Amos spring shock absorber. Fig. 7—Scientific safety garage heater

Corubia Acetylene Lamp Lighter

To light acetylene lamps without the use of matches or batteries and spark coils, the Corubia Manufacturing Company, 71 Third avenue, New York City, now makes a small burner to which a self-lighting device is attached. The latter consists of a stem in the top of which a hard-steel gear is pivoted which is in contact with the lava arm of the burner. The lower end of the stem carries a round plate and the steel gear is held in its highest possible position by the tension of a small spring wound around the above-mentioned stem. If the plate at the end of the stem is pressed downward, the friction between steel and lava results in a series of sparks which are directed in the center of the burner space, where they ignite the acetylene coming from the tank. When the plate is released the steel gear returns again to its normal position and is then ready for the next application

Ames Leaf-Spring Shock Absorber

To check the rebound of the lower leaves of elliptic springs the Ames shock absorber, made by O. B. Ames, Brewster, N. Y., has been designed. It consists of a small three-leaf spring attached to the elliptic spring by a double U-clip, Fig. 6; a rubber cushion is inserted between the two springs. This arrangement does not limit the free movement of the main spring as long as only moderate road inequalities are encountered but when the car strikes a bump or thank-you-ma'am the small spring counteracts the excessive movement of the large one as well as its sudden rebound, thereby adding to the life of the spring proper.

Adamat Composition Floorboard

The Flintkote Mfg. Co., New York City, maker of waterproofing specialties, is now in the market with a new product, Adamat, which is a composition flooring material. It consists of a water and fireproof body which is covered, on both sides, with a comparatively thick, rubber-like skin. The material does not absorb or permit the passage through it of a drop of moisture and is claimed to be unaffected by ordinary gases and fumes. Since both sides are prepared with the same finish and color, the material may be turned around when one side is worn. Adamat is made in red and black, coming in 36- and 72-inch width in the red material, and 36 inches in the black one.

FENDER for Motor Vehicles—Being a design on which the fender is turned when the front wheels are moved laterally by the steering gear action.

This patent refers to the construction of a fender, Fig. 3. Brackets are clamped to the steering gear and have longitudinally slotted standards rotatably fastened to them. To the standards a fender is secured projecting beyond the wheel.

No. 1,033,750—to Albertus Tift, Deer Harbor, Wash. Granted July 23, 1912; filed August 8, 1911.

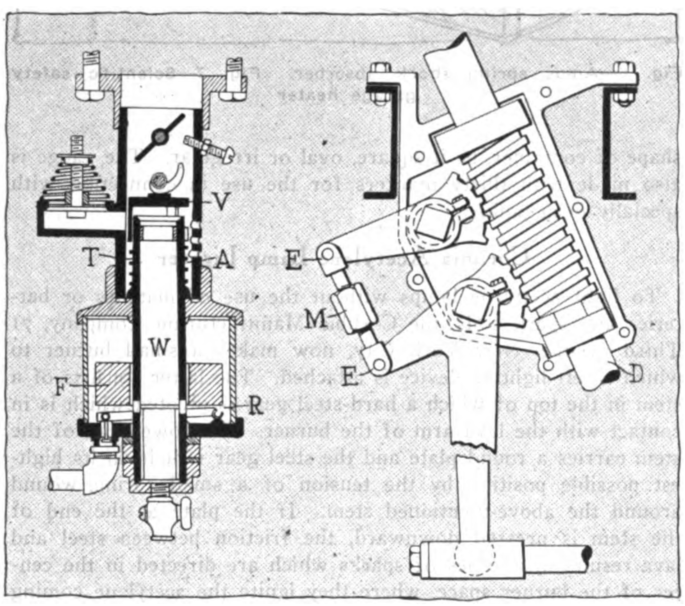


Fig. 1—Morris-Merritt wick-feed carbureter. Fig. 2—Moore steering gear

Lock Nut—Being the combination of a nut and lock washer, which latter is a resilient plate.

The lock washer W., Fig. 4, is a resilient plate, folded around a nut, with three parallel corrugations; it has rounded channels and crests permitting the corrugations to yield under pressure, thereby securing a lateral sliding action which is accompanied by a spring resistance between the washer and the parts between which it is clamped. The intermediate corrugations have a bolt opening with an inward lug adapted to engage a bolt groove G.

No. 1,033,759—to Granville A. Humason, Shreveport, La. Granted July 23, 1912; filed April 26, 1910.

Shock Absorber and Spring—A design combining the functions of these two members, which is held to axle and body.

In Fig. 5 is shown the subject-matter of this patent, which comprises upper and lower spring-retaining plates P1 and P2 plates and an intermediate body-retaining plate B, between which springs are positioned in the following manner: The plates have on their edges annular flanges which serve to brace and strengthen them and are connected by bolts C. Spring-receiving sockets S are arranged on the plates around the bolts, and coiled springs surround the bolts.

No. 1,033,657—to Julian Seay Bashaw, Gainesville, Fla. Granted July 23, 1912; filed April 11, 1911.

Wick-Feed Carbureter—In which the normal air intake surrounds a wick the end of which is submerged in the fuel.

The subject-matter of this patent, a wick-feed carbureter, is shown in Fig. 1; it consists of a fuel reservoir R containing a float F for controlling the admission of fuel thereto. Above the reservoir an air chamber A with air openings is placed, and a vertical tube T is so stationed that its upper, open end is within the air chamber, while the lower end is in the reservoir R. A wick W is located in the tube T, and its lower end is immersed in the fuel in R, the upper end being in the chamber A and tube is adapted to be closed by a valve V.

No. 1,033,443—to Charles A. Morris and Walter H. Merritt, Red Bank, N. J. Granted July 23, 1912; filed March 27, 1911.

Steering Gear Mechanism—In which two or more gears or sections engage the steering worm.

This patent refers to a steering gear, Fig. 5, consisting of a worm D which is engaged by two or more pivotally mounted members D, which may be of the gear or sector type. These members engage the worm oppositely at different threads.

No. 1,033,442—to Van Zandt M. Moore, Cleveland, O. Granted July 23, 1912; filed March 15, 1911.

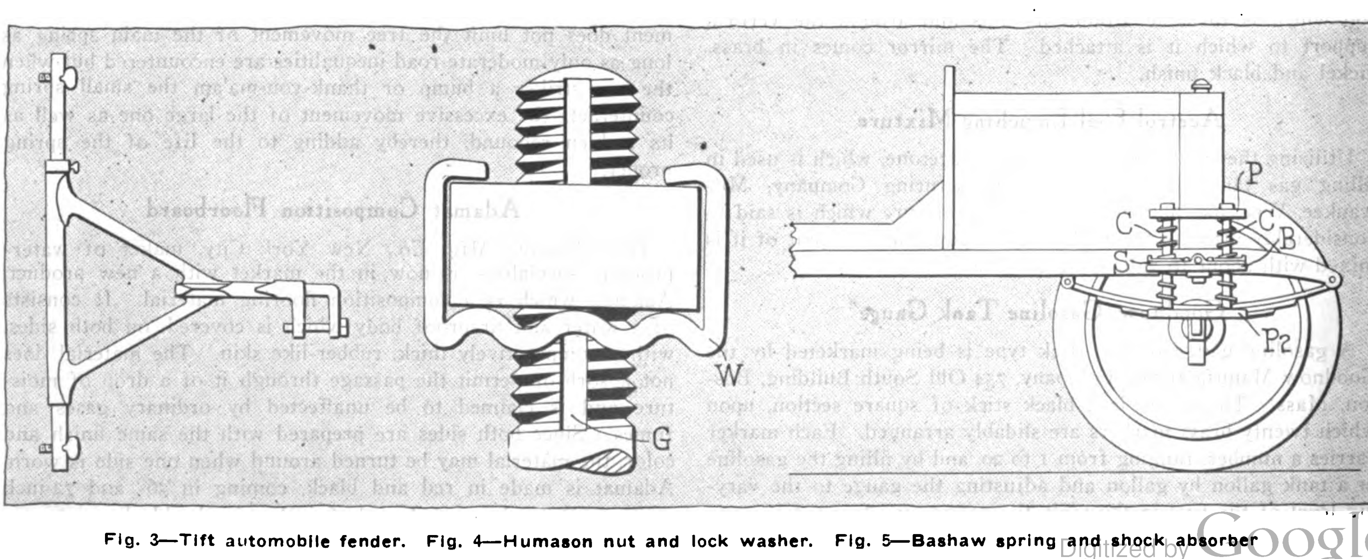


Fig. 3—Tift automobile fender. Fig. 4—Humason nut and lock washer. Fig. 5—Bashaw spring and shock absorber

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The AUTOMOBILE

Dyer Licenses To Be Taken Out By Automobile Board of Trade

Present and Future Membership of Manufacturers' Organization Provided for Up to Certain Limit Under Lump Sum Agreement—Board Will Turn Over the Minor Patents

Suits Now Pending Against Members to Be Withdrawn When Licenses Are Issued—Negotiations Have Been Pending for 6 Months—Patent Runs 13 Years

CONSEQUENT upon negotiations extending over a period of more than 6 months, the Automobile Board of Trade and the Enterprize Automobile Company have finally reached an agreement.

Manufacturing licenses under the Dyer patents, covering selective transmission, and direct drive epicyclic transmission, also known as planetary, the right to use the H change-plate and other devices covered by the patents, has been secured for a certain number of the present and future members of the Automobile Board of Trade, under an agreement dated August 15, 1912. The contract securing these rights is voluminous, but its exact terms have not been made public.

Under the contract the Board of Trade pays a lump sum to the Enterprize Automobile Company, of Hoboken, N. J., the holding corporation that owns the Dyer patents and secures the right from the Enterprize company to apply for licenses for its membership without cost up to a certain specified number. It is also provided that in case the individually licensed company leaves the Automobile Board of Trade or abandons manufacturing, the license shall expire. In the contingency of the dissolution of the Board of Trade, the agreement, as such, will be nullified. Just what will be done with applications for license in excess of the specified number was not revealed by either side.

As a further consideration for the contract it is provided that the Patents Holding Association, a subsidiary of the old Association of Licensed Automobile Manufacturers and which was inherited by the Automobile Board of Trade, shall convey all right, title and interest held by it in the five Dyer patents covering the H-change-plate, removable rigid motor frame, planetary gear and other gear patents, to the Enterprize Automobile Company and that the licenses issued by the Enterprize Automobile Company shall include rights to manufacture under all the patents involved in the settlement and any further automobile patents that may be taken out by Leonard H. Dyer.

The rights of the Patents Holding Association consisted of exclusive rights to issue licenses under the five minor patents referred to. These rights have been held by the association for over 6 years.

The Enterprize company is left free to grant licenses to other manufacturers on a royalty basis.

The rights secured to the members of the Automobile Board of Trade are very broad.

The most important patent included in the license rights attained under the agreement is number 885,986, a division of the application filed by Leonard H. Dyer, February 3, 1900. This patent is remarkably broad in its view and is outlined in fifty-seven separate claims. It is dated April 28, 1908, and consequently will run until April 28, 1925, a trifle less than 13 years.

The Enterprize Automobile Company has issued two manufacturing licenses so far. One was to the makers of the Correja and the other to the manufacturers of the G. J. G. Three importers' licenses have been granted and over eighty individual licenses.

Suit was commenced against four companies affiliated with the Automobile Board of Trade last year and the minor suits were pressed, according to Mr. Dyer, to demonstrate what basis of

The five Dyer patents which have been assigned to the Enterprize Automobile Company by the Automobile Board of Trade, all apply to improvements in the gearing for automobiles. They are numbered respectively, 643,595, 657,650, 662,400, 662,401 and 676,223.

The first of them was applied for June 8, 1898, and was granted September 11, 1900, and covers a fixed guide plate with recesses and notches to hold the gear-shifting lever. This is patent No. 657,650.

Patent 643,595, granted February 13, 1900, is for two gears and an intermediate epicyclic gearing interposed between one of the gears and the driven axle.

Patent 662,400, granted November 27, 1900, covers the subject of two shafts with spur gearing and means for intermeshing the gear wheels so as to transmit power from the driving to the driven shaft.

Patent 662,401 is for a multiple-speed transmission gearing, and similar to the main patent, save that the gears cannot be shifted as an entirety and the principle of direct drive with all gearing quiescent is not covered.

Patent 676,223 covers a removable ridged bridge to carry the motor and operating parts.

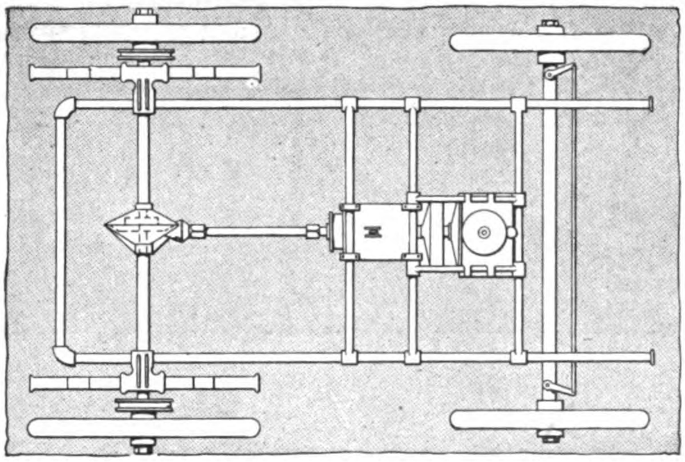


Fig. 2—Showing location of Dyer's device from above

royalty should be charged pending the determination of the main suits.

This campaign will probably be continued for a time despite the withdrawal of the main suits in question as soon as licenses have been issued to the defendant companies.

According to William A. Redding, patent counsel, associated with Frederick P. Fish, in representing the Automobile Board of Trade, the Dyer transmission patent is broader and more intimately related to the automobile trade than the Selden patent was deemed to be. The devices described by Mr. Dyer in patent 885,986 cover the selective type of transmission in fifty-seven phases, and Mr. Redding declares that the present type of selective transmission in general use throughout the industry comes within the terms of the patent.

The full text of the claims made by Mr. Dyer is reproduced on another page.

The effect of the agreement will be to check prosecutions for infringement against the licensed members of the Automobile Board of Trade and the sellers and users of their product. The four suits now pending against the Maxwell-Briscoe Motor Company, Locomobile Company, of America, Winton Motor Carriage Company and the Saurer manufacturers will be withdrawn when licenses have been granted to the four companies.

These suits were entered last summer and fall on behalf of the Enterprize Automobile Company as assignee of the patent rights of Leonard H. Dyer. They called upon the court to grant an injunction against further infringement and asked for an accounting for profits derived from past infringement and damages for the alleged infringements.

In discussing the litigation, Mr. Redding said:

"The suits have been in the United States District Court, Southern District of New York, for about a year. Even before the filing of the formal actions we had begun a systematic search of the prior art. At a cost of thousands of dollars the United States Patent Office, and the similar institutions of Switzerland, Germany, France, Belgium, Italy and Great Britain were thoroughly examined. Time and money was spent in profusion to make the search radical and comprehensive and I can say that in the 38 years during which I have handled patent matters, none has come under my notice in which more care was used or more pains exerted.

Redding Describes Breadth of Patent

The patent is imposing in its breadth and has been a threatening element in the industry up to this time. Our search disclosed a mass of data, but the industry can draw its own conclusions from the fact that my clients were strongly advised by me, as early as last winter, to take out licenses and avoid the possible danger and expense that must have followed a complete and favorable adjudication of the patents in question.

"Since that period, numerous conferences have been held between the interested parties and an option was given by the Enterprize Automobile Company to take out licenses. This option would have expired August 15. I am not at liberty to detail the terms of the instrument nor the particulars of the agreement we have just made. There were some changes in the original proposition submitted on behalf of the Enterprize company and some changes in the counter-proposition made by my clients to the Enterprize company, but I can say that the agreement is satisfactory to both sides. It raises the shadow cast by the likelihood of suits against makers and users of automobiles produced by the Automobile Board of Trade members and gives them certain valuable rights under the patents and at the same time the acknowledgment of the validity of the patents by the act of taking licenses under them must prove agreeable to the patentee and his assigns."

It was stated by Mr. Redding that his efforts had been directed solely toward bringing about the present settlement ever since the search conducted under his direction for devices anticipating the Dyer patents had been concluded. His answer, a most voluminous document, has been finished for nearly 6 months, and while it was never filed, due notice of its readiness had been served upon the complainants. Numerous continuances have marked the progress of the suits on motion of Mr. Redding.

The Enterprize company consented to these delays so that the negotiations for settlement might be pursued. These stipulations granted extensions of time to file the answer and were renewed regularly, rule day after rule day.

The contract for licenses under the lump sum agreement provides for the present membership of the Automobile Board of Trade if applications are made and all companies that join that organization in the future up to a certain number. As a merger of the Automobile Board of Trade and the National Association of Automobile Manufacturers is pending, the members of the National Association, who are not already members of the Board of Trade, will be entitled to licenses on that basis.

The procedure by which the licenses will be granted contemplates an application by the Board of Trade to the Enterprize Automobile Company for such license. The number is not limited, but it is unquestionably true that future members of the Board of Trade will have to pay more for the license privilege than the present membership, including the N. A. A. M.

Eligible to License Under Agreement

The present membership of the Automobile Board of Trade is as follows:

Autocar Company, Buick Motor Company, Cadillac Motor Car Company, Cartercar Company, Chalmers Motor Company, Jas. Cunningham Sons and Company, Elmore Manufacturing Company, H. H. Franklin Manufacturing Company, Garford Company, Haynes Automobile Company, Hudson Motor Car Company, International Motor Company, Jackson Automobile Company, Knox Automobile Company, Locomobile Company, of America, Lozier Motor Company, Marquette Motor Company, Matheson Automobile Company, Mercer Automobile Company, Metzger Motor Car Company, Mitchell-Lewis Motor Company, Moline Automobile Company, Moon Motor Car Company, National Motor Vehicle Company, Nordyke and Marmon Company, Oakland Motor Car Company, Olds Motor Works, Packard Motor Car Company, Peerless Motor Car Company, Pierce-Arrow Motor Car Company, Pope Manufacturing Company, Premier Motor Manufacturing Company, Pullman Motor Car Company, Rapid Motor Vehicle Company, Reliance Motor Truck Company, Reo Motor Car Company, Selden Motor Vehicle Company, F. B. Stearns Company, Stevens-Duryea Company, S. G. V. Company, E. R. Thomas Motor Company, United States Motor Company, Warren Motor Car Company, White Company, Willys-Overland Company, Winton Motor Carriage Company.

The list totals forty-six. In the event of application for license of the constituent companies of the United States Motor Company and the International Motor Company, this number would be increased to fifty-one.

The full roster of the N. A. A. M. includes the following cars:

Auburn, Abbott, Alco, American, Detroit, Electric, Apperson, Austin, Autocar, Babcock electric, Baker, Glide, Brush, Buick, Cadillac, Cartercar, Chalmers, Cutting, Cole, Columbia, Firestone-Columbus, Corbin, Stoddard-Dayton, De Tamble, Duryea, Elmore, E-M-F, Federal truck, Fiat, Ford, Franklin, Garford, Grabowsky, Gramm, Great Western, Haynes, Hewitt, Hudson, Hupmobile, Imperial, Interstate, Jackson, Rambler, Kelly truck, Kissel, Knox, Krit, Locomobile, Lozier, Stutz, International Motor Car Manufacturing Company, Marquette, Matheson, Maxwell, Everitt, Mitchell, Moline, Moon, National, Marmon, Oakland, Ohio electric, Oldsmobile, Packard, Peerless, Pierce-Arrow, Case, Pope, Premier, Pullman, R. C. H., Rapid, Rauch and Lang, Regal. Reliance, Reo, Royal Tourist, Selden, Simplex, Staver, Stearns, Stevens-Duryea, Studebaker, Thomas, Velie, Walter, Waverley, White, Winton, Woods, Overland, Warner. This makes a total of ninety-two members.

There are forty-four members of the N. A. M. who are not represented in the Board of Trade, but among them are six makers of electrics, a duplication of the Studebaker Corporation and E-M-F and several companies that are not active at the moment. The United States Motor Company, comprising the Brush, Maxwell, Columbia, Stoddard-Dayton and Sampson lines is expected to take out four licenses for the last four companies named. This will bring the total number of licenses to be granted to the members of the merged organizations about seventy-five.

In the list of members are the names of several companies whose product is deemed to be outside the patents. Precisely which companies are included in this list will appear when the licenses are granted.

One Reason for Merger Disclosed

The outcome of the successful negotiations uncovers one of of the main reasons for the pending merging between the two national organizations. The membership of the Board of Trade is almost entirely included in the National association, but the National Association under its charter is not allowed to hold patent rights as such. Therefore, if the license rights are assumed by the Automobile Board of Trade and the two organizations are merged, the members of the National Association will be able to enjoy the privilege of license rights granted through the Board of Trade.

An interesting sidelight on the matter is shed by a statement made to THE AUTOMOBILE by Herman Cuntz, patent counsel for the Board of Trade. Mr. Cuntz returned from a trip abroad recently, having been commissioned to conclude negotiations between the General Vehicle Company and the Daimler company for the exclusive American rights to manufacture Daimler commercial vehicles by the former company. Trucks of this type use a selective type of transmission under British patents dated in 1898. Mr. Cuntz was asked whether this device did not anticipate the Dyer patents in such a way as to defeat them; he replied in the negative, saying that there were vital points of difference between the Daimler patented device and that covered by the Dyer patents. The chief point, he said, was that the Dyer device is shiftable as an entirety, while that employed since 1899 in the Daimler commercial wagons constitutes a series of shifts in order to vary speed and reverse. Mr. Cuntz characterized the later improvements now used in the Mercedes and Daimler pleasure automobiles as changes and modifications of the original idea.

The main Dyer patent in the limelight at present is number 885,986, issued April 28, 1908, on application filed January 22, 1906, but in reality extending back in its effect to the statutory period before February 3, 1900. The reason for this retroactive effect of the patent is that it is declared to be a division of an application for patent filed at that date by Leonard H. Dyer and which was later issued as patent 921,963 under date of May 18, 1909.

Patent 921,963 underlies the other as a sort of foundation for it. It is for an automobile vehicle, covering improvements in the frame, driving gear and changing and reversing mechanisms. According to the language of the patent, the object of the invention is to improve automobile construction by direct driving connections between the motor and the differential with such reduction as is necessary owing to the relatively different speeds of such parts. In connection with this direct drive mechanism is provided an additional low speed gearing, and if necessary, a back or reverse gearing, either of which will be introduced when required.

The invention also comprises in a rectangular metal framework, supported by means of springs, upon wheels with a driving motor carried thereon. Connection is made between the driving engine and the longitudinal shaft by means of the usual friction clutch and the shaft may be provided if necessary with one or more flexible or knuckle joints to permit the framework to oscillate independently of the wheels and yet allow the driving mechanism to run freely.

What Underlying Patent Contains

To provide a speed-changing gear the longtitudinal shaft is formed in two parts with a releasable connection between, combined with means for rotating the two shaft parts at different speeds. The invention is broad enough to permit of any form of mechanism being used for this purpose, but an auxiliary is preferred, so mounted as to be parallel with the two parts of the main shaft, with a system of spur-gearing, which is normally not in mesh but which can be inter-meshed after the two shaft parts have been separated.

Combined with the speed reducing gear is a reversing gear, which may be of any type but a series of gears mounted upon another auxilliary shaft with bevel gearing so arranged that the two parts of the longitudinal shaft may be caused to rotate in opposite directions is preferred.

The claims under this patent number three and are as follows:

1—The combination in a vehicle of a spring-supported frame, driving and steering wheels, a motor mounted upon the front of the frame, a shaft driven by such motor and in line with the shaft of the motor, the said shaft being longitudinally arranged substantially at an equal distance between the wheels and substantially parallel with the ground, a friction clutch connecting the shaft to the motor, a second shaft in line with the first shaft, means for directly connecting the two shafts for driving the second shaft without reduction in speed, means for breaking the connection between the two shafts and for connecting them together through power transmitting mechanism, affording a reduced speed, a differential gear between the second shaft and the wheels of the vehicle, and a reversing gear for reversing the direction of travel of the vehicle.

2—The combination in a vehicle of a spring supported frame, driving and steering wheels, a motor mounted upon the front of the frame, a shaft driven by such motor and in line with the shaft of such motor, the said shaft being longitudinally arranged between the wheels, a friction clutch connecting the shaft to the motor, a second shaft in line with the first shaft, means for directly connecting the two shafts for driving the second shaft without reduction in speed, and means for breaking the connecting between the two shafts and for connecting them together through power-transmitting mechanism, affording a reduced speed.

3—The combination in a vehicle, of a spring supported frame, driving and steering wheels, a motor mounted upon the front of the frame, a shaft driven by such motor and in line with the shaft of the motor, the said shaft being longitudinally arranged between the wheels, a friction clutch connecting the shaft with the motor, a second shaft in line with the first shaft, means for directly connecting the two shafts for driving the second shaft without reduction of speed, means for breaking the connection between the two shafts and for connecting them together through power-transmission mechanism, affording a reduced speed, and a reversing gear for reversing the direction of travel of the vehicle.

Referring to the accompanying illustrations designated as

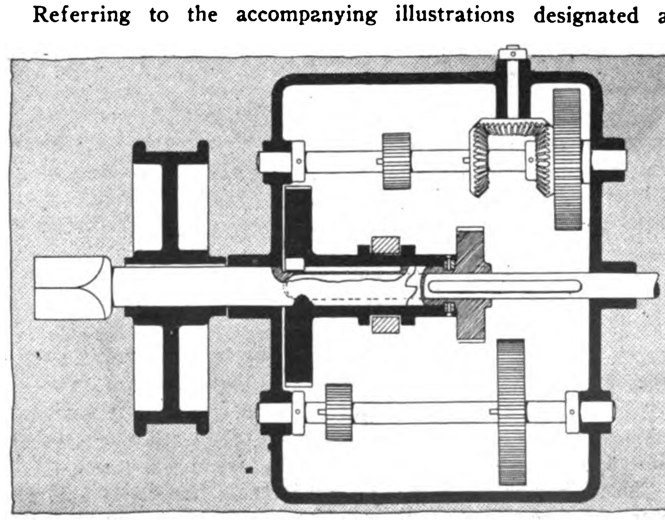


Fig. 3—Low speed and reversing gear claimed in patent

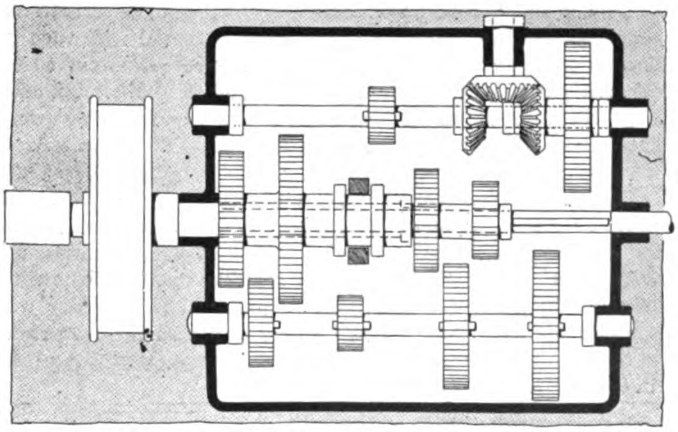


Fig. 5—Low and reverse with additional forward speeds

Figures 2, 3, 5, 6 and 7 and taken from the official drawings shown in the patent papers, Fig. 2 shows the location of the patented device, looking down upon a motor vehicle chassis; Fig. 3 shows the low speed and reversing gears; Fig. 5 shows the low, reverse and additional forward speeds secured by the addition of extra secondary gears upon one of the auxiliary shafts together with extra gears on the main driving shaft. Figs. 6 and 7 are views of the device from above and from one end.

The claims of patent 885,986 are as follows:

1—In a transmission for automobiles, the combination of a driving member, a driven member, a driving gear for the former, a plurality of intermediate gears, including a reversing gear and means, including mechanism shiftable as an entirety for driving said driven member through any one of said intermediate gears.

2—In a transmission gear for automobiles, the combination of a driving member, a driven member, a driving gear for the former, a plurality of intermediate gears including a reversing gear and means, including mechanism shiftable as an entirety, for coupling said driving member to said driven member and for also driving said driven member through any one of the said intermediate gears.

3—Transmission mechanism for motor vehicles, the same comprising a driving member, a driven member, means to couple said driven member to said driving member to be driven by the latter and means comprising mechanism shiftable as an entirety to drive said driven member at a different speed for said driving member and to drive said driven member in reverse direction from said driving member.

4—Transmission mechanism for motor vehicles, the same comprising a driving member, a driven shaft axially aligned therewith, means to couple said member and shaft, one to the other for direct drive of the latter by the former, a plurality of gears arranged out of line with the axis of said shaft and driven by said member, and a shiftable transmission device on said shaft and adapted to engage the said plurality of gears to drive said shaft in the same, and also in a reverse direction.

5—In a transmission gear for automobiles, the combination of a driving member, a driven member, and means comprising mechanism shiftable as an entirety coupling said driving member to said driven member to drive the latter from the former and for varying the speed and direction of movement transmitted from said driving member to said driven member.

6—Transmission mechanism for automobiles, the same comprising a driving shaft, a plurality of fixed intermediate gears, including a reversing gear, means for supporting said gears, a driven shaft and means comprising a longitudinal, shiftable transmission device to rotate the latter from the driving shaft to any one of said intermediate gears.

7—Transmission mechanism for automobiles, same comprising a driving shaft, gear supporting means driven therefrom at a reduced speed, a plurality of fixed intermediate gears, including a reversing gear, a driven shaft and means comprising a longitudinal, shiftable transmission device to rotate the latter from the driving shaft through any one of said intermediate gears.

Claims Cover Shiftable Mechanism

8—TRANSMISSION mechanism for motor vehicles comprising a driving member, a driven member, a shiftable transmission member, means coordinate therewith to couple said driven member to said driving member, one or more stationary intermediate gears driven by said driving member and means to bring said transmission member into separate engagement and disengagement with said one or more intermediate gears.

9—Transmission mechanism comprising a driving member and a driven member adapted to be driven one by the other at the same speed, at different speeds, or in a reverse direction and mechanism longitudinally shiftable as an entirety for obtaining such changes in speed and direction.

10—Transmission mechanism for motor vehicle comprising a driving member, a driven shaft axially aligned therewith, a shiftable transmission device on said shaft, means for coupling said driving member and said driven shaft one to the other for the direct drive of the latter by the former, one or more stationary gears arranged at one side of the axis of said shaft and driven by said driving member and means to shift such transmission device into engagement with the said one or more gears.

11—In a motor vehicle, a motor, clutch, driving gear and driven shaft, all axially aligned, intermediate gears between said driven shaft and driving gear, mechanism shiftable as an entirety to couple said driven shaft to said driving gear and to drive said shaft from said driving gear through any one of said intermediate gears, a jack-shaft arranged at an angle with said driven shaft and driven therefrom and vehicle driving wheels connected with and driven from said jack-shaft.

12—In a motor vehicle, a motor, clutch, driving shaft and driven shaft, all axially aligned, means comprising mechanism shiftable as an entirety for varying the speed and direction of movement transmitted from said driving shaft to said driven shaft, a jack-shaft arranged at an angle with said driven shaft and driven therefrom and vehicle driving wheels connected with and driven from said jack-shaft.

13—In a transmission gear for automobiles the combination of a driving member, a driven member, axially aligned therewith and means comprising mechanism shiftable as an entirety to couple said driving and driven members together and to vary the speed and direction of movements transmitted from said driving member to said driven member.

14—In a speed changing gear for motor vehicles, the combination with a motor shaft, a driven shaft, means for connecting the two together to secure high speed, a low speed gearing consisting of a plurality of gear wheels caused to engage by longitudinal shifting movements and means for producing reverse rotation of the driven shaft.

15—In a motor vehicle the combination with the motor and driving wheels, of a gearing connecting the driving wheels and motors, the said gearing comprising a longitudinal shaft and a clutch connecting the shaft to the motor, and by means of which it will be driven, of means for rotating the wheels and a portion of the shaft at a different speed ratio, the said means including a jaw-clutch and longitudinally sliding gears, a single lever for sliding the gears and engaging and disengaging the jaw-clutch and a reverse gearing, and means operated by the said lever for engaging the reverse gearing.

16—In a motor vehicle the combination with a driving motor and driving wheels, of a gearing connecting the two, the said gearing comprising longitudinally aligned driving and driven shafts and a clutch connecting the driving shaft to the motor, and by means of which it will be driven, connections between the driven shaft and the driving wheels, gearing connecting the longitudinal shaft to positively drive the driven shaft at low or high speed, and comprising longitudinally sliding gears and a second clutch, and a single manually operated sliding device for sliding the gears, and for engaging the second clutch.

17—In a motor vehicle, the combination with a driving motor and driving wheels, of a gearing connecting the two, said gearing comprising longitudinally aligned driving and driven shafts and a clutch connecting the driving shaft to the motor and by means of which it will be driven, connections between the driven shaft and the driving wheels, gearing connecting the longitudinal shafts to positively drive the driven shaft at low or high speeds, and comprising longitudinally sliding gears and a second clutch, and a single actuating lever for sliding the gears and for engaging and disengaging the second clutch.

Gears Still When Disconnected

18—In a motor vehicle, the combination with the motor and driving wheels, of a gearing connecting the two, the said gearing comprising longitudinally aligned driving and driven shafts and a clutch for connecting the two, for driving the driven shaft at high speed, and reduced speed gearing for positively driving the driven shaft at a reduced speed and means for engaging the said reduced speed gearing, the said reduced speed gearing being entirely disconnected when not in use, and being introduced and disengaged by a longitudinally sliding movement.

19—In a motor vehicle, the combination with the motor and driving wheels of a gearing connecting the two, the said gearing comprising longitudinally aligned driving and driven shafts and a clutch for connecting the two for driving the driven shaft at high speed, and reduced speed gearing and reverse gearing for positively driving the shaft at a reduced speed, or in the reverse direction, and means for engaging the said reduced gearing and reverse gearing, the said reduced speed gearing and reverse gearing being entirely disconnected when not in use, and being introduced and disengaged by a longitudinally sliding movement.

20—In a motor vehicle the combination with the motor and driving wheels, of a gearing connecting the two, the said gearing comprising a longitudinal shaft, a clutch connecting the shaft to the motor and by means of which it is driven, connections between the shaft and the driving wheels, and a change speed device for rotating a portion of the shaft at a less speed than the motor, the said change speed device comprising an auxiliary shaft and gears on the longitudinal shaft, and means for intermeshing the gears by a sliding movement.

21—In a motor vehicle, the combination with the motor and driving wheels of a gearing connecting the two, the said gearing comprising a longitudinal shaft, a clutch connecting the shaft to the motor, and by means of which it is driven, connections between the shaft and the driving wheels and a change speed device for rotating a portion of the shaft at a less speed than the motor, the said change speed device comprising an auxiliary shaft, and gears on the longitudinal shaft and means for intermeshing the gears by a sliding movement, the said means comprising a single manually operated lever.

22—In a motor vehicle the combination with the motor and driving wheels, of a gearing connecting the two, the said gearing comprising a longitudinal shaft, a clutch connecting the shaft to the motor, and by means of which it is driven, connections between the shaft and the driving wheels and a change speed device for rotating a portion of the shaft at a less speed than the motor, the said change speed device comprising an auxiliary shaft, mounted in rigid bearings, gears rigidly mounted on the auxiliary shaft and gears on the longitudinal shaft, and means for intermeshing the gears by a sliding movement.

23—In a motor vehicle the combination with a driving shaft made in two parts, of a clutch made in two parts and connecting the shaft parts, one of the clutch parts sliding upon its supporting shaft part, a gear connected to the sliding clutch part and sliding with it, an auxiliary shaft, gears thereon and means for sliding the moving clutch part and its companion gear to disengage the two shaft parts and engage the gear with a gear on the auxiliary shaft, to cause the two shaft parts to rotate at a different speed relation.

24—In a motor vehicle the combination with a driving shaft in two parts, of a clutch made in two parts and connecting the shaft parts, one of the clutch parts sliding upon its supporting shaft part, a gear connected to the sliding clutch part and sliding with it, a gear on the other shaft part and rotating with it, an auxiliary shaft gear thereon, the said shaft being mounted in rigid bearings and means for sliding the moving clutch part and its companion gear to disengage the two shaft parts and engage the gear with a gear on the auxiliary shaft, to cause the two shaft parts to rotate in a different relation.

25—In a motor vehicle, the combination with a driving shaft made in two parts, of a clutch made in two parts and connecting the two shaft parts, one of the clutch parts sliding upon its supporting shaft part, a gear connected to the sliding clutch part and sliding with it, a gear on the other shaft part and rotating with it, an auxiliary shaft, gears thereon, the gears being rigidly mounted on the shaft and means for sliding the moving clutch part and its companion gear to disengage the two shaft parts and engage the gear with a gear on the auxiliary shaft to cause the two shaft parts to rotate in a different speed relation.

26—In a motor vehicle the combination with a driving shaft made in two parts, of a gear case, a clutch made in two parts and connecting the two shaft parts, one of the clutch parts sliding upon its supporting shaft part, a gear connected to the sliding clutch part and sliding with it, a gear on the other shaft part and rotating with it, an auxiliary shaft, mounted in rigid bearings, carried by the gear case, gears movable in a fixed plane with respect to said shaft, on the auxiliary shaft and means for longitudinally sliding the moving clutch part and its companion gear to disengage the two shaft parts and engage the gear with a gear on the auxiliary shaft to cause the two shaft parts to rotate in a different speed relation.

27—In a motor vehicle, the combination with a driving shaft made in two parts, of a gear case, bearings on the gear case for the shaft parts, a clutch made in two parts and connecting the two shaft parts, one of the clutch parts sliding upon its supporting shaft part, a gear connected to the sliding clutch part and sliding with it, a gear on the other shaft part and rotating with it, an auxiliary shaft, mounted in rigid bearings, carried by the gear case, gears on the auxiliary shaft, the said gears being rigidly mounted on the shaft and means for sliding the moving clutch part and its companion gear to disengage the two shaft parts and engage the gear with a gear on the auxiliary shaft to cause the two shaft parts to rotate in a different speed relation.

28—In a motor vehicle, the combination with a shaft made in two parts of a gear case, bearings on the gear case for the shaft parts, a clutch made in two parts and connecting the two shaft parts, one of the clutch parts sliding upon its supporting shaft part, a gear connected to the sliding clutch part and sliding with it, a gear upon the other shaft part and rotating with it, an auxiliary shaft, mounted in rigid bearings carried by the gear case, gears on the auxiliary shaft, and means carried within the gear case for sliding the moving clutch part and its companion gear to disengage the two shaft parts and engage the gear with a gear on the auxiliary shaft to cause the two shaft parts to rotate in a different speed relation.

29—In a motor vehicle the combination with a driving shaft made in two parts, of a gear case, bearings on the gear case for the shaft parts, a clutch made in two parts and connecting the two shaft parts, one of the clutch parts sliding upon its supporting shaft part, a gear connected to the sliding clutch part and sliding with it, a gear on the other shaft part and rotating with it, an auxiliary shaft mounted in rigid bearings carried by the gear case, gears on the auxiliary shaft, the said gears being rigidly mounted on the shaft, and means carried within the gear case for sliding the moving clutch part and its companion to disengage the two shaft parts and engage the gear with a gear on the auxiliary shaft to cause the two shaft parts to rotate in a different speed relation.

Two Sections Rotate Separately

30—A motor vehicle having driving wheels, a motor, a shaft in line with the motor shaft, a clutch connecting the two to cause the shaft to rotate at the same speed as the motor, the shaft being longitudinally arranged between the driving wheels and divided into two sections, a device for connecting and disconnecting the two sections for causing them to rotate as an entirety or to permit independent rotation, means for rotating the rear section of the shaft at a lesser speed than the motor or in a reverse direction, said means including sliding gears, longitudinally movable in a fixed plane with respect to said shaft and mechanism for so moving said gears, and connections between the rear section of said shaft and the driving wheels, substantially as set forth.

31—In a motor vehicle, the combination with a shaft formed of two parts, a connecting clutch and a gear on each shaft part, of a second shaft and gears thereon, and a single lever for shifting the gears on the first shaft and actuating the clutch, substantially as set forth.

32—Transmission for a motor vehicle, having a shaft formed of two parts, one telescoping within the other, connecting clutch, a gear carried by one clutch member, a second gear connected to the first gear but freely rotatable with respect thereto, a second shaft, and gears thereon and a single lever for shifting said first gears, and actuating the clutch substantially as described.

33—In a motor vehicle, the combination with a shaft formed of two parts, of a clutch connecting the two parts, a sleeve surrounding the abutting ends of the two parts, a gear formed integral with the clutch, and engaging with one part, a second gear formed integral with the sleeve and engaging with the other part, an auxiliary shaft, gears thereon disengaged at the high speed, intermediate gears interposed between the gears on the second shaft, and means for moving the sleeve, clutch and gears to disengage the two shaft parts and intermesh the gears, whereby the two parts of the shaft may be caused to rotate in different speed relations, substantially as described.

34—Transmission gearing for a motor vehicle having a shaft formed of two parts, one telescoping within the other, a connecting clutch, a gear integrally formed upon one clutch member, a second gear, a sleeve thereon, connecting with, but freely rotatable with respect to the first gear, a second shaft with gears thereon and a single-shifting lever for sliding said first gears and disengaging the clutch, substantially as described.

35—In a motor vehicle, a gear case therefor, having a cover and supporting brackets, with a set of common securing bolts.

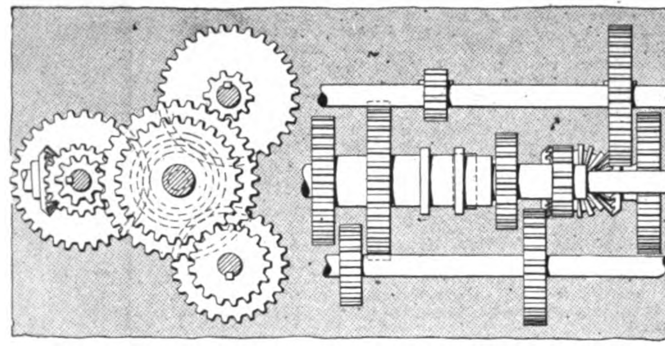
36—In a motor vehicle, a combination of a shaft therefor, formed in two parts, a fixed clutch member on one part, a movable clutch member on the other, gears connected to said movable member, a plurality of auxiliary shafts, gears thereon, and means for sliding said movable clutch member and connected gears along the shaft to disengage the clutch and intermesh the gears seriatim, substantially as and for the purposes set forth.

37—In a motor vehicle, the combination with the shaft, formed in two parts, of a clutch for connecting parts together to cause the shaft to rotate as an entirety, slidable gears on the shaft's parts, connecting to and working with one clutch member, auxiliary shafts with gears thereon, and means, which being moved, will first disengage the clutch and move the gears to a position to engage with the gears on one auxiliary shaft to cause the shaft's parts to partake of the different speed relations, and the continuation of the movement will cause the gears to engage with the gears on the other auxiliary shaft and cause the shaft's parts to rotate in opposite directions, substantially as and for the purposes set forth.

38—In a motor vehicle, the combination with an operating motor, of connections between the motor and the driving wheels, comprising a two-piece shaft connected thereto, connections to said shaft and driving wheels, a clutch connecting the two parts of the shaft, a gear carried by one part of the shaft, a second gear carried by the other part, connections between the gears and the clutch for moving altogether, an auxiliary shaft, two gears secured thereto, out of mesh with the other two gears at the high speed, a second auxiliary shaft, two gears secured thereto, normally out of mesh with the first two gears, intermediate gearing interposed between the two gears on the second auxiliary shaft, and means for disengaging the clutch and intermeshing the different gears, whereby the two parts of the shaft may be caused to rotate in different speed relations.

39—In a motor vehicle, the combination with the driving shaft made in two parts, of the clutch connecting the two parts, a sleeve surrounding the abutting ends of the two parts, a gear formed integral with the clutch, a second gear formed integral with the sleeve and engaging with the other part, and an auxiliary shaft, gears thereon, disengaged at a high speed, and means for moving the sleeve, clutch and gears to disengage the two shaft parts and intermesh the gears, whereby the two parts of the shaft may be caused to rotate in different speed relations.

40—In a motor vehicle, the combination with the driving shaft made in two parts of a clutch connecting the two parts, a sleeve surrounding the abutting ends of the two parts, a gear formed integral with the clutch,



Figs. 6 and 7—End and top views of patented device

a second gear formed integral with the sleeve and engaging with the other part, an auxiliary shaft, gears thereon, disengaged at the high speed, a second auxiliary shaft, gears thereon, disengaged at the high speed and means for moving the sleeve, gears and clutch to disengage the two shaft parts and intermesh the gears, whereby the two parts of the shaft may be caused to rotate in different speed relations.

41—In a motor vehicle, the combination with the driving shaft made in two parts, of a clutch connecting the two parts, a sleeve surrounding the abutting ends of the two parts, a gear formed integral with the clutch and engaging with one part, a second gear formed integral with the sleeve and engaging with the other part, and an auxiliary shaft, gears thereon, disengaged at the high speed, intermediate gearing interposed between the gears, means for moving the sleeve, clutch and gears to disengage the two shaft parts and intermesh the gears, whereby the two parts of the shaft may be caused to rotate in different speed relations.

42—In a motor vehicle, the combination with a motor and driving wheels, of connections between said motor and the driving wheels, including a two-piece shaft, a clutch connecting the two shaft pieces, gears upon the shaft pieces and auxiliary shaft with gears thereon, said gears being so arranged as to be out of mesh when the clutch is engaged, and an element longitudinally shiftable as an entirety for actuating said clutch and intermeshing said gears, substantially as and for the purposes set forth.

43—In a motor vehicle, the combination with the shaft formed in two parts, one telescoping within the other, of a connecting clutch, a gear integrally formed upon one clutch member, a second gear connected to the first gear but freely rotatable with respect thereto, a second shaft, and gears thereon and a single lever for shifting said first gears and actuating the clutch, substantially as described.

44—In a motor vehicle, the combination with the driving shaft formed in two parts, of a fixed clutch member on one part, a sliding clutch member on the other part, a gear rigidly connected to said slidable member, a gear rotatably connected to said slidable member, an auxiliary shaft, gears thereon, and means for moving said slidable clutch member and connected gears along the shaft to disengage the clutch and intermesh the gears, substantially as and for the purposes set forth.

45—In a motor vehicle, the combination with an operating motor, of connections between the motor and the driving wheels, comprising a two-piece shaft connected thereto, the connections between said shaft and driving wheels, a clutch connecting the two parts of the shaft, a gear carried by one part of the shaft, a second gear carried by the other part, connections between the gears and clutch for moving all together, an auxiliary shaft, two gears secured together, out of mesh with the other two gears at the high speed, a second auxiliary shaft, two gears secured thereto out of mesh with the first two gears at the high speed, and means for disengaging the clutch and intermeshing the gears, whereby the two parts of the shaft may be caused to rotate in different speed relations.

46—In a motor vehicle, the combination of the driving wheels, the motor, the driving shaft between the motor and driving wheels, made of two longitudinally aligned sections, a clutch arranged to couple the sections so that the driving shaft may turn as an entirety and longitudinally sliding speed reducing gearing arranged to connect the shaft sections, and so coordinated with said clutch that the engagement of said gearing will effect the prior disengagement of said clutch and vice versa, substantially as described.

Details of Dyer's Transmission Claims

47—In combination in a change speed mechanism, a driving shaft, a driven shaft, gears mounted upon said driving shaft and driven shaft, intermediate gears on an axis in fixed relation with the axis of said driving and driven shafts, means for transmitting power from said driving shaft to said driven shaft through said intermediate gears, and means movable on the driven shaft for directly connecting the driving and driven shaft with all intermediate gears at rest.

48—In combination in a change speed mechanism, a driving and a driven shaft arranged in the same axial line and adapted to have independent movement, change gears carried upon the driving and driven shafts, means for varying the position of said gears, power transmitting means adapted to connect a gear on said driving shaft and on said driven shaft and a clutch mechanism for directly connecting said driving and driven shafts.

49—In combination in a change speed mechanism, a driving shaft, a gear borne upon said shaft, a counter shaft, a gear borne upon the counter shaft and meshing with the gear upon the driving shaft, a driven shaft operatively arranged with relation to the driving shaft and provided with a clutch mechanism adapted to clutch it directly to said shaft, and intermediate gears borne upon the driven shaft and counter shaft, whereby the speed of the former may be varied with relation to the speed of the latter.

50—In combination in a change speed mechanism, a driving shaft and driven shaft, a driving gear for the former, a plurality of intermediate gears including a reversing gear and means for driving said driven shaft through any one of said intermediate gears.

51—In combination in a change speed mechanism, a driving shaft, a driven shaft, a plurality of transmission gears mounted to slide thereon, a plurality of intermediate gears arranged to engage and drive respectively, but singly, the said transmission gears, and means to couple said driven shaft directly to said driving shaft.

52—In a motor vehicle, the motor, clutch, driving gear and driven shaft, all axially aligned, means to drive said driven shaft from said driving gear at the same and also at different speeds, a jack-shaft arranged at an angle with said driven shaft and driven therefrom, and vehicle driving wheels connected with and driven from said jack-shaft.

53—In combination in a change speed mechanism, a driving shaft, a driven shaft, a counter shaft in fixed relation to said driving and driven shafts, an operative gearing on said shafts, and inclosing casing, a bearing in said casing for one end of the driven shaft, the other bearing for said driven shaft being in the driving shaft.

54—In combination in a change speed mechanism, a driving shaft and a driven shaft, operatively arranged, an inclosing casing, a bearing in said casing for one end of one of said shafts, the other end of said shaft having a bearing in the other shaft, a counter shaft in fixed relation to said driving and driven shafts and a plurality of gears connecting said counter driving and driven shafts.

55—In combination in a change speed mechanism, a driving shaft and a driven shaft axially aligned, a counter shaft in fixed relation to said driving and driven shafts, a plurality of gears connecting and said counter, driving and driven shafts, an inclosing casing, a bearing in said casing for one end of the driven shaft, the other end having a bearing in the driving shaft.

56—In combination in a change mechanism, a driving shaft and a driven shaft, the driven shaft having a bearing in the driving shaft, and means movable on the driven shaft to engage the surrounding end of the driving shaft to rotate the two shafts at the same speed, a counter shaft in operative fixed relation to said driving and driven shafts and a plurality of gears connecting said counter, driving and driven shafts.

57—In a transmission mechanism, for motor vehicles, a casing, a driving shaft or shaft section projecting into said casing at one side, a bearing therefor, in the wall of said casing, a gear and clutch part fixedly secured on or integral with said shaft section, and entirely on one side of said bearing within said casing, a driven shaft in said casing having a movable complementary clutch part, a counter shaft in fixed relation to said driving and driven shaft, and a plurality of gears on said shaft whereby varying speeds are transmitted to a shaft projecting from said casing.

Leonard Huntress Dyer
(Photo by Mrs. Dyer)

High-lights in Inventor's Life

Leonard H. Dyer was born May 13, 1873, in Washington, D. C. He was educated in the schools of Washington and later at Columbian University and Georgetown University, specializing in mechanics and electric science. From early boyhood his trend toward inventions has been apparent. Among his inventions is numbered an electric steering gear for ships, which is now owned by the General Electric Company and several improvements upon apparatus related to the cotton industry.

Early in the career of Mr. Dyer he became interested in automobiles and he has always held the belief gained from his investigation that the internal combustion engine would be a favorite of destiny.

In 1897 he devoted the entire year to the building of automobiles and constructed three cars of full size that were successfully demonstrated, all using gasoline engines, thus indicating that he was among the pioneer builders of the industry.

In 1903 he entered the firm of Dyer, Dyer and Taylor and engaged in the practice of patent law. In 1908 the two patents mainly involved in the license rights granted to the Automobile Board of Trade were transferred to the Enterprize Automobile Company.

John R. Taylor has been president of that corporation until recently, when he resigned and Mr. Dyer was chosen president in his stead.

Mr. Dyer is married and resides at Greenwich, Conn.

In speaking of his patents and particularly referring to patents 885,986 and 921,963, Mr. Dyer said recently:

"When Mr. Redding said that a comprehensive research of the prior art developed nothing sound upon which a defense against the patents could be based, he confirmed my opinion. Any such search as he prosecuted is bound to turn up a mass of data, but in this instance none of it could be applied by the defense. This is demonstrated by the fact that Mr. Redding's clients have agreed to take out manufacturing licenses.

"There has been a widely circulated opinion that the Dyer patents were allowed to sleep in the Patent Office and after the industry had grown up around them were issued. This is not true. The exact fact in the case is that through interference proceeding with the Renault patent, application for which was pending coincidentally with my own, the dates and claims of my patent were revealed and the industry appropriated my idea and incorporated it into the modern automobile.

"Imagine, if possible, the elimination of my idea from modern construction and then the importance of my device will be obvious.

"As to the prior art, there is none. Of course there can be found a record of a vast amount of ineffectual endeavor, but there is a difference between ineffectual endeavor and desire to attain a certain result and the actual accomplishment of such a result.

"The American situation is embodied in the Dyer patents, 1900, Renault patent 1901, Law, Leonard and Riker 1903. These records are all available to searchers and if any of them antedated my patents, Mr. Redding surely would have discovered them. In the foreign art there is nothing effective, despite the large quantity of abortive and ineffectual material revealed by a careful search.

"I demanded interference proceeding in the Patent Office when the Renault patent was issued and the whole record of the proceedings is available. The fact that despite the proceedings, my patent was issued as antedating that of Renault ought to be conclusive. The French Renault patent was issued in 1904.

"As a firm believer in the permanent usefulness of the automobile, I will say that I am on the constructive side. I do not wish to tear down; I wish to aid in building up."

Prosecution of individual owners of automobiles by the Enterprise Automobile Company for alleged infringement of the Dyer transmission patents has not yet been checked, despite the favorable outcome of the negotiations with the Automobile Board of Trade. The following suits have been entered this week in the United States District Court on behalf of the Enterprise Automobile Company: George Litwin, Frontenac; Sidney Ascher, Decauville; Oscar L. Lines, Mais; Edwin F. Brush, C. G. V.; John Beshar, Charron, and Desire E. Manduse, Clement-Bayard.

Supply Company in Receiver's Hands

COLUMBUS, OHIO, Aug. 12—The Brandt & Johnston Auto Supply Company, which has been operating a plant in South Columbus, O., for a number of years, was thrown in the hands of Fred W. Herbst as receiver upon the application of the City National Bank of Columbus, who claimed to be unable to collect a judgment of $5,000 against the corporation. The officials of the company did not oppose the action, although they contended the concern is solvent. It is alleged that bill receivable more than offset the debts of the concern and that $200,000 worth of business is on the books. The plant will be continued in operation under Charles Barndt and W. R. Johnson as managers. The petition was one of the results of the death of Dr. L. M. Early, a heavy stockholder in the company.

Prest-O-Lite Sues Searchlight

INDIANAPOLIS, IND., Aug. 12—Another suit defending its patents has been brought in the Federal Court in this city by the Prest-O-Lite Company. The new case is directed against the Searchlight Gas Company of Ohio and is very similar to cases which have been brought against other concerns manufacturing and selling devices which the Prest-O-Lite company claimed were infringements on its patents.

An injunction against the infringement of the Prest-O-Lite patents and an accounting are demanded in the suit. It is alleged that the Searchlight company has refilled Prest-O-Lite tanks. These tanks are trade-marked and it is alleged that refilling the tanks is an infringement of this trade-mark.

The Searchlight Gas Company has an office in this city.

Report on Oldfield Bill

Calls Attention to Numerous Evils Which the Measure Will Scotch—Limits Rights to 19 Years

WASHINGTON, D. C., Aug. 10—Of vital interest to the motor car and accessory industries is the report made to Congress this week on the Oldfield patent bill. Broad changes in the patent laws, recommendations for changes in the equipment and organization of the patent office are outlined in the report. The bill has been fought bitterly by manufacturers all over the country.

It seeks to make great changes in existing conditions, one feature being a section prohibiting a manufacturer from bringing suit for infringement of patents against a dealer who sells the manufacturer goods at a less price than that fixed by the manufacturer as a retail price.

"As to the wealthy corporations," says the report, "it has become obvious that the skilful handling of patent cases gives them an untold advantage over their smaller competitors. For them a well organized patent department is a reliable machine, where money is the lubricant. This machine, in its slow but grinding way, can reduce to pulp any of the smaller competitors. For large corporations, the maintenance of such a machine, with a staff of lawyers and experts, is merely a small side expense. By its aid they can bluff their weaker competitors into quick submission. If this is not successful, they can drag out a patent suit indefinitely until the weak opponent, unable to bear the ever-increasing expenses, collapses and withdraws."

The evils spoken of in the report cover a broad field of activity. The habit of manufacturers fixing a retail price for their goods is one, the custom of manufacturers of patented articles stipulating in what manner they shall be used is another; and the third evil is a phase of the trust problem, whereby owners of patents suppress them with a view to killing competition.

The bill has a clause limiting a patent right to 19 years exclusive of the time actually consumed in the patent office in considering it, or by the courts in deciding some phase of it. "This provision," says the report, "is aimed at the procrastination that has become proverbial on the part of applicants for patents."

The bill seeks to upset the present practice of considering as an infringement of a patent any sale of any patented article below price fixed by the manufacturer. For instance, many well known articles of everyday use, particularly in the motor car accessory trade, have the same retail price the world over. This is a matter controlled by the manufacturer and any cut-rate sale is liable to a suit in the United States courts on the ground that it is an infringement. The bill would make it not a matter of suit on the patent, but simply a matter of contract with manufacturer and dealer.

Rochester Orphans Enjoy Outing

ROCHESTER, N. Y., Aug. 10—Rochester's annual orphans' day held last Tuesday was a great success, 762 orphans being driven in 284 automobiles to Ontario Beach Park where the parentless children had access to every amusement on the grounds.

Headed by the automobile owned by President C. J. Brown, of the Rochester Automobile Club, in which were seated Mayor Edgerton, of Rochester; his secretary, Bernard J. Haggerty, and Commissioner of Public Works Herbert W. Pierce, the procession of automobiles started at 1 o'clock and paraded through the prominent streets of this city to Ontario Beach. After the many children were unloaded from the machines at the amusement resort, the automobiles were parked along the lake shore extending along Ontario Park beach and beside the grandstand. The procession returned with their occupants at 5 o'clock to the various institutions where the orphans are confined.

Scene at Ontario Beach Park, where the orphans of Rochester, N. Y., were entertained by the Rochester Automobile Club

Trade News of the Week

Detroit Factories Planning to Ship 330,-000 Automobiles During the Coming Trade Year

Philadelphian to Make Wire Wheels Under Rudge-Witworth Patent—Rubber Lower Than Last Year

DETROIT, MICH., Aug. 12—To formulate plans for furnishing all the railroad cars which will be necessary for the handling of the 1913 shipments of automobiles from this territory, a conference was held on August 7 at the Board of Commerce between that organization's traffic bureau and local automobile factory representatives.

Detroit motor car manufacturers will require 102,000 freight cars for the shipment of their 1913 output. On this basis the above figures mean that Detroit's contribution to the automobile world for the coming season will be about 330,000 automobiles.

The problem faced by the railroads, manufacturers and the traffic bureau is to determine the best manner in which to get the necessary freight cars into Detroit for transporting the motor cars to their destinations and for returning them for reloading.

The conference was attended by a number of railroad officials in addition to the motor car men. Harry Moule, chairman of the Detroit committee of the National Association of Automobile Manufacturers, presided, while the Board of Commerce traffic bureau was represented by A. T. Waterfall. Representatives of the following automobile concerns were present: Abbott, Anderson, Buick, Chalmers, Cadillac, Ford, General Motors, Hupp, Hudson, Krit, Lozier, Oakland, Packard, R-C-H, Reo, Regal and Willys-Overland.

Lloyd with International Motor

R. M. Lloyd, who has been vice-president of the General Vehicle Company for several years, resigned recently from that corporation to take a position as assistant to the president of the International Motor Company, manufacturers of the Saurer, Hewitt and Mack trucks.

Formal announcement of the change was not made until after it had taken place and Mr. Lloyd had been installed in his new work. No announcement has been made by President Coleman, of the International, or President Wagoner, of the General Vehicle Company, as to the significance of the move.

Van Sicklen Goes to Motor Field

N. H. Van Sicklen, Jr., who for the past year has been associated with the Class Journal Company as office manager, and for 8 years previously occupied a similar position with *Motor Age*, has bought an interest in the Wahlgreen Publishing Company, Denver, Col., publishers of *Motor Field*. Mr. Van Sicklen takes to his new venture the well wishes of the hosts of friends he has made during his long experience in the automobile publication field.

To Make English Wire Wheels Here

PHILADELPHIA, PA., Aug. 13—The Geo. W. Houk Company, of this city, which has the American rights for manufacturing the Rudge-Whitworth detachable wire wheels, an English invention, has completed arrangements with the Standard Roller Bearing Company, of this city, for the manufacture of these wheels for the American trade. The Standard company at its plant in this city has sufficient manufacturing space available and is already engaged in equipping it with the necessary machinery for the manufacture of the wheels. It is expected that the manufactur ing will begin in 30 days. Reports are to the effect that severa of the large car manufacturers have already blue prints com pleted and are showing specifications and requirements for hu constructions for their particular cars.

Edwards to Locate on Long Island

Official announcement has been made that the Edwards Moto Car Company will be located in the plant formerly used by th United States Metal Products Company at Long Island Cit for at least 1 year.

With regard to the establishment of a big assembling plai for trucks at Louisville, an option has been secured for such a undertaking, but whether it will be exercised depends largel upon the success that attends the financial negotiations now i progress with local Louisville capitalists.

Rubber Lower than Last Year

LONDON, Aug. 13—The volume of plantation rubber offerin at the fortnightly auctions so far this year have been nearly 1(000 tons against about 5,500 tons during the corresponding peri of 1911. The auction that began today will dispose of about 7 tons, although the exact amount cannot be known until the sa is concluded. Two large consignments are due to arrive befo the sale is finished. Prices secured have averaged lower th last year, the present level being almost 8d. lower per poun The mystifying quietude of the market for Para continues a there is an undertone of strength in the trading that would n seem to be warranted by the volume of general buying. Tho

Automobile Securities Quotations

There was a more active market for automobile securities du ing the past week. The movements were irregular, but in t main they were upward. The most notable advance in quo tions was that of Ajax-Grieb common, which was moved up 150 bid with sellers at 200. The trading was exceedingly light holders stiffened measurably when the bids went up. Unit States Motor Company had a lively action in both issues. I organization rumors which included revival of the talk that merger with Studebaker had been concluded led to sharp buyi that drove the preferred above 20. This was officially den and the real reason for the rise is the probability of a favora reorganization based upon the company's own resources. Go rich was easier in tone. A comparison with last year:

	1911 Bid	1911 Asked	1912 Bid	1912 Ask
Ajax-Grieb Rubber Co., common	..	..	150	2(
Ajax-Grieb Rubber Co., pfd	..	..	95	1(
Aluminum Castings, preferred	..	..	..	
American Locomotive, common	38	38¼	99	1(
American Locomotive, preferred	106	107	44½	4
Chalmers Motor Company	..	..	145	1
Consolidated R. T. Co., common	5	10	13	
Consolidated R. T. Co., preferred	10	20	50	
Diamond Rubber Company	..	..	..	
Firestone Tire & Rubber Co., com	160	170	273	2
Firestone Tire & Rubber Co., pfd	105	107	106½	
Garford Company, preferred	..	..	99	1(
General Motors Company, common	51½	52	35	
General Motors Company, preferred	86	87	78	
B. F. Goodrich Co., common	..	..	72½	
B. F. Goodrich Co., preferred	..	..	107¼	1
Goodyear Tire & Rubber Co., com	230	240	330	3
Goodyear Tire & Rubber Co., pfd	105	107	104¼	1
Hayes Manufacturing Company	..	..	..	
International Motor Co., com	..	..	27½	
International Motor Co., pfd	..	..	84	
Lozier Motor Company	..	..	50	
Miller Rubber Company	..	..	..	1
Packard Motor Company, preferred	..	..	105	1
Peerless Motor Company	..	..	..	1
Pope Manufacturing Co., common	48	52	37	
Pope Manufacturing Co., preferred	78	80	74	
Reo Motor Truck Company	8½	10	9¾	
Reo Motor Car Company	23	25	21	
Studebaker Company, common	..	..	44	
Studebaker Company, preferred	..	..	97	
Swinehart Tire Company	..	..	95	
Rubber Goods Company, common	..	..	100	
Rubber Goods Company, preferred	..	..	107	
U. S. Motor Company, common	39	40	4½	
U. S. Motor Company, preferred	79	80	19	
White Company, preferred	..	..	107½	

who are marketwise have scented another plan of valorization and as partial confirmation of their suspicions it has been rumored that 2,400 tons of Para have been quietly purchased and retired from the market. The market stands at $1.17 per pound for up-river fine Para with other grades of rubber on a corresponding basis.

Steel Bars Sold at Premium

The market for structural steel and soft steel bars has been enlivened recently by the placing of orders for 10,000 tons of the latter commodity by manufacturers of automobiles, mostly located at Detroit. Tht order in itself is not of remarkable size for this period of the year, but it was placed at premiums running from $1 to $5 a ton and was conditioned upon definite delivery dates.

Most of the steel involved in the automobile orders will be specially treated and much of it will be alloyed before it finds its way into the product of the factories.

Jewel Merged in Ohio Company

Columbus, O., Aug. 12—The Secretary of State of Ohio has authorized the amalgamation of the Jewel Carriage Company and the Ohio Motor Car Company, both of Cincinnati. Heretofore the Ohio car was manufactured and sold through the Jewel Carriage Company, but by the change the Jewel Carriage Company will forever lose its identity and the business will be carried on by the Ohio Motor Car Company, the carriage end of the business having been sold to the American Carriage Company, of Cincinnati, several months ago.

Market Changes for the Week

Tin was the most prominent feature of the metal market this week, in that renewed activity in this material raised the price 45 cents per 100 pounds. Fractional gains were also scored by both electrolytic and Lake Superior copper, which were accompanied by a somewhat firmer tone of dealing than was witnessed in the preceding weeks. The steady, fractional rise in antimony which evidenced itself during the past 3 months was continued when on Saturday the price rose to 7 5-8 cents a pound. Steel quotations remained unchanged, and the condition in such products as channel steel, where producers found no bids on their wares, continues from last week. Lead remained unchanged.

Oil and lubricants remained at their old prices, with the exception of cottonseed oil, the latter declining owing to speculative influences. Gasoline also remained unchanged. Fine upriver Para rubber rose 1 cent a pound during the week, closing firm at $1.17. The variations for the week follow:

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, lb.....	.07¼	.07¼	.07¼	.07¼	.07⅝	.07⅝	+ .00⅛
Beams & Channels, 100 lbs........	.....	.....	.....	.....	.....	.....	....
Bessemer Steel, Pittsburgh, ton..	21.50	21.50	21.50	21.50	21.50	21.50	....
Copper, Elec., lb..	.17⅝	.17⅝	.17⅝	.17⅝	.17½	.17¾	+ .00⅛
Copper, Lake, lb..	.17¼	.17¼	.17¼	.17¼	.17¾	.17½	+ .00¼
Cottonseed Oil,							
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	....
August, bbl.....	6.49	6.41	6.38	6.35	6.15	6.33	— .16
Fish Oil (Menhaden)	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @....	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime..	.85	.85	.85	.85	.85	.85	....
Lead, 100 lbs.....	4.50	4.50	4.50	4.50	4.50	4.50	....
Linseed Oil......	.70	.70	.70	.70	.70	.70	....
Open-Hearth Steel, ton......	22.00	22.00	22.00	22.00	22.00	22.00	....
Petroleum, bbl., Kansas crude...	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa., crude.....	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine Upriver Para......	1.16	1.16	1.17	1.17	1.17	1.17	+ .01
Silk, raw Ital....	....	4.15	....	....	4.15	....	....
Silk, raw Japan...	....	3.67½	....	....	3.67½	....	....
Sulphuric Acid, 60 Beaumé....	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs......	45.25	45.25	45.25	45.25	45.75	45.70	+ .45
Tire Scrap.......	.09	.09	.09	.09	.09	.09	....

Atlas Plant Not Yet Sold

Prospective Purchasers Cannot Agree on Bid—Detroit Capitalists Abandon Idea of Taking Over Works

Havers Company Acquires Former E-M-F Plant—Market Changes for the Week

INDIANAPOLIS, IND., Aug. 12—Although today was fixed for the sale of the Atlas Engine Works plant and property, Fred C. Gardner, receiver for the company, had no report to make to the court. Judge Clarence Weir is out of the city, but it is understood that upon his return the time for making the sale will be extended.

M. L. Thomsen, of Cleveland, who some time ago said a company of Eastern capitalists would submit a bid, sent a telegram saying the men with whom he was associated had been unable to agree on the matter of making a bid. Detroit capitalists, who were said to have been headed by Walter E. Flanders, and who were expected to bid, have withdrawn as prospective bidders. It is reported the men who expected to be interested in this deal have also disagreed.

It is reported there are other prospective bidders in sight, but their identity is not being made public at this time. The proposition is a large one to handle, including assuming bonds for $1,050,000 secured by a mortgage; another bond issue of $105,000 and receivership expenses and mercantile accounts aggregating about $80,000.

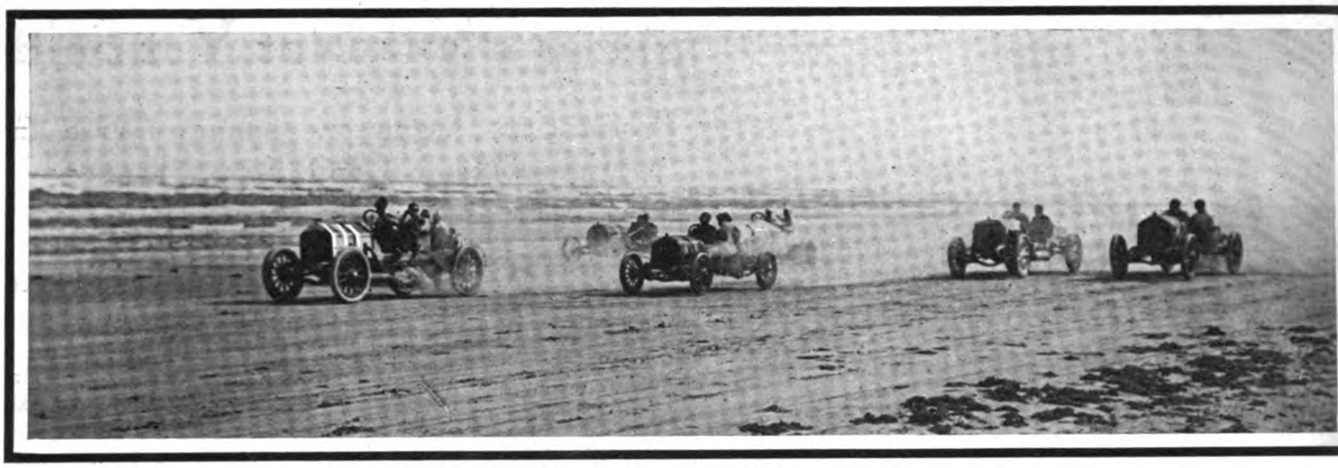
[Percy Martin, head of the British Daimler and Birmingham Small Arms companies of England, is in the United States on a visit that is scheduled to cover 6 weeks or more. Mr. Martin spent several days in New York, inspecting the Maxwell plant and conferring with various automobile interests and then went West, partly on a personal mission.

He is a native American and his present visit to this country is the first he has made in many years. His presence here has caused much speculation among the trade as to its reasons, as he is the leading exponent in England of the Knight motor and appears upon the scene at the time the affairs of the Atlas Engine Works of Indianapolis are in a much tangled condition. He has been in consultation with W. E. Strong, chairman of the Board of Directors of the United States Motor Company and accompanied Mr. Strong on a visit to Detroit last week for the purpose of inspecting the automobile field there.]

Havers Purchases E-M-F Plant

Port Huron, Mich., Aug. 12—The Havers Motor Car Company has purchased the E-M-F plant in the north end from the Studebakers and will manufacture from 1,200 to 1,500 cars in 1913. The E-M-F will begin at once the removal to Detroit and the Havers people expect to be able to occupy the local plant by September 1. The purchase price is not made public and the machinery of the E-M-F, with the exception of some of the shafting, was not included in the deal. The Havers now employs between sixty and seventy men. With the new facilities the number of employees will be greatly increased. Last year the company was able to turn out only 200 cars. That the plans for 1913 call for at least six times that number shows what the move will mean to this city.

The Havers company is a local concern with the following officers: President, A. D. Bennett; vice-president, H. L. Stevens; secretary-treasurer, A. J. Murphy; directors, David McMorran, S. L. Boyce, Edmund Harrington and Phil Higer. The company was one of the pioneers in the manufacture of six-cylinder cars and will continue the manufacture of this type.



Cars well bunched in the 75-mile race on the first day of the Galveston Beach meet

Disbrow Galveston Star

Captures 50-, 75- and 200-Mile Events With Simplex and Mercedes—Mason Second in Big Race

Mason, Case and National Feature in the Shorter Events, Each Winning Two

GALVESTON, TEX., Aug. 10—Signal success and big crowds marked the fourth annual automobile meet which came to a close here today. It was conducted, like its predecessors, under the auspices of the Galveston Racing Association and as one of the attractions of the Galveston Cotton Carnival.

The Galveston beach course is on the gulf side of the island. It is a straight and ideal stretch of 2 1-2 miles, and according to the statements of experienced drivers it has no superior in the country. The turns are all that could be desired. The fact that the hard sand beach is subjected to tidal inundation keeps it packed and smooth. The course is so laid out that the cars pass the grandstand twice in making each lap. The grandstand itself is a new structure with a seating capacity of 10,000 people. It was comfortably filled on each of the 3 days and besides this crowd tens of thousands of spectators viewed the racing from the open space along the course.

The entrants to the different events and classes numbered seventy-three, but a number of these failed to start.

The program for the 3 days was made up of ten events. F. E. Edwards, chairman of the technical committee of the A. A. A., besides performing the work of inspecting the mechanism of the different cars and putting his official stamp of approval upon the entries and classes, also had charge of the electrical timing machine. The referee was Mayor Lewis Fisher, of Galveston.

First Day

The program of the first day was made up of five events. Interest was centered in the last one on the list, a 75-mile race open to Class E (non-stock) cars of 600 cubic inches displacement and under. Louis A. Disbrow, driving his Simplex "Zip," easily took first money in this event. He started at a clip that quickly placed him in the lead and during the entire 75 miles he retained first position, but was closely pressed at different times by Clark, driving the Mercedes, the latter coming in a close second and never once losing its position next to the winning car. Disbrow also took second money in the second race, driving the Case White Streak. These two successes made him the hero of the day in the eyes of the spectators who applauded him every time he appeared on the course.

In the 75-mile race eleven cars were entered, but only five of the number completed the fifteen laps. As stated above, Disbrow, driving his Simplex Zip, won this event. His time was 1:09:16.72. The time of the Mercedes, Clark, which finished second, was 1:09:42.66. The Mason special, driven by Endicott, was third, in 1:12:16. The Case White Streak and the Mercer finished fourth and fifth, respectively. Summary of first day:

Car	Bore	Stroke	Driver	Time
Class C, non-stock, division 3-C, 15 miles				
Case Bullet	4 3-8	5	Nikrent	15:04.62
Case White Streak...	4 3-8	5	Disbrow	15:05.00
Mercer	4 3-8	5	Ferguson	15:09.70
Class C, non-stock, division 2-C				
Mason Special	3 13-16	5	Endicott	15:27.75
Flanders Special	4	4 1-2	Tower	15:57.55
Flanders Special	4	4 1-2	Evans	.16:09.89
Class C, non-stock, division 4-C, 20 miles				
National	5	5 11-16	Plummer	20:05.00
Stutz	4 1-4	6 1-2	Stolz	22:01.36
National	5	5 11-16	Melaum	(Flagged off)
Class C, non-stock, division 1-C, 10 miles				
Studebaker 20	3 5-8	3 3-4	Evans	11:07.09
Studebaker 20	3 5-8	3 3-4	Tower	11:11.91
Studebaker 20	3 5-8	3 3-4	Finch	(Distanced)
Class E, non-stock, 75 miles				
Simplex	5	5 3-4	Disbrow	1:09:16.72
Mercedes	5	7 1-4	Clark	1:09:42.66
Mason Special	3 13-16	5	Endicott	1:12:16.9
Case White Streak...	4 3-8	5	Ulbrecht	1:58:49.7
Mercer	4 3-8	5	Ferguson	2:00:20.0
National	5	5 11-16	Plummer	
Lozier	5 3-8	6	Horan	
Flanders Special	4	4 1-2	Evans	
Flanders Special	4	4 1-2	Tower	
Case Bullet	4 3-8	5	Nikrent	
National	5	5 11-16	Melaun	

Second Day

GALVESTON, TEX., Aug. 10—There was a good program o events for the second day of the meet. The crowd was almos as large as on the opening day.

The Simplex "Zip" easily won first place in the Clas D, free-for-all, covering the distance of 50 miles, we ahead of its nearest competitor on every lap. This event wa the fourth on the second day's program. The time of Simple "Zip" was 46:18.89. The other feature of this race was the unusu ally large field of entries. Seventeen cars lined up for the star They filled the entire beach course from side to side. Fir money amounted to $350. The second prize of $100 went the Mercedes, entrant, W. H. Bertrand, driver, Clark. This c showed better speed in the second day's events than in those the opening day, due to the fact that its gauge had been rea justed. The third place in this event was won by the Ca Bullet, entrant and driver, Joe Nikrent. The prize for thi place was $50. The Case special, J. A. Sloan, entrant, and Endicott, driver, came in fourth in this race.

In the 75-mile race Mr. Wagner disqualified driver Stolz for cutting across the course with his car, Stutz, which was entered by A. C. Bering. The second day's summaries follow:

Class E, non-stock, special, 25 miles

Car	Bore	Stroke	Driver	Time
Mason Special	3 13/16	5	Endicott	23:25.76
Flanders Special	4	4½	Evans	24:12.51
Flanders Special	4	4½	Tower	

Class E, special, 25 miles

Car	Bore	Stroke	Driver	Time
National	5	5 11/16	Plummer	23:54.69
Case White Streak	4⅜	5	Disbrow	26:10.37
Case Bullet	4⅜	5	Nikrent	26:46.52
National	5	5 11/16	Melaun	26:49.03
Studebaker 20	3⅝	3¾	Christie	
Case Special	4⅛	5½	Perry	
Mercer	4⅜	5	Ferguson	Failed to finish
Stulz	4¼	6½	Stolz	" "

Class E, non-stock, special, 25 miles

Car	Bore	Stroke	Driver	Time
Case Bullet	4⅜	5	Nikrent	23:29.09
Case White Streak	4⅜	5	Disbrow	24:43.82
Studebaker 20	3⅝	3¾	Christie	33:03.35
Mason Special	3 13/16	5	Endicott	

Class D, free-for-all, 50 miles

Car	Bore	Stroke	Driver	Time
Simplex "Zip"	5	5¾	Disbrow	46:18.89
Mercedes	5	7¼	Clark	46:43.67
Case Bullet	4⅜	5	Nikrent	51:46.63
Case Special	4⅛	5½	B. Endicott	
National	5	5 11/16	Melaun	
Studebaker 20	3⅝	3¾	Christie	
Case White Streak	4⅜	5	Ulbrecht	
Simplex	6 1/10	5¾	Pringle	Failed to finish
National	5	5 11/16	Plummer	" "
Studebaker	3⅝	3¾	Finch	" "
Flanders Special	4	4½	Tower	" "
Flanders Special	4	4½	Evans	" "
Mason Special	3 11/16	5	H. Endicott	" "
Fiat	5⅛	7¾	De Palma	" "
Lozier	5⅜	6	Horan	" "
Buick	5	5 11/16	Robeties	" "
Stutz	4¼	6½	Stolz	" "

Third Day.

Galveston, Tex., Aug. 10—There was much interest manifested in the effort to break the mile record, which was 37.8 seconds, made last season. This event came last on the day's program and it was well after darkness had begun to settle down that Disbrow in his Jay-Eye-See covered the mile in 31 11-100 sec-

The 200-mile race was not without its thrilling incidents. The onds. In the 200-mile race the Simplex Zip, Disbrow, driver, quickly caught the lead and it maintained it with varying regu- the 100th mile. All during the race the closest competitor of the Simplex was the Mason special, H. Endicott entrant and driver. This car made 180 miles before visiting the pit for gasoline or other purpose.

Class D, free-for-all, 200 miles

Car	Bore	Stroke	Driver	Time
Simplex "Zip"	5	5 3-4	Disbrow	186-17-19
Mason Special	3 13-16	5	H. Endicott	188-23-31
Mercedes	5	7 1-4	Clark	195-47-12
Flanders Special	4	4 1-2	Evans	216-47-44
National	5	5 11-16	Plummer	(Flagged Off) 37 Laps
Case Special	4 1-8	5 1-2	B. Endicott	(Failed to Finish)
Studebaker 20	3 5-8	3 3-4	Christie	" "
Flanders Special	4	4 1-2	Tower	" "
Stutz	4 1-4	6 1-2	Stolz	" "
Case White Streak	4 3-8	5	Ulbrecht	" "
Fiat	5 1-8	7 3-4	J. De Palma	" "
National	5	5 11-16	Perry	" "
Case Bullet	4 3-8	5	Nikrent	" "
Studebaker 20	3 5-8	3 3-4	Finch	" "

Class E, non-stock, flying start, for beach record of 1 mile

Car	Bore	Stroke	Driver	Time
Jay Eye See	9 1-4	8 5-8	Disbrow	31 seconds

Boillot Wins at Ventoux

Grand Prix Victor Not Only Annexes The Honors, But Breaks the Record as Well

Covers the 13-Mile Course in 17.46, Lowering the Previous Best By 55 Seconds

La Garenne Colombes, France, Aug. 12—(Special Cable to The Automobile)—The Mont Ventoux hill climb has added another triumph to those already accumulated by the winner of the French Grand Prix, Boillot, with a Peugeot car again proving the winning combination and incidentally breaking the record for the hill climb.

The times made by the competitors were as follows:

UNLIMITED CLASS

Car	Driver	Time m. s.
Peugeot	Boillot	17:46
Cottin-Desgouttes	Deydier	18:38
Benz	Demoraes	18:49
Bugatti	Bugatti	19:16
Excelsior	Christaens	19:34
Lion-Peugeot	Thomas	21:14
Fiat	Tongazzi	21:51
Hispano-Suiza	Grua	22:50

TOURING CLASS

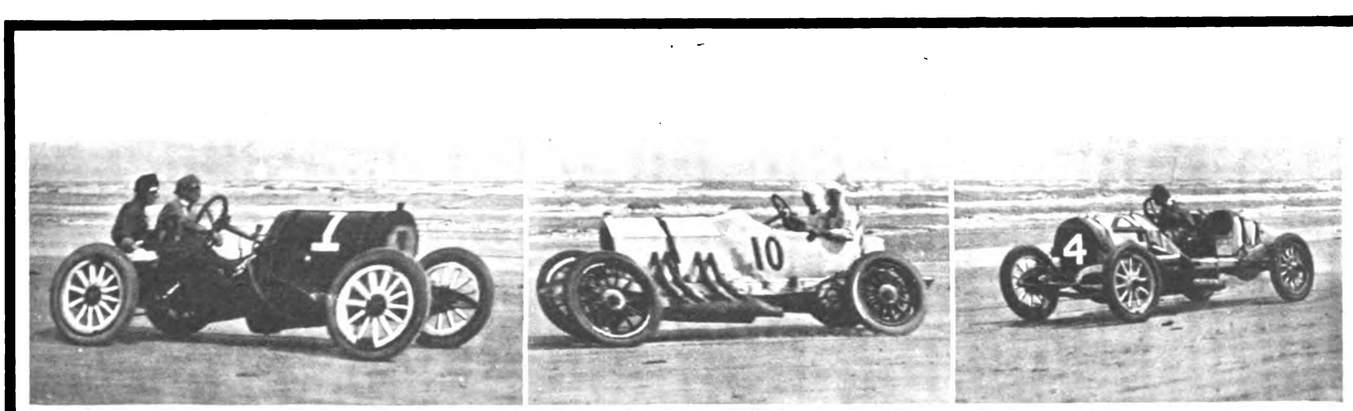
Car	Driver	Time m. s.
Cottin-Desgouttes	Pox	24:35
Schneider	Juvanon	28:11
Cid, Valveless	Naas	34:15
Cid	Thivolle	34:31
Cid	Robert	38:27
Apollo	Tonndorf	42:35

Mont Ventoux stands out as the oldest, the most important and the most difficult hill climb in France. With a total length of a fraction over 13 miles, its maximum percentage is 13 over the last few hundred yards, and after the first few hundred yards it rarely drops below 8 per cent. The percentage at distances of 5 kilometers are as follows:

5 kilometers	5.7 per cent.
10 kilometers	9 per cent.
15 kilometers	8.2 per cent.
20 kilometers	8.1 per cent.
21.6 kilometers (finish)	13 per cent.

Since 1909 the record for the hill has been held by Bablot, who on the Grand Prix Brasier driven by Thery at Dieppe the previous year climbed the hill in 18 minutes 41 seconds. This year's climb was rendered more interesting than usual by the presence of Boillot with the Peugeot racer.

Cleveland, O., Aug. 12—The clipping of 4 seconds from the 1-mile dirt track record for Cleveland made 3 years ago by Barney Oldfield on the old Glenville track, was the sum total of achievement at the all star meet promoted by the Burman-Moross bunch of barnstormers Wednesday, August 7, as a feature of the Eagle's convention.

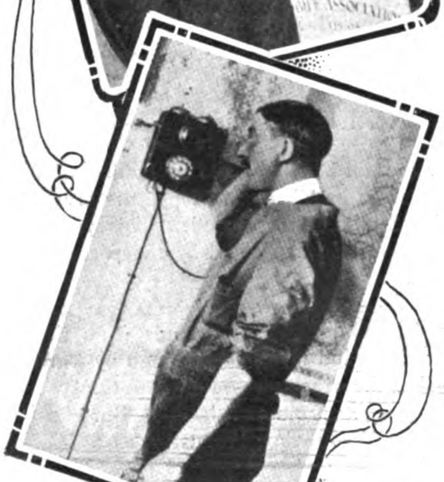


Simplex "Zip," driven by Desbrow — Mercedes, driven by Clark — Case White Streak, Disbrow driving

Sentry box equipped with telephone for use of members of British Automobile Club

Patrols for Motor Tourists

How the British Automobile Association Safeguards Traveling Over Highways—Roadside Phones Insure Prompt Assistance—Equipped for First-Aid Work



Patrolman

NOVEL and interesting to the American automobile tourist is the system of road patrols, road guides and wayside telephones in common use throughout Great Britain. The commencement of the present nation-wide institution was the movement initiated by the Automobile Association in 1905, when a few patrolmen were commissioned to travel over certain well-patronized sections of the highways to give aid of whatever nature to members of the association who desired it.

These patrols were prepared to give information with regard to roads and routes; to assist in making temporary repairs when required; to direct the inquiring member to the nearest garage, hotel or supply depot and to perform any other services that appeared to be necessary.

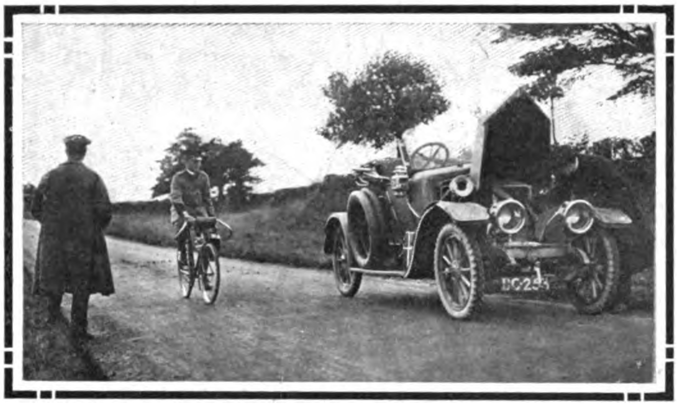
As the association grew, the system was extended until at present, the membership of the organization is nearly 49,000 and the patrol system covers 14,000 miles of highway.

By the last of August the roadside telephone system will be completed and at the service of the members. By means of this system of communication it will be possible for the automobile tourist who is affiliated with the association to get into close touch with garages, hotels and all points reached by the regular system. In case of mishap it will be possible for the tourist to communicate with home, friends or office from any of the patrol boxes of the association. These boxes are erected every 10 miles on the main roads radiating from all the chief cities.

Quick Relief When in Trouble

A telephone communicating with the nearest exchange is installed in each box. The telephones are at the service of members for all purposes, business or private use, breakdown or accident, entirely free of cost. Only in case of trunk-line calls is a tariff levied and it is never higher than the ordinary trunk-line fee. Each sentry box is available, both for local and trunk calls and for receiving, as well as transmitting messages. A patrol is on point duty at each box. Thus is the aim of the

Association badge



Patrol discovers automobilist in trouble and hastens to nearest sentry box to bring assistance

committee being realized, which is to give the motorist a practical organization, affording him practical help in a businesslike way; giving him free legal defense in any proceedings under the Motor Car Act; ensuring the comfort of members while on tour; supplying facilities for repairs during any hour, day or night, week days and Sundays; making easy the obtaining of spare parts; extending international touring facilities and engineering advice; maintaining patrols on all main roads; and extending first aid and prompt assistance in the event of accident or breakdown.

The Royal Automobile Club, realizing the value of some such system of road patrol, has installed a somewhat similar idea. The patrols are called guides and are instructed to give road information and to assist any member of the organization in any way possible in case of need.

Signals to Cars in Motion

Developments of the patrol idea are coming along with much speed and frequency. At present a system of whistle signals is being worked out so that the patrolman will be able to give certain information to the operators of automobiles after they have passed. Semi-deflated tires can be called to the attention of the driver by a certain signal; a loose license plate will be indicated by another; smoke in undue volume will be noticed with still another series of whistles.

Under present conditions the patrols have no way of communicating these facts to the driver unless the car is stopped, because if it continues on its way, the patrol realizes the conditions after the car has passed and it is then too late to stop it except in rare cases.

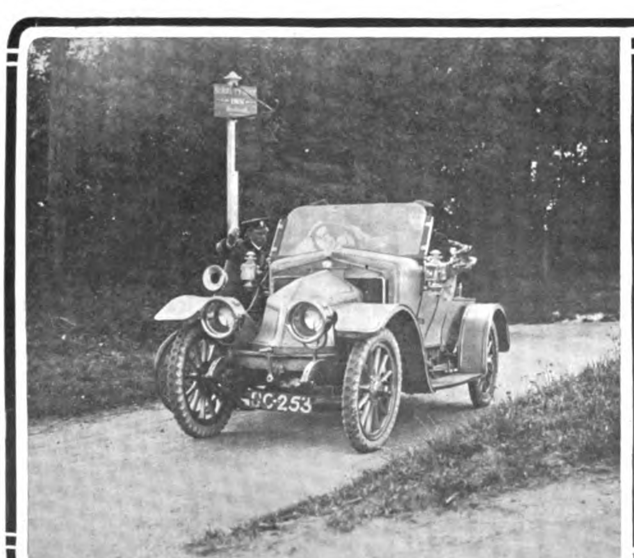
The character of the patrolmen has improved remarkably with the growth of the movement. Today, in order to hold such a post for the Automobile Association it is required that the man shall have a general knowledge of First Aid work and practice in case of mishaps; that he must have a good working knowledge of automobile repairs, maintenance and mechanism, and that he shall be energetic and observant as well as industrious and discriminating. He must be well up on road geography and capable of imparting information in an intelligent manner.

High-Price Gasoline in England

In discussing the recent boost in gasoline in England, where motorists now have to pay 32 cents a gallon for the fuel, R. M. Lockwood, head of the Regal Motor Car Company's foreign department, says: "The difficulties which the motorists of England face should make us thankful for two things. First, that the price of gasoline here is, in comparison, much lower, and second, that the industry in this country has advanced to the stage where we are producing cars that are actually economical in gasoline consumption.

"In America we do not always appreciate the fact that we pay a very low price for this necessity. In parts of Europe and certain localities in the Orient I have known the price to be as high as 60 cents a gallon. Quite naturally, the figure varies according to the facilities for receiving the gasoline. Here, where we have apparently an inexhaustible supply and good means of transportation, the price of the fuel is correspondingly low.

"Furthermore, our cars in most instances develop more power in proportion to the amount of gasoline consumed than do the cars of Europe. The average European car may use less gasoline, but it cannot mount the hills as easily as our cars can. Europeans are preferring the cars we export because they give better service for the gasoline consumed than the ones manufactured in their own countries."



Patrol directing automobile party to the nearest sentry box, where they may telephone for assistance

Ran out of fuel, patrol responds with gasoline
Patrol members must be adepts in first-aid service

Data Relating to One of the Centrifugal Pumps for Fire Engines Made in Germany—How the Interests of the Automobile Industry and the General Public are Identified with Either Centrifugal or Rotary Gear Pumps—Miscellany

CENTRIFUGAL **Fire Engine Pumps**—Fire engines of a construction which any automobile or motor truck manufacturer may take up without interfering with the system and routine of his other production, which are economical and compact and require little more care at the fire station than an ordinary automobile; which, further, are of light weight and may be taken readily and rapidly over any passable road from one town or village to another, in case of unusual conflagrations, and which may be served in emergencies by crews whose physical skill in fire-fighting is undeveloped, naturally recommend themselves to the attention of the public and its representatives as well as to that of specialists in a country like the United States, where the automobile movement is more popular than in any other country, and where, on the other hand, the art of fire prevention is much more backward, so that the total fire losses in a year per capita of population is about five times greater than the international average.

But although the leading feature of such a construction is the use of a centrifugal pump driven direct from the automobile motor, and the construction of centrifugal pumps in general owes its development principally to the ingenuity of American inventors and the enterprise of American firms, it is Germany which has led and is still leading in the simplification and cheapening of fire-fighting apparatus attainable by the use of the centrifugal pump on an automobile chassis. Only the rotary gear pump of German invention (see illustrated description in THE AUTOMOBILE of July 11) competes with the centrifugal type for securing the advantages referred to, a comparison disclosing advantages and disadvantages on both sides. In various extracts from articles in German journals THE AUTOMOBILE has recently given some of the most interesting facts relating to the German development, and in the following some supplementary notes are presented from an article by Werner Ahrens, an engineer with the Sulzer firm at its Winterthür plant, relating mostly to the Sulzer multiple centrifugal pump.

In the use of the centrifugal pump the speed of the pump shaft is the factor by which efficiency is secured. This speed, it might be said, takes the place of the close fit of piston and the alternating closing and opening of the valves in pumps with positive action. The maximum pressure which can possibly arise in the pipes and hose of a centrifugal pump is that determined by the maximum speed of the pump shaft. This is the same whether the hose nozzles are open or closed. To obtain efficiency without cumbersome special gearing it is necessary that the automobile motors used in fire engines of this type should be high-speed engines giving their best torque at more than 2,000 revolutions of the motor shaft, and this is the type of motors used. (The positive or almost positive rotary gear pump seems in this respect more adaptable to the slower-running automobile motors still prevailing in the United States, especially among motor truck makers.—ED.) A multiple centrifugal pump of the Sulzer manufacture with three centrifugating wheels fixed on the pump shaft is shown in Figs. 1, 2 and 3. Fig. 1 gives a sectional view of all but the evacuating pump (the exact construction of which does not seem to be made public anywhere, at present, perhaps because the liveliest competition among the various German pump makers bears upon improvement of this detail by which the advantages of the rotary gear pump are sought to be equalled). Fig. 2 shows the pump shaft and the centrifugating wheels on it, and Fig. 3 shows the dismounted parts of the complete pump in their sequence and to the right thereof the complete pump assembled. Each centrifugating wheel rotates within a stationary housing with circumferential discharge ports and separated from the housing of the next wheel by a baffle plate compelling the water thrown out of the first housing to enter the next wheel near its center.

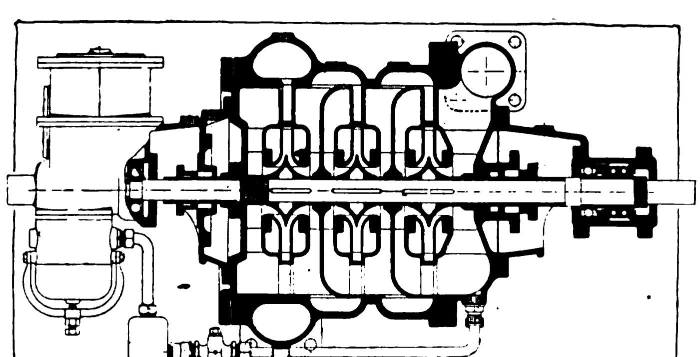


Fig. 1—Sectional view of Sulzer triple centrifugal pump with air-exhausting attachment

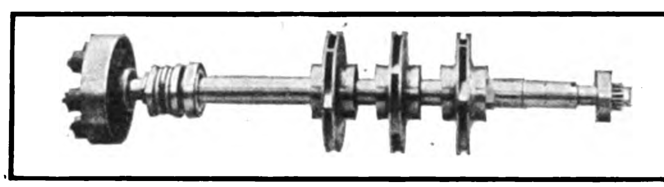


Fig. 2—The shaft and centrifugating wheels of the Sulzer pump

WATER ENTERS WHEELS ON BOTH SIDES

Provided the dimensions of the working parts and the speed of the shaft are properly suited to the quantity of water handled and the available power, the pressure created by the first wheel is doubled by the next wheel and tripled by the third. The capacity and the required power are proportionate to the square roots of the pressures. To obviate end-pressure on the ball bearings the water is made to enter into the centrifugating wheels on both sides. The evacuation pump is built in one with the centrifugal pumps, so that the whole pump plant may be mounted in the automobile chassis as a unit. It is of the reciprocating piston type and is built so as to operate not only as an air pump to evacuate the suction hose, but also as a water pump which may be left going in conjunction with the centrifugating pump. In other constructions the evacuation pump operates as air pump only, and a device is necessary for automatically closing it against the entrance of water. The illustrations show the pipe by which the evacuation pump is connected with the suction room of the centrifugal pump. When the stopcock on this pipe is closed the evacuation pump runs idle, as may be desirable when the whole pump is operating with the assistance of a considerable waterworks pressure.

As a flexible coupling is effected by merely shoving the pump shaft against the end of the transmission shaft, the mounting of a centrifugal pump consists merely in bolting it to the automobile chassis, and small misalignments are unimportant as the method of coupling admits of them. There is therefore an advantageous independence between the work of the automobile manufacturer and that of the pump maker.

By allowing the evacuation pump to be operated concurrently with the centrifugal pump, a special gear shift for the small pump is dispensed with and the service is simplified. But the principal advantage of this arrangement lies in the complete reliability of the pumping action which is gained as the evacuation pump disposes of all the air which may be, and nearly always is, present in the suction hose. For example, when the hose is carried over walls or other obstructions, air pockets are nearly always formed. And when the suction hose is disconnected in order to be attached to a new water source, air pockets are formed unless the valves and the hose itself are perfectly watertight. With the evacuation pump permanently attached—and working with either air or water—only 30 to 60 seconds are required for the evacuation of the air from the suction conduit when the engine arrives at a fire.

PUMP PERFORMANCE CAN BE REGULATED

All organs of the pump are made of bronze excepting the shaft and the ball bearings, and the weight of a complete pumping plant with evacuation attachment and dimensioned for a pressure of 100 meters and a capacity of 1,000 liters per minute by a power output of 32 horsepower, reaches only 330 kilograms, while one throwing 2,000 liters per minute with 80 meters pressure by means of 50 horsepower weighs 450 kilograms.

A comparison of working pressures and the amount of water ejected with the power efficiency attained at test performances shows that even without varying the number of revolutions of the pump shaft a considerable regulation of the pump performance can be effected. When, for example, the discharge is regulated from 15 liters per second to 30 liters per second at 1,600 revolutions per minute of the pump shaft and a power output of 70 horsepower, the manometer pressure is at the same time reduced from 115 meters to 85 meters.

When the number of revolutions is changed, similar variations may be obtained with each of the shaft speeds. A small change in the speed makes a considerable variation in the work results as the pressures vary with the squares of the number of revolutions, and this makes it possible to suit widely varying requirements with a small variety of pump models. But in order to select the most suitable model it is of advantage to take into consideration the waterwork pressure which is locally available.

Diagrams published by Mr. Ahrend show that the water throw realized at an angle of the nozzle of 50 degrees reached from 16 to 20 meters in height and from 31 to 41 meters in distance by means of pressures of 6, 8, 10 and 12 atmospheres, 10 atmospheres corresponding to about 100 meters manometer pressure, and that at a nozzle angle of 32 degrees the distances were raised from 44 to 56 meters.—From *Zeitschrift des Mitteleuropäische Motorwagen Vereins, medio* July.

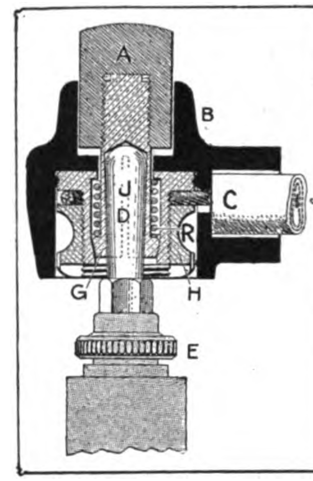


Fig. 4—Sectional view of Serfix device

To Secure Wires—Serfix is a neat little device whose mission is to hold ignition wires to spark-plugs without chance of accidental loosening and with some measure of protection against short-circuiting by rain. The connection is not inconveniently rigid, however, as the device may rotate a little around the terminal. The latter is shaped as a baseball bat and is inserted in the lower split and hollow part of a bolt G, whose upper part is screwed into the knob A made of insulating material. The lower end of this bolt G is conical and an interior conical surface on the surrounding metallic piece, which is not designated by any reference letter in the illustration, Fig. 4, is drawn against the conical part of G by means of the interposed spring R, thereby pressing G against the conical surface of the terminal D. The dotted lines marked J indicate the split. The wire is passed around the shank of the exterior piece and is held against its upper flange by the nut H. All the parts are inclosed in the cap B made of insulating material. In order to release the terminal from the wire it is necessary to press down upon cap B disengaging the two conical surfaces and while doing so to pull up at A.—From *Omnia,* July 27.

The Colors of Cars—Harmony in the colorings of of a car, and of any other large object, is restful, while discord brings about an indefinite sense of fatigue and displeasure. This well-known fact has given rise to theories by which the phenomenon is explained in a rational manner in accordance with the known laws of optics and light, and by the aid of which it may, in turn, become easier to avoid discordant colorings in the products of industry. This subject is treated by A. Rosenstiehl in the March bulletin of the Industrial Society of Mulhouse. Differently colored light rays do not come to a focus at the same angle of refraction when passing into the human eye or through any other refracting medium. This is established. It follows from this that if the eye shall see clearly a surface upon which several colorings are spread side by side it must accommodate itself at the same time to different distances, and this is fatiguing if the effort is made, while otherwise the impression is blurred and

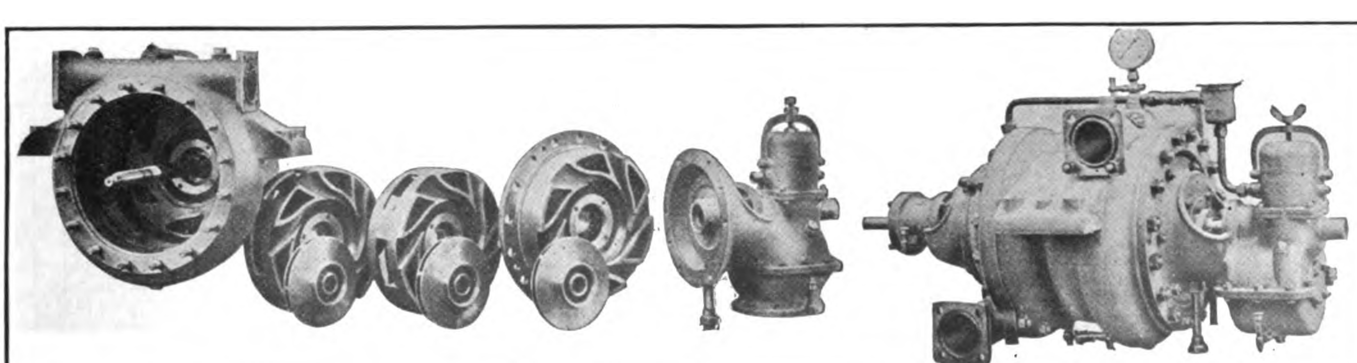


Fig. 3—Parts of the Sulzer centrifugal pump dismounted and shown in sequence. To the right, complete pump assembled

indistinct. It is also this difference in the refraction angles of the different colors which causes some colors to seem to recede and others to spring into relief. Red especially is a receding color. A red object seems farther away than a blue object placed in the same light and the same plane. In devising a color scheme it is important to avoid the clashes referred to, and this may be done by separating two sharply complementary colors by a neutral one whose angle of refraction lies between those of the two other ones and, especially, by adding white to at least one of two sharp colors. The author counsels particularly the latter method, which, according to his theory—presumably verified by experience—should render it practicable to obtain strong and yet not tiresome color effects without relying upon the artistic sensibilities of designers and workmen.—From *La Génie Civil* of July 13.

Stereoscopic Microscope—All who have occasion for examining polished and etched specimens of steel through an ordinary microscope with a single optic have experienced some difficulty in distinguishing the raised from the sunken parts. The image lacks perspective, and the expedient of rocking the microscope so as to make the shadows move and thereby indicate the formation is a makeshift which it is not always easy to apply. Only a partial relief from this difficulty has been offered through the binocular stereoscopic microscopes which so far have been in the market. They are constructed with two objective lenses and can therefore not be brought close to the object, and consequently the magnification is comparatively small, in fact limited to 80 diameters. They also fatigue the eye by inducing an effort for seeing the two images as one, especially when the observer is near-sighted, far-sighted or has eyes of different foci. A new construction has now been devised by Dr. Quidor, and it is manufactured by Nachet. In it a single objective is used and magnifications up to 400 diameters can be obtained. The light rays passing from the object through the objective lens are divided into two symmetrical bundles by means of two pairs of prisms and the observer perceives the perspective through the fusion of the two images. As in all other stereoscopic instruments the distance between the two oculars must correspond closely to the distance between the observer's eyes, but this adjustment is easily effected by rotation of one of the pairs of prisms. All fatigue of the eyes is said to be avoided. The advantages of the new construction were laid before the *Académie des Sciences* at its session of July 1.—From *Le Génie Civil*, July 13.

Aluminum Coat on Iron—A coat of lasting qualities can be produced by dipping an iron article in molten aluminum if the iron article is first dipped in alcohol so much diluted as not to be ignitable. Franz Jordan, of Berlin, has German patent on the process and kindred processes for aluminum-plating sheet iron by dipping and fixing the coat by reheating and rolling.—From *Metallurgie*, July 22.

Harking Back a Decade

What the Motoring Publications of 10 Years Ago Had to Say on Live Matters of the Day

FROM *The Automobile and Motor Review*, August 16, 1902: With a few exceptions, the business vehicles, power-driven, are electrically propelled, so far as New York City is concerned.

A special motor wagon for the delivery of mail on a rural free delivery route has been constructed after designs of George E. De Groot, a letter carrier of Morristown, N. J. The body of the wagon is divided into two parts, the front for the driver and the rear for the postman. The driver can not get out after he is once inside unless released by the carrier. The car is equipped with a 20-horsepower gasoline motor.

The automobile industry in Berlin gave employment to 1,000 men during 1901 and is growing steadily. So far, the patrons of the industry who can afford to pay from 8,000 to 10,000 marks for a car prefer to purchase outside of Germany.

The official tabulation of the recent Paris-Vienna race has been completed, involving the consideration of 16,000 sets of figures. The final result is not materially changed. The summary shows that eighty out of the 137 starters finished the full course. Of the finishers seventy-one were of French manufacture.

A Panhard, driven by Jarrott, won the heavy-car class in the Circuit des Ardennes. A Gobron-Brillie, alcohol car, won the light-car class, driven by Rigolly.

Can't Turn Out Cars Fast Enough

It is more than a coincidence that the announcement of the development of the kerosene burner for steam vehicles to a practical point comes simultaneously with the report of a shortage of high-test gasoline in certain New England localities. Editorial.

The Peerless Manufacturing Company, of Cleveland, despite a full force and a shop full of fine machinery has been able to turn out only three cars a week. Manager Kitridge announces that a deal is pending to acquire a factory plant at Lorain, O., so that a force of 400 men may be employed for next season's manufacturing.

The first American models of the C. G. V. car were completed last week at the Rome Locomotive & Machine Works, Rome, N. Y. The car is fitted with an American-made aluminum body and has a four-cylinder motor rated at 15 horsepower.

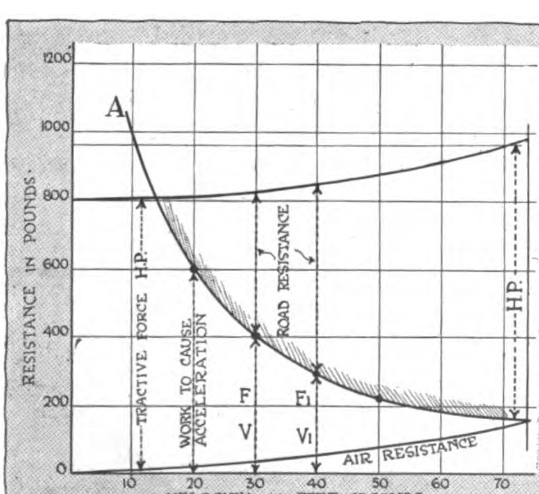


Fig. 1—The road resistance increases geometrically with velocity

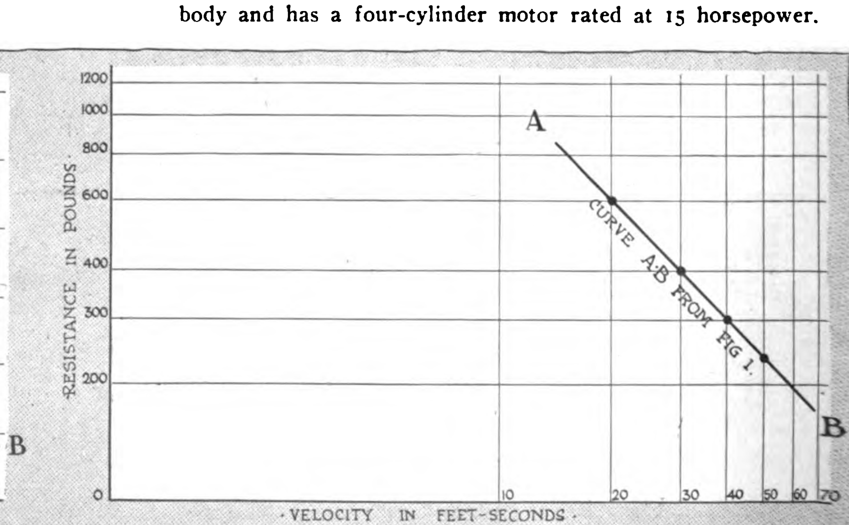


Fig. 2—Same condition shown by linear curve on logarithmic paper

Selecting Proper Gears

S. I. Fekete Shows a Simple Way of Determining Correct Ratio for Any Number of Speeds

IN the July 18 issue of THE AUTOMOBILE there was published a very remarkable article, by W. H. Cameron, on the subject of the four-speed gearset. In this he predicts its general adoption and its necessity. This article certainly came at the right time and on the right subject.

In this article I wish to introduce a very simple mechanical way of determining correct gear ratios for any number of speeds. At the same time I wish to call attention to Mr. Cameron's reasoning and explanations, but would not advise following his diagrams, illustrating the steps between the gears, for the reason below stated.

In the diagram where ordinate O X is apparently the time, while the gears are engaged and ordinate O Y stands for the velocity, miles per hour. If we were to make a diagram like that which he illustrates before laying out a set of gears, and in this diagram the steps between velocities were to be equal, then the result would be in some cases an error, because such a diagram gives us the arithmetical progress instead of that which we need, the geometrical progression.

Gears Should Progress Geometrically

According to my way of thinking the gears in a gear-set should progress in a geometrical progression because the resistance increases in the velocity interval in a hyperbolic curve. During acceleration the road resistance increases and is a function of the velocity. If we suppose there is one even condition of the roadbed, going at top speed, the road resistance consumes the power output of the motor. If we analyze the increase of the resistance, we find that it is in geometrical progression.

When a car starts, a certain amount of work is required to cause acceleration and the other part of this work is required to overcome the resistance of the car. The total tractive effort given by the motor is consumed by these two factors. When the resistance is so high as to consume all the tractive effort, then there is no more work left to cause acceleration and so the car begins to travel with a constant velocity. In equation:

Resistance = tractive force.

During acceleration the work is consumed by two factors, one which causes acceleration and the other is the resistance, that is

Force to cause acceleration + resistance = tractive effort.

If we imagine a constant horsepower output during acceleration, then

$$\text{Horsepower} = \text{constant} = (\text{force to cause acceleration}) \frac{V}{550}$$

or

$$\text{Horsepower} = \text{constant} = \left(\text{mass} \times \frac{olv}{olt}\right) \frac{V}{550}$$

And this is equation of a parabola.

Let F mean the force to cause acceleration in one interval (in Fig. 1) and V the velocity.

Farther F_1 — the force to cause acceleration in one other interval when the velocity is V_1.

Then

$$F \times V = \text{constant}$$
$$F_1 \times V_1 = \text{constant.}$$

This equation of a hyperbola referred to its asymptotes will represent the increase of resistance.

To prove that this curve in Fig. 1 is geometrical progression, it is necessary to plot it over on logarithmic paper. On this paper it should appear as a linear function.

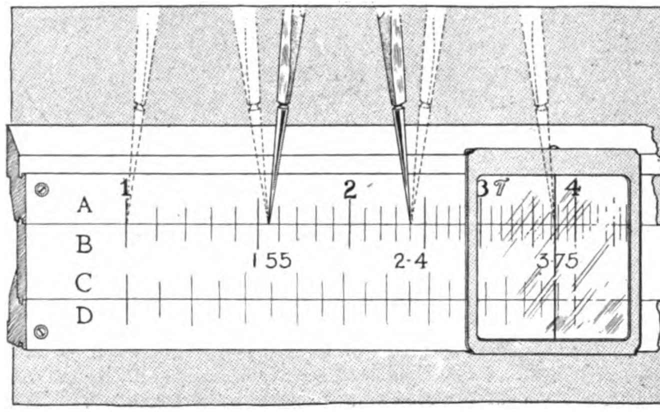


Fig. 3—Geometrical progression illustrated with a slide rule

In Fig. 2 ordinates O X are the values of the velocity and the scale used is a logarithmic scale of the slide rule.

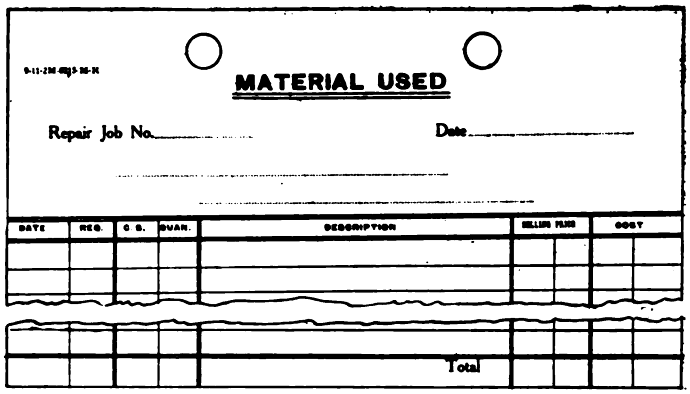
Ordinate OY signifies the resistance in pounds on the same scale. On this diagram, if we take equal steps between gears taken, between any chosen points, then they will give us a geometrical progression.

If we take a divider and make steps on the scale, such reading will give us geometrical progression. To get any number of gear ratios between a chosen lowest ratio and to the direct drive, all that is necessary is to divide the slide rule into as many equal spaces as we want intermediate speeds. If we begin dividing at the point which is our lowest gear and take the readings where the dividing points come we will get the correct theoretical gear ratios. This division may be subject to change during process of designing, on account of inability to secure even center distances and pitch. See Fig. 3.

Lessons from London Rubber Show

Speaking to the colonial branch of the German Agronomic Society at a recent meeting, Professor Dr. Warburg, an expert on rubber questions, reported the impressions which he had received at the London rubber show held last year. It demonstrated the predominance of England and of Para rubber derived from the hevea rubber tree, he said. The English idea of cultivation and preparation was also ruling. Next to Great Britain, the country which made itself felt was Holland which showed rubber derived from ficus trees (same family as the fig tree) and guttapercha prepared from their leaves. The showing made by Germany, though assisted by the government, was inferior comparatively. Preparation methods were well exhibited, however, and the apparatus for rubber testing were brilliantly instructive. On the whole, the lessons of the show may be summarized as follows: (1) Para plantation rubber will rule the world markets in a few years under control from London; (2) where climate or high wages operate to disadvantage the exploitation of wild stands of rubber trees will stagnate or retrograde; (3) no immediate danger (?) of synthetic rubber crowding out the natural; (4) prices will in course of time drop considerably, as cost of production may be much reduced, but the danger (?) of overproduction of first-class rubber is still remote.

With regard to the probable fate of German rubber plantations the lecturer held that those in Kamerun and Togo as well as in New Guinea and the Samoan islands were not threatened. But in German East Africa the situation is different. Here 23,000,000 rubber trees, out of a total of 31,000,000 German-grown trees in all regions, are located and represent an investment of 20000,000 marks. These plantations are cultivated by people who know little of agriculture, and many blunders have been committed. The raw material obtained from them is not of the first-class and cannot meet the competition in the world markets. The trees are largely manchot and ficus.—From *Allgemeine Automobile-Zeitung*, June 28.


MATERIAL USED

Repair Job No. Date

DATE	REQ.	C. O.	QUAN.	DESCRIPTION	SELLING PRICE	COST
				Total		

Fig. 1—Sheet for recording all material used on a job

System in the Service Plant

Illustrated by the Methods Employed by the New York Distributors of the Garford

Fifteen Forms are Used and the System Requires the Entire Time of But One Man

Fig. 2—Repair tag used by R. & L. Co.

A GOOD business system is to a merchant what his multiplication tables are to the schoolboy. Both enable their operators to handle a large bulk of operations in a simple and efficient way; both present a means of checking at any given moment the results of preceding operations with an infallible reliability. It is as useless and as senseless for the present-day business man to attempt to conduct his affairs in a manner not in accord with modern methods, as it would be for a schoolboy to attempt the solution of arithmetical problems without the knowledge of the fundamental operations and the rule of three.

As the repair business is a necessary branch of the automobile trade, every improvement in the methods of carrying on the requisite operations will be welcomed by the progressive automobile business man. To him system means reduction of burden to a minimum and augmentation of profit to a maximum; moreover, the clever business man knows enough to keep the system as his servant and not to become the slave of the system. In selecting a recording system which will meet the requirements he will choose one which necessitates a relatively small amount of labor but which permits of recording every essential step in the repair of an automobile.

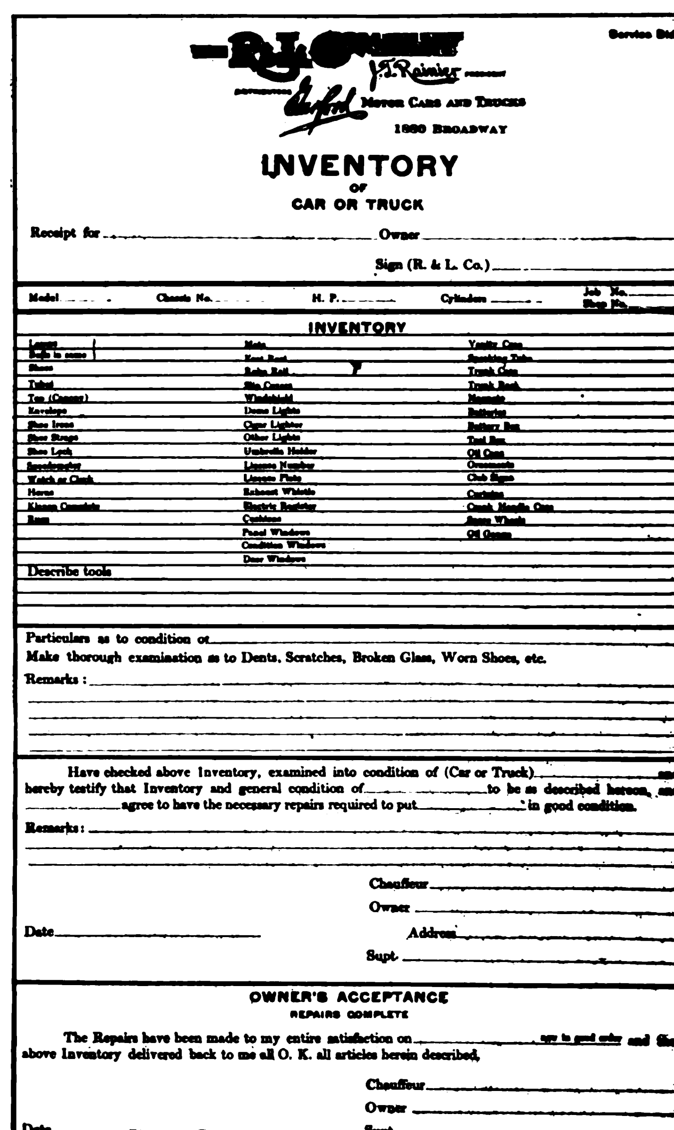
Division of the Work

The series of operations constituting the repairing of a car may be classified under three heads; the entrusting of the service department with the car, the work done on the car in the service department, and, finally, the testing and returning of the automobile to its owner.

In the first and third operations the owner is personally concerned, or at least is represented by his chauffeur, and his attention is naturally focused on the state the car is in before and after the repair and also on the condition of the automobile's equipment. The second operation, or rather set of operations, is of eminent importance to the owner of the service department. Therefore, the interest of the owner makes it necessary that the condition of the car be most closely examined before the machine enters the shop and after it leaves it, while it is of the utmost importance to the operator of the repair establishment to keep himself informed as to even the smallest expenditure of money, time and material in the repair of every automobile in his shop.

Recognizing this necessity, leading automobile companies have devised elaborate control systems serving the purpose outlined above. An up-to-date system, that of the R. & L. Company, New York City, distributors of Garford pleasure and commercial cars, is described below. The system covers practically every phase of modern service, so far as the repair of automobiles is concerned, and for this work thirteen separate cards and sheets are required. The purpose of these is as follows:

1. Two forms for outlining by the owner, the work to be done in the shop and to give an index of the equipment on the car, when it is turned over to the company.
2. A tag also giving a list of the repair jobs, and which is attached to the car.
3. Three forms, to record the labor required in the car repair.
4. Three forms to keep record of the material used.
5. One slip for enumerating outside or cash expenses made by men in connection with repair work.


Garford Motor Cars and Trucks

INVENTORY OF CAR OR TRUCK

Receipt for ______ Owner ______

Sign (R. & L. Co.) ______

Model ______ Chassis No. ______ H. P. ______ Cylinders ______ Job No. ______ Shop No. ______

INVENTORY

Lamps	Mats	Vanity Case
Bulbs in same	Foot Rest	Speaking Tube
Shoes	Robe Rail	Trunk Case
Tubes	Slip Covers	Trunk Rack
Top (Canopy)	Windshield	Magneto
Envelope	Dome Lights	Batteries
Shoe Irons	Cigar Lighter	Battery Box
Shoe Straps	Other Lights	Tool Box
Shoe Lock	Umbrella Holder	Oil Cans
Speedometer	License Number	Ornaments
Watch or Clock	License Plate	Club Signs
Horns	Exhaust Whistle	Curtains
Klaxon Complete	Electric Register	Crank Handle Case
Rugs	Cushions	Spare Wheels
	Panel Windows	Oil Gauge
	Condition Windows	
	Door Windows	

Describe tools

Particulars as to condition of ______

Make thorough examination as to Dents, Scratches, Broken Glass, Worn Shoes, etc.

Remarks: ______

Have checked above Inventory, examined into condition of (Car or Truck) ______ and hereby testify that Inventory and general condition of ______ to be as described hereon, and ______ agree to have the necessary repairs required to put ______ in good condition.

Remarks: ______

Chauffeur ______

Owner ______

Date ______ Address ______

Supt. ______

OWNER'S ACCEPTANCE
REPAIRS COMPLETE

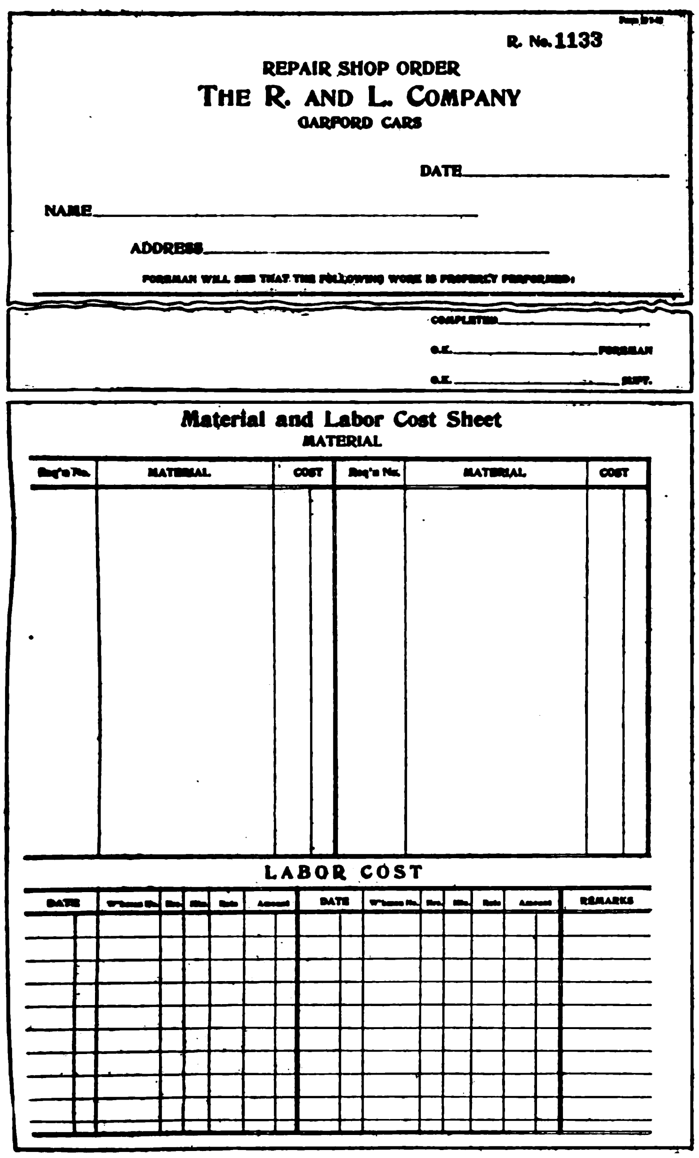
The Repairs have been made to my entire satisfaction on ______ are in good order and the above Inventory delivered back to me all O. K. all articles herein described.

Chauffeur ______

Owner ______

Date ______ Supt. ______

Fig. 3—Accessories and equipment inventory blank


R. No. 1133

REPAIR SHOP ORDER

THE R. AND L. COMPANY

GARFORD CARS

DATE

NAME

ADDRESS

FOREMAN WILL SEE THAT THE FOLLOWING WORK IS PROPERLY PERFORMED:

COMPLETED

O.K. FOREMAN

O.K. SUPT.

Material and Labor Cost Sheet

MATERIAL

Req's No.	MATERIAL	COST	Req's No.	MATERIAL	COST

LABOR COST

DATE					Amount	DATE					Amount	REMARKS

Fig. 4—Repair order. Fig. 5—Time and material record

6. One slip on which the working items which come under the guarantee are listed.

7. One form giving the results of tests made with the car by the company's inspector and by the chauffeur.

8. A daily service building report which is sent by the superintendent to the manager of the company; this sheet contains a detailed report of the work done in the establishment during the previous day and a statement of cars and materials received and delivered during the day. As this sheet also gives the number of new cars received from the factory and delivered to customers—the R. & L. Company also keeps its stock of cars at its service department—two more forms must be mentioned in this connection:

9. The delivery order giving the number of a car delivered to a purchaser, together with a statement of all the equipment furnished with it.

10. The receipt for delivery of such car to the purchaser.

In the following the various forms are described, each one being treated in detail and illustrated to show the advantageous arrangement of the various data on every blank here shown.

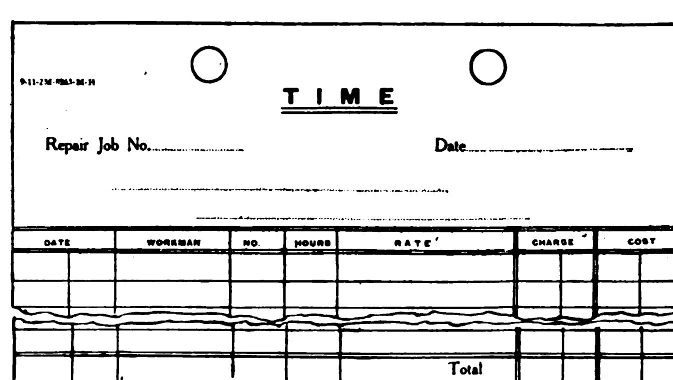
1. These forms are bound in books and are made out in duplicate, one copy of the document remaining permanently in the original binder. The other forms are kept in pads and are made out, in most cases, in duplicate, in one case even in triplicate, as will be detailed below. Where more than one copy of a form is made out, the duplicate is sent to the Broadway office of the company either immediately or after the repair is completed. This is done for the double purpose of giving the office a check on the operations of the service department and to insure the preservation of one copy if the other is destroyed by fire occurring in either the service department or the office. The original of this form remains in the order book of the superintendent, a duplicate is mailed to the customer whose machine has been delivered to the department, while the triplicate accompanies the automobile which is brought into the shop. The form illustrated in Fig. 4 is numbered, each set of blanks in the book bearing consecutive numbers. The specific number of the order made out is written on every form used later on in connection with that job, so that it is very easy to refer from any particular sheet or card to the general information on the job kept at the office of the superintendent. This method of marking every form pertaining to the same job with the same number makes it also easy to file all the cards and sheets together, so that they are ready for reference at a moment's notice. All files containing the records of past transactions are kept at the Broadway office, with the exception of the forms remaining in their books.

Keeping Tabs on Equipment

When the owner calls at the service department with his car, he is met by the superintendent, who takes his order for the repairs to be made. Before the car is taken from the owner, however, a detailed list of the equipment and accessories on the car is made by the superintendent or his assistant, who, for this purpose, uses the blank shown in Fig. 3. This form is white, ruled with blue lines and printed in black, and a yellow carbon-duplicate sheet follows every white blank in the book. No standard type of accessory has been overlooked in preparing this form which even specializes on Klaxon horn, electric whistle, vanity cases, etc. Three lines are left open for the detailing of the tools kept on the car. The condition of the body and the equipment is also described on this blank. The owner or chauffeur, as the case may be, goes over the record and signs it, after which he retains the carbon copy of the form.

The details of the repair work which is to be done on the car appear on the triplicate form, Fig. 4, which is filled out with the name and address of the owner, as well as the date on which the car is brought into the building. The triplicate copy is also printed on the reverse side, as shown in Fig. 5, which is a blank for recording the costs of time and material used in the repair of the car.

2. At the same time with the order, Figs. 4 and 5, when the automobile is turned over to the shop, the repair tag, Fig. 2, is attached to it. This tag is of a dark vermilion, 3 by 6 inches, and is fastened to the steering wheel of the car, with the name of the owner and the job number being clearly written on the front side. The reverse side is not printed but left blank, and on it the different repair jobs to be done on the car are enumerated. This design and use of the repair tag makes the working system very simple for the laborers who handle the repairs; further-

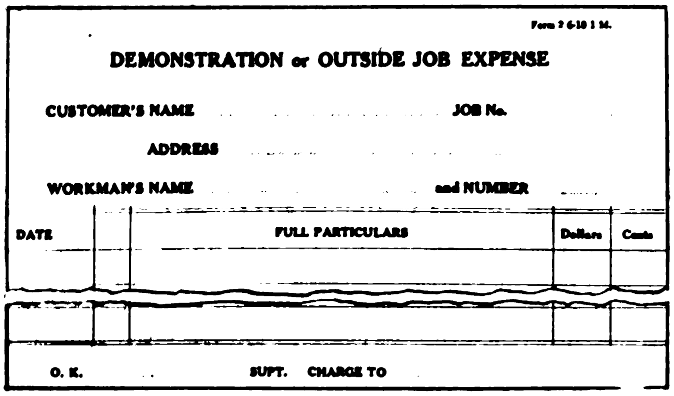

TIME

Repair Job No.

Date

DATE	WORKMAN	NO.	HOURS	RATE	CHARGE	COST
				Total		

Fig. 6—Sheet used for recording all labor spent on a job



Form 7-6-10 1 M.

DEMONSTRATION or OUTSIDE JOB EXPENSE

CUSTOMER'S NAME .... JOB No. ....

ADDRESS ....

WORKMAN'S NAME .... and NUMBER ....

DATE		FULL PARTICULARS	Dollars	Cents

O. K. .... SUPT. CHARGE TO ....

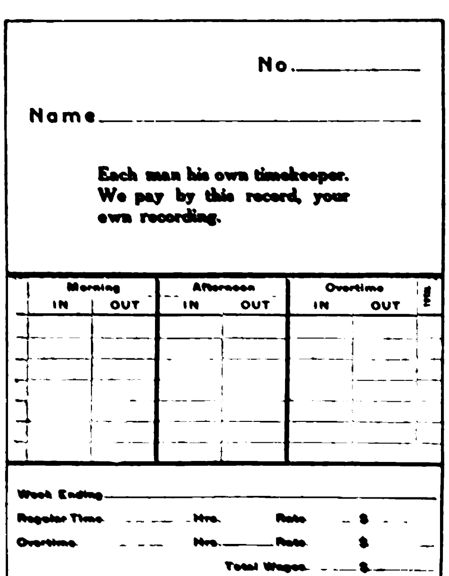
Fig. 7—Slip used by men in accounting for outside expenses

more the order, Fig. 4, is kept clean, as it remains at the desk of the foreman. All the workingmen have to do is to check each successive item of the work on the tag when that work has been completed.

Little Record-Keeping for Men

3. The less the men who have to concentrate on manual labor are bothered by the keeping of records, the more readily will they supply what information the company demands, while their work is proceeding. The R. & L. Company has simplified the extent to which the workingmen have to participate in the recording system, and all the writing that is necessary for them to do is done in connection with the recording of their own time and labor; consequently the men are glad to adhere to the system in their own interest. To record the time spent by the men in the shop, as well as its distribution on the various jobs, two cards, each 4 by 5 1-2 inches, are used. Fig. 8 is the ordinary clock card, on which each man stamps time in and out, during the morning, afternoon and when working overtime. This card is a weekly one, and at the end of every week the daily total times of each man are calculated and summed up to give the number of hours he worked during the week. The results are marked at the bottom of the card and the total wages paid to the man for his week's labor is also written thereon, so that the workingman, when receiving his pay, may check it against his time and sign for the money, after which the card serves as a receipt. The spaces Number and Name printed on this card have reference to the workingman. This card is kept at the office until pay-day, after which it is filed in the Broadway office.

Fig. 11 shows the time spent on individual car repairs. When a man starts work on a new repair job—that is, one on which he has not worked before—he fills out a card, Fig. 11, on which the car owner's name, that of the laborer and the job number appears. This card is also punched at the time clock and the total time spent by each man on each job is thereby determined, giving an easy means of calculating the exact cost of labor on every job passed through the shop. If any repair work should have to be done outside of the building, the time of a man's start for the work and of his return therefrom are marked on this card. This card is held by the foreman until the completion of the repair job; then it is turned over to the superintendent or his assistant.



No. ....

Name ....

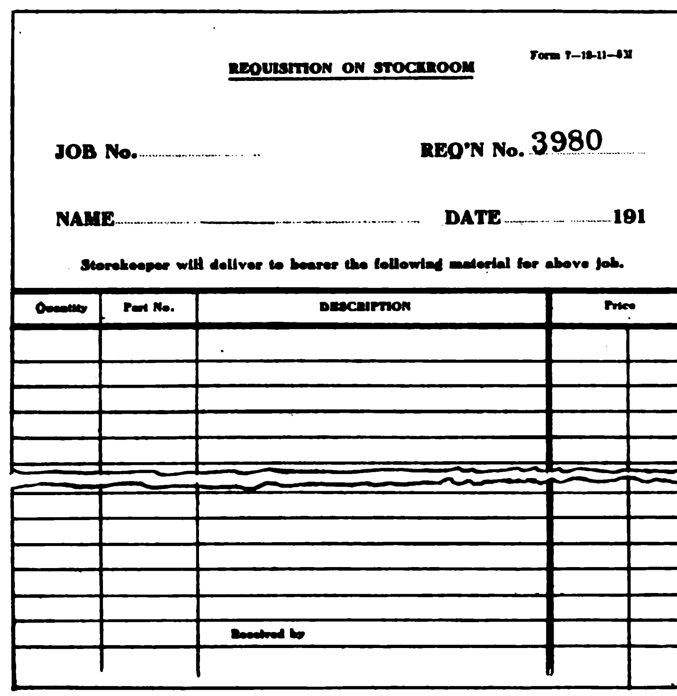
Each man his own timekeeper.
We pay by this record, your own recording.

Morning IN	Morning OUT	Afternoon IN	Afternoon OUT	Overtime IN	Overtime OUT	Total

Week Ending ....
Regular Time .... Hrs. .... Rate .... $ ....
Overtime .... Hrs. .... Rate .... $ ....
Total Wages .... $ ....

Fig. 8—Clock card of shop workers

The total time expended in the repair of a car is recorded and itemized on a time sheet, Fig. 6, which is made out from the job-time cards by the foreman of the repair shop. This sheet is 6 3-4 by 11 inches. It remains on the desk of the foreman and every morning the time records from the cards, Fig. 11, are transferred to this sheet, which is also marked with the job or order number. The foreman in filling out this blank notes the dates of the various steps of the repair, the name and number of the workingmen who did them, the number of hours spent by each man on each job, his rate of payment and the consequent cost of the labor on each step of the work. When the repair of the car is finished, the foreman totals the hours spent on the car and the cost of the labor, and, after checking once more and signing the items, sends the sheet to the superintendent of the service department, whence it passed with other blanks relating to the job, to the bookkeeping department of the Broadway office.



Form 7-18-11-8M

REQUISITION ON STOCKROOM

JOB No. .... REQ'N No. 3980

NAME .... DATE 191

Storekeeper will deliver to bearer the following material for above job.

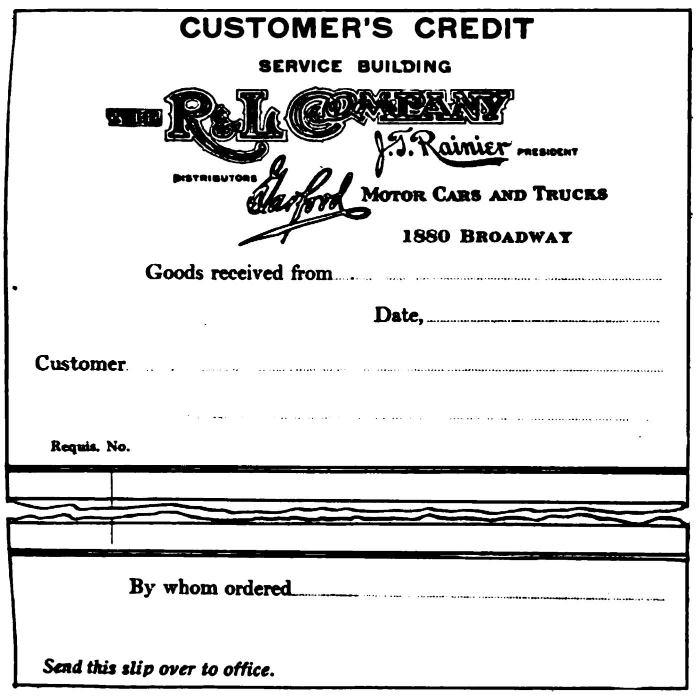
Quantity	Part No.	DESCRIPTION	Price
		Received by	

Fig. 9—Requisition used when material is drawn from stock

4. At the time, when the time sheet is first made out by the foreman, a carbon is made of the information written on the three top lines of the sheet, the carbon record appearing on the Used-Material sheet, Fig. 1. After the sheets have thus been started, they are taken off the original pad and the time sheet, which is yellow, is kept on one file, and the white material sheet on another. Both sheets are of the same size. On the material sheet every piece of material, every pound of waste and every pint of gasoline used in the repair of an automobile are recorded, with the dates of their use, their requisition numbers and their cost.

In order to keep the stock of the service department in strict order, a requisition must be used, whenever material is drawn from the stock room, whether it be worth 1-20 cent or $15 or even more. It is a well-known fact that where the men are not used to keep track of every cotter pin or nut, they will in time permit an inexactitude to occur in the stock of more intricate and more valuable parts. The severe obligation of recording all material leaving the stockroom is founded not only on direct economic considerations, but also on moral ones which give rise to a situation of the vastest economic importance to the business. Therefore, no material must be drawn from stock without turning in a requisition. The latter is shown in Fig. 9. The method of procedure in its use is as follows: If a man requires a part or other material, he so informs a floor boy and to him specifies his needs. The boy thereupon goes to the assistant of the service superintendent who fills out the requisition, which is made in duplicate. The latter is kept by the writer of the requisition and at the close of the day is sent to the Broadway office. On the requisition appear the number of the bin in which the part is kept in stock, the nature of the part required, and the price which is charged for it to the customer. After filling out the requisition, the assistant superintendent signs it and the boy takes it to the stockroom clerk, who delivers the material to him. All the requisitions are held on a file in the stockroom until the next morning, when they are deducted from the standing stock records; after this they are returned to the superintendent's office, who later on sends them to Broadway quarters. As the requisitions are numbered consecutively and when filled out are marked with the numbers of the jobs for which the necessary material is used, a mutual control between stockroom and superintendent's records is possible for the main office of the company.

It must be remembered that no material whatever is allowed

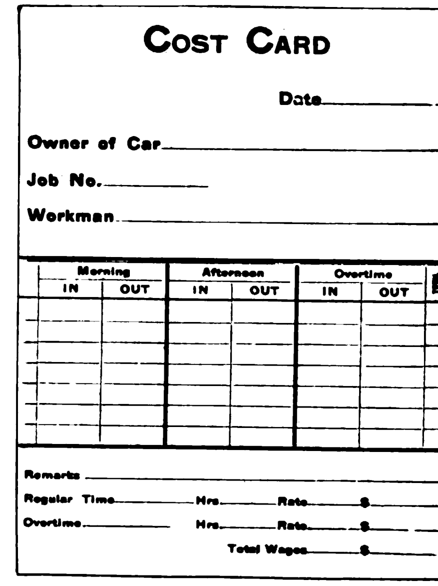


CUSTOMER'S CREDIT
SERVICE BUILDING
THE R. & L. COMPANY
J. T. Rainier PRESIDENT
DISTRIBUTORS Garford MOTOR CARS AND TRUCKS
1880 BROADWAY
Goods received from
Date,
Customer
Requis. No.
By whom ordered
Send this slip over to office.

Fig. 10—Customer's credit slip balances unused requisitions

to leave the stockroom without being exchanged for a requisition. Consequently, when a workingman goes on an outside repair job, he will in many cases be required to take along material that might be used in his work, but which may prove later to have been unnecessary and must be returned to stock. When a man goes out and takes material with him, be it parts, waste or anything else, he has a requisition filled out. If he returns with unused parts, he shows them to the superintendent or his assistant, who then makes out a customer's credit slip, Fig. 10, which comes in a pad. Then he sends the parts back to the stockroom with a duplicate of the credit slip. There the returned parts or materials are checked against the requisition, and, if necessary, the stock file is rectified. When the duplicate is returned by the stockroom clerk, the superintendent sends it to the Broadway office with the other forms relating to the repair job.

5. In case of a man doing outside work petty expenses are invariably incurred, and these are taken care of in the following manner: The man, when going out, stops at the office of the department cashier, and there draws approximately the sum which he thinks will be necessary to cover his expenses. He signs a receipt for the money given to him and goes after his work. When he returns, his job being done, he fills out an expense slip, Fig. 7, containing a detailed account of how much money was spent by him in doing his work and itemizing this statement with sufficient detail. Again the customer's name and address, the job number, as well as the laborer's name and number, are recorded, and after the man has refunded the unused balance of the money to the cashier, the latter adjusts his account and hands the expense slip to the office of the superintendent, whence it is sent to the Broadway office with the other repair job records.



COST CARD
Date
Owner of Car
Job No.
Workman

Morning		Afternoon		Overtime		
IN	OUT	IN	OUT	IN	OUT	

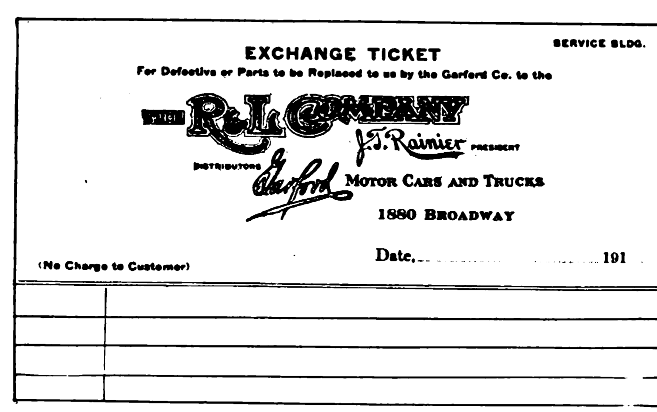
Remarks
Regular Time Hrs. Rate $
Overtime Hrs. Rate $
Total Wages $

Fig. 11—Worker's job-time card

6. Labor and material which are charged to a customer are distinguished from those expenses which must be borne by the company, because the repairs made were necessitated by faulty material or poor workmanship in the car; in a word, when repair work is done under the guarantee. If a part must be drawn from stock to replace a broken part on a car, perhaps outside of the service department, an exchange ticket, Fig. 12, is filled out at the same time with the requisition for taking this material from stock. Exchange tickets come in the form of duplicate blank pads. The original ticket is pink, but the carbon copy is made on light green paper. This green copy is immediately sent to the Broadway office to notify it of the necessity of doing guarantee work while the pink original is retained by the superintendent. The same time the service department now proceeds to send a man after the broken part, who takes the material with him and if necessary installs it on the car. When he comes back with the damaged part, a white tag giving the model and number of the car from which it was taken is attached to the part, which is then sent back to the factory for the purpose of crediting the department with its value. As soon as the part has been sent away, the pink slip is also sent to Broadway, so that this office may await a credit note from the factory, until which time both exchange tickets are held on a special file. The factory is also charged with the labor.

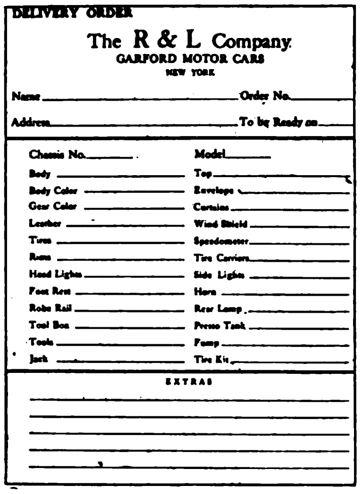
Repaired Cars Given Road Test

7. When a car repair has been completed, the service department has the car tested out to see whether the damage has been completely remedied, and to insure the perfect operation of the machine, it being important to exclude the possible



SERVICE BLDG.
EXCHANGE TICKET
For Defective or Parts to be Replaced to us by the Garford Co. to the
THE R. & L. COMPANY
J. T. Rainier PRESIDENT
DISTRIBUTORS Garford MOTOR CARS AND TRUCKS
1880 BROADWAY
Date, 191
(No Charge to Customer)

Fig. 12—Exchange ticket used where guaranteed repairs are made



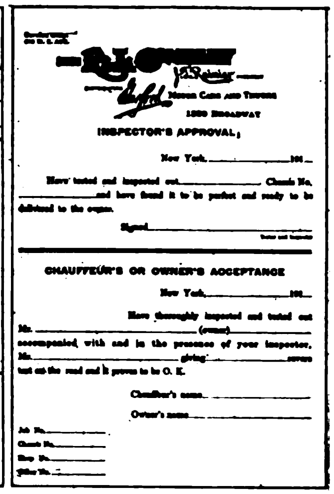
DELIVERY ORDER

The R & L Company
GARFORD MOTOR CARS
NEW YORK

Name ______ Order No. ______
Address ______ To be Ready on ______

Chassis No. ______	Model ______
Body ______	Top ______
Body Color ______	Envelope ______
Gear Color ______	Curtains ______
Leather ______	Wind Shield ______
Tires ______	Speedometer ______
Rims ______	Tire Carriers ______
Head Lights ______	Side Lights ______
Foot Rest ______	Horn ______
Robe Rail ______	Rear Lamp ______
Tool Box ______	Presto Tank ______
Tools ______	Pump ______
Jack ______	Tire Kit ______

EXTRAS



Motor Cars and Trucks

INSPECTOR'S APPROVAL;

CHAUFFEUR'S OR OWNER'S ACCEPTANCE

Chauffeur's name ______

Owner's name ______

Fig. 13—Delivery order. Fig. 14—Tester's and chauffeur's blank

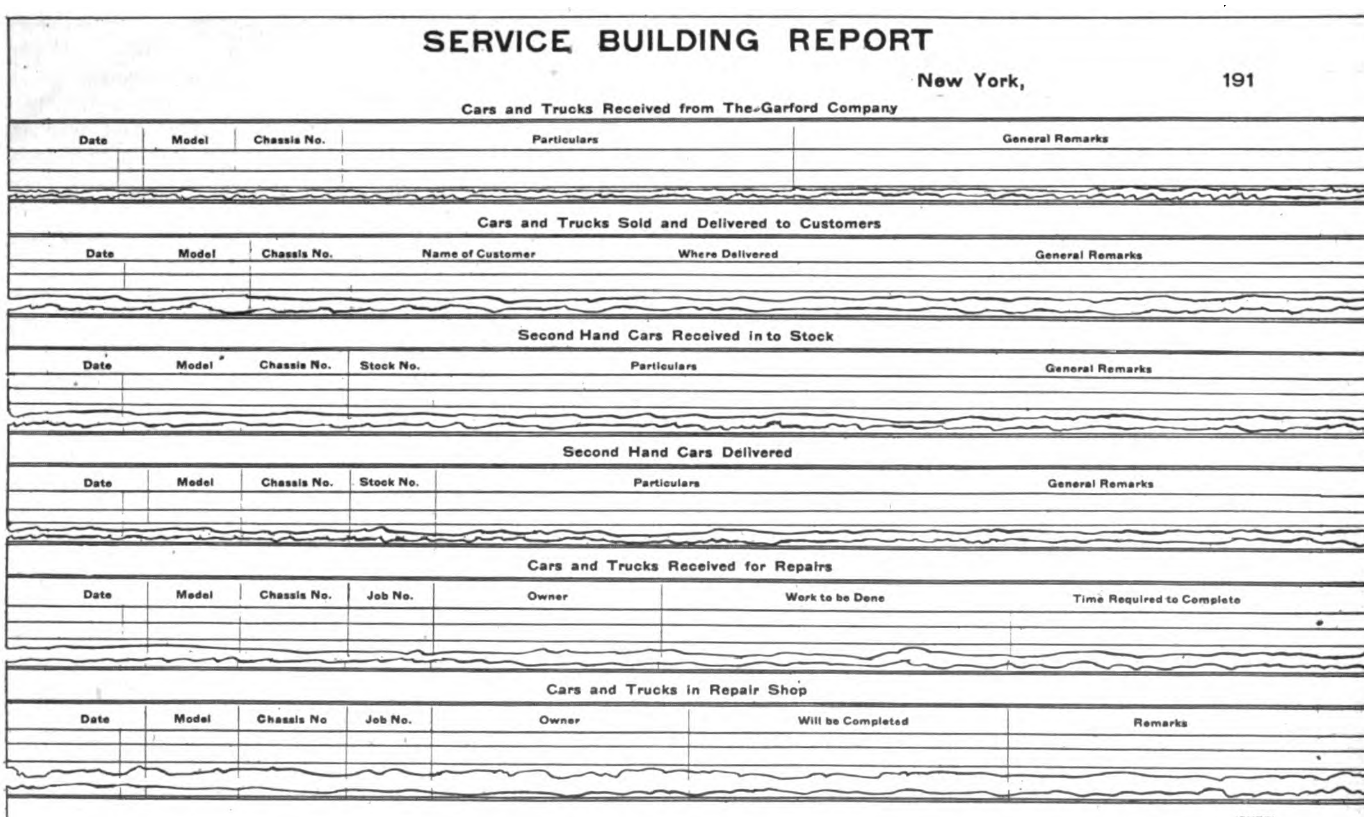
development of poor adjustments, etc., while making the repair. According to the differing nature of automobile repairs, the test made to insure that a good job has been done may be more or less extensive, as the specific conditions require; but the company prefers to give the automobile a good road test before returning it to the customer. One of the company's inspectors, an expert in the construction of the car, undertakes the test. He looks out for what necessary repairs may have been overlooked while the car was in the shop, and does what he can to tune the machine up generally to insure its good performance. When he has done this and found the automobile satisfactory, he reports at the office of the superintendent and proceeds to write out a test form, Fig. 14, which comes in a duplicate-blank pad. He fills out the upper half of the form, expressing his approval of the repairs made on the car. This having been done, the machine is ready to be redelivered to its owner, who is thereupon notified that he may call or send for his car. When the owner or chauffeur calls, he finds the car ready for operation and is invited to test it out on the road to assure himself that the work ordered has been done well. When he has done this, he signs the lower half of the form, Fig. 14, to express his satisfaction with the repair at the time when his car was delivered. Then he is made to sign the equipment blank, Fig. 3, after having looked over his car to see whether all his accessories and other equipment are there. The duplicate test form is held by the superintendent, while the original is sent to the Broadway office.

8. The above-mentioned daily report which is sent to the Broadway office is the most original feature of the entire system, in that it is a complete statement of the day's work done in the service department, and also of the number of cars received and delivered during the day for the company's new, repair, and second-hand trade. The sheet which serves this manifold purpose comes in pads, is 14 inches wide and 17 inches high, ruled in blue and printed in black. Its two sides are illustrated in Figs. 15 and 17.

Complete Day's Work on One Sheet

This statement has a double value. It puts the main office in a position of having a record of the service department's operations for every day of the week and month, without the necessity of having any of its own officers spend hours over the records and forms which are sent over daily from the service department; moreover, it forces the superintendent or his assistant to go over the whole plant at least once a day and to take such insight into the affairs of the department that no mistake can get by the records. It is this type of live reporting, done by one or two capable men, which makes a system efficient and at the same time keeps it from becoming cumbersome. The daily report sheets are filed in the Broadway office, as they come in day by day, and are always ready for reference. There they form a standing source of record indicating what the work of the service department has been for any given time and how profitable or otherwise it has been.

9. Reference to the headings appearing on the daily report sheet show that the service department also receives and deliv-



SERVICE BUILDING REPORT

New York, 191

Cars and Trucks Received from The Garford Company

Date	Model	Chassis No.	Particulars	General Remarks

Cars and Trucks Sold and Delivered to Customers

Date	Model	Chassis No.	Name of Customer	Where Delivered	General Remarks

Second Hand Cars Received in to Stock

Date	Model	Chassis No.	Stock No.	Particulars	General Remarks

Second Hand Cars Delivered

Date	Model	Chassis No.	Stock No.	Particulars	General Remarks

Cars and Trucks Received for Repairs

Date	Model	Chassis No.	Job No.	Owner	Work to be Done	Time Required to Complete

Cars and Trucks in Repair Shop

Date	Model	Chassis No	Job No.	Owner	Will be Completed	Remarks

(OVER)

Fig. 15—Front side of daily report sheet which is sent to the manager of the company to keep him informed of department doings

REPORT CONTINUED

Cars and Trucks Repaired and Delivered

Date	Model	Chassis No.	Job No.	Owner	Where Delivered	Remarks

Cars and Trucks Sent to Body-Builders

Date	Model	Chassis No.	Body Builder	Address	Style of Body and Particulars

Cars and Trucks Received from Body-Builders

Date	Model	Chassis No.	Body Builder	Address	Particulars

Demonstrations

Date	Model	Chassis No.	Job No.	Demonstrator	Demonstration to Whom	Time Consumed	Remarks

Report of Daily Sales

Date	Cash Sales	Charge Sales	R. & L. Material Used from Stock

Remarks

Sign

OVER

Fig. 17—Reverse side of the daily report going to the main office and filled out after personal inspection by assistant superintendent

ers new cars coming from the Garford factory and second-hand machines traded in by the Broadway store. This faculty of the service department calls for forms usable in connection with the work of handling these cars. When they arrrive at the service department, the assistant of the superintendent makes a memorandum of the car's number and equipment, which he keeps on his desk, no special form being used for this end. After noting the number and model of the machine on the daily report sheet, the machines are turned over to stock. When any automobile is delivered to a buyer from the service building on the orders of Broadway quarters, the assistant of the superintendent fills out a delivery order or card, Fig. 13. These cards come loosely, like the time cards. The assistant superintendent gives the name of the purchaser, the sales order number which he receives from the Broadway office, and the date on which the machine is to be delivered. Then the details describing the car and its equipment, the number and model of the chassis, as well as a detailed account of the accessories carried on the machine, are entered on the delivery order, enumerating the most general accessories. The back side of the order is a short inspection blank containing the following items: fill oiler, fill radiator, gasoline, grease cups, tune motor, adjust brakes, which are checked by an inspector before the car is delivered.

Records Filed at Main Office

10. In this operation the receipt, Fig. 16, is used. The name of the purchaser, date of delivery and details regarding the car and its accessories are written on this form, which is made out with a carbon copy on yellow paper by the assistant to the service superintendent. When the owner or his chauffeur calls at the department, he signs the original and carbon copy of the receipt and retains the latter, while the former is sent to the Broadway office together with the delivery order. Both forms are filed there under their sales order number.

It has been stated above that when a repair has been completed, all the forms used in connection with it are sent to the Broadway office, to be filed there under the job number which first appears in Fig. 4. The forms which are sent together to the main office are herewith summed up: Figs. 1, 4, 5, 6, 7, 9, 10, 11 and 14. The repair tags, Fig. 2, are all kept by the superintendent and are filed by their job numbers. The inventory, Fig. 3, stays in the book it came in. The clock cards of the workingmen, Fig. 8, after having been gone over by the foreman, are sent to the bookkeper's and cashier's office for settlement at the end of the week. Exchange tickets, Fig. 12, are kept on a special factory credit file at the Broadway office. Figs. 13 and 16 go to the sales file of the main office. The daily report, Figs. 15 and 17, is kept on a special file in the main office for future reference.

This system requires the full attention of the assistant of the superintendent, as well as that of the stockroom clerk and the foreman, the latter two, however, doing other work in addition thereto, so that only one special man is necessary. The R. & L. Company stores and serves about threescore cars. The consequent cost of service per car is very low and the saving proportionately great.

RECEIPT

To Be Delivered to ____________

____

Date ____________

Chassis No.______ Model______ H. P.______ Cylinders______

Inventory____________

Received by ____________

Fig. 16—Receipt for new or second-hand cars sold and delivered

Suggests Machine for Testing Brakes—Right and Wrong Methods of Attaching License Plates—Light on Dyer Patent Situation—Removing Carbon from Manifold—Lubricating the Clutch—Running on Advanced Spark

Recommends Brake Testing Machine

EDITOR THE AUTOMOBILE:—I read with interest the article on brake efficiency and materials in your last issue, and in connection therewith would like to give some details of the methods employed in the Hudson factory in brake construction. We use fabric brake linings in which asbestos is interwoven with copper wires. The coefficient of friction is between 0.25 and 0.40. Our brake diameter, 16 inches, with 4 inches width of face. The car is able to stop in a distance of 35 feet when running at a velocity of 20 miles per hour. A very desirable feature of the present brake linings which are now on the market would be a greater conductivity of heat.

In my opinion, axle manufacturers are in a position to carry out experiments on their brakes, regarding their resistance moment, and it would be desirable if they would specify the results on their drawings. To calculate the retarding moment gives very uncertain results. Such calculations involve too many variable quantities and factors, such as the friction coefficient, and the action of cams and differential levers.

Obtaining the result by calculation, this way, it will never give the designer a near enough correct value of the brake moment, and to know this exact value it would be necessary to know the braking moment at the time when they select a certain set of brakes for their car. Of course, it would be still better if on their drawings they would furnish a character curve of the brake. This curve should indicate the increase of the moment, with the increase of the load applied on the end of the tightening system. The point of such a curve could be easily determined by a simple testing machine. The design of such a machine should be something like the following: A flywheel resting on two ball bearings and on one end of the shaft is connected with the hub of the rear axle. The other end carries a clutch which enables us to disconnect the motive power; also it has a sensitive tachometer. During the experiment it would be well if the gears on the differential and also the bevel gear were removed. To obtain the different readings, different weights should be applied on the end of the tightening lever. Then the calculation of the moment would be the following:

G = the weight of the flywheel concentrated in the center of gravity of the section of the flywheel.

r = radius of this point.

t = uniform length of time interval in which the revolution is recorded and in this interval the disk makes a revolution of n and in the following interval it makes a revolution of n_1.

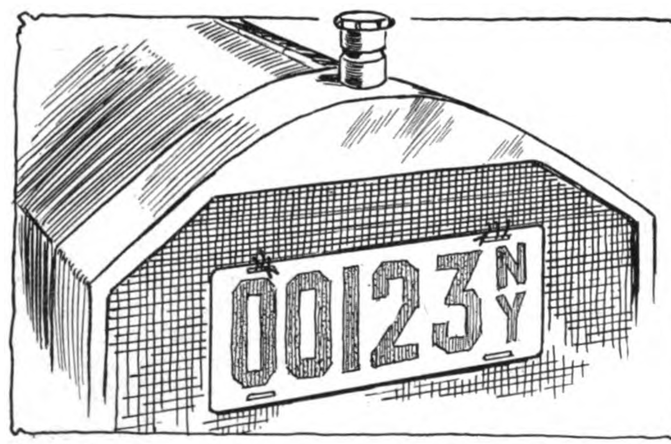


Fig. 2—This way of suspending license plate means radiator breaks

The mean angular velocity during the first interval is

$$\frac{2.\pi.n}{t}$$

and during the second interval is

$$\frac{2.\pi.n_1}{t}$$

then the retarding moment in the t = time interval on a body which has a moment of inertia $G \times r^2$ — is equal to

$$M = \frac{2.\pi\ (n - n_1)\ G.r^2}{G.t^2}$$

This moment is due to the friction coefficient, f.

If r_1 = brake radius, then

$$f = \frac{2\pi\ (n - n_1)\ r^2}{g.t^2.r_1}$$

where $g = 32.2$.

This way, knowing the character of the brake moment, we could easily establish the rate of retardation due to the road resistance, because the variation of road resistance could be measured by the accelerating condition. This is given by the motor output because at top speed the motor output equals resistance. The total retardation of a car

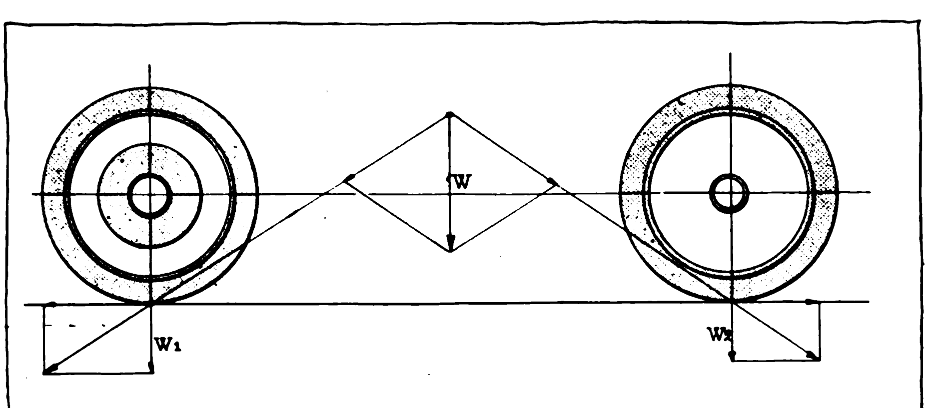


Fig. 1—Illustrating distribution in adhesion in front-wheel braking—car standing still

is the sum of the retardation due to road resistance plus retardation due to the brake. These two acting on a distance treatment is the work done by retardation. When the brakes are thrown into engagement, the capacity of doing work against retardation is

$$\frac{MV^2}{2}$$

foot-pound per second. Consequently the distance traversed during the action of resistance is

$$\text{Distance} = \frac{MV^2}{\text{Mean resistance}}$$

To know the character of resistance would also be important in a case of transmission brakes. Here the disk running on a higher speed gives a larger friction surface than in the rear brake. The resistance of a correctly designed transmission brake should not be greater than the torque of the motor on low gear. I found that many transmission brakes give an overload on the rear axle pinion bearing as high as 300 per cent., which is decidedly harmful even if it acts only for a short length of time. The same requirements hold good on brakes on the jackshaft.

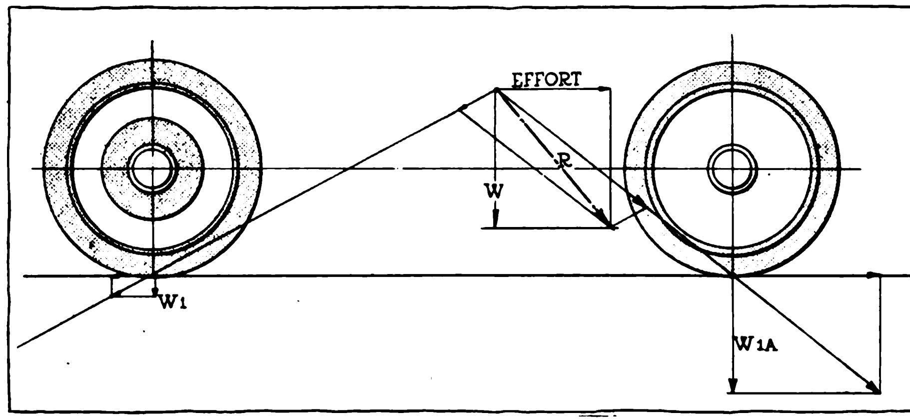


Fig. 4—Diagram illustrating increase of adhesion of front wheels with car in motion

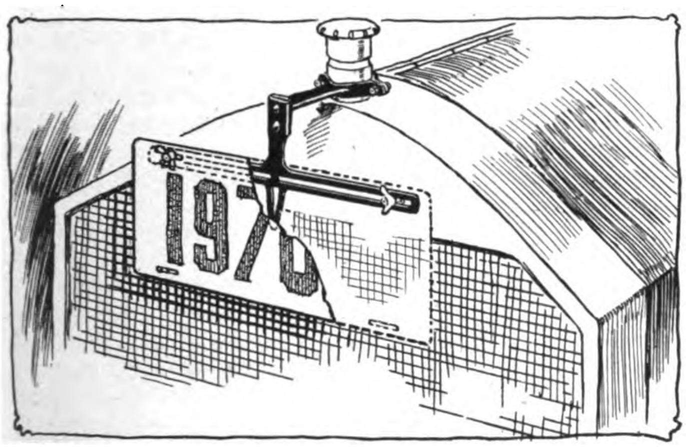


Fig. 3—Safe method of hanging license—radiating surface not lessened

In regard to the future of front wheel brakes: These have one disadvantage; this is the comparatively complicated brake shoe operation. Its advantage lies in the fact of the change of the adhesion on the wheels. Individual sets of brakes should have a retardation near to the locked wheel condition. The car, at rest, by the distribution of the weight has a larger adhesion generally on the rear according to the location of the center of gravity. Fig. 1.

While the car is moving, Fig. 4, the adhesion on the rear axle changes, due to the fact that the driving effect and the weight of the car is acting on the center of gravity. These two forces give a result of R, shown in Fig. 2. This R decomposed in the contact points of the wheel will give an increase of adhesion on the front. Consequently, the front wheel in the early part of retardation is able to carry a larger brake moment, as in the rear and at a lower speed, the adhesion again increases on the back axle. Therefore, the front brakes give a quicker rate of retardation as a correctly designed transmission brake, with a rear axle brake, would give.

Detroit, Mich. S. J. Fekete.

Care in Hanging License Plate

Editor The Automobile:—What is the best way to hang a license plate? I wired mine to the radiator and have practically ruined the latter.

New York City. Subscriber.

—Many licenses are carried by car owners in the manner shown in Fig. 2. The wires are run through the openings in the radiator and passed through the holes in the license plate. When the car passes over road obstructions it shakes the license plate causing the wires to break down the structure of the radiator.

The plate should be hung in some such manner as by the bracket shown in Fig. 3. In this way the radiating surface is not cut down and a much neater appearance is made. When the license plate is put on such a holder, however, the owner should remember the following important point: Always have a leather or rubber washer between the thumb screw and the enamel or the latter will start to chip and before long a large amount of the surface will snap off. The same point should be remembered in attaching plates to the rear brackets.

Concerning the Dyer Patents

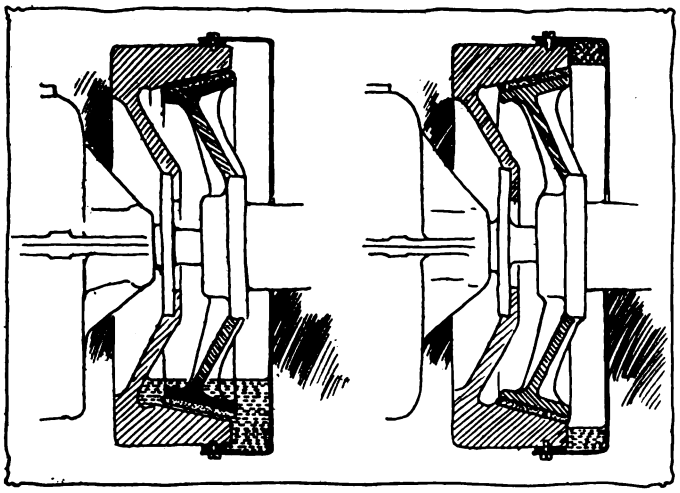
Editor The Automobile:—As an owner of an automobile I received a notice from Dyer, Dyer & Taylor, attorneys, calling attention to infringements of the Dyer change-gear patents. In your issue of The Automobile, page 1315, June 13, you make mention of individual licenses being issued. As an automobile owner I am interested in the proposition, as I feel sure are other owners as well, and I for one would like to know where I stand and what is to be done. Possibly in some previous issue of The Automobile you covered this subject, and if so I failed to see it. If not, why not let your readers know just where are their rights in the matter and what to do should they receive these lawyers' notices of alleged infringement?

New York City. An Automobile Owner.

—The Dyer patents, referred to in your letter, were duly granted by the Patent Office and at this time are in process of adjudication in the United States District Court. There are but two courses open to an automobile owner in your predicament. First, to disregard the notice and second, to take out a license. If you follow the second plan, the matter is settled at once. If you disregard the notice and the complaining party pursues the usual course, suit will be filed in the United States District Court asking for an injunction, accounting and damages.

Any attempt on the part of The Automobile to forecast the action of the United States District Court touching any matter pending before that court would be the height of impropriety. The patents in question have not been adjudicated, but all patents carry with them a presumption of validity until the contrary is shown. Therefore, it would be in bad taste for The Automobile to prejudge or anticipate the action of the court in any patent case.

The present status of the suits brought under the patent is inconclusive. Four main suits against the Locomobile, Maxwell, Winton and Saurer respectively are now before the court as well as several scores of individual suits. The four suits referred to above are being defended by William A. Redding, but no answer to the original complaint has yet been made. When this answer is filed, proof of the patent will be taken in due form and the



Figs. 5 and 6—Showing novel method of lubricating clutch

facts upon which the defense relies will be put in. The testimony will then be submitted to the court and arguments will be heard on both sides. The opinion of the court will be rendered and in such an important matter it is reasonably certain that no matter which side prevails, appeal will be taken to the United States Circuit Court of Appeals. Ordinarily this court is the tribunal of final resort in patent matters and its decree will be accepted as the law of the land on the particular measure involved.

It is conceivable, however, that the Supreme Court may accept jurisdiction of the cause after decree by the United States Circuit Court of Appeals.

Before decree, the patentee, or his assigns, may proceed against alleged infringers irrespective of pending suits.

In the Selden litigation, it will be remembered, suits against individuals were filed; licenses were granted and proceedings in court prosecuted during the pendency of the basic or main suit against Henry Ford, *et al.*

When the Selden suit was overthrown in the United States Circuit Court of Appeals and the limits of the patent sharply outlined, the decision of the court served to check further proceedings against defendants whose cases involved the same facts covered by the decree.

In case suit is filed against you, if your attorney puts in an answer and takes advantage of all the chances for delaying a hearing that the case is susceptible of, it may be that in the meantime the main suits will be tried and in case the defense prevails, there is a chance that your suit will be dismissed without coming to trial. This should be considered in no wise advice from The Automobile, as the whole question is one for the automobile owner to answer for himself.

Kerosene and Water to Remove Carbon

Editor The Automobile:—Do you believe it a good idea to introduce by way of petcock in the manifold between the cylinder and carbureter kerosene while the engine is running? In some publication I noticed an article that kerosene and water in alternate doses would remove carbon. Do you think this a good practice?

Amsterdam, N. Y. H. L. Reed.

—According to the idea expressed in this communication the petcock would be located in some such position on the manifold as is shown in Fig. 7. It would be very difficult to find many manifolds that would be suitable for such an application of the petcock on account of the vertical riser which would be prohibitive of placing the cock directly on the manifold, although it could easily be accomplished by the aid of an elbow. While the scheme would doubtless work very well, as it would allow the operator to put the kerosene into the cylinders while the motor is running, which is a very desirable feature, yet, if the kerosene is placed in the regular compression cocks on the top of the cylinder as soon as the motor is stopped it will be sufficiently warm to vaporize the kerosene and in this form allow it to reach its maximum efficiency as a solvent.

The introduction of water into the manifold at this point is a matter which should be approached with great caution and it is difficult to see where the benefit of its use would be felt. The petcock would compel the use of another joint in material which has not been especially bossed to take the thread of the plug and which is not of sufficient thickness to be proof against a leak where the difference in pressure on the interior and the exterior of the manifold is very high. On the whole, it would seem more satisfactory to introduce the kerosene in the manner which has been previously described. That is, on stopping the car to put a compression cupful of kerosene into each cylinder and let the car stand overnight. When starting, open the petcocks for a while and blow out the accumulated matter.

A Unique Clutch Lubricator

Editor The Automobile:—I have a suggestion to make for slipping clutches, without the use of cushion springs, and would like your advice on same.

It is a plate screwed on the rear face of the flywheel enclosing the clutch. It can be put on a gasket and has a hole in the center, large enough to take the clutch hub. This plate will form an oil-tight reservoir in which clutch oil can be put to a certain level. I claim that this oil will lubricate a small portion of the leather facing of clutch for starting. Then when the motor starts, centrifugal force will cause the oil to spread into the form of a ring and entirely leave the clutch face, so that it can become dry again for transmitting power without slipping. I am driving a car with this type clutch and have had no trouble with slipping when using castor oil. I think this scheme will take away the only fault of the cone clutch. It will also keep out the dirt. (Figs. 5 and 6.)

Cranford, N. J. Harold L. Collins.

Wants to Build and Equip a Garage

Editor The Automobile:—Could you give me an estimate as to what it would cost to put up and equip a garage suitable for general repair work such as you would have to do around a summer and winter resort? I do not want a large storage room. I would like to put in a small lathe, drill press and emery wheel run by a gasoline engine. I would like to keep a small stock of supplies such as would sell readily and would pay. If you could give me an idea of what it will cost and as to how it should be managed and also stocked, I would be greatly obliged to you.

Jackson Springs, N. C. Robert B. Cochran.

—The following equipment will probably be sufficient for your needs: A small lathe, $175; drill press, $60; emery wheel and other small tools, $25; a vulcanizer, from $15 to $50 varying with size; small gasoline and oil outfit, $300; car-washing arrangement, $10 to $15; crane, $80; gasoline engine, $100. The prices for machinery refer to second-hand goods, procurable in any large city. Regarding the cost of erecting a suitable building it is

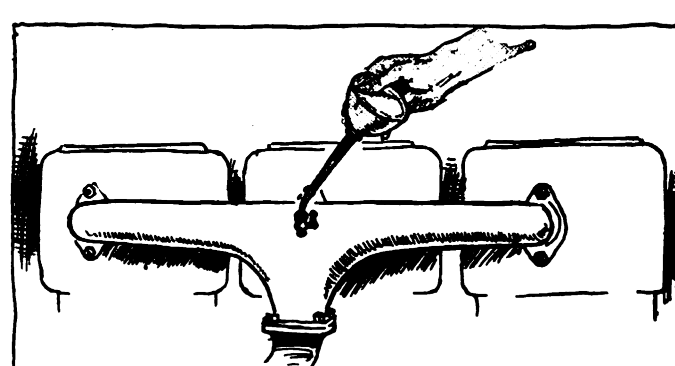


Fig. 7—Petcock on manifold for injecting kerosene to remove carbon

hard to say anything definite as it varies very much with its size, the material of which it is constructed and local conditions, so that it will be necessary for you to address a local contractor for a bid. Methods of conducting the business of a garage have repeatedly appeared in THE AUTOMOBILE, and the articles in the issues of April 18, 1912, and May 16, 1912, should prove of interest to you. If you have in mind to carry a small stock of supplies and accessories, this should principally include one or two good makes of tires in the most called-for standard sizes, tire repair outfits, oils and greases, spark-plugs and the like.

Pierce-Arrow Wiring Diagram

Editor THE AUTOMOBILE:—I have a 1912 Pierce-Arrow, 48-horsepower model, which is of the six-cylinder type. Can you give me the correct method of wiring the double ignition system and the proper order of firing the cylinders?

West Chester, Pa. AMATEUR.

—In Fig. 8 the wiring diagram of the double ignition system is shown. The order in which the cylinders should fire is 1, 5, 3, 6, 2, 4; therefore the binding posts of the magneto spark-plugs in these cylinders should be connected to the distributer plugs marked 1, 2, 3, 4, 5, 6 respectively; that is, 1 on the distributer to cylinder 1, 2 on distributer to cylinder 5, etc. The spark-plugs for the magneto are in the cylinder heads. The second ignition system uses a storage battery and individual unit autocoils with a master vibrator. The connections are also seen in Fig. 8, together with the leads to the acetylene headlights, where dash-control of the illumination is used.

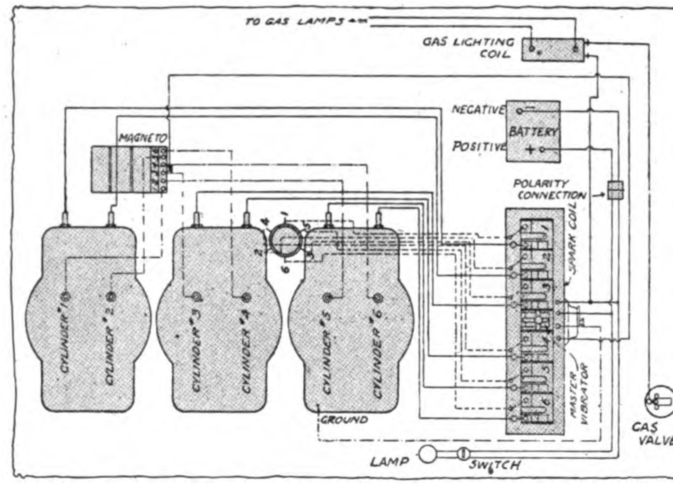


Fig. 8—Wiring diagram of Pierce-Arrow double-ignition system

From Detroit to Delhi, Ont.

Editor THE AUTOMOBILE:—Will you kindly give me the route from Detroit, Mich., to Delhi, Ont.; also the road conditions and what is necessary in taking an automobile into Canada.

Chicago, Ill. SUBSCRIBER.

—The best route to follow from Detroit to Delhi, Ont., is 611R of the Blue Book, which leads from Detroit to London, Ont., whence route 612 leads to St. Thomas, 40 miles from Delhi. The distance from Detroit to St. Thomas by the routes mentioned is 159.8 miles. In making this tour start from the Soldier Monument, Detroit, setting odometer at zero. Follow Woodward avenue trolley northwest and cross International ferry, 0.3, after which proceed to Windsor, Ont., to corner of Oulette avenue and Sandwich street. When meeting trolley turn to the left, then to the brick-laid road on the right, leaving the tracks into Glangarry avenue. From six-corners, 1.3, after meeting trolley car, turn to right into Howard avenue, crossing the railroad tracks at 2.4, 3.0, 3.1, 4.5 indications on odometer. At 9.3 cross railroad at Old Castle Station, then at Maidstone station, 12.8. Join trolley and cross tracks at 17.2, passing through Essex at 17.3; the trolley leaves to the right at 23.2. At 28.0 passing blacksmith shop, turn to the right, then at 28.6, at the end of the road to the left; then to the right with poles. At 30.4 enter Ruthven, turning to the left around the hotel and pass through Leamington, 34.1, and Wheatley, 41.9. Turn to the right at 46.1, and to the left with the poles at 46.5, proceeding on the curve to the left, 50.4, and to the right, 50.5. After taking the next curve to the left and then the right-hand road with the poles, observe caution in rounding curves along the lake, 58.6. Passing through Cedar Springs, 68.6, and crossing the railroad at 71.8, go through Blenheim, 72.6, thence to Ridgetown, 82.5. At 85.9 reach diagonal four corners and turn to the left across two railroad tracks, then into the next right-hand road, to arrive at Highgate, 88.9. At four corners, 91.2, turn to the left, then to right at 91.7. At the next four corners turn left, 92.3, reaching Clachan, 96.6, whence proceed to long iron bridge which is crossed at 103.8 and come to Wardsville, 104.1. Pass through Wood Green, Strathburn, Melbourne to Delaware, 128.9, turning to the right when reaching the church and at three corners, 134.2, turning to left, following sign "London." Pass through Lambeth, 141.2, across the iron bridge into London, 142.0. Start from there, corner Richmond and York streets, and follow the trolley across the bridge, at end of road turn to left on Wharncliff road, pass under Grand Trunk railroad and run straight ahead, bearing to right at 145.4 and entering Lambeth. Then turn to left with trolley line, crossing the iron bridge at 149.5 and the railroad tracks at 157.5. Just before railroad viaduct turn to left at 159.1, turn to right into Talbot street, St. Thomas, 159.8. There inquire of natives for direct route to Delhi.

Using Light Oil in Gearbox

Editor THE AUTOMOBILE:—I have about 15 gallons of oil on hand which is not heavy enough for my machine. What ingredients should I add to convert it into a suitable transmission grease?

Hollywood, Cal. T. J. BOSSERT.

—The oil can be mixed with any grease or non-fluid oil which will give the resulting compound sufficient body to have the requirements of a satisfactory gear lubricant. The result should be a soft paste.

The primary qualification of a gear lubricant is that it shall be of such composition that it will adhere to the surface of the teeth in spite of heavy pressure being placed upon it. When the power is transmitted from one gear to another the whole energy of the motor is distributed over the driving faces of the teeth and unless the viscosity of the oil is sufficiently high the lubricant will be squeezed out and rapid wear will result.

The oil which is drained from the crankcase of a motor may be used over in the gearbox when mixed with grease in the same manner as described for the light cylinder oil. It will have a waxy residue, which spoils it for cylinder use, but makes it desirable for the gearset in that it clings to the tooth surface.

Running on Advanced Spark

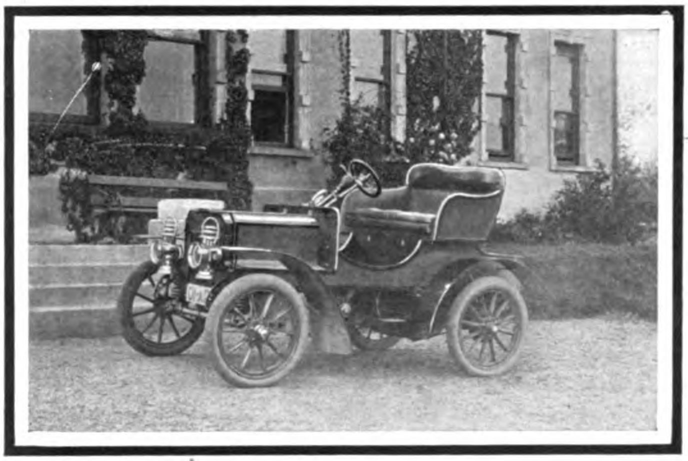
Editor THE AUTOMOBILE:—We have four chauffeurs, two of whom are unusually good mechanics, one with 15, the other with 9 years' experience. The car used occasionally by all four is often out of order. One claims it is best to run on advanced spark, another claims this method injures the machinery and claims that it is best to run on retarded spark.

Will you kindly give your opinion and oblige an old subscriber.

Fieldhome, N. Y. CORTLANDT DE P. FIELD.

—The best economy and results are secured when the spark is advanced as far as possible without the slightest knock. This is the opinion of expert drivers, and it is backed up by results over measured courses with given quantities of gasoline. It is doubtless slightly easier on the machine to retard the spark a trifle further than this, following the idea that the ear is not sensitive enough to catch the knock as soon as it develops.

If the spark is advanced until the knock is heard and then retarded until the knock just disappears and then one notch further the results will be about right.



First car ever made in Ireland—a Chambers

Motor Trade in Ireland

Nearly 10,000 Cars in Use in the Emerald Isle—Good Field for American Automobiles

What to Avoid in Seeking Business—Only One Factory on the Island, but More Coming

DUBLIN, IRELAND, Aug. 5—Although there are upwards of 9,000 automobiles in use in Ireland to-day, the manufacture of this class of cars in the Emerald Isle at the present time is confined to a single factory, located in Belfast. An additional motor-car factory is, however, to be built in Dublin in the near future.

The automobile has long since become an indispensable fixed factor in Ireland, not alone for pleasure traveling, but as a commercial carrier. There are about thirty different makes of commercial cars in use in Ireland at present.

Ireland's business firms make use of great numbers of lorries and vans for the carrying on of commerce. This is highly practicable, for the reason that of the country's 54,000 miles of public roads, at least 50,000 miles are in splendid condition for traffic and the county councils are making them better daily by the application of the steam-roller. Hundreds of these machines are in active service.

The advent of the railways in Ireland resulted in much neglect in the upkeep of the public roads. Again, by reason of the old Grand Juries act, a bar was placed upon every description of power-propelled road-making machinery prior to 1898. But all of that is passed and Ireland is an ideal country for motorists and for the carrying on of motor traffic.

The fire brigades both of Dublin and Belfast have fallen in with the progressive idea. The type of motor fire-engine used in both cities, is identical. Very soon Cork and Londonderry will also be able to boast of a motor fire brigade.

Automobile drivers are well paid in Ireland. The speed laws are not tyrannical, and accidents are surprisingly few.

Quick Production No Advantage

There are but two American types of automobiles to be found in any number in Ireland. But the average Irishman who is in the market to buy a car wants to see it demonstrated; he wants to be able to purchase parts of the local dealer; and he will not be driven from the long-established custom of asking and receiving credit. Another thing, American agents traveling over here (one in particular gave moving picture demonstrations) do their level best to impress upon the Irishman that the American-made car is built rapidly. The Irishman shudders at the very thought. His first impression is that a car made hastily cannot be good. There is no use trying to break through conventionalities. It is better to say nothing about the time required for the production. Such talk only has a tendency to frighten the Irishman and spoil a sale.

Ireland today affords one of the best opportunities of any country in the world for the sale of automobiles. The country has awakened. It is prosperous. Its farmers are getting rich. They get as much per pound for butter and bacon as do the American farmers. The exports from this country last year amounted to more than $325,000,000—$72.50 per capita of population—making her the fifth exporting nation among eighteen. Ireland's people are buying luxuries, notably automobiles. But they cannot see that it adds anything to the quality of a car to prove that it was manufactured within a few hours' time. The history of the nation has convinced them that things to be desired are secured only after long and patient endeavor. They have not yet been educated up to the point where they can see the virtues of quantity production. In the accompanying illustration is shown the first automobile ever manufactured in Ireland. It is of the vintage of 1904, and was built at the Chambers works in Belfast. It is of the two-cylinder type and registers 7 horsepower. Everything about it, with the exception of the tires, was made in the Emerald Isle.

Other Foreign Opportunities

AUTOMOBILES FOR GERMANY—A big American company, which recently established an automobile agency in Germany, sold 10 cars during the first 3 months. Most of the machines are for pleasure purposes, but one is being used as a taxicab. An American Consul writes that there are persons in his district who are willing to form a $50,000 company for importing American cars, but they desire the general agency for Germany or for all Europe if possible. They are looking for a four-seated car that could be sold for about $1,000. American firms interested in this proposition may secure information by writing the consulate in question. File No. 9196.

SMALL MOTOR TRUCK—An American manufacturing company writes to the Bureau of Manufactures that one of its customers in a Latin-American country is interested in purchasing a small truck, with two seats in front and a space of about 5 1-2 feet behind, with cover, to carry a total weight of about half a ton. What is desired, therefore, is something in the nature of a runabout, but with the truck attachment described. Manufacturers interested in this should submit printed matter and prices f.o.b. vessel New York. File No. 9236.

LOW-PRICED AUTOMOBILES—A business man in a Mediterranean country informs an American consular officer that he desires to secure the exclusive agency or representation in that country of some American manufacturer of automobiles. An automobile of the touring type that will cost not more than $800 f.o.b. New York is what is desired, and for this type a considerable market exists in the country in question. The inquirer desires illustrated catalogues, prices, discounts, and terms of payments. He can furnish satisfactory references and correspondence may be in English, Italian or French. File No. 9240.

AUTOMOBILES—A foreign business firm advises an American consul that it desires to purchase an American automobile costing from $800 to $1,500. Catalogues and prices, with shipping weights, are desired, and if possible the freight rate from port of shipment to city of destination, either *via* Hamburg or the Pacific coast. Correspondence and printed matter can be in English. File No. 9234.

IF a motor 'bus breaks down in a London street and repairs are made in the street which cause inconvenience to the general traffic, it is within the power of a constable to take action against the driver for neglecting to have the 'bus towed to the nearest garage.

Big Paris Show Prospects

Nearly a Dozen American Cars Will Be Represented in Addition to Many Accessory Makers

Three Trade Associations Will Run the Exhibition on a Profit-Sharing System

PARIS, July 26—Nearly 30,000 square yards of exhibition space have been applied for in connection with the next Paris motor show to be held in the Grand Palais, Paris, from December 7 to 22. Every available inch of space has been booked and there is a big waiting list of firms hoping to get into the exhibition by the withdrawal of those already given stands. This year's show, the thirteenth of the series, is distinctive by reason of the large number of American firms taking part. The United States motor industry is represented by Cadillac, Buick, Case, Century, Flanders, Ford, Hupmobile, Mitchell-Lewis, Oakland, Reo and Overland. American accessory manufacturers are generally represented by French agents, who show the products on their own stands and under their own names. Among those having distinct stands are Rushmore lamps, Klaxon, Acheson Oildag, Werner Speedometers, Vacuum Oil Company. Only one American tire manufacturer will be represented at the show, this being the Goodrich concern, exhibiting through its European house. American machine tool manufacturers will be represented by Potter & Johnston. Among the few electric vehicles will be those of the Anderson Electric Car Company. This list of American concerns exhibiting at Paris is evidence of the important position the United States manufacturers are securing on the European market, for when the last show was held in Paris, 2 years ago, the only American-built car on exhibition was the Ford.

With every available inch of space booked up, the French manufacturers anticipate a bumper show. The increase has been brought about by the larger number of home firms wishing to compete, and by the increased applications from America and England. Up to the present English manufacturers have not considered it advisable to take part in the Paris Salon, especially as the French exhibition followed very closely after the one at Olympia. For the first time this year many of the leading British manufacturers have applied for space, among the more important being Argyll, Austin, Coventry Chain Company, Daimler, Hele-Shaw, Humber, Napier, Rolls-Royce, Star, Sunbeam, Vickers, Wolseley, and a number of accessory and tire makers.

The Paris show is now a purely manufacturers' concern, being organized by the three leading trade associations and run under a profit-sharing system. All exhibitors are entitled to share in the profits, although those belonging to the trade associations participate undler more favorable conditions than outsiders. Stand positions are to be awarded by the drawing of lots, foreign exhibitors taking part under the same basis as the home firm, provided their own show organizers give equal facilities to French firms.

Congress of Material Testers

THE sixth congress of the International Association for Testing Materials will be held at the Engineering Societies Building the week of September 2-7. Delegates from every country in Europe except Turkey and a few of the less important states, several Asiatic nations and the United States have been named and it is expected that the congress will bring out a very representative, cosmopolitan gathering.

The Society of Automobile Engineers will be represented by Past-President Henry Souther. The technical program so far arranged includes 170 papers and at least thirty-five of Ameri-

Besides the regular sessions, the business of the congress will include trips to West Point and about the city and suburbs and at its conclusion the delegates may take a swing around the eastern portion of the country. A special train has been arranged for the party, leaving Sunday afternoon after the end of the deliberations and stopping at Washington long enough to allow of an inspection of the public buildings, Bureau of Standards and testing laboratories. The trip is scheduled to cover Pittsburgh for 2 days, including visits to the steel, cement, electric and explosive factories. From Pittsburgh the party will go to Buffalo and Niagara Falls, returning to New York on September 14.

The officers of the organizing committee of the congress are as follows: Henry M. Howe, president; Robert W. Lesley and Robert W. Hunt, vice-presidents; Edgar Marburg, treasurer; H. F. J. Porter, secretary, and W. O. Wiley, treasurer of the executive committee.

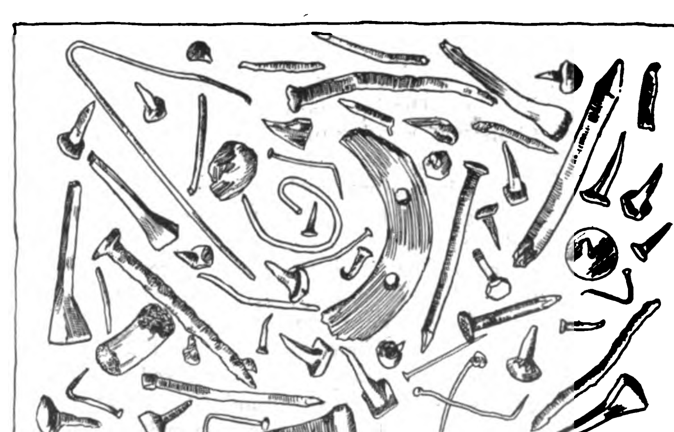
Two Boston Companies Go Under

BOSTON, MASS., Aug. 12—The Selbach Rubber Company, a Massachusetts corporation doing business at 404 Columbus avenue, has assigned. The assignment was made to Walter Powers, but no estimate has been made of the value of the business or the amount of the indebtedness.

Frank H. Coyne, doing business in Boston and New York under the name of the Detroit Tool Sales Company, and the Portable Machine Shop Company, an automobile accessory, made an assignment last week. He owes $95,405, of which $95,201 is unsecured among about 200 creditors. The creditors are scattered throughout the country.

Tire Shoe as a Junk Repository

About sixty bits of metal, as shown in the accompanying illustration, were picked up by the left rear tire of a Cadillac car in service on the London streets during the course of 1,000 miles. The owner of the car, a friend of A. Staines Manders, general manager of the International Rubber Exposition, which will be held at the Grand Central Palace from September 23 to October 3, was so impressed with the number of tire destroyers that he picked them out of the tire and had them photographed. Mr. Manders was so much interested in the demonstration of the danger to tires in London that he presented the picture to THE AUTOMOBILE. The curious part of the story is that the tire did not suffer a single puncture and the owner did not know that his tire was accumulating a load of metal until one day he was forced to extract the bit of horseshoe, shown in the middle. This did not cause a puncture and neither did the accession of the wire and wire nails. The thing that did the business was the small nail, shown at the lower right-hand corner and when it reached the vital spot, the shoe blew out for 22 inches. The tire tread and fabric had been so weakened by the repeated stabs that after the blow-out occurred the whole shoe was useless.



Collection of junk picked up by a tire in London

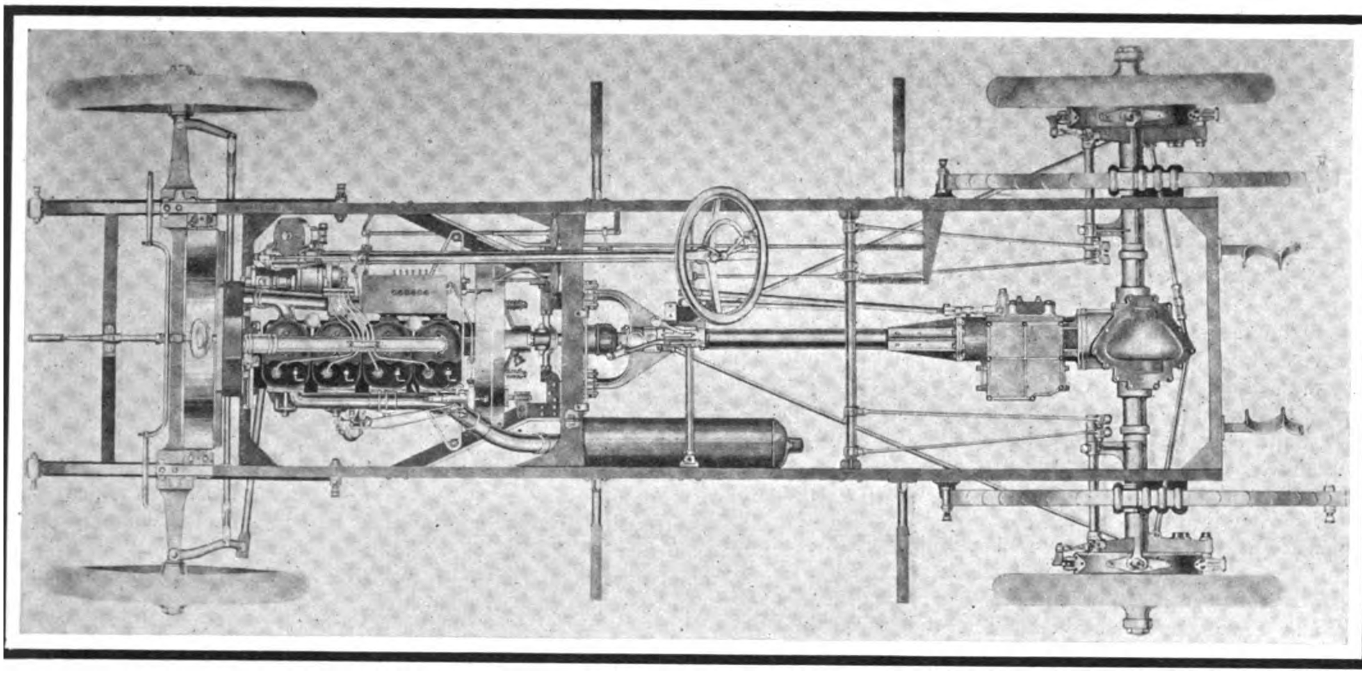


Fig. 1—Plan view of chassis of model 69 of the 1913 Overland line, showing location of gearbox

Two Models of 1913 Overland

While Characteristics of Line Are Retained, Quite a Number of Refinements Are Noted

Cylinders Are Cast Separately—Gearbox Is Located on Rear Axle—Eight Body Types Offered

THE Overland line for 1913 consists of two models, as for 1912. These are to be known as models 69 and 71, and replace models 59 and 61, respectively. A number of changes and improvements have been incorporated in the two, but on the whole they retain all the characteristics of the Overland construction. The gearboxes are located on the rear axles, motors have their cylinders cast separately, and while a number of changes have been made, these are principally refinements and do not alter the general Overland features.

Model 69, the less expensive of the two cars, is still the leader and its construction will be taken up first. The motor is a four-cylinder, L-head type; each cylinder is separately cast, as brought out in Fig. 1. The bore is 4 inches and stroke 4 1-2 inches, giving a horsepower rating of 30. The stroke-bore ratio is 1.12 and for this reason the motor will develop more than its rated power. As heretofore, cooling is by thermo-syphon system with a cellular radiator. The water capacity is about 4 1-4 gallons, and the total weight of the water in the cooling system 34 1-2 pounds. The maximum temperature reached by the cooling water is given as 198 degrees. The thermo-syphon cooling system obviates the water pump and is considered to be absolutely automatic. It is claimed that the speed with which the cooling water circulates is increased or decreased with every corresponding change in the power demand. In the Overland system, the water enters the lower ends of the cylinder jackets on the opposite side of the motor from that shown in Fig. 3. On becoming heated, due to the explosions within the cylinders, the water becomes partly steam and rises to the tops of the jackets entering the outlet manifold, and thence flowing into the radiator where it is brought into contact with the large cooling surface.

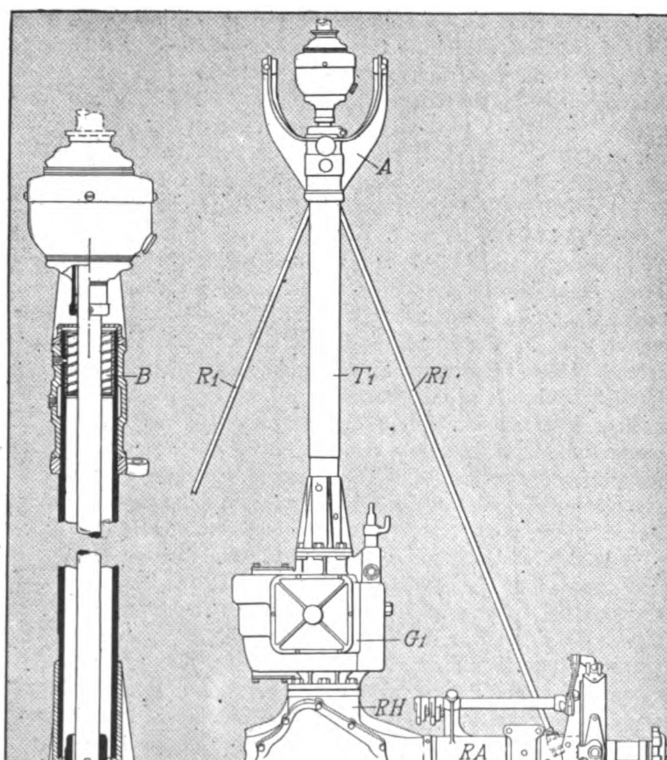


Fig. 2—Plan of Overland transmission and rear system

As to the mechanical construction of the motor, the pistons have a length of 4 1-16 inches and are fitted with three rings each. Improvement has been made in the pistons in that oil grooves under the lower rings have been added, each with six drain holes equally spaced around the circumference to keep excess oil from the piston heads.

The motor bearings are all of a babbitt which is an alloy of tin, copper and antimony. The various bearing sizes are given below:

CRANKSHAFT—FIVE BEARINGS—Length rear bearing, 3⅛ inches; diameter, 1½ inches. Length of other four bearings, 1¾ inches; diameter, 1½ inches.
CAMSHAFT—THREE BEARINGS—Front: 2 5-16 or 2 7-16 inches long; diameter, 15-16 inch. Center: 2 3-4 inches long; diameter, 15-16 in. Rear: 2 1-16 inches long; diameter, 15-16 inch.
MAGNETO SHAFT BEARINGS—Length, 2 1-8 inches.
CONNECTING ROD BEARINGS—Piston ends: length, 1 3-4 inches; diameter, 7-8 inch. Crankshaft ends: length, 1 3-4 inches; diameter, 1 1-2 inches.
WRIST PIN BEARINGS—Length, 3 3-4 inches; diameter, 7-8 inch.

The crankshaft and connecting-rods are of carbon steel, drop-forged. The wristpins are cold-rolled steel, hardened and surface-ground. The crankshaft steel has the following properties: Three per cent to 4 per cent carbon, 4 per cent to 6 per cent manganese, not over 4 per cent phosphor of sulphur, an elastic limit of 90,000 pounds per square inch, and an ultimate strength of 100,000 to 110,000 per square inch.

The properties of the camshaft steel are the same as those of the crankshaft, with the exception of the carbon content, which is from 1 1-2 per cent. to 2 1-2 per cent. carbon.

Details of Valve Mechanism

The valves, Fig. 3, have a clear opening of 1 9-16 inches and are of nickel steel, the dimensions being as follows: Diameter of head, 1 13-16 inches; length of stem, 5 3-8 inches; length of push-rod guides, 2 3-8 inches; length of push-rod, 3 1-8 inches; diameter of push-rod, 1-2 inch.

The valve tappets bear directly on the cams, which are integral with the camshaft. On the push-rod guides new oil-retaining washers have been placed.

The lubrication is a combined splash system for the crank and camshaft bearings and mechanical Kinwood force-feed oiler for the cylinders and timing gears, as shown in the top view, Fig. 1. Ignition is by model RL Remy magneto and battery and model LE coil. This furnishes two sources of current. A change in the intake manifold has been made; it is now flanged instead of being threaded so that the carbureter may be removed without taking off the manifold. The Schebler carbureter has been retained on all models. The fuel is fed by gravity.

The clutch is of the cone type and leather-faced. This applies to both models. Power is transmitted from the clutch to the gearbox, which is placed at the rear, through a propeller shaft having a diameter of 1 1-8 inches. A view of the transmission system after it leaves the motor is shown in Fig. 2. The propeller shaft is enclosed in a torque tube T-1 which has a U-shaped arrangement A at its forward end where it fastens to the cross-member of the frame. As in the usual construction, two radius rods R-1 run from the forward end of the torque tube to the rear axle. The gearbox G-1 is bolted directly to the rear axle housing RH. A cross-sectional view of the transmission gears is given in Fig. 3. The gearset is of the three-speed selective type, the gear ratios being as follows: High, 1 to 1; intermediate, 1.55 to 1; low, 2.57 to 1; reverse, 3.30 to 1.

The rear axle, R.A, Fig. 4, is of the three-quarter floating type, whereas this model for 1912 was equipped with a semi-floating rear axle. The bearings are of the Hyatt roller type, as shown at B, Fig. 2. The length of the ends of the bearings is 1 9-16 inches, while the differential bearing has a length of 2 inches. The axle shafts are 1 1-4 inches in diameter, the left half LS having a length of 32 5-8 inches, and the right half 33 3-8 inches. Brakes BR are increased in size over those of 1912, their diam-

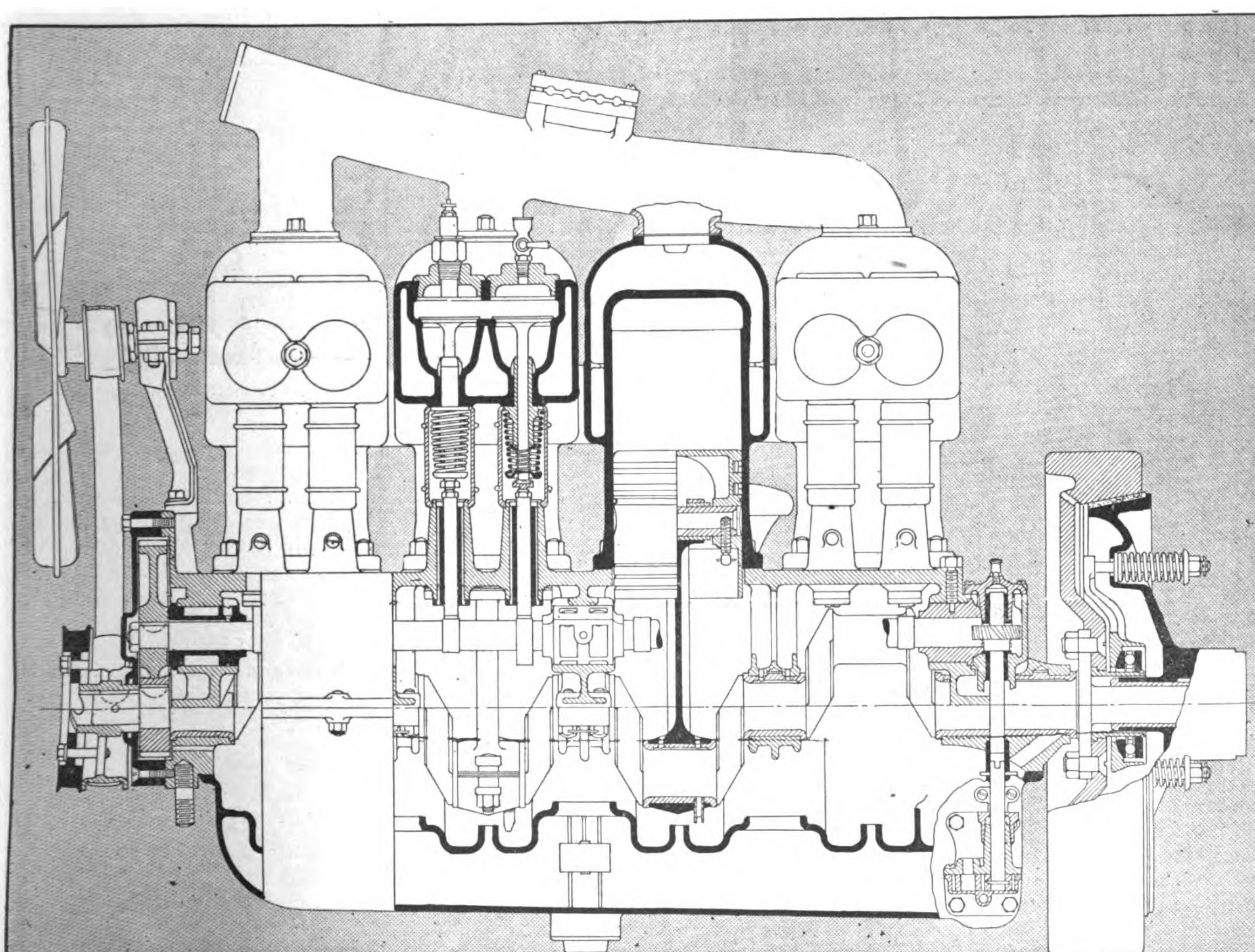


Fig. 3—Side part sectional view of the motor of Overland model 71, showing single-cylinder castings

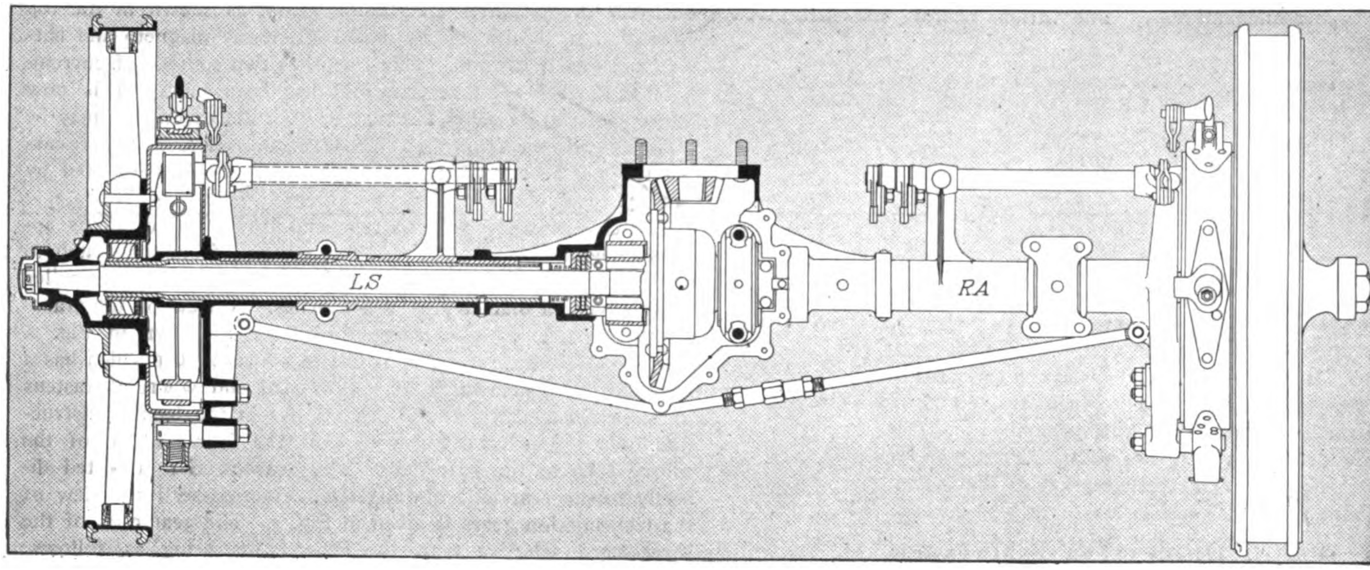


Fig. 4—Three-quarter type of floating rear axle used on 1913 Overland line

eter being 13 inches and width 2 1-4 inches. They are of the conventional external-contracting service and internal-expanding emergency types, their construction being shown clearly in the illustration herewith. The brake equalizing arrangement has been much simplified. Instead of the two operating shafts used on the 1912 models the new cars are equipped with a brake operating mechanism which consists of a tube and a shaft on which the equalizer parts are mounted. The arrangement of this new equalizing device is shown clearly in Fig. 8. Both service and emergency equalizers are at the right side of the frame and are fitted with special springs.

The frame is of cold-rolled steel channel section, No. 9 U. S. gauge. This has a thickness of .156 inch. The depth of the side members is 3 3-4 inches and the flange face width 1 1-4 inches. The frame is well braced with three cross-members, in addition to the brake member which acts as an additional brace. The front cross piece is a little forward of the front axle, while the second one is just to the rear of the motor, the torque tubes, fastening to it. The third cross member is at the rear. The motor is hung in a form of sub-frame and has one supporting cross piece in front and one at either side in the rear. These rear supports run diagonally from the side frame members to the cross member at the rear of the motor and the crankcase arms bolt to them at about their centers.

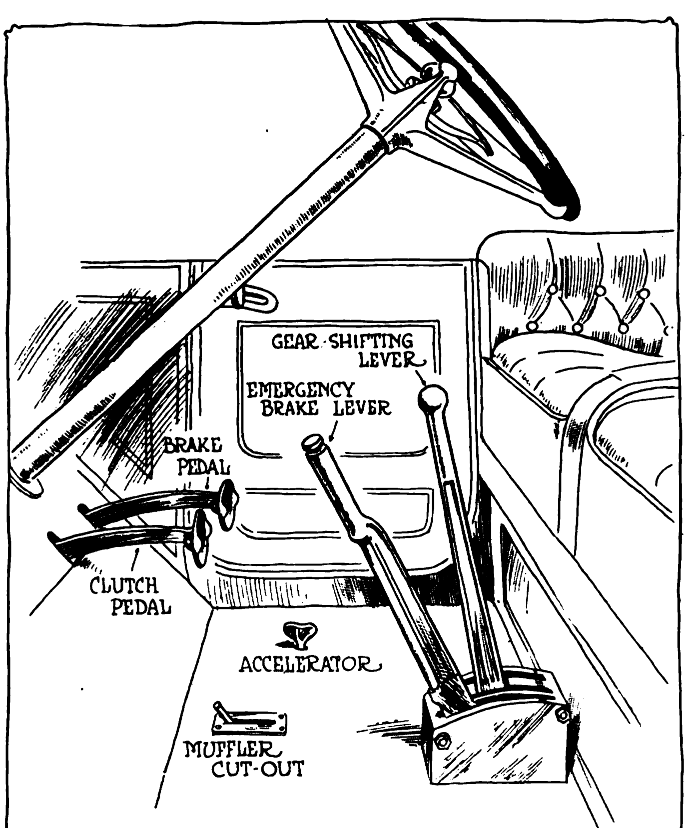


Fig. 5—Drive features of the 1913 Overland, showing center control

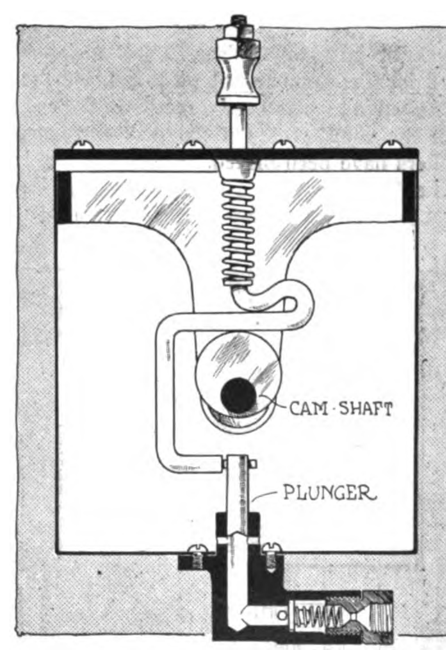


Fig. 6—Section of mechanical oiler used on model 69

The front axle is drop-forged of the usual bowed-center I-beam type, and affords a road clearance of 10 1-2 inches. Springs are all constructed with six leaves and are fitted with steel bushing eyes. The front springs are half elliptic, while the rear are elliptic. The spring sizes are as follows:

Front: Length, 36 inches; width, 1 3-4 inches.

Rear: Length, 42 inches; width, 1 3-4 inches.

The steering wheel is on the right with the control levers in the center. Spark and throttle levers are on top of the steering wheel on the usual type of quadrant.

Wheelbase Increased on Model 69

The wheelbase of model 69 has been increased from 106 to 110 inches on all models. For the touring car the extreme length is 168 inches with the top down, and for the roadster 151 inches. The wheelbase of model 71 is 114 inches.

As to model 71, this chassis is practically the same in design as the other, except for the difference in size of the various parts, as has already been brought out. The motor, a sectional view of which is shown in Fig. 3, has a bore of 4 3-8 inches and a stroke of 4 1-2 inches. The rating is 45 horsepower. It will be seen that its features do not vary materially from those of the other motor. The oiling, however, is entirely by splash with a pump for maintaining constant level in the crankcase. The ignition and cooling systems are similar to those on the model 69 engine. The various motor dimensions are given below:

CRANKSHAFT—FIVE BEARINGS—Front: 1 7-8 inches long; 1 1-2 inches diameter. Three center: 1 3-4 inches long, 1 1-2 inches diameter. Rear: 4 3-8 inches long; 1 1-2 inches diameter.
CAMSHAFT—THREE BEARINGS—Front: 2 11-16 inches long; 1 inch diameter. Center: 2 3-4 inches long; 1 inch diameter. Rear: 2 1-4 inches long; 1 inch diameter.
MAGNETO SHAFT BEARING—2 1-8 inches long.
CONNECTING ROD BEARINGS—Piston ends: 2 1-4 inches long; 1 inch diameter. Crankshaft end: 2 1-8 inches long; 1 5-8 inches diameter.
WRIST PIN BEARINGS—4 inches long; 1 inch diameter.
VALVES AND PUSH-RODS—1 7-8 inches clear opening; 2 1-8 inches diameter of seat. Push-rods: 4 1-16 inches long. Push-rod guides: 3 3-8 inches long.
FLY-WHEEL—17 inches diameter; 3 1-4 inches width.

Like model 69, model 71 has three-speed selective gearset, the gear ratio being as follows: High, 1 to 1; intermediate, 1.72 to 1; low, 3.2 to 1; reverse, 3.93 to 1.

This gearset is also mounted at the rear axle. The latter, however, on this model is floating, while that of model 69 is three-quarter floating. The transmission dimensions are:

REAR AXLE—Differential bearing, length 7-8 inch. End bearing,, length 7-8 inch.
AXLE SHAFT—Diameter, 1 5-16 inches; length, right 32 13-16 inches; left, 32 1-16 inches.

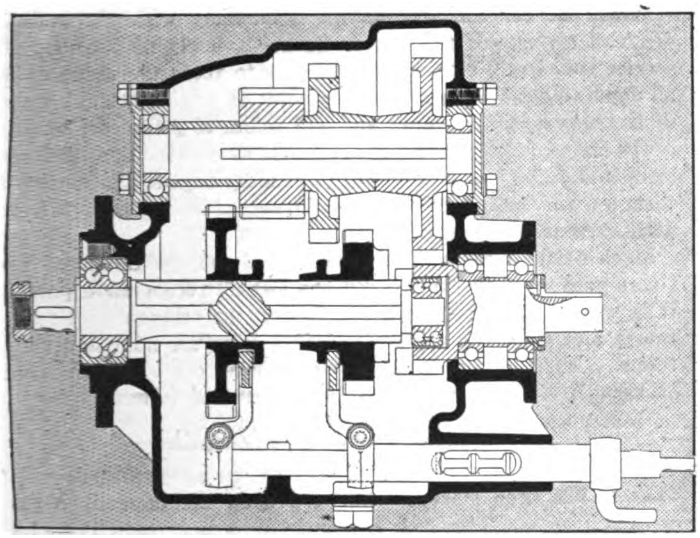


Fig. 7—Cross-section of the 1913 Overland gearset

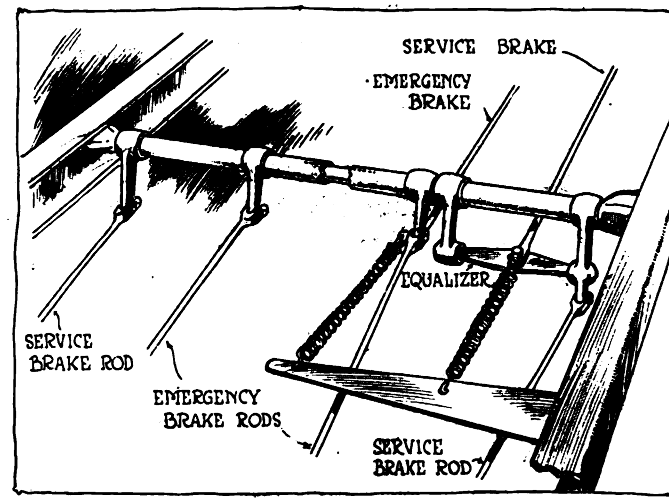


Fig. 8—Showing new brake equalizing arrangement on Overland cars

PROPELLER SHAFT—Length, 41 inches; diameter, 1 1-8 inches.
GEARSET MAIN DRIVE SHAFT—Diameter, 1 13-16 inches; length, 12 7-16 inches.

The same scheme of inclosing the drive shaft in a torque tube and bracing is used on this model as on model 69. Brakes are also identical in every respect on the two models.

As to the wheel sizes, those of model 69 are designed to take 32 by 3 1-2-inch tires on quick detachable rims, front and rear, while on the 71 the tire size is 34 by 4 inches.

Wide Range in Body Design

Eight body types are fitted to the two chassis. These consist of touring cars, roadsters, four-passenger models and coupés. The bodies have all been deepened and lengthened, while the seats have been made deeper and lower. Increased leg room has been provided in the tonneaus. As to the five-passenger touring car fitted to the model 69 chassis, this has a divided front seat and its front cushions have a width of 18 inches. The cushion depths are also 18 inches. The rear seat cushion has a width of 46 inches. The doors have been made amply wide, and door handles are placed within. The model 69 two-passenger roadster has also been somewhat changed to give it added distinctiveness and more rangy appearance.

Model 71 bodies are similar to those furnished on model 69, but being more expensive are, of course, somewhat more refined. Running-board tool boxes and kits are provided, which

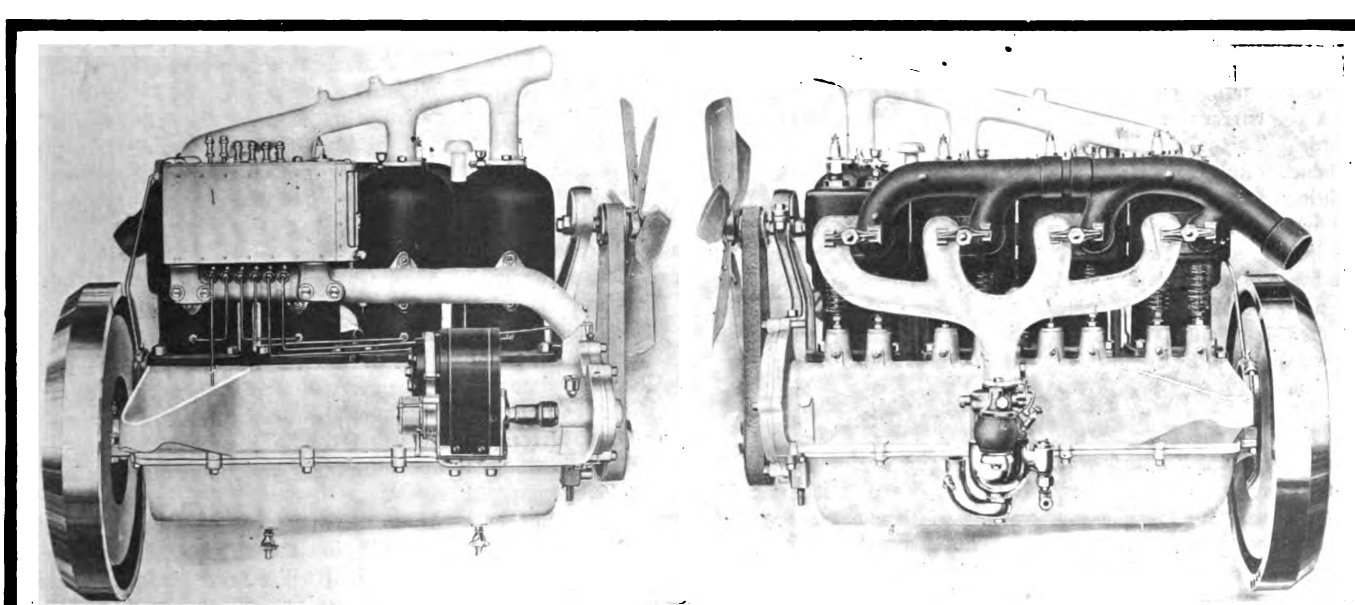


Fig. 9—View of both sides of the model 69 Overland motor, showing magneto, carbureter and mechanical oiler

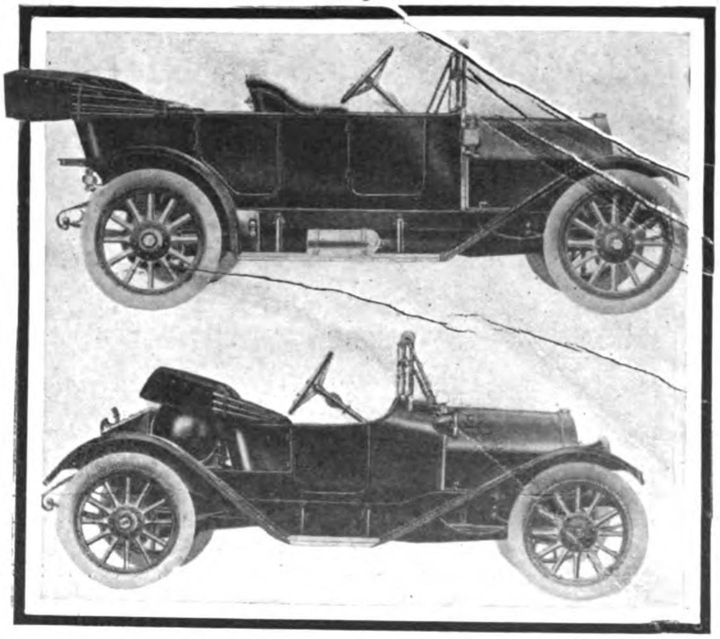


Fig. 10—Model 69 touring car and model 71 Overland roadster

give the clean running-board appearance, and at the same time afford ample room for all supplies. The roadster does not have these running-board boxes, but there is a slanting-top box mounted at the rear of the seat back of the gasoline tank. Tire irons are provided on top of this rear tool box on both roadsters.

The price for model 71 has been fixed at $1,475, while that of model 69 is given as $985. The $85 increase in the price of the cheaper model is accounted for by the fact that model 69 carries full equipment, while model 59 for 1912 did not. The 1913 model has a mohair top and top envelope, windshield, speedometer, gas tank and self-starter as added equipment, compared with what its predecessor carried for its price of $900, so that the new model is really cheaper when everything is considered.

All cars this year with the exception of the coupés are fitted with Prest-O-Starters, which operate in connection with the Prest-O-Lite acetylene gas tanks, and the construction and operation of which has been explained in previous issues of The Automobile. The coupé models, when so ordered, are fitted with self-contained electric starters, the motor-generators of which take the place of the flywheels. This starting apparatus is manufactured by the United States Light & Heating Company, of Niagara Falls, N. Y. The device also furnishes current for lighting all lamps.

Electric lighting is a standard equipment feature of model 71 cars, the current for these lights is furnished by a lighting generator. This operates in connection with a storage battery. Whenever the car's speed is in excess of 10 miles an hour, the lighting current passes directly from the generator to the lamps, but when there is more current produced by the generator than the lights require, the excess passes to the storage battery. This condition obtains in the day time when the lamps are not lighted. At a speed of about 18 miles an hour, the generator produces its maximum current of 10 amperes. An ammeter on the dash shows the condition of the current in the system.

Cold Is Not Good for Tires

It is well known that heat and light and decidedly injurious to tires, but a thing not so widely known is the fact that cold is quite as harmful to tubes and casings if they are exposed for a long time to a low temperature. The effect of cold upon tires is not unlike that of cold on other substances; iron pipes burst in extreme cold; tires first begin to harden, then lose their resiliency and finally become fragile and crack. This shows the advisability of keeping tires in a dark, dry place, with a uniform temperature of about 60 degrees Fahrenheit.

Revarnishing The Car

Carefully Touch Up the Bad Spots with Proper Color Before Beginning the Operation

Chassis and Mud Guards Will Need Renovation, Too—Advisability of Coloring Brass Parts

After treatment of water baths, renovators, surface elixirs, varnish restorers and the other liquid contraptions has been exhausted and the varnish refuses to longer respond to the cleaning and "doctoring," it is high time that the car be turned over to the painter with the admonition to "tune her up."

Varnish reaches a day when coating and renovating methods and even the prayers of just men no longer avail. In this emergency the automobile painter comes to the rescue and with much necessary cleaning and fussing and the application of paints and varnishes in adequate measure makes the car look like new throughout.

When the car comes from the paint shop with the radiant depth of the mirror reflected in its finish, it begins a course of service sufficiently erosive in its nature to fetch the depth of it all down to a mere glaze, at which point of decline nothing short of touching up and revarnishing will suffice to please the owner.

The days of the motor car finish are, as a rule, comparatively brief and full of trouble. It is constantly exposed to a varied form of service which includes doping, cleaning and rubbing until eventually it succumbs.

Much of the cleaning and rubbing and the application of revivers goes on after the varnish has lost all recuperative power. It is without any capacity to feed upon the cleaners and renovators, and show any appreciable effect from the nourishment.

Such a surface is even a bad one to bring out under one coat of varnish, a single coat being insufficient nourishment.

Preparing Surface for Varnish

The surface, in fact, may be described as varnish-hungry. It has been starved while fed upon the dope of cleaners and feeders. This lack of nourishment is in most cases inexcusable. The car owner should know, even if he should be invited to sit at the feet of the painter and learn, that after 6 or 8 months' wear in the strife of modern service, maltreated and scrubbed until its life has been threatened a score of times, the average car varnish is in a condition to be replaced.

To be sure, comparatively few cars get the fresh coat of varnish, but this neglect simply adds emphasis to the statement that they all should get freshened up with a new supply of luminous material considerably oftener than the present practice provides for.

To renew the finish by adding a single fresh coat of varnish is not an expensive treatment and it should not take the car long out of service.

To condition the finish in this way proceed about as follows:

Do as little unhanging of the car and its parts as possible Clean the interior of the car out well and cover with a piece of canvas or other like material. Wash the body thoroughly in order to determine the exact condition of the varnish. There will be grease spots upon the body and upon the chassis which should be removed with waste saturated with turpentine. Failing with this, rub with a strip of broadcloth rolled up in the shape of a cylinder, after dipping the roll in water and pulverized pumice stone. This method will remove the grease spots in short order. Then rub the surface all over with a felt pad dipped in water and pumice stone flour. This treatment clips off the motes of dirt and makes everything clean and smooth to receive the new coat of varnish.

Naturally, there will be spots in the color that will need touching up and matching up with the old color. This is an operation that very few men can perform successfully. The car owner may be quite as adept in getting the color tone and shade as the painter, and in some cases more so, merely because he may possess color sense, without which no one need hope to succeed in the work.

The eye for color is a gift, not an acquirement. In touching up confine the work to precisely the spots worn or nicked off, or disfigured in other ways. Touch only the blemish, and do not let the color splash over parts of the surface in perfect condition. It's very rarely the case, to be candid, where the match of the new color with the old is so perfect that it cannot be detected. For this reason touch only the diseased or imperfect surface space.

This work now having been attended to, the next step consists of applying the varnish. No one but the experienced painter or varnisher can hope to do this work upon the fine and beautiful surface of the motor car with any degree of success. It requires professional skill and brush expertness, and an intimate knowledge of varnish in all its fitful moods, to flow the surface and cause it to look like a mirror from Paris.

Touching Up Chassis and Fenders

The layman may paint his car, but when he comes to varnish it, that is quite another story.

The finishing coat of varnish should always be flowed on plentifully. Lay it out with brush strokes lengthwise of the panels, cross brush, and again brush it lengthwise of the panel surface. All this appears very simple, and it really is so, but there is the practice and the know-how back of it.

Bring the chassis along in practically the same way that the body surface is attended to. In touching up both body and chassis preparatory to varnishing observe this rule invariably: Use the color with sufficient varnish in it (added after thinning the color with turpentine) to cause it to dry with a gloss. The theory of this is that the color with strong luster to it reflects more light than it absorbs, in which case, in drying out, it does not change in tone or shade, whereas the color containing no luster, and drying dead, as the term is, absorbs enough light to not infrequently change it a shade, and perhaps several shades, from what it appeared to be in the mixing kettle.

The fenders or mud guards should, of course, be brought along with the body of the car. The lamps and brackets, etc., if in color, should get at least a coat of varnish color or enamel, and if a baking oven is handy this varnish color or enamel should be baked on.

If of polished brass, the parts will need polishing up, but if such parts have been lacquered it will be necessary to first remove the lacquer. This may be accomplished by mixing 1 pound of caustic soda in 3 gallons of water and applying to the brass with a soft wool sponge tied to a stick. Use this solution with care and avoid smearing it on other parts of the surface. Rinse off with clean water, after which treat it with some good metal polish. All of the brass parts after cleaning and polishing should be coated over with lacquer or lacquer substitute, which latter may be made by thinning pale elastic automobile body varnish with turpentine or by using a thin coat of white shellac.

Lacquered brass becomes dirty and discolored through use and often appears tarnished when in fact it is merely dirty. Rubbing smartly with metal polish under a woolen cloth will remove the dirt and restore the surface to its original condition.

The advantage of having these parts finished in some selected color, blue, green, black, maroon, and so on, is that they may be maintained in presentable condition at less expense than in case of the brass finish, and in the matter of refinishing the cost is considerably less. Moreover, from an artistic standpoint the color finish, if in harmony with the field color of the car, loses nothing by comparison with the blazing brass surface.

The varnished car is not complete until the radiator has been brushed, and cleaned, and treated with a thin coat of asphaltum, bronze, graphite or some dark mineral paint qualified to stand heat and wear hard and long. No thick or heavy-bodied pigment should be used on the radiator and the car owner may wisely insist upon the use of only very thin coats of material for these parts.

Attention should always be given the top as the car goes through the shop. If only a mohair top, it deserves a brushing to eradicate the dust and dirt and bring out the good points of the material. As a rule, the car top gets about the worst sort of neglect.

For the dirty leather, rubber or Pantasote top, the outside finish requires washing with a weak solution of castile soap. In course of time if the leather or rubber becomes worn and looks permanently "dingy" it should have a thin application of some reliable dressing, formulas for which have been given in previous issues of THE AUTOMOBILE. The bows of the top need a finish to correspond to other parts of the car. They should be cleaned perfectly from impressions of the hands, and finally, before recoating, washed off with turpentine. Then coat them in with a clean, full application of varnish color. In the event of the bows being found "nicked," and the finish fractured and possibly chipped off somewhat, a coat of flat color should first be put on, the varnish color to follow.

Too Many Patents Issued

Commissioner Moore Says That a Large Percentage of Them Should Not Be Granted at All

With $500,000 the Office Could Guarantee Novelty of Every Patent Issued

WASHINGTON, D. C., Aug. 3—There are no industries in the country more vitally interested in the matters pertaining to the United States patent office than the motor car and accessory industries. To all those connected with these industries it will come as a distinct surprise that Commissioner of Patents E. B. Moore has come out with a statement to the effect that a large percentage of patents issued by the patent office should not be issued at all. Commissioner Moore made this declaration in discussing the proposed investigation into the methods and personnel of the patent office.

Indorsing all the claims made by Representative Bulkley, as to the needs of the patent office and the evils which it is alleged exist in the department under his charge, Commissioner Moore said that a half million dollars would remedy every existing abuse and place the office on a modern business footing, under which the government could guarantee the novelty of every patent issued. Commissioner Moore defended the men who work under him, but he admitted the truth of the statement that no sooner had a man been trained to some position with the patent office than he would move into some business for which his training had fitted him, and which paid him double and often treble the government salary.

"I would not care to say 50 per cent., but a large percentage of the patents which are issued from this office are not good patents and should not be issued," said the commissioner. "Yet what can one do under the condition with which we work? We have not the men nor the equipment to conduct the searches and it is only natural that a great deal should be overlooked, which would not be the case if we had the improvements for which I have asked during the past five years. If these things are granted to us, it would enable the patent office to make the search so thorough that the government would be able to guarantee at least the novelty of the patent, as is done by the German government. Then the patentee can be sure that his patent is at least original.

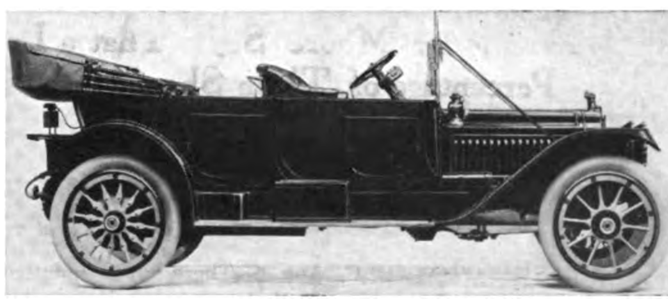
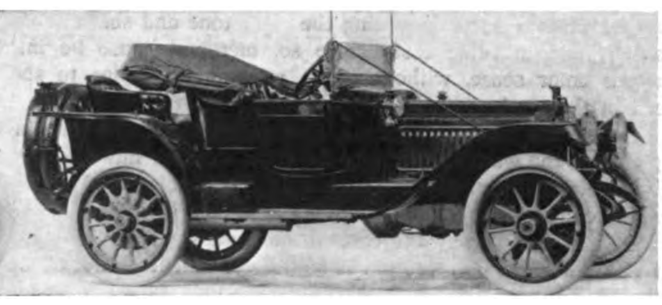



Fig. 1—Packard 38 phaeton Little Six

Fig. 2—Packard 38 Little Six runabout

Packard Announces 1913 Little Six

Left Drive and Control; Positive Starter, Combined with Electric Lighting and Ignition Are Features

Convenient Control Board on Steering Column Within Easy Reach of Operator's Hand

THE Packard Motor Car Company will have for delivery within a month a small six-cylinder machine, which will be known as model 38. It will be furnished in any desired body type at prices ranging from $4,050 for the runabout to $5,400 for the imperial limousine, which has seating accommodations for seven. The touring car and phaeton types will be sold at $4,150. The wheelbase of the touring car chassis is 134 inches; of the phaeton, 138 inches, and of the runabout, 115 1-2 inches.

While in general appearance and most details of construction the new six conforms to previous Packard design, several of its features are decidedly new to cars of this make, and they mark what might be termed a new Packard era. These more or less noticeable changes from the details which have been accepted as part of Packard cars of the past are the adoption of left-hand drive and control, electric self-starting, and the distinctive feature of using a control board mounted on the steering column, which carries all the switches and buttons connected with starting, ignition, lighting, as well as the carbureter adjustments.

The left-hand drive and control feature is perhaps the most significant change which has been made and marks the entrance of this company into the ever-increasing ranks of the left-hand drive users. The reasons given by the Packard company for this adoption on its newest creation are that it did not wish to adopt the left drive until it had developed a starting system which would be positive, since the car operator would have to get out into the road to crank his motor and might just as well go the rest of the way around the front of the car to get into the driver's seat. But now that it feels that it has added a starter which is positive, there is no reason why left drive should not be used, since the driver is now enabled to reach his seat and start the motor without stepping into the road.

Combined Starting, Lighting, Ignition

The starting system, of the Delco type, is in combination with the electric lighting and ignition systems. The outer rim of the flywheel has teeth cut in it, with which the gear of the electric motor-generator meshes when the crankshaft is to be revolved by electric energy for starting. The motor-generator is normally a generator, and runs only temporarily as a motor when required for starting. This electric system has been taken up in detail on several occasions in these columns, but a brief description of its operation will not be out of place here.

In addition to the combination of electric system there is a set of dry cells, which are used only for furnishing ignition current when the motor is first started. After the engine is running, the operator switches to the generator current. The reason for the use of this auxiliary set of dry cells is that in starting the storage battery is drawn upon to furnish energy for operating the electric starting motor, and should this battery be required to furnish ignition current as well the spark would be weak. After the engine is running, however, this extra drain of starting is not made, and the storage battery and generator are ample for ignition purposes. The dry cells may also be used in emergency, should the other electric apparatus get out of order.

To start the motor, the driver pushes the starting button on the control board and presses down on the clutch pedal. This automatically meshes the teeth of the generator gear with those on the periphery of the flywheel and current is drawn from the storage battery to drive the generator as a motor, thus turning the crankshaft. After the engine is running under its own power, the operator releases the starter button and throws the ignition current switches so that the dry batteries are no longer required. The generator then runs as a generator and supplies ignition current, any excess amount developed being passed to the storage battery, which has a capacity of 80 ampere-hours. The running ignition system is of dual type. A transformer coil is used in connection with it, while the same set of spark-plugs is common for both it and the auxiliary system.

Control Board a Convenience

For lighting, the current is supplied from the storage battery when the motor is not running, but when the engine has attained a speed of about 200 revolutions per minute the generator furnishes the current.

The battery and battery controlling device are located on the right running board, while the generator is on the left rear side of the engine and is driven by inclosed gears.

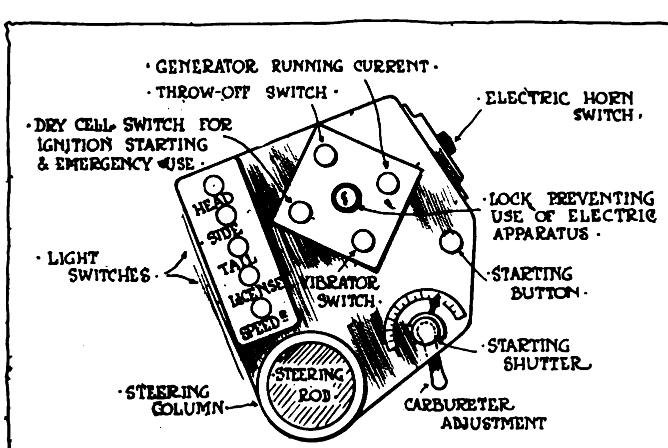


Fig. 3—Plan view of control board located below steering wheel

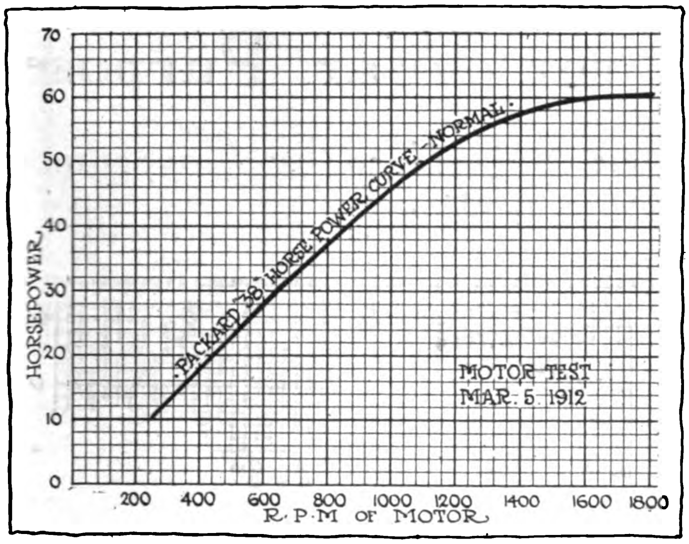


Fig. 4—Chart showing high horsepower developed by Packard 38

A sketch of the control board, which is an entirely new apparatus and never before used on any machine, is given in Fig. 3. It will be seen that every feature of the car's running is brought within easy reach of the driver's hands. It is rigidly fastened to the steering column. This column is stationary, the steering rod turning within it. The location of the control board below the steering wheel is clearly shown in the body illustrations. A single cable running up the steering column carries all the wires from the various electrical apparatus to the switches. Placing these devices here leaves very little on the dash. Speedometer, oil and air pressure gauges and priming buttons are practically all that remain there. The sketch is self-explanatory. A lock is provided so that the car may be protected against indiscriminate use. This lock puts all the electrical connections out of use when desired. A button conveniently located on the dash within reach of the driver's foot is for use in cold weather for priming the cylinders with acetylene gas and thus facilitating starting. Pushing this button injects the gas into the cylinders. For this purpose a special acetylene gas tank is carried, and is seen in the body views at the lower rear corner of the hoods. Referring to the control board sketch, it will be further seen that there is an indicator which shows the relation of air to gas in the carbureter. This carbureter adjustment is operated by a small handle just below the control board and which is seen in the body illustration. The starting shutter button is used to throttle the air supply to the carbureter to facilitate starting the motor. This shutter is operated by pulling up on the button marked.

Motor Differs From Big Six's

The new 38 motor is different from that of the larger six-cylinder Packard car in that it is an L-head type and the valves are all on the right side. The Packard 48 six-cylinder motor is a T-head type. The cylinders are cast in blocks of two each, and another new feature of the 38 design is the complete inclosing of all valve springs by removable cover plates. Since the carbureter is placed on the left side of the motor and the valves on the opposite side, a new form of intake manifold construction is used. This manifold, on leaving the carbureter, passes into three branches and these run between each pair of cylinder castings to the cylinder inlet connections.

As indicated by the model designation, the horsepower rating is 38 according to the S. A. E. formula. The stroke of the new motor is 5 1-2 inches and is the same as that of the larger Packard six. The bore is 4 inches, giving a ratio of 1.375. Referring to the horsepower chart, shown in Fig. 4, it will be seen that the maximum horsepower developed is 60 at about 1,600 revolutions per minute. The rated horsepower of 38 is attained at about 800 revolutions, which appears to be very much below the average power of the motor.

The carbureter on the new six is the same as that of its larger predecessor and is characteristic of Packard design. It is provided with a hydraulic governor which makes use of a diaphragm. The pressure of the water system is directed on one side of this diaphragm, while the other side is connected with the throttle of the carbureter. The greater the speed of the engine, the greater the consequent water pressure on the diaphragm and the greater its outward bulge. By its connection with the throttle, this bulging partially closes the throttle and acts to slow down the motor somewhat, thus performing its function of uniformly governing the motor speed. However, on the new six, while the same governing principle is maintained, the water pump and governor are separate and not combined as in the other model.

The lubrication system is identical in all its principles with that used on the 48 six-cylinder motor. The lubricant is fed by pressure from an eccentrically-driven force pump to all the crankshaft bearings and to the upper and lower bearings of the connecting-rods. In addition to this positive oiling of the bearings, an auxiliary lubricating system connected to the carbureter throttle operate so that when the engine is under heavier load and doing more work, it will get greater supply of oil and vice versa. This auxiliary scheme feeds oil to each of the cylinder walls and the leads from these cylinder openings are connected to the main lubricating system through a check valve. The crankshaft is drilled from end to end to provide a passageway for the lubricant. The lower part of the crankcase furnishes a reservoir for the collection of the oil, from which point it is positively forced by the pump to all the bearings. The splash arrangement which is found in many other American motors is absent in the Packard design.

Fuel Tank Located at Rear

In keeping with the system adopted on its other cars this year, the Packard company has adopted the rear-tank arrangement on the new 38. The gasoline is supplied to the carbureter under about 2-pound pressure maintained by an automatic pressure pump on the motor in connection with a large hand pump on the front seat heel board. This latter is used for the initial pressure. A gauge on the dash indicates the pressure within the tank, while a magnetic gauge on top of the tank tells the supply of fuel contained, the maximum capacity of tanks for all body types being 20 gallons.

The motor is cooled by the conventional system of cellular radiator and centrifugal water pump, located on the left side of the motor and driven by inclosed gears. The cooling fan is belt driven and has a type of belt-tension adjustment. The capacity of the water system is 6 -2 gallons.

The clutch is of multiple disk type, as on the other Packard models. There are five lined driving plates and four steel driven plates. The clutch brake, which is attached to the clutch pedal, aids in gear shifting. The clutch rear bearing is supported by an integral extension of the crankcase and a cover arrangement completely incloses the clutch.

The Packard two-unit principle in which the motor unit comprises the motor and clutch, and the rear axle unit takes in the transmission gears, differential and final drive, is maintained. The power connection between the two units is an amply large drive shaft which is provided with two universal joints. The gearcase bolts by a flange to the rear axle housing. There are three forward speeds and a reverse, the gear-shifting lever having a selective action in the standard form of Packard single quadrant. The gear shift lever and the emergency brake lever are placed at the driver's left, just inside the left front door, to be in keeping with the left-hand steer.

In the new 38 no change from the Packard 48 construction is to be found in any of the running gear features, the frame, brakes, springs and axles presenting the same general appearance in the two cars. The spring sizes are given below:

Front springs: 40 by 2 inches; semi-elliptic.

Rear springs: 51 by 2 inches; three-quarter scroll elliptic.

The frame is of pressed steel, channel section, and arched

France Tests Trucks for War Purposes

Vehicles Not Bought Outright, but Subsidized by Government —Trials Tend to Standardization

Strict Examination Follows 1,558-Mile Road Test, for Which Sixteen Firms Offered Their Latest Models—Economy Considered.

PARIS, Aug. 11—Military France prefers to subsidize privately-owned motor trucks rather than maintain a large fleet of vehicles which can never be fully employed except during general manœuvres or on the outbreak of war. By offering $600 at the time of purchase and $200 for each of three following years it is possible to have at the dispostion of the army whenever needed a very large and perfectly maintained fleet of motor trucks. But before the private owner can enter into the subsidy agreement with the government, the manufacturer must have the type of vehicle approved after strenuous tests on the road and close examination at the hands of technical experts. As new models are brought out every year, these army trials are now an annual event, and as it is to the advantage of every manufacturer to be able to offer his trucks to the public with the possibility of a subsidy, all the latest types of commercial vehicles are found in the trials. Probably, without the public being aware of it, the army has a greater influence in determining design and development of commercial motors than has the private user. Yet the army makes very few direct purchases. It has the first call, however, by reason of the new models being presented to it for test and examination with a view to participation in the subsidy scheme. The army requirements have tended to standardize wheels and tires, bodies and body fittings, under clearance and track; they have made radiator protectors an essential, they have insisted on hooks front and rear for hauling purposes; they have cut down gasoline consumption and arrested oil wastage, and they have done more than the demands of the private user to develop accessibility.

This year's tests have just been brought to a close. They consisted of 1 month under observation, during which the competing vehicles had to make twenty distinct daily runs over routes radiating from Versailles, the total distance covered being 1,558 miles for ordinary trucks, and 1,225 miles when a trailer was hauled.

Spare parts of two cars laid out for inspection

The runs had to be made under full load both singly and in convoy formation, without load, and with gasoline, benzol and alcohol as fuels, the army authorities evidently anticipating a shortage of the usual gasoline supply in time of war. An officer was carried as observer on every vehicle, and very careful control was kept of fuel and oil consumption, for it was on running economy, reliability and absence of wear that awards will be made which will entitle the models to be classed as subsidized types. This year there was no failure on the road; but mere ability to cover the distance is not sufficient, and when the road portion of the trials was over, a very close examination was made of the working parts. This was not a superficial look-over, but consisted of dismounting rear axles, jackshafts, gearboxes, road wheels, motors, steering-gear, etc.

Thirty-two Models in Trials

The French trucks taking part in the trials are really representative of the national industry. This year, for instance, sixteen of the leading home firms entered their latest models, the total number of competing vehicles being sixty-two, representing thirty-two distinct models. Although the army stipulates the body sizes and insists on a certain ratio of dead

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above the rear axle. It is extended back to protect the gasoline tank and to afford a hanging for it. To allow for a short turning radius the frame is narrowed in front. The front axle is of heavy I-beam section, while the steering knuckles have integrally forged yokes. The rear axle housing is of heavy-gauge pressed steel and it is riveted within flanged collars which are bolted to the internally ribbed aluminum rear-axle housing.

The brakes are of the conventional type of internal and external expanding designs and are of ample size. Bayonet locks are provided on the internal brakes to prevent rattling.

As to the standard equipment which will be furnished with the new six, this includes top and side curtains, top envelope, windshield, electric headlights, combination oil and electric side and rear lamps, license light, horn, tools and tire-repair equipment. All the inclosed bodies are to be fitted with dome lights and switches, speaking tubes and so on. In general, it may be said that while a number of mechanical differences have been incorporated in the new car, the bodies on all Packard cars present similar characteristics.

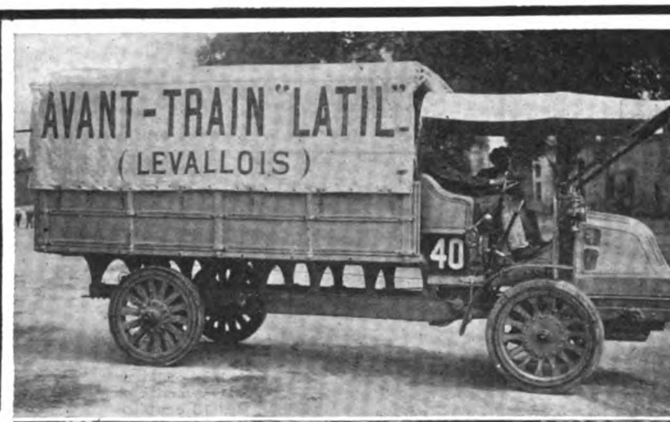
weight to useful load, there is no decided preference for either the motor-under-the-bonnet or the motor-under-the-seat type. This year the bonneted type was in a slight majority, but while certain firms, Saurer at the head of them, claim that the motor should be in front of everything, such leaders as Renault, Berliet, De Dion Bouton, Delahaye, Bayard-Clement, build both types.

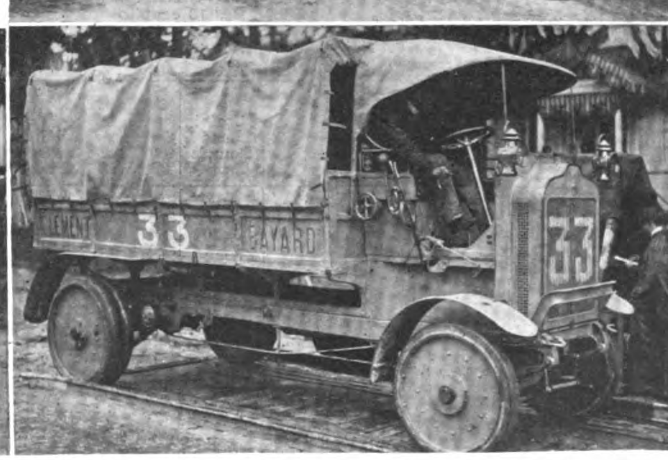
From an American standpoint an important feature of the French trucks is the small size of the power plant. In every case four-cylinder motors were employed, but in only a few cases did the cylinder diameter exceed 4 inches. A very common dimension for 3 to 3 1-2-ton trucks was a cylinder bore of 3 to 3 1-2 inches. There is a tendency, too, to make one type of motor do duty in different chassis designed to carry loads varying from 2 to 3 1-2 tons. The explanation of the small motor can, of course, be found in the high cost of gasoline in France. Last year, in calculating running costs, the price of gasoline was taken at 33 3-10 cents per gallon. This year it is still higher. In motor design there is not any great departure from touring car practice, and except that a lower number of revolutions is aimed at the touring and the truck models hardly differ. For the most part the motors are of the L-type, with fixed point high-tension ignition and either pressure feed or circulating oil systems. The unit system is not favored, being found on only two types: the Latil, which drives to the front wheels, and the new La Buire truck. The Latil is distinctive by reason of a considerable use of bronze alloy castings in place of aluminum, this latter metal being used only for such parts as timing gear housings, oil base, gearbox cover, etc. The Latil motor is a good example of the simplicity that is being aimed at by the French manufacturers. This motor has the valves on one side, the intake, exhaust and water pipes being made in the casting, and while the base for the magneto is made with the crankchamber, there is a flange on one side of the cylinder casting through which is screwed a bolt with locknut to bear on the top of the magneto and hold it to its platform.

Economy Plays Important Part

In the majority of cases the makers apply to the specialist, such as Claudel, Zenith, G. & A., Solex, for their carbureters. The regulations stipulate that gasoline benzol and alcohol shall be used without a change of carbureter. Practically no change is required to use benzol in the place of gasoline, but to properly vaporize alcohol a considerable amount of heat is required. For this purpose nearly all the carbureters are amply water-jacketed, with provision for turning on the flow of water only when required for running on alcohol. The results obtained are not the best, but as alcohol has no commercial use in France for internal combustion motors, the compromise is satisfactory. The rigorous control of lubricating oil and grease in these trials has led to considerable care being exercised to secure economy. Pressure feed to the main bearings and connecting-rod ends and the pump driven circulating system are about equal in numbers. But of equal importance with the actual lubricating system is the necessity of preventing leakages through the tappet guides, crankcase breathers, the ends of the bearings and the joints of the gearbox and rear axle.

Among the new mechanical features shown on the trucks is a special type of frame member employed on the Clement-Bayard chain-driven models. At the point where the jackshaft passes through the frame member the latter is considerably increased in depth, the top line of the frame being straight, but the bottom line given a considerable downward sweep. Thus the total depth of the frame member at this point is about three times that at any point. Obviously this gives increased strength at the point of the frame receiving the bracket for the jackshaft bearings and the forward end of the rear spring. The frame is trussed, the truss rod passing around this downward sweep of the frame. On these models the gearbox is mounted immediately behind the cone clutch, and a propeller shaft carries the drive to the jackshaft. The differential housing is practically of the same type as used on the firm's touring cars, and is bolted to a couple of transverse frame members, one in front of it and one to the rear of it. Unlike some of the smaller models, where the jackshaft is practically of the same design as a touring car rear axle, there is no casing for the two portions of the transverse shaft. Each shaft carries near its outer extremity a brake drum lodged within the face of the frame member, the increased depth at this point making this possible. On some of the other models, notably Delahaye and Peugeot, brakes are fitted at this point, but in both cases the drum is on the outside of the frame, or between the sprocket and the frame. On the Clement-Bayards, with a view to giving accessibility to the brakes, there is a coupling on each half of the jackshaft. All of the Clement-Bayards are fitted with pressed-steel road wheels, this being a type of wheel which up to the present has





The Berliet entry was equipped with rubber tires on the front and steel tires on the rear wheels

Front-drive Latil truck performed satisfactorily

Clement-Bayard truck—note frame construction

One of the trucks submitted by Schneider & Co.

New shaft-driven Saurer truck stood up well

not been considerably adopted in France. During the trials it gave very satisfactory service.

La Buire had in the trials a new 2 1-2-ton model, shaft driven, with canted rear wheels. Unit construction is adopted for the motor and gearbox, the crank chamber having a rearward extension which encircles the disk clutch and has bolted to it the four-speed gearbox. On an extension of the propeller shaft, to the rear of the axle, the foot-operated brake is mounted, the hand brakes being in the usual position on the road wheels. A double reduction is employed in the rear axle; this consists of two spur pinions, one of which is mounted on the same shaft as the crown bevel wheel, and the other on the differential shaft. In principle, though not in the same detail, this has been adopted by several other French firms for both touring and commercial models. These trucks are also fitted with oscillating hubs for the steering wheels. This invention, while giving perfect lateral stability, allows the wheel to articulate in a vertical plane. It consists of a central hub, with the wheel revolving on a centrally-located pin attached in the usual position, but being mounted on the stub axle below the main journal. The result is that the weight of the vehicle is carried by the wheel below the main journal, leaving the wheel free to articulate in a vertical plane about this lower suspension. Briefly, the construction of the wheel consists of a steel hub pierced in its center for the passage of the axle pin. The spokes are mounted on this hub in the usual way, and in the interior of the hub is a single steel plate bored to provide two distinct bearings; the upper one is the axis of rotation, the lower one receives the stub axle and is the axis of oscillation. The wheel, which is the invention of M. Genillon, appeared to give satisfactory service in the trials. The usual type of muffler was not fitted on the La Buire cars. In its place there is a long, big-diameter pipe—probably 3 inches in diameter—attached just below and slightly within the frame member, and terminating in a small-diameter pipe discharging at the rear.

Saurer competed with a shaft-driven model, the vehicle being a new 2-ton truck, but all the larger types were retained with side chains. Shaft drive was in a decided minority, the firms adopting it being Schneider, who builds most of the Paris buses; De Dion Bouton, La Buire, Berliet for one model only, and Renault. At the end of the Renault shaft a bevel pinion meshes with a crown bevel wheel carrying on its shaft a spur pinion engaging with a larger spur pinion on the end of the left-hand axle shaft. On the continuation of the propeller shaft, to the rear of the differential, there is a second bevel pinion meshing with another crown bevel wheel, also carrying on its shaft a spur pinion in engagement with a larger pinion mounted on the extremity of the right-hand axle shaft. Obviously, the two extremities of the forged axle are bored out to receive the drive shafts. Instead of the usual type of spring shackle, Renault makes use of a sliding block, consisting of a hanger bolted to the lower side of the frame member and having two grooves into which the sliding piece mounted on the shackle bolt is received.

Many Steel Tires in Evidence

Serious attempts have been made by French makers to abolish use of rubber tires for commercial vehicles, and in the army competition the use of steel rims gives a decided advantage, for the cost of the wear and tear of tires is estimated by the jury, and this cost must always be lower for steel than for rubber ones. Steel-shod wheels, however, were present in smaller numbers than usual, and no vehicle came successfully through the trials with steel rims on all four wheels. In a number of cases the front wheels were shod with rubber and the rear ones fitted with steel tires, Delahaye, Berliet and Latil adopting this combination. This latter firm, having the entire power plant over the front axle, there being no mechanism to the rear of the driver's seat, was fully justified in employing steel-shod wheels at the rear, but in other cases the results were not satisfactory. When running without load the temptation was to speed, with the result that the vehicles danced about on the road, play set up in the spokes of the wheels and the mechanism suffered. Wheels are still the weakest point of the trucks, many having had to be patched up on the road in order to complete the test. In a few cases tires gave way, breaking up completely and having to be changed. Spare rubber tires had to be carried, their weight being considered as useful load, whereas all other spares were weighed in with the empty vehicle, but as in most cases it was not possible to fit them without the use of a hydrau-

OFFICIAL OPERATING COSTS OF FRENCH TRUCKS HAVING QUALIFIED IN 1911 ARMY TRIALS UNDER THE SUBSIDY SCHEME

The cost of operating was based on fuel at the following prices:

Lubricating oil	58 1-2	cents per gallon.
Grease	8 1-5	cents per pound.
Gasoline	33 3-10	cents per gallon.
Benzol	22 1-5	cents per gallon.
Alcohol	36	cents per gallon.

	Distance in Miles	Weight Empty Pounds	Total Weight Pounds	Useful Load Pounds	Cost per Kilometer Car in Francs	Cost per Ton-Kilometer in Francs
De Dion Bouton	1,569	6,856	14,528	7,672	0.101	0.029
Malicet & Blin	1,569	6,767	11,971	5,204	0.140	0.059
Aries	1,569	7,341	15,057	7,716	0.154	0.044
Renault	1,569	6,900	13,227	6,326	0.124	0.043
Dietrich	1,569	7,363	13,778	6,415	0.145	0.050
Delahaye	1,569	5,665	10,934	5,268	0.074	0.031
Delaugere-Clayette	1,569	6,778	12,543	5,784	0.134	0.051
Berliet	1,569	5,676	10,163	4,596	0.078	0.037
Vermorel	1,569	6,800	12,984	6,183	0.134	0.048
Front drive Latil	1,569	7,259	14,440	7,179	0.121	0.037
Peugeot (truck)	1,569	6,194	11,353	5,158	0.074	0.031
Clement-Bayard	1,569	5,798	11,397	5,559	0.091	0.035
Saurer, tractor	1,255	8,598	15,211	6,613 15,432	0.206	0.020
Aries, tractor	1,255	12,147	17,526	5,379 15,432	0.303	0.041

Cost is given in francs. About three-quarters of distance was covered under the full load and one-quarter empty. No account is taken of tire wear. The kilometer is, roughly, 5-8 mile. The franc is 20 cents.

Shaft-driven De Dion Bouton truck

Renault entry, which had a distinctive drive

lic press it was difficult to see their utility aboard. Torrihon had a system by which it was claimed that tires could be changed on the road, this consisting of a detachable rim with studs on its inner face passing into grooves on the fixed rim. The same firm had also a quick-detachable arrangement consisting of a U-section fixed rim on which the ordinary rubber tire was mounted and secured in position by means of four circular section rings—two on each side—levered into position in much the same way as a pneumatic tire is levered over its rim. Put into position, these rings filled up the space between the walls of the fixed rim and the rubber bandage, and entering into a groove on this latter prevented it being pulled off. Rubber block tires were not admitted by the army authorities. Metal wheels did not find much favor among the French manufacturers. Clement-Bayard made use of pressed-steel wheels; Peugeot had tubular cast-steel wheels, but all the others had heavy artillery wood type. In some cases an extended flange was given the steel rim, with the object of protecting the walls of the rubber tire.

Calendar of Coming Automobile Events

Shows, Conventions, Etc.

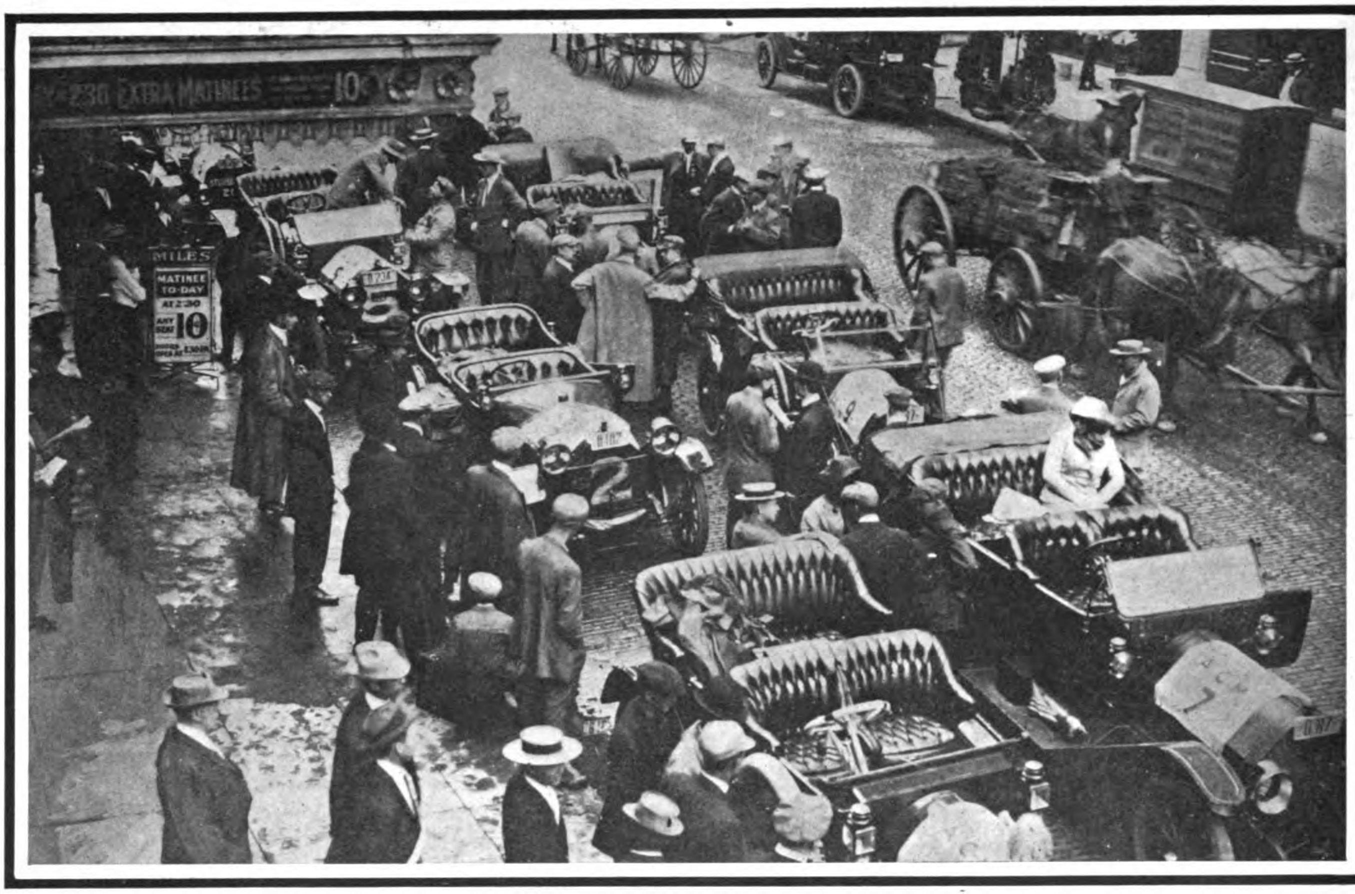
Aug. 24-Sept. 9....Toronto, Can., Display of Automobiles, etc., at Canadian National Exhibition, Transportation Building.
Sept. 17-20........Denver, Col., Convention International Association of Fire Engineers.
Sept. 23-Oct. 3....New York City, Rubber Show, Grand Central Palace.
Dec. 7-22..........Paris, France, Paris Automobile Show, Grand Palais.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 11-25, 1913...New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Feb. 1-8...........Chicago, Ill., Annual Automobile Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 24-March 1...St. Louis, Mo., Annual Automobile Show.
March 3-8..........Pittsburgh, Pa., Annual Automobile Show.
March 8-15.........Boston, Mass., Annual Automobile Show.
March 17-22........Buffalo, N. Y., Annual Automobile Show.
March 19-23........Boston, Mass., Annual Truck Show.
March 24-29........Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Aug. 30-31........Elgin, Ill., Road Races, Chicago Automobile Club and Elgin Automobile Road Racing Association.
Sept. 1-2..........St. Louis, Mo., Track Races, Universal Exposition Company.
Sept. 2..........Indianapolis, Ind., Speedway Meet.
Sept. 2..........Winnipeg, Man., Track Meet.
Sept. 3-6........Chicago, Ill., Commercial Vehicle Reliability Run, Chicago Motor Club.
Sept. 11-14........Buffalo, N. Y., Third Annual Reliability Tour, Automobile Club of Buffalo.
Sept. 17...........Milwaukee, Wis., Grand Prize Race.
Sept. 20...........Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.
Sept. 21...........Milwaukee, Wis., Vanderbilt Cup Race.
Sept. ....Washington, D. C., Reliability Run, Automobile Club of Washington.
Oct. 7-11..........Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 12...........Salem, N. H., Track Meet, Rockingham Park.
Nov. 6............Shreveport, La., Track Meet, Shreveport Automobile Club.

CHARACTERISTICS OF TRUCKS COMPETING IN FRENCH ARMY TRIALS TO QUALIFY FOR SUBSIDIES

Make	Approx. Load	Motor	Revolutions	Indic. H. P.	Cooling	Carburetor	Ignition	Oiling	Clutch	Gears	Drive	Wheels	Tires	Weights in Pounds				Position of Motor
														Front	Rear	Empty	Total	
Schneider	3	3.9x4.7	1,000	22	Ther.	Solex	Eise	Circ.	Cone	3	Sh'ft	Wood	......	3,747	9,589	6,701	13,359	Un. bon.
Panhard-Levassor	3	3.5x5.1	1,350	15	Pump	Krebs	Bosch	Circ.	Discs	4	Ch'ns	Wood	Rub.	5,048	8,708	6,944	13,668	Un. seat
Delahaye	3¼	3.5x5.5	1,000	20–24	Pump	Dela.	Bosch	Press.	Cone	4	Ch'ns	Wood	R&S	5,423	9,148	7,208	14,440	Un. seat
La Buire	2½	3.5x6.2	1,000	30	Pump	Zen.	Bosch	Press.	Discs	4	Sh'ft	Wood	Rub.	3,703	9,391	7,341	13,227	Un. bon.
Vinot-Deguingand	2½	3.7x5.1	1,000	20	Pump	Solex	Bosch	Press.	Cone	4	Ch'ns	Wood	Rub.	3,416	9,259	7,120	12,632	Un. bon.
Aries	2½	3.3x5.1	1,200	14–18	Pump	G&A	Bosch	Press.	Discs	3	Chains	Wood	Rub.	3,438	8,686	6,591	12,081	Un. seat
Delaugere-Clayette	2½	3.9x5.5	1,300	18	Ther.	Solex	Bosch	Circ.	Cone	4	Ch'ns	Wood	Rub.	2,821	9,722	6,679	12,654	Un. bon.
Delaugere-Clayette	3½	3.9x5.5	1,300	18	Ther.	Solex	Bosch	Circ.	Cone	4	Ch'ns	Wood	Rub.	5,842	9,369	7,429	15,564	Un. seat
Clement-Bayard	2½	3.1x5.5	1,200	15	Ther.	Clem.	Bosch	Circ.	Cone	4	Ch'ns	Steel	Rub.	5,136	7,605	7,120	12,786	Un. seat
Clement-Bayard	3½	3.9x5.5	1,200	20	Ther.	Clem.	Bosch	Circ.	Cone	4	Ch'ns	Steel	Rub.	5,930	9,501	7,517	15,409	Un. seat
Clement-Bayard	5	3.9x5.5	1,200	20	Ther.	Clem.	Bosch	Circ.	Cone	4	Ch'ns	Steel	Rub.	6,569	11,000	8,906	17,570	Un. seat
(Tractor)														6,503	9,810	5,555	16,314	
Latil front drive	2¼	3.3x5.5	1,000	16	Ther.	Solex	Bosch	Trou.	Cone	4	Sh'ft	Wood	R&S	4,982	6,834	6,944	11,816	Un. bon.
Saurer	2	4.3x5.5	1,000	30	Pump	G&A	Eise	Press.	Cone	4	Sh'ft	Wood	Rub.	3,174	8,465	5,238	11,574	Un. bon.
Saurer	3½	4.3x5.5	1,000	30	Pump	G&A	Eise	Press.	Cone	4	Ch'ns	Wood	Rub.	3,703	9,876	7,032	13,668	Un. bon.
De Dion	2	3.1x5.5	1,000	14	Ther.	Zen.	Nilme	Press.	Plate	3	Sh'ft	Wood	Rub.	2,777	9,104	6,635	12,015	Un. bon.
De Dion	2½	3.1x5.5	1,000	14	Ther.	Zen.	Nilme	Press.	Plate	3	Sh'ft	Wood	Rub.	4,100	8,598	7,109	12,863	Un. seat
Berliet	2	3.9x5.5	1,200	22	Ther.	Berl.	Bosch	Circ.	Discs	4	Ch'ns	Wood	Rub.	3,394	9,788	7,252	13,425	Un. bon.
Berliet	3½	3.9x5.5	1,200	22	Ther.	Berl.	Bosch	Circ.	Discs	4	Ch'ns	Wood	Rub.	4,805	9,854	7,252	14,925	Un. seat
Berliet	3½	3.9x5.5	1,200	22	Ther.	Berl.	Bosch	Circ.	Discs	4	Ch'ns	Wood	R&S	4,805	9,942	7,297	15,013	Un. seat
Peugeot with trailer	5	4.3x5.1	1,150	35	Pump	Clau.	Bosch	Press.	Discs	4	Ch'ns	S.Tubes	R&S	6,944	10,582	9,259	17,570	Un seat
														......	9,964	3,990	15,520	
Motobloc	2½	3.5x5.1	1,200	16	Pump	Clau.	Bosch	Press.	Discs	4	Ch'ns	Wood	Rub.	3,086	8,642	7,010	12,125	Un. bon.
Cohendet	3½	3.9x6.6	1,000	35	Ther.	Clau.	Bosch	Press.	Cone	4	Ch'ns	Wood	Rub.	5,026	9,611	7,451	15,079	Un. seat
Renault	2½	3.5x5.5	1,100	14	Ther.	Ren.	Bosch	Circ.	Cone	4	Sh'ft	Wood	Rub.	3,152	8,664	6,547	12,103	Un. bon.
Renault	3½	3.5x5.5	1,100	14	Ther.	Ren.	Bosch	Circ.	Cone	4	Sh'ft	Wood	Rub.	3,791	9,876	7,142	13,911	Un. bon.



Scene in Minneapolis just before the start of the annual tour of the Minnesota State Automobile Association for Winnipeg

Seven Clean in Winnipeg

Annual Tour of Minnesota State Automobile Association Meets with Rain and Bad Roads

Running Schedule Twice Lowered—Tour Expected to Result in Big Business

WINNIPEG, MAN., Aug. 11—Minnesotans in their fourth annual reliability tour, after three days of road experience have found that northern Minnesota soil and that of Manitoba may be right to raise grain, but that it is not designed for touring after a rain. The running schedule has twice been cut 2 miles an hour all around.

The start was made Thursday morning from the Automobile Club of Minneapolis with nine contesting cars and two non-competing. One of the former, the Staver-Chicago, withdrew at Hallock Saturday afternoon, due to trouble with the steering gear and other slight difficulties, but expects to pick up the trail at the American border tomorrow. The McFarlan and Cutting entries failed to check out. The Packard non-contesting car is at Hallock with gear stripped and differential housing wrecked. The Stoddard-Knight pacemaker car, after a series of slight accidents to tires and fenders, cracked its crankcase over a railroad track 3 miles east of Red Lake Falls. The hole was patched and the pacemaker resumed the lead the following day.

Road work galore was encountered the first day and the run therefore was slow. Tire trouble was the main hazard for the second day which ended for the night at Thief River Falls. The noon control was made at the home of a half-breed Indian family where luncheon was served by descendants of the Ojibways.

On the third day the gumbo had dried and left ruts deep and hard, and the mire was so deep at points that it engaged the radius rods on the front of the runabout class cars, and even touched the hubs of the touring machines. The result was slow running and a necessity for detouring along the right of way of the Great Northern road.

When the border line was reached, the Canadians' custom officials were induced to allow the foreigners to enter at slight cost.

The trip is expected to be a great sales tour for the medium and low-priced car dealer and manufacturer. Following is the list of entries, with the first day penalties:

No.	Car	Driver	Division	Penalty
	CLASS E, GRADE III			
1	Marmon	Bohn Fawkes	5	0
2	Hupmobile	Warren Munzer	2	0
3	Studebaker 20	William Soules	1	9
5	Cadillac	A. Zekman	3	0
7	Mitchell	George Murphy	4	—
8	Paige-Detroit	Ed. Fox	2	9
9	Warren-Detroit	Harry Rockelman	2	0
10	Staver	Noah Moss	5	withdrawn
11	Reo V	N. Bass		0
	NON-CONTESTANTS, GRADE IV			
12	Buick	H. G. Blanchard	2	0
13	Packard	Charles Smith	7	0

Chicagoans Stopped by Rain

CHICAGO, Aug. 12—Torrents of rain, coupled with reports of wretched road conditions, caused the abandonment of the second annual team match between the amateurs and tradesmen of the Chicago Motor Club after half of it had been run. Nine amateurs and ten tradesmen started in the match which left Chicago last Thursday morning for St. Joseph, Mich. The run over, 118 miles, was made easily, the weather being good, but the roads in Michigan sandy. At the end of the first half of the match the amateurs had only 3 points against their team, while the tradesmen were loaded down with 170, the bulk of them coming because one of the cars came in after the 2-hour limit, the delay being caused by tire trouble.

Making Plans for Elgin

Entry List Growing Daily, and Fields for The Five Events on the Card Will Be Well Filled

Tetzlaff's Fiat in Elgin Trophy and Free-for-All Races—Mercedes Also Entered

CHICAGOfi, Aug. 12—Prospects for the annual Elgin road races are bright indeed. The entry list continues to grow daily and it looks now as if the field would be made up of a fast lot of cars, including several of foreign make.

Teddy Tetzlaff, holder of the world's road record, reached Chicago Saturday and signed blanks which book him for competition in both the Elgin trophy and the free-for-all on the second day of the meet. He is to drive the smaller Fiat which he handled at Indianapolis. Tetzlaff states that E. E. Hewlett, his backer, will send on the grand prix Fiat for the free-for-all, which will be driven by Dave Lewis, another California star.

A Mercedes also has been dropped into the speed battle, the entry of George Clark having been secured at Galveston by representatives of the Chicago Automobile Club. Clark intends following Tetzlaff's example and will run in both races on the second day.

One entry has been booked for the race for cars 230 inches and under, which was added to the card last week, the nomination coming from F. S. Duesenberg, who has declared the little Mason which did so well in the last Algonquin hill-climb. Bill Endicott is to drive the car.

Heavy rains the past few days have delayed the work on the course, but it is expected that within a day or so half a dozen gangs of men will get busy making the repairs which are needed. The military has been secured and now there seems to be no stumbling block in the way of the promoters.

Atlanta, Ga., Aug. 7—The idea, novel in the South at least, of a 1-day tour within the confines of a single county was given a work-out here today when the 1-Day-Route Around Fulton County, Ga., was dedicated.

Of the thirty-two cars entered twenty-five started and sixteen finished. That no more finished is due to the fact that in the 125-mile route there were virtually 10 miles of clay road.

Electric Pathfinder Fighting Mud

LORETTA, TENN., Aug. 11—After three days of excessively heavy rain in this section the official pathfinder of the American Automobile Association tour of 1912, a Flanders electric, reached this place over roads that are deep in mud and almost tractionless. The route being picked out will be known as the Jackson Highway and in one of the counties traversed today $200,000 will be expended in improvements before the tour itself passes.

The pathfinder has covered the route from Louisville to Loretta during the past week, touching at Mammoth Cave, Nashville, Bristol and Columbia, bringing the total distance to 799 miles.

It was found that the Bristol road was impracticable because of the numerous ferriages necessary and the lack of facilities for such transport.

Tomorrow's course is toward Memphis, but cutting across the northern end of Alabama and Mississippi, touching Sheffield, Florence and Corinth before swinging north to Memphis.

Transcontinental Alco's Progress

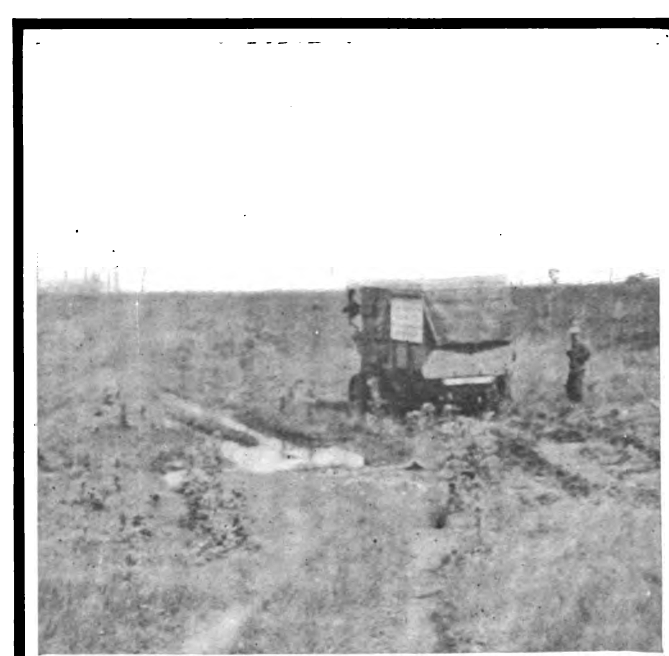
POINT OF ROCKS, WYO., Aug. 10—The trip of the Transcontinental Alco truck is just one flood after another, according to advices received here from the crew.

Just as the motor freighter, which is now engaged in the first delivery of merchandise from one end of the country to the other, was going well after experiencing ten cloudbursts in 8 days, it ran into another heavy rainstorm that hung it up along with four transcontinental touring parties and two prairie schooner outfits.

Reports from the Wyoming country are to the effect that floods are worse at this time than in 14 years and travel by motor through certain sections has been made impossible by the conditions of the road. Trails are both impassable and invisible.

From latest information the Alco truck is on its way towards Evanston, Wyo., where it is taking a trail towards Salt Lake City; from there the route will lead to Reno, San Francisco and Petaluma, Cal., where the load of merchandise will be delivered.

Flanders electric A. A. A. pathfinder crossing to Columbus, Ind.



Trail of Transcontinental Alco truck after a heavy rain

The AUTOMOBILE

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Developing Export Trade

Major Points of Consideration

THE export trade offers a fruitful field to the American automobile maker owing to the widespread use of the motor vehicle in such continents as South America, Africa and Australia and parts of Asia. In every one of these territories the European maker obtained a leading advantage due to his being several years earlier in the manufacturing field than our big organizations and to the fact that when their home field was apparently surfeited, American makers were having the utmost difficulty in filling orders and meeting urgent demands. With such a condition of market saturation in Europe and so healthy a demand here, there was little hope for other conditions than those which happened: namely, that European makers should start rigorously the development of the foreign field and that American makers should give every attention to satisfying the home demand. In this way Europe gained a position of precedence in the foreign field, a position she has constantly strengthened ever since and a position which the American builder has been valiantly attacking during the last 2 years.

The European maker has been longer schooled in the export trade than many of our builders and consequently while his work may have been slower it has also been surer and on a more permanent basis. Not a few of our concerns which have shown particular aggression have laid themselves open to criticism by their entire disregard for local conditions in the countries to which they have exported their cars and also by some of the tactics pursued. When doing business in a foreign clime it is essential to meet the citizen of that land in his own business way. If he has his characteristic way of opening trade negotiations, they may appear antiquated; the aggressive American export man may consider them quite at variance with home methods, but they are his ways of doing business. This is imperative until a business friendship extending over some years has been made, by which time the foreigner will have learned to rely on the export man, will have learned to depend on his goods, will have become acquainted with his various business methods, and in a word, will have become thoroughly satisfied that his ways are just, his intentions always to do right and his commodities dependable.

Some of the American builders have shown excellent judgment in developing their export trade. They have not set out with a large consignment of cars, some of questionable vintage, with larger advertising appropriations and masses of literature; rather their course has been one of conservatism. They have opened up headquarters, perhaps 2, 3 or even 4 years before they made any effort to carry cars on hand for sale and immediate delivery. They carried stocks of spare parts for all who might be touring in those countries. They sold machines on photographs, blue prints and performances. The citizens of the country were impressed with the fact that these concerns were to be trusted, that they had confidence in their goods and that they could be expected to stand firmly back of their product, irrespective of the quarter of the globe in which it might be sold.

Other American houses took equally judicious courses. They established assembly factories, made real estate investments and stocked well up with repair parts when starting to do business. The result was only as could be expected: The business grew and flourished, because the method of attack engendered confidence in the people. The people recognized that they were not purchasing from some concern that would be here to-day and gone to-morrow. They realized that if their car remained in commission for 10 years or longer there was good opportunity that the supply of spare parts and the factor of attention that the consumer would receive would be as great as at the present time.

Contrast with these methods those of the concern that engages the so-called export expert who hopes to stampede the people into his product. His advertising appropriations are enormous compared with the value of the commodity he has to sell. His supply of spare parts is amazingly small, his cars in some cases are carried-over models, and his prices have been raised as high as 100 per cent. over the American price. He hopes to storm the citadel, to make conquests in a day or a week and to establish a broad export trade in 3 or 6 months at the outside. The result is that at the end of that period he returns, some of his cars sold, the remainder left with some not-too-dependable organization, the advertising appropriation exhausted, the home company dissatisfied and the export trade manacled at the start.

Big Crops Are Assured

Reports as of August 1 Indicate Enormous Harvests of the Cereals Throughout the Country.

WASHINGTON, D. C., Aug. 12—Bumper crops are assured, according to the August crop report of the United States government, and in all probability the actual harvest will be larger than those indicated by the official figures. The estimates are dated August 1 and in the days that have intervened since then favorable progress has been made in all lines of agriculture. Perfect crop weather has been experienced and much improvement must have occurred since the first of the month.

The government figures show that the yield of winter wheat has been an average of 15.1 bushels to the acre and while the acreage is smaller than last year by 5,623,000, the average yield is .6 bushel larger per acre, bringing the official estimate of the yield to 390,000,000 bushels. This is 64,000,000 bushels smaller than last year in the departmental estimate. That the estimate for 1911 is too high and that of 1912 too low is generally admitted. The official figures of last year have been revised to conform with the data secured by the census bureau which reduces the acreage to 29,162,000 and the yield to 430,000,000. A report received from the Kansas Bureau of Agriculture shows that in that state alone the official figures for this year as to winter wheat acreage are 600,000 acres too low. This would account for a difference of 11,000,000 bushels of wheat in Kansas. Thus, according to close students of the situation, the weight of probability points to a yield of winter wheat not far from 400,000,000 bushels, with the chances favoring a larger yield rather than a smaller.

The condition of spring wheat is placed at 90.4, a gain of 1.1 since July 1. Since August 1 the condition has improved materially. Last year the yield of spring wheat was 190,000,000 bushels. The August 1 report indicates a yield of 290,000,000 bushels and the favorable weather during the early part of this month when spring wheat is in the final stage of ripening makes it certain that the total yield will be larger.

The corn crop is estimated at 2,811,000,000 bushels, a decrease in condition of 1.5 points since July 1. Oklahoma makes the poorest showing in corn this season with a condition of 65, against a 10-year average of 76. Iowa, a huge producer, has a condition estimated at 89, against a 10-year average of 83. Oats crop is in splendid condition all over the country.

Summarized, the grain crops of the country are estimated by the government to be about as follows:

Grain	Acreage	Estimated yield	Condition
Winter wheat	25,744,000	390,000,000	...
Spring wheat	19,201,000	290,000,000	90.4
Corn	108,110,000	2,811,000,000	80.
Oats	37,844,000	1,207,000,000	90.3
Other crops, except cotton	17,900,000	675,000,000	...
		Tons	
Hay	49,209,000	73,000,000	...
Totals compared with last year:			
	1912	1911	
Grain and crops	5,373,000,000	4,616,000,000	
Hay, tons	73,000,000	47,000,000	

The difference in money value is in the neighborhood of $1,200,000,000 in favor of the current season.

Made His Own License Plates

LOCKPORT, N. Y., Aug. 12—Albert Dussault, of the Dussault Garage, of this city, will be given a hearing on Friday in Police Court on charge of faking New York state license numbers on the plates of his automobiles. It is claimed that Dussault painted over last year's plates with numbers he secured from the state's automobile bureau at Buffalo, and that the prisoner has several similar sets of numbers in use throughout the city.

Boston Booms Electrics

Business Men of the Hub to be Convinced of Utility of Commercial Vehicles of that Type

BOSTON, MASS., Aug. 10—An independent trucking system using electric vehicles exclusively and competing with the horse-drawn vehicles now in use by the majority of the trucking firms of Boston is the latest recommendation from the special committee of the Electric Vehicle Club of Boston appointed to look after business problems. The principal object of the contemplated move is the education of the business men in the growth, durability and economical operation of the electric vehicle, although it is believed that the company will be self-supporting and will later on be purchased by private individuals or a corporation when its success has been fully demonstrated. The avowed intention of the committee is to compete actively with teamsters with a view to increasing local sales of electric vehicles among this class of prospective customers as well as among the large corporations doing their own transportation.

In detail, the project that has been laid before the club by a special committee appointed to devise ways and means for promoting the sale of electric commercial cars in Boston, calls for the organization of a $100,000 company under the auspices of the commercial section of the club. Not less than one-half of the stock is to be subscribed or raised by truck, tire, battery and other interested concerns, subscriptions to be payable either in cash or in suitable equipment.

W. E. Eldridge, representing the Couple-Gear Company, is chairman of the committee which formulated the plan. The other members are: J. Walter Emery, Walker Vehicle Company; B. A. Tirrill, Commercial Truck Company; N. Rommelfenger, Detroit Electric Car Company; R. F. Ketchum, General Motors Truck Company; J. W. Bowman, Waverley Company; H. E. Taylor, Lansden Electric Company; Frank N. Phelps, Baker Motor Vehicle Company.

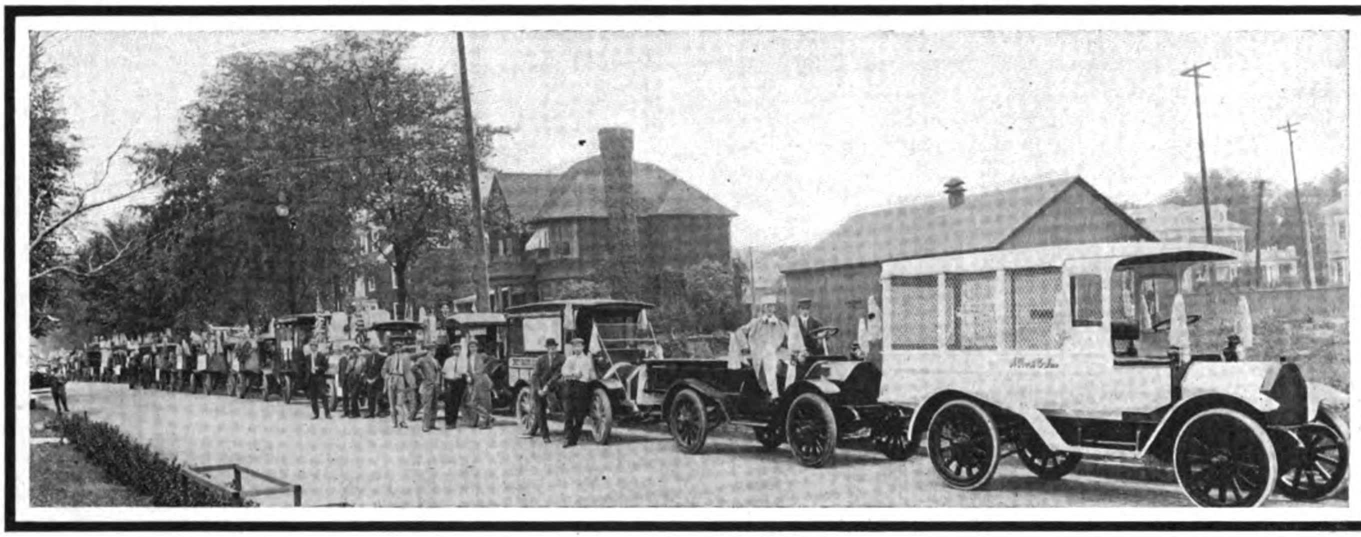
"It is estimated that two-thirds of the horses operating in and around Boston are owned by professional teaming contractors and expressmen," reported the committee in presenting its plan. "The reason for this is that the service required in the transportation departments of many of the merchants and manufacturers having hauling to do is intermittent. They need several trucks today—and perhaps only one tomorrow. More service must be had during busy seasons than dull.

"It therefore would seem that the coming of the electric truck is likely to make much change in the percentage of the total hauling now done by the professional contractors.

"The merchants or manufacturers who will buy the electric trucks and wagons will be only those who have steady work for them. The bulk of the work in Boston will continue to be done by vehicles kept for hire. When the complete change from horses to motor vehicles has been made, the majority of the equipment is likely to be owned by those of the now existing teamsters whose foresight and finances admit of the adoption of the new ways, or more likely by large motor trucking service corporations financed from entirely new sources. If these are the conditions—how shall we confront them?"

Goggles Duty, 1 3-8 Cents per Pound

WASHINGTON, D. C., Aug. 12—The board of general appraisers recently rendered a decision wherein it was held that certain so-called motor goggles, which were assessed with duty at 10 cents per dozen pairs and 45 per cent. ad valorem, under paragraph 106 of the tariff act, were properly dutiable at 1 3-8 cents per pound and 5 per cent. ad valorem under paragraphs 90 and 104 of said act.



Showing sixty Federal trucks in line in the recent Cadillaqua parade in Detroit, led by a shining, white delivery wagon

MANY Federal Trucks in Line—In the recent Cadillaqua parade in Detroit there were many commercial vehicles to swell the number of automobiles to 5,000 as well as pleasure cars. The Federal contingent numbered sixty trucks of many styles, ranging from the heaviest type of truck made by the concern to its lightest delivery model.

After the Cut-Outs—The City Council of Coshocton, O., has adopted an ordinance against the use of the muffler cut-out.

Oakland Branch in Cleveland—In furtherance of the new sales policy of the Oakland Motor Company, a factory branch has been opened in Cleveland, O., where this car will be handled exclusively.

Tyler Goes to Marion—C. H. Tyler, former manager of the United Motor Cleveland Company, Cleveland, O.. signed to become special representative of the Marion Motor Car Company in the Central West.

Lloyd to Leave Velie—George H. Lloyd, who has been sales manager at the factory of the Velie Motor Vehicle Company since 1908, has announced his retirement. He has not yet made any plans for the future.

Griffith Joins Ohio Electric—Warren E. Griffith has accepted a position as assistant sales manager for the Ohio Electric Car Company, Toledo, O. Owing to the increased business of this concern it was found necessary to branch out in its sales department.

Undertaker Makes Innovation—With the purchase of a Peerless hearse, ten Reo limousines, a Peerless casket wagon and an embalmer's runabout a New Orleans, La., undertaking establishment has gone on a motor basis. One of the peculiar local customs in New Orleans is the pomp observed at funerals.

Auto License Plates Expensive—The automobile license plates for 1913 will cost New York state $27,150, or at the rate of 30 cents a pair, which will make the amount $30,000 if the registration figures reach 100,000, as expected. The plates are to be finished in baked enamel. The contract was awarded to the Manhattan Supply Company, of New York.

Absorbs Transfer Company—As a result of a deal consummated the past week the Seattle, Wash., Taxicab Company has absorbed the baggage and passenger business of the Seattle Transfer Company. The name of the Seattle Taxicab Company has been changed to the Seattle Taxicab & Transfer Company. A motor service will be installed in all departments of the new business.

Willys Heavily Insured—President John N. Willys, of the Willys-Overland Automobile Company is the most heavily insured man in Toledo, O. He carries $500,000 for which his wife in beneficiary; $500,000 to be paid at his death to his child; $500,000 in favor of the Willys-Overland company, and $300,000 which he carried before taking out the three other policies. Mr. Willys carries in all $1,800,000 insurance on his life.

Motz Branch in Pittsburgh—A factory branch of the Motz Tire & Rubber Company, of Akron, O., has been opened in Pittsburgh, Pa. The new branch has been made necessary by a large increase in the use of the Motz double-notch tread cushion tire in this district. It is equipped to give a complete service to the users of these tires, and is now operating with a full corps of workmen and tire experts. S. H. Fronsdorf is in charge.

Canada Exporting Cars—When the Rakala of the New Zealand Shipping Company sails for Auckland and other Antipodean ports this week she will carry among other items of general cargon 180 Canadian automobiles, worth approximately $250,000. The Whakatane sailed from Montreal 6 weeks ago with 280 automobiles on board, while one of the Elder Dempster liners, the Ninina, leaving Montreal a month ago carried 100 or more cars to South Africa.

Dr. McClure in Charge—Merging the United States Motor Company's interests places Dr. F. E. McClure in charge of the marketing of all of the company's products in the Cleveland, O., district. He retains the management of the States Cleveland Motor Company, which handles the Stoddard-Dayton, Brush and Currier cars, and, in addition, will have charge of the marketing of Columbia and Maxwell, which the United Motor Cleveland Company markets.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Albany, N. Y.	Peerless	Albany Garage Co.
Albany, N. Y.	White	Albany Garage Co.
Andalusia, Ala.	R-C-H	Fletcher & O'Neal
Austin, Minn.	R-C-H	A. W. Wolten
Babylon, N. Y.	R-C-H	G. Haab
Baltimore, Md.	Stoddard-Dayton	H. S. Block
Beloit, Wis.	Columbia	Manhall Garage
Beloit, Wis.	Hudson	Manhall Garage
Beloit, Wis.	Reo	Manhall Garage
Benton, Pa.	R-C-H	J. F. Wright
Buxton, Ia.	Nyberg	Jack Williams
Chicago, Ill.	R-C-H	G. A. Jacobs
Cleveland, Tenn.	R-C-H	J. B. Hargis
Cleveland, O.	R-C-H	Gus A. Baumetz
Columbia, S. C.	R-C-H	Independent Auto Sales Co.
Columbus, O.	Inter-State	R. Westwater
Columbus, O.	Mercer	Sitgreaves Automobile Livery
Columbus, O.	R-C-H	Sitgraves & Boyd
Danville, Ill.	R-C-H	J. P. Agan
Denver, Col.	R-C-H	W. Thorney Auto Co.
Dixon, Ia.	R-C-H	Hansen Auto Co.
Dodge Center, Minn.	R-C-H	G. F. Wolter
Dotham, Ala.	R-C-H	Dotham Carriage Co.
Edison, Ga.	Oakland	C. C. Weaver
Elkhart, Ind.	R-C-H	A. C. Adams
Faribault, Minn.	R-C-H	Mutual Auto Co.
Gagetown, Mich.	R-C-H	Gagetown Auto Co.
Geneva, N. Y.	R-C-H	D. M. Dorman
Greeley, Co.	R-C-H	G. S. Hamnett
Greensboro, N. C.	R-C-H	P. W. Richardson
Honey Grove, Tex.	R-C-H	J. I. Warren
Huron, S. D.	R-C-H	E. I. Bowe
Indianapolis, Ind.	American	A. & M. Sales & Service Co.
Indianapolis, Ind.	Chalmers	Conduit Auto Co.
Indianapolis, Ind.	Marion	A. & M. Sales & Service Co.
Jacksonville, Fla.	Nyberg	L. F. Carr
Kaukauna, Wis.	Marathon	Kaukauna Auto Co.
Knoxville, Tenn.	R-C-H	Vest & Anderson Co.
Lakefield, Minn.	R-C-H	Finch & Stinar
Little Valley, N. Y.	R-C-H	H. W. Burrell & D. J. Case
Louisville, Ky.	Overland	Allen E. Reid
Luthersville, Ga.	R-C-H	A. O. Williams
Machias, Me.	R-C-H	Crane Brothers
Madison, Wis.	Hudson	Ritter Auto. Co.
Milton, N. D.	R-C-H	Ralph Prom
Minneapolis, Minn.	Hudson	Smith & Heberle
Minneapolis, Minn.	Mercer	Mercer Sales Co.
Moody, Tex.	R-C-H	Clay & Gilmore
Mount Pleasant, Tex.	R-C-H	R. H. Love
Newark, N. Y.	R-C-H	Farnsworth & Welcher
New Haven, Conn.	R-C-H	Cowles Toleman
New London, Conn.	R-C-H	Myers & Lippincott
Nonticelle, Ind.	R-C-H	Clifford Auto Co.
Norristown, Pa.	R-C-H	D. H. White
Norwich, Conn.	R-C-H	Uncas Garage
Oswego, N. Y.	R-C-H	Rowe & Sikes
Ottawa, Can.	Maxwell	International M. Co.
Ottawa, Can.	R-C-H	J. Nelson & Son
Pensacola, Fla.	R-C-H	W. L. Wittich & Co.
Peru, Ill.	R-C-H	A. A. Bakewell
Pine Bluff, Ark.	Mercer	Pine Bluff Motor Car Co.
Portland, Maine	R-C-H	F. D. Morse
Poughkeepsie, N. Y.	R-C-H	E. B. Delamater
Quincy, Mass.	R-C-H	Central Garage
Quincy, Ill.	R-C-H	Reid Motor Co.
Redfield, S. D.	R-C-H	Blaine Auto Co.
Rochester, N. Y.	Hudson	Baird Motor Co.
Rochester, N. Y.	Locomobile	Empire State G. V. Co.
Roswell, Ga.	R-C-H	Walton & Ellington.
Salem, O.	R-C-H	Salem Auto & Repair Co.
San Luis Obispo, Cal.	R-C-H	R. A. Minor
Saranac Lake, N. Y.	R-C-H	J. J. Duquette & Moody.
Shamokin, Pa.	Abbott-Detroit	Warren Unger
Shamokin, Pa.	National	Warren Unger
Shamokin, Pa.	Reo	Warren Unger
South Bend, Ind.	R-C-H	Otis Motor Car Co.
Steubenville, O.	Nyberg	Hunter & Co.
Thomasville, Ga.	Oakland	Thomasville Motor Co.
Topeka, Kan.	R-C-H	J. C. Vanier
Traverse City, Mich.	R-C-H	Hines Motor Co.
Tuckahoe, N. J.	R-C-H	A. B. Adams
Uhrichsville, O.	R-C-H	J. W. Lytle
Vancouver, B. C.	Mercer	Terminal City Motor Co.
Wapakoneta, O.	Mercer	C. J. McFarland
Ware, Mass.	R-C-H	Hoyt Brothers
Waycross, Ga.	R-C-H	H. L. Marvil
Wilmont, Minn.	R-C-H	Olund & Nystrom
Windom, Minn.	R-C-H	W. P. Cowan
Witt, Va.	R-C-H	G. H. Guerrant
Wionona, Minn.	R-C-H	E. J. Tisdale
Yates Center, Kan.	R-C-H	Patterson & Patterson
Youngstown, O.	Mercer	R. L. Culbertson & Co.

COMMERCIAL VEHICLES

Place	Car	Agent
Binghamton, N. Y.	Alco	M. T. Rogers
Boston, Mass.	Brown	R. H. & R. L. Smith Co.
Harrisburg, Pa.	Autocar	A. Redmond
Minneapolis, Minn.	Commerce	Hume & Ragen
Minneapolis, Minn.	Universal	Hume & Ragen
Peekskill, N. Y.	Alco	W. H. Ash
Holyoke, Mass.	Adams	Magna Auto Co.
Winsted, Conn.	Adams	Roscoe Benjamin

Gibbes President Columbus Club—Frank H. Gibbes has been elected president of the Columbus Automobile Club to succeed F. S. Terry, who resigned. Dr. E. C. L. Adams was chosen vice-president of the club.

Vancouver's Big Fire Loss—Between fifty and sixty cars were destroyed in a recent fire in Vancouver, B. C., it is estimated by the A. B. C. Motor Company, whose loss amounted to $225,000. The total loss amounted to about $2,000,000.

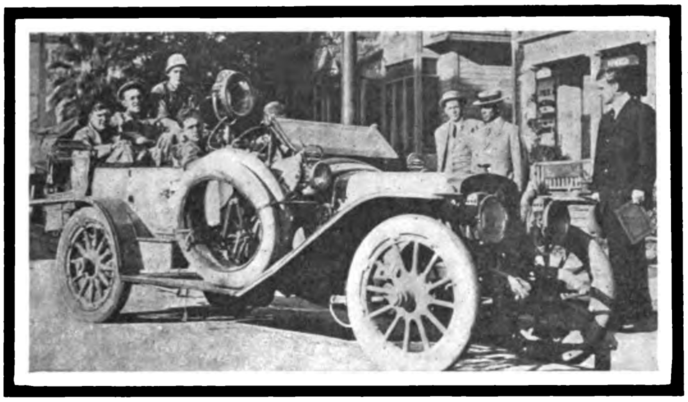
Kelly Experimenting with New Truck—The Kelly Motor Truck Company, of Springfield, O., builders of 3-ton motor trucks, have been experimenting with a 5-ton truck of their own make, which it is thought will be added to their list of models for 1913.

Displacing the Army Mule—Recently seven White motor vehicles ranging in capacity from 1,500 pounds to 5 tons left New York City to be used by the Red and Blue armies now maneuvering for possession of the city. The trucks are to be utilized in carrying the luggage of the men, besides the tents and camp supplies.

Russia Field for American Cars—The field for American-made automobiles in Russia is commented upon at considerable length by Vice-Consul Frederick W. W. Cauldwell, at Batum, to the State Department, who points out that a good market for lightweight, low-priced American machines should be found in the Caucasus. The American car is peculiarly suited to road conditions there, he points out, as the roads are practically the same as those found in America.

Mobile Drawing Tourists—Mobile, Ala., is making every effort to attract the automobile tourists of its whole section. The greatest interest is in a first-class highway to New Orleans. Other plans include a model road to Jackson, the capital city of Mississippi, a road leading to Selma and intermediate Alabama points, and still another will follow the coast to Pensacola, Fla. The road to Selma will be a link in the proposed highway from Tennessee to the Gulf, which has been promised federal support.

One of the fleet of White trucks engaged in army maneuvers around New York City



How five Western college men are going to Princeton

New Remy Service Station—The Remy Electric Company, Anderson, Ind., has opened a service station at the Frey Auto Supply Company, Buffalo, N. Y.

Meeley Has Philadelphia Office—In addition to his shop at No. 1331 Mount Vernon street, Philadelphia, Pa., George Meeley has established a sales office at No. 702 North Broad street.

Hughes Now Superintendent—Oswald V. Hughes has become superintendent of the gasoline pleasure vehicle department of the Empire State General Vehicle Company, Rochester, N. Y.

Opens Detroit Branch—The E. R. Van Wagener Company, Syracuse, N. Y., maker of castings and die-cast bearings, has opened a sales office in Detroit, Mich., with H. J. McCallam, Jr., in charge.

To Handle Staggard—The Licking Motor Car Company, Newark, O., has closed a contract with the Republic Tire & Rubber Company, Columbus, O., to handle the Staggard tread tire in the Newark territory.

Cross Continent to College—Woodward W. Duke and four other young men are on their way across the continent in a six-cylinder Lozier automobile. They are making the trip from Los Angeles to Princeton.

Smith Slowly Recovering—Frank E. Smith, manager of the New Castle, Ind., plant of the United States Motor Company, is slowly recovering from the serious illness sustained in an automobile accident on May 23 last.

Hartford Suspension Branch—D. E. Harvey, New England manager for the Hartford Suspension Company, has opened a branch at Bretton Woods, N. H., for the sale of the various accessories made by that company.

Campbell-Ewald Branches Out—A branch office of the Campbell-Ewald advertising service of Detroit, Mich., is to be opened in Saginaw. The members of the firm are F. J. Campbell and H. T. Ewald, both of whom have been long connected in Detroit advertising circles.

East with Amplex—George L. East has resigned as director of advertising of the Olds Motor Works to be affiliated in a similar capacity with the Amplex Motor Car Company, Mishawaka, Ind. He will conduct the sales and advertising departments at his Chicago offices.

To Handle Wholesale End—The W. L. Russell Company, handler of the Regal in Boston, Mass., doing a retail business, has decided to take on the wholesale end also. The retail business will be conducted in the Park square salesrooms with the Haynes and Veerac truck, while the wholesale business will be conducted from the Motor Mart.

Starter Company Active—The Ignition Starter Company has opened a branch in Indianapolis, Ind., with H. L. Morgan in charge as manager. The company has closed a deal for a plant in Detroit, Mich., which will give them a floorspace of 100,000 square feet for the manufacture of their new electric starting device. It has also contracted with the Buick company for 25,000 starters of the acetylene type for the 1913 Buick cars.

Need Paved Roadway—Carl G. Fisher and James A. Allison, owners of the Prest-O-Lite Company, Indianapolis, Ind., and promoters of Speedway, the horseless city, have called on city officials demanding that they keep a promise made some months ago that a paved roadway would be provided connecting the paved streets of the city with the Crawfordsville road. The Prest-O-Lite Company is building a new plant at Speedway, which is located on that road.

Radford Has Great Responsibility—At a recent meeting of the board of directors of the General Motors Company, Harry R. Radford was elected to the office of vice-president and general manager of the Cartercar Company, with complete charge of the factories at Pontiac, Mich. It brings the engineering department, purchasing department, manufacturing, advertising department and selling organization, with all of the branches in New York, Philadelphia, Detroit, Chicago, Kansas City, Omaha and San Francisco, entirely under Mr. Radford's direction and he alone will be responsible for their success.

Automobile Incorporations

AUTOMOBILES AND PARTS

Buffalo, N. Y.—Gardner-Hotte Sales Company of Buffalo; capital, $10,000; to deal in automobiles, tires, tubes and other accessories. Incorporators: J. H. Gardner, G. Hotte, W. E. Hotte.

Buffalo, N. Y.—Studebaker Sales Company; capital, $25,000; to deal in pleasure automobiles and accessories. Incorporators: Arthur W. Maile, Bradley M. Phillips, E. C. Schlenker.

Buffalo, N. Y.—William Guillott Manufacturing Company; capital, $10,000; to deal in automobile frames and stamped metals. Incorporators: William Guillott, Anna G. Guillott, Edward B. Reynolds.

Chicago, Ill.—Modoc Motor Car Company; capital, $2,500; to deal in automobiles and parts. Incorporators: Otto S. Heberling, William A. Curtis, George R. Daurgana.

Chicago, Ill.—E. C. Kadow & Company; capital, $25,000; to engage in the manufacture and sale of automobiles, trucks, wagons, etc. Benjamin Garler, Bertha Spever, Simon La Grou.

Columbia, S. C.—Consolidated Auto Company; capital ,$5,000; to engage in the automobile business. Incorporators: J. B. Roddey, John J. Cain, J. P. Matthews.

Indianapolis, Ind.—A. & M. Sales Company; capital, $2,000; to deal in automobiles and parts. Incorporators: J. I. Handley, T. L. Marshall, L. R. Wilbur, C. C. Perrin, F. G. Sudrow.

Middletown, N. Y.—Industrial Motor Car Company; capital, $350,000; to manufacture and sell automobiles and parts. Incorporators: William A. Courtland, Cuthbert W. Jewell, M. G. Crawford, Harris H. Rayl, Montecelle A. Bonneford.

Milwaukee, Wis.—George W. Browne, Automobiles; capital, $5,000; to deal in automobiles and parts. Incorporators: George W. Browne, T. C. McMillan, Mark F. Browne.

Milwaukee, Wis.—Overland Wisconsin Company; capital, $50,000; to engage in the automobile business. Incorporators: George W. Browne, T. C. McMillan, Mark F. Browne.

Newport, Ky.—Central Automobile Company of Kentucky; capital, $15,000; to engage in the automobile business. Incorporators: Walter P. Dickerson, Gus Koehler, Clyde S. Enrick.

New York City.—Harmon-Yount Company; capital, $100,500; to buy and sell automobiles. Incorporators: Daniel H. Hanckel, Frederick B. Hunt, Helen M. Kelly.

New York City.—Holt-Chandler Company; capital, $25,000; to deal in automobiles. Incorporators: H. E. Holt, W. E. Chandler, F. E. Tucker.

New York City.—Regal Auto Sales Company; capital, $5,000; to engage in the automobile business. Incorporators: Max Hart, William M. Botto, Norman E. Manwaring.

Peru, Ind.—Brown Commercial Car Company; capital, $100,000; to manufacture automobile trucks and parts. Incorporator: R. H. Bouslog.

Richmond Hill, N. Y.—Dillman-Helin Motor Company; capital, $20,000; to engage in the automobile business. Incorporators: William C. Dillman, Richard A. Dillman, E. W. Helin, Fred G. Hoerlein.

Tampa, Fla.—West Coast Auto Company; capital, $25,000; to deal in automobiles and parts. Incorporators: Victor A. James, Frank A. James.

Toledo, O.—W. H. McIntyre Company; capital, $10,000; to deal in automobiles and trucks and to operate a repair shop. Incorporators: W. H. McInytre, Edward L. Laskey, Clara McIntyre, William G. Vollamayer, Frank C. Kelley.

Toronto, Ont.—Consolidated Motors, Ltd.; capital, $40,000; to manufacture automobiles and other vehicles. Incorporators: Alfred Hunter, Andrew H. Paterson, Garrett Tyrell and others.

Youngstown, O.—Folberth Carbureter Company; capital, $70,000; to manufacture carbureters and other automobile parts and accessories. Incorporators: E. A. Hegg, H. A. Emery, E. A. Tobey, Joseph F. Williams, Thomas L. Morgan.

GARAGES AND ACCESSORIES

Brooklyn, N. Y.—Chinnock Garage; capital, $3,000. Incorporators: Beatrice H. Mattoon, Adelaide Kenny, Edgar Chinnock.

Charlotte, N. C.—McManaway's Garage; capital, $20,000. Incorporators: I. M. McManaway, C. R. McManaway and C. G. McManaway.

Gets Tire Agency—The Brandeis Machinery & Supply Company has secured the agency for Imperial tires in Louisville, Ky.

Page Resigns from Shawmut—G. Page has resigned his position as sales and advertising manager for the Shawmut Tire Company.

Taxicab Company Moves—The Taxicab Company of Baltimore, Md., has moved into its spacious new quarters on Cathedral street near Chase.

Car Helps Advertising—Advertising the Wyoming County fair fifty-five automobiles filled with business men are touring that county in New York state.

University Adds Engine Course—The University of Southern California has added a course in the study of the Silent Knight engines to its engineering curriculum.

Garfords for Postal Work—Eleven Garford trucks, each with a carrying capacity of 3 tons, have been purchased for the handling of United States mail in New York City.

Pullman Is 6-66—In the issue of THE AUTOMOBILE for July 25 an error occurred in the name of the Pullman Motor Car Company's 1913 six-cylinder car. The correct appellation is model 6-66.

Johnston Leaves Washington—T. S. Johnston has resigned as manager of the Buick Motor Company's branch in Washington, D. C., to accept a position as manager of the Republic Motor Company's branch in Philadelphia.

Robinson Goes to Detroit—Hanson Robinson, for the past five years in charge of the sales of the Studebaker electric trucks in South Bend, has gone to Detroit, where he will take a position as manager of the truck sales department.

Mitchell to Double Its Output—A meeting of the distributors of Mitchell automobiles has just closed at the factory where the visitors inspected the new 1913 cars. Orders have been issued at the factory to double the output over that of 1912.

Holt Now in Charge—L. W. Holt, factory representative of the Matheson Automobile Company, has gone to Boston, Mass., where he is now in charge of the branch in that city. He is going to reorganize the service and sales-force in Boston.

Velie Employees to Picnic—The annual picnic of the employees of the Velie Motor Vehicle Company, Moline, Ill., will take place August 15 at Campbell's Island in the Mississippi River near Moline. All expenses of the outing are met by the company.

Strong Transferred to Indianapolis—E. T. Strong, manager of the Buffalo, N. Y., branch of the Buick Motor car Company, has been transferred to the Indianapolis branch of that concern and is succeeded at the Buffalo office by J. S. Collins, of Saginaw, Mich.

Porto Rico Buys Trucks—Manager John L. Snow, of the Boston, Mass., branch of the Peerless Company, shipped three trucks to Porto Rico last week, each of which will be equipped with 30-passenger bodies, for use on the island, to transport people from coast to coast.

Columbus Goodyear Branch Moves—The Columbus, Ohio, branch of the Goodyear Tire & Rubber Company, Ross A. White, Manager, which is located at 54 North Fourth street, Columbus, Ohio, will move about the 15th of August to a new building at 87 North Fourth street.

Conde Republic Sales Manager—After 4 years with the Indianapolis sales branch of the Buick Motor Company, L. H. Conde has resigned to become associated with R. H. Losey, general sales manager of the Republic Motor Car Company with headquarters in New York City.

Invents Kerosene Automobile Carbureter—Henry Reichenbach, of Chicago, states that he has invented a new carbureter that will utilize kerosene in motors instead of gasoline. Mr. Reichenbach recently tested the kerosene in a motor at Harvard University and the result was highly satisfactory.

Battle Creek Club Organized—The Battle Creek, Mich., Automobile Club has been organized with the following officers: G. H. Bathrick, president; I. Fell, vice-president; H. W. Johnson, secretary and treasurer. The club's object is to obtain fair laws, see that they are enforced, encourage good roads campaigns, aid victims of automobile thieves and discourage speeding.

Start of the Flanders electric on A. A. A. pathfinding trip

Automobile Incorporations

CHICAGO, ILL.—Automobile Supply Company of Illinois; capital, $10,000; to make automobile supplies. Incorporators: A. Norwald, S. Rubinsky, H. Simmons.

CHICAGO, ILL.—Tesla Automobile Light Company; capital, $6,000; to manufacture automobile supplies. Incorporators: C. B. Stafford, H. C. Levinson, A. Jacobs.

CHICAGO, ILL.—Thirty-five Per Cent. Automobile Supply Company; capital, $10,000; to manufacture automobile supplies. Incorporators: A. R. Norwald, S. Rubinsky, H. D. Simmons, S. Kohan.

CLEVELAND, O.—No-Shammy Funnel Company; capital, $1,000; to handle automobiles. Incorporators: F. T. Kovar, G. Dantel, L. Dantel, D. P. Bowden, R. K. McKay.

COLUMBUS, O.—Davis-Bach Manufacturing Company; capital $300,000; to manufacture tires and vehicles. Incorporators: R. Nash, C. H. Davies, O. Nelson, G. Lampus, P. D. Metzer.

GAINESVILLE, FLA.—Kelly Self-Starter Company; capital, $50,000; to manufacture a self-starter. Incorporators: W. R. Thomas, M. H. De Pass, J. W. Blanding, P. Miller.

MACON, GA.—Wade Garage Company; capital, $12,000; to conduct a garage. Incorporators: P. Wade, E. T. Wadley, M. E. Richardson.

NEWPORT, IND.—Newport Motor Club; to conduct a club. Incorporators: I. M. Casebeer, J. B. Groves, J. Barker.

NEW YORK CITY.—A. H. Kasner Tire Company; capital, $10,000; to manufacture automobile tires, etc. Incorporators: Alexander H. Kasner, Hattie Kasner.

NEW YORK CITY.—Cukor Safety Crank Company; capital, $40,000; to manufacture automobile parts. Incorporators: B. Cukor, Isidore Neustaedter, H. J. Rosenblum.

NEW YORK CITY.—Curran Patent Company; capital, $10,000; to manufacture devices for automobiles. Incorporators: H. L. Curran, C. D. Curran.

NEW YORK CITY.—Duffy Lubricants Manufacturing Company; capital, $25,000; to manufacture and deal in automobile oils. Incorporators: J. F. Duffy, H. W. Conklin, H. K. Halikman.

NEW YORK CITY.—Electric Spark Appliance Company; capital, $5,000; to manufacture electrical and other devices for automobiles. Incorporators: M. M. Lint, P. Ross, A. Miller.

NEW YORK CITY.—Maxi Company; capital, $200,000; to manufacture carbureters. Incorporators: E. A. McCoy, E. Hopkinson, F. V. W. Richardson, J. C. McCoy.

NEW YORK CITY.—Silvex Company, capital, $100,000; to manufacture cleaners for metals. Incorporators: E. H. Schwab, J. H. Ward, C. M. Schwab.

PHILADELPHIA, PA.—International Automobile League Tire & Rubber Company; capital, $1,000,000; to manufacture tires. Incorporators: Clarence J. Jacobs, R. Boyd Cooling.

ST. LOUIS, MO.—Cabanne Automobile Club of St. Louis; capital, $50,000. Incorporators: C. F. Haanel, H. L. Hagerman, M. A. Nicholson.

URICHSVILLE, O.—Union Delivery Company; capital, $5,000; to do a general delivery business. Incorporators: J. E. Smith, John F. Cappel, Ernest C. Fox, C. W. Rosel, P. W. McCue, W. B. Devine.

WEBSTER GROVES, MO.—Pugh Automobile Chain Company; capital, $5,000; to manufacture automobile chains. Incorporators: Arville Vancleave, C. C. Knight, John Schulz, Harry Schulz, Webster Groves, Edward Brocksmith.

WILMINGTON, DEL.—Automobile Pilot Lamp Company; capital, $25,000; to manufacture lighting devices for automobiles. Incorporators: George H. B. Martin, E. T. Vinnell, C. M. Martin.

CHANGES OF CAPITAL

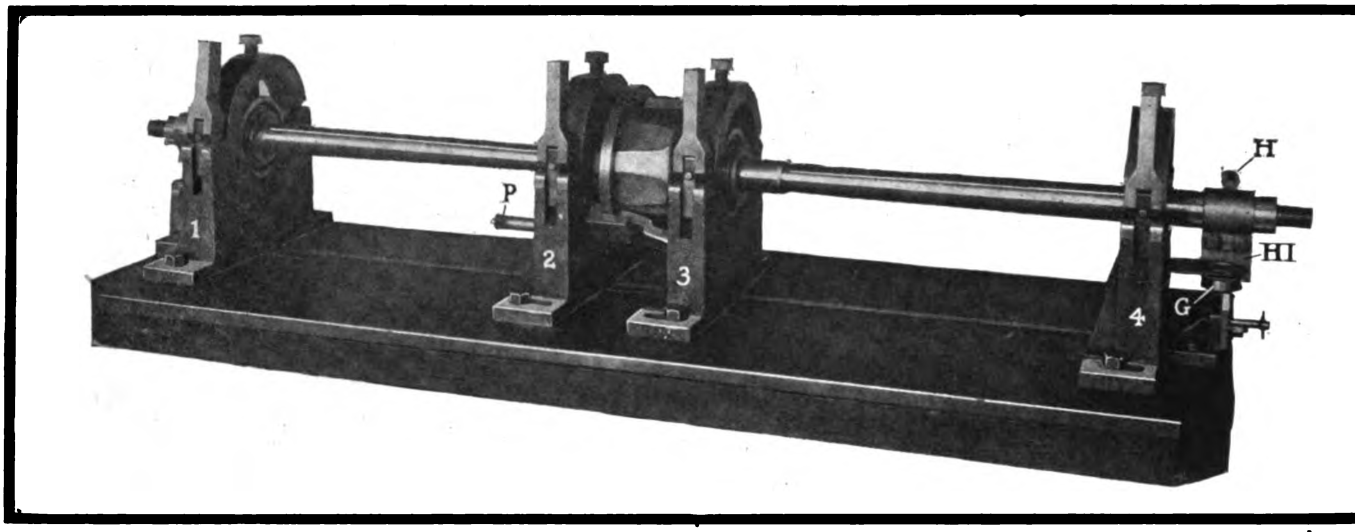
AKRON, O.—Miller Rubber Company; capital stock increased from $500,000 to $1,000,000.

NASHVILLE, TENN.—Imperial Motor Car Company; capital stock increased from $6,000 to $20,000.

PITTSBURGH, PA.—Pittsburgh School of Automobile Engineering; capital stock increased from $5,000 to $100,000.

YOUNGSTOWN, O.—Republic Rubber Company; capital stock increased from $4,000,000 to $9,000,000.

Factory Miscellany



Instrument used in the Pierce-Arrow factory at Buffalo for testing for back-lash in rear axle

The Pierce-Arrow Motor Car Company uses in its factory a delicate instrument for testing for back-lash in the rear axles of all its cars. The testing apparatus consists of four bearing supports 1, 2, 3 and 4 to carry the axle drive shafts and differential. The left side device shaft is located by pin PP; onto the end of the other axle drive shaft is attached the handle H with a short arm H1, which is set to bear lightly upon the arm of a pressure gauge G. When making a test the tester works the handle back and forth endeavoring to turn the drive shaft, and the amount of possible movement is indicated on the pressure gauge, this showing the back-lash in the axle unit.

In order to eliminate back-lash the inspection department of the factory exercises every effort to select the planetary spur gears in the differential set with respect to their size. The gears are assembled in uits in the differential housing in this department and the amount of free movement noted. If too much, a new selection of a gear or two is made and a re-arrangement results. In this selection work frequently a dozen or more gears are discarded, being over or under size by a slight variation; these eventually find their place into another unit with others of their exact size. After all of this care the testing machine illustrated herewith comes into place and gives the final test. If the back-lash is too much, the entire set of spur differential pinions is returned to the inspection department for a re-selection.

David Fergusson, the Pierce-Arrow engineer, ascribes some of the chattering gearbox noises to ill-fitting differential sets, and the company has taken this signal step in noise elimination to meet the requirements for the silent rear axle, so much demanded by car users to-day.

OAKLAND Factory's Coming Increase—That the Oakland Motor Car Company, of Pontiac, Mich., will turn out 11,500 cars next season is the announcement made by George E. Daniels, vice-president and general manager of the company. To provide for this increase in output a number of factory additions will be made, providing in all for 300,000 square feet of additional space. The fiscal year just closed has been the most successful in the history of the company, according to Mr. Daniels. For 1913 the company have added a six-cylinder chassis and another popular-priced car to sell at $1,075. The Greyhound 60, the new six-cylinder chassis, has a wheelbase of 130 inches, double-drop frame, unit power plant, cone clutch, sliding-gear transmission, floating rear axle, demountable rims, V-shaped German-silver radiator, 10-inch upholstering, full nickel trimmings, electric lights and a self-starter.

Moline is Expanding—The Moline Auto Company is to build an extension to its East Moline, Ill., plant, a building 60 by 60 feet to be constructed for use as repair shop and repair stock room.

Piston Ring Makers May Move—The Muskegon Piston Ring Company, of Muskegon, Mich., now manufacturing motor specialties here, is considering the removal of its plant to Muskegon Heights.

Fisk to Make Additions—The Fisk Rubber Company is making extensive additions to their plant in Chicopee Falls, Mass., in order to take care of the increased demand for automobile tires. The contracts have been let to the Fred T. Ley Company, of Springfield, for two buildings. Buildings are to be completed and machinery installed by November 1, 1912.

American Castings Company Alive—The American Castings Company, of Mishawaka, Ind., has just installed new equipment, including molding machinery, pneumatic tools and other apparatus. It is also erecting an addition to its plant and has taken on a number of men in the mechanical department. The company has just received an extensive order from an automobile engine company at Harvey, Ill. The company manufactures aluminum castings.

Irvin Body Factory Enlarged—An additional factory building is being erected at Morris and Division streets, Indianapolis, Ind., for the R. J. Irvin Manufacturing Company, which manufactures motor car bodies and tops. The building will be two stories high, of brick construction, 50 by 407 feet, and will cost about $50,000. The Irvin company also has one building 50 by 275 feet and another building 50 by 126 feet.

Commercial Club Activities—The Commercial Club of Columbus, Ind., has completed selling 150 building lots, which sale was necessary to obtain a $250,000 factory which will manufacture motor cylinder castings. Of the $45,000 obtained by the sale of lots, $25,000 is to be used in paying the debts of the Caldwell Manufacturing Company, whose plant is to be taken over by the new company, which will be incorporated with $75,000. Those interested in the new company are J. I. Handley, of Indianapolis, president of the Marion Motor Car Company and of the American Motors Company; S. H. Penfield, Fletcher Goodwell and Benjamin S. Dean, of Jamestown, N. Y.

Mercer Adds to Plant—The Mercer Automobile Company of Trenton, N. J., will build a new factory, measuring 160 by 161 feet. Plans are also being drawn for a new office building. It expects to occupy the new quarters before Fall.

Steiner Wants to Remove—The H. A. Steiner Company, of Chilton, Wis., manufacturing gasoline engines and motors, is negotiating with local capitalists for re-location of its works. A bonus of $13,000, to be subscribed for its stock, is demanded.

Buick Not Moving Yet—The Boston, Mass., branch of the Buick company has been delayed in getting into its new salesrooms at the corner of Massachusetts avenue and Newbury street because the work of alteration, which is very extensive, has not been completed.

Chevrolet Buys Imperial Factory—It is reported on good authority that the Chevrolet Motor Company has purchased the Imperial Wheel Works plant in Flint, Mich., and will open a factory there on September 1. This factory has been secured as a branch plant to the Detroit factory and it will be used for the manufacture of motors for the new Chevrolet cars.

Mason Motor Company Growing—The Mason Motor Company, of Flint, Mich., after a year of business, has found it necessary to add 15,000 square feet of space to its present plant. The fiscal year of the company closes September 1 and it is expected that by that time 2,500 motors will have been turned out. The company manufactures motors for the Little Motor Company's cars.

Champion Ignition Company's Increase—Work has been begun on an addition to the plant of the Champion Ignition Company, Flint, Mich. At the present time the company is supplying about eighty-six manufacturers of automobiles with spark-plugs and the number will be increased to 120 within the next two months. The company employs about 120 persons, of whom about eighty-five are women.

Marvel Carbureter to Remove—Announcement is made that the Marvel Carbureter Company, Flint, Mich., has entered into a contract with the local board of commerce to remove its plant to this city from Indianapolis, Ind. The company has a well-established business in Michigan and the change is said to be largely due to a desire to get into the center of the automobile manufacturing industry.

Durant-Dort Develops Departure—After more than a year of experimenting the Durant-Dort Company, of Flint, Mich., has decided upon a new departure. The company has decided to engage in the manufacture of light motor delivery wagons and has secured the material for the first 100. The class of car will be similar to that of the horse-drawn vehicle now manufactured by the company.

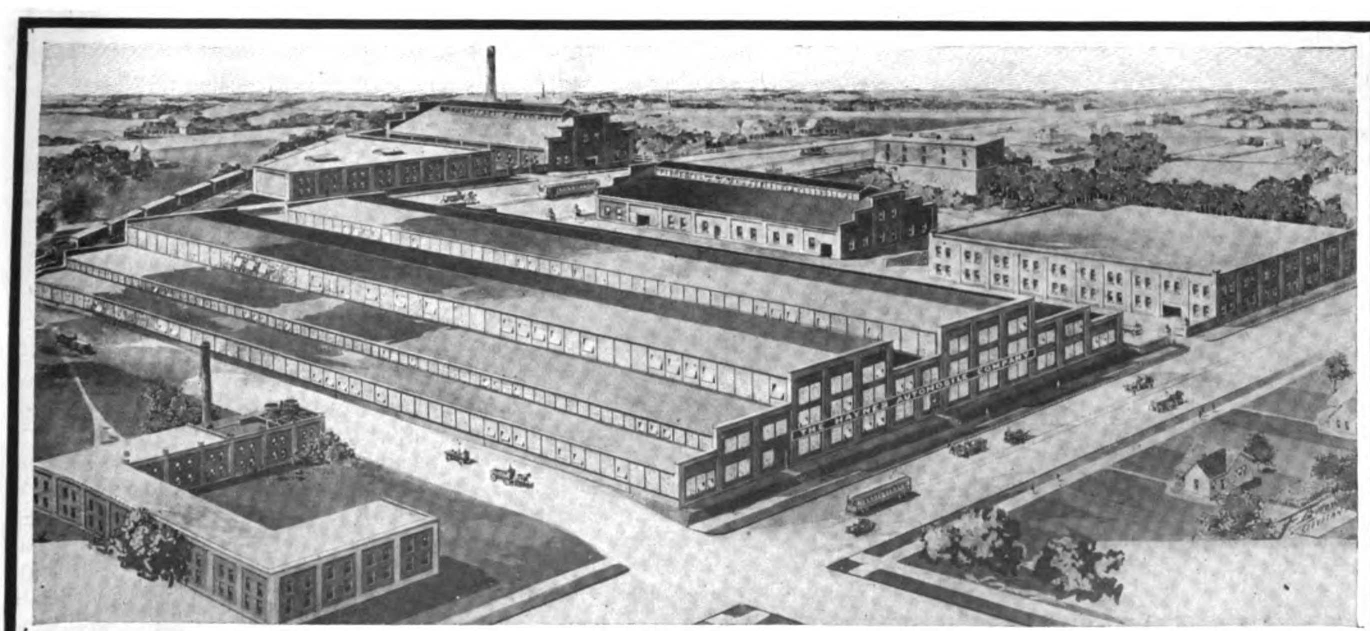
Pharis Brothers Go to Ohio—The Pharis Brothers Rubber Company, of 121 East Gay street, Columbus, O., has closed a deal for the purchase of the Newark Tire & Rubber Company, of Newark, O., and will remove the plant to Columbus as soon as a suitable location is secured. The Pharis Brothers Company has been selling the Pharis tire manufactured by the Mansfield Tire & Rubber Company, of Mansfield.

Rambler Wants to Expand—Nine acres of ground adjoining the present holdings have been purchased by the Thomas B. Jeffery Company, of Kenosha, Wis., to provide for future extensions. The increased output planned for 1913 necessitates several enlargements, which will be made in the course of the coming six months. Definite plans are now being prepared under the direction of Charles T. Jeffery, president and general manager.

Leech Company Ready to Build—The Leech Automobile Company, Lima, O., which was incorporated three years ago for the purpose of carrying on experiments with a new style of gasoline engine, is now ready to erect a plant for the manufacture of the engine. In addition to manufacturing automobile engines, the company will also make a line of parts for motor cars and commercial vehicles. It is believed the plant will be located at Lima.

United States Tire Activities—The Kenosha Industrial Association, of Kenosha, Wis., is negotiating with the United States Tire Company for the location of its proposed new tire and rubber plant, which will have an output of between 500,000 and 750,000 tires annually. The United States Tire Company is looking for a location in a small city near Chicago, and if the Kenosha association can offer sufficient inducements the location is promised.

Stegeman Plans Increase—The Stegeman Motor Car Company, 1148-1160 Holton street, Milwaukee, Wis., manufacturing the Stegeman commercial vehicles, has leased the big manufacturing plant at Woodworth, Linus and Kinnickinnic avenues, Milwaukee, in the Bay View manufacturing district, and will at once increase its capacity to one truck per day, or 360 per year. The work of removing the equipment from the Holton street works has already begun and will be completed by August 10.



Showing a bird's-eye view of the enlarged plant of the Haynes Automobile Company at Kokomo, Ind.

Rajah Spark-Plugs; Electrically-Driven Tire Pump; Shaler Garage Steam Vulcanizer; Single-Hole Imported Acetylene Burner; Radiator Cleaning Compound; Jiffy Side Curtains; Glasses Excluding Ultra-Violet Rays

Rajah Giant and Starter Plugs

IN Fig. 1 are shown two plugs manufactured by the Rajah Auto-Supply Company, Bloomfield, N. J. Both types are shown in a side view and an inclined one, and their principal feature is their evident strength of construction. Both plugs are high-duty designs, in which the insulation is of imported porcelain while the metal parts are correspondingly strong. The electrodes are of imported wire made of a special alloy designed to withstand the exigencies of hard service and the sparks produced by powerful magnetos. The shapes of shell and porcelain are such as to prevent short-circuits even if the cylinders are oiled very liberally. A copper gasket is inserted between shell and porcelain, so that the whole plug consists of but four parts, not considering the clip terminal which is supplied with every plug.

The self-starter plug shown in the same figure has a shoulder at its lower end carrying a yoke which is held in place by a jam nut. There is a gasket on each side of the yoke between shoulder and jam nut, forming a gastight connection. The yoke is grooved with a passage continued by one which is bored in the plug shell and through which the acetylene coming from the tank and through the dashboard distributer valve enters the cylinder, surrounding the sparking points and being ready for ignition when the switch is thrown on. The porcelain of this plug is held in a brass bushing, which may be removed by a wrench without disturbing the position of the plug in the cylinder or disconnecting the gas line through which the acetylene enters. All parts of this plug are made interchangeable and reserve parts may be procured from any agent of the manufacturer. The starter plug is made in two thread sizes, 1-2 inch standard and 7-8 inch S. A. E.

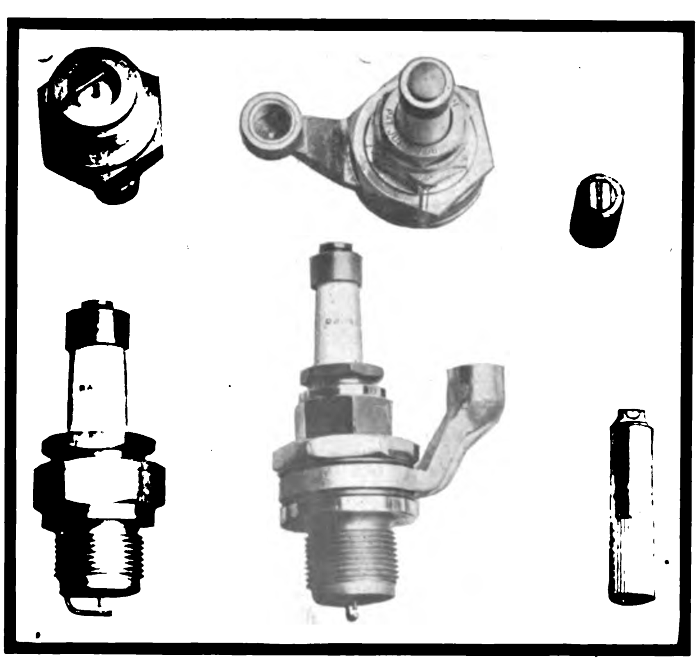


Fig. 1—Rajah Giant and starter plug. Fig. 2—Bray-Roni burner

The illustration indicates the pleasing appearance of both types of plug, the dimensions of which indicate strength. The 7-8 inch self-starter plug has a diameter of 1 5-16 inches at the copper gaskets and a total height, from negative electrode to binding-post cap, of 3 3-4 inches.

Ingersoll-Rand Tire Pump

A recent addition to the line of electrically-driven garage tire pumps is the one shown in Fig. 6, and made by the Ingersoll-Rand Company, of New York City. The pump equipment, comprising an electric motor and a piston pump, is mounted upon a base plate supported on two short feet and two casters and fitted with a handle. The entire outfit weighs 75 pounds, is 27 inches long, 11 wide and 23 inches high. The pump, which has a cylinder of 1 by 1 1-2 inches, is driven by a 1-2-horsepower electric motor, and is of the air-cooled type. It is capable of pumping a 35 by 4-inch tire in 3 minutes from flat to 70 pounds, or, in 3 1-2 minutes, to 80 pounds. The electric motor may be connected to any current socket furnished with city installations. To transmit the air from the pump to the tire 6 feet of 1-2-inch hose is included in the equipment.

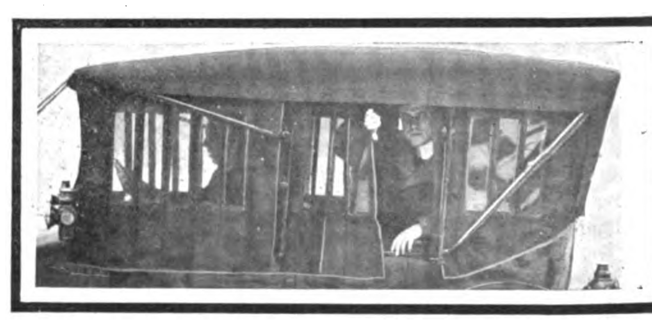


Fig. 3—Jiffy automobile side curtains folding into the top

New Shaler Garage Vulcanizer

The latest product of the C. A. Shaler Company, Waupun, Wis., is the garage type of vulcanizer shown in Fig. 5. This device is operated by steam, the heat being produced by a gasoline burner fed from an overhead reservoir. The apparatus is equally suitable for the repair of casings and inner tubes, molds serving the former purpose and plates heated inside the latter. The equipment, which stands on two legs L, is arranged at such a height as to insure ease of operation, where a man of medium height does the repair work. The casings treated in this vulcanizer, which is of the wrapped-tread type, are covered with a piece of material protecting the damaged portion from direct contact with the hot surfaces. When an injured casing is vulcanized in this machine the wound is first cleaned, then the worn-out sections are replaced by live rubber and fabric, after which the heat treatment is resorted to. The heat is applied to the inner and outer surface of the casing, the inner mold being carried by the two supports S, while the outer one is shown at M. They are tightened on the casing by bolts held in a channel clamp. Both these molds are connected by flexible steam pipes to the coiled copper-tube boiler, to which the gasoline is fed by gravity through tubes T. Inner tubes are vulcanized between the plate P and upper plates Q, being pressed in place by clamps K. The supports S1 serve for hanging inner tubes thereon, while other work is being done on the equipment. The pressure of the steam and its temperature are automatically regulated by a thermostat, which prevents under-curing or burning of casings and tubes. A gauge which is attached to the boiler shows the steam pressure at any moment. The water contained in the boiler is transformed into steam very quickly, so that after 20 minutes it is ready for the vulcanization of tires.

Bray-Roni Acetylene Burner

The William M. Crane Company, 18 West Thirty-second street, New York City, is the distributor for the imported Bray-Roni acetylene burners, Fig. 2. These burners, which are

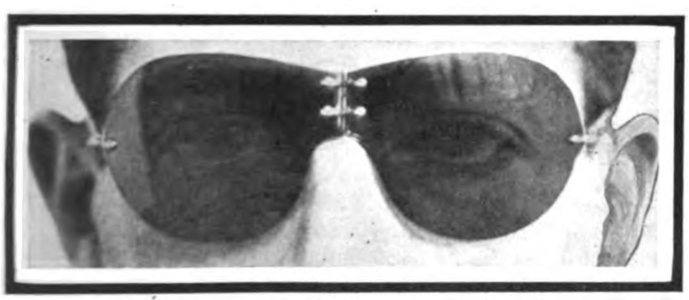


Fig. 4—Hardy Autosun glasses absorb rays which fatigue the eye

made of an imported material held in a nickel-plate brass base, are without the conventional prongs and have but one outlet for the gas coming from the tank, which is located in the center of the top end of the burner. On both sides of this hole there is an elevation in the burner material and between these portions there are two lateral openings between which the air used in the combustion of the gas is admitted, being sucked in by the fast-ejected acetylene. The air, rushing into the flame at two sides, produces a wide, flat flame having the same appearance as one produced in a burner with two prongs from which two pointed flames impinge upon each other. One of the chief features of this burner is that one small gas aperture cannot be clogged up as the pressure of the gas flowing out of it forces out all small foreign matter, so that there is no place for it to accumulate except in the passageway between the elevations at each side of the gas hole. This foreign matter is easily cleaned from these points by means of an old toothbrush.

Apex Cleanser for Radiators

A compound which dissolves the scale deposits in the water-cooling system is sold, under the name Apex Radiator Cleanser, by the U. S. Compound Company, Buffalo, N. Y. The liquid, which comes in cans of various sizes, is mixed with the radiator water in the proportion of 1 ounce to a gallon of water and is left in the system, being drained after a week with the dissolved deposits. The appearance of the liquid is somewhat similar to honey, both as regards color and viscosity.

Jiffy Invisible Side Curtains

A waterproof side curtain, which is operated from the seat, perfectly shields the passengers of a car from inclement weather, and, when not in use, folds invisibly up into the top, is made by the Jiffy Auto Curtain Company, Detroit, Mich. As shown in Fig. 3, each curtain consists of a number of sections made of

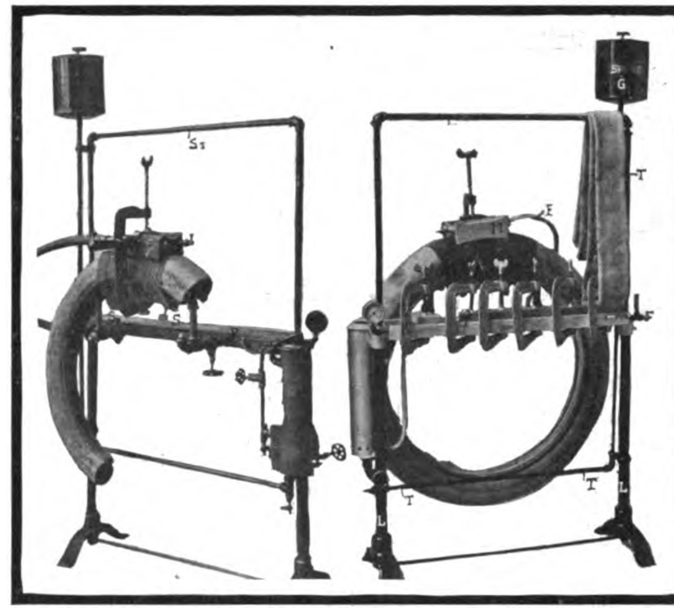


Fig. 5—New Shaler wrapped-tread, garage steam vulcanizer

waterproof material and fitted with windows of celluloid or another transparent material. Adjacent sections are connected by hinge joints which permit of folding one section around another. The top edge of each section has apertures through which extend wire-cable supports along the side of the automobile top. When this is the case, all the curtain sections are in the same plane and form practically one continuous curtain, but it is possible to slide the sections along the cable supports, arrange two or more behind one another, roll them together and attach them to the material of the top by straps. Adjoining sections are held together, when in service, by a snap button, so that the whole device may readily be put into or out of operation. The Jiffy side curtains may be installed upon an automobile of any make.

The Hardy Autosun Eye-Shield

A new addition to the line of automobile goggles made by F. A. Hardy & Company, 31 Wabash avenue, Chicago, Ill., are the Autosun glasses, Fig. 4. These glasses are made in the conventional Hardy design, but are distinguished by the peculiar shade of smoking which gives the glasses a brownish tint, making their use very easy on the eye. This particular smoking of the glass is effective in absorbing the ultra-violet rays, which otherwise prove very tiring to the eye, so that through the use of the Autosun glasses the eyes of the driver are kept fresh and guarded against strains, while the color scheme of the impression he receives of his surroundings is almost the same that he would get with eyes unshielded. The glasses are held together by a simple bridge which is so formed as to be easy on the nose, and the same idea is carried out in the design of the elastic braces which attach the glasses to the ears and are covered with a soft fabric.

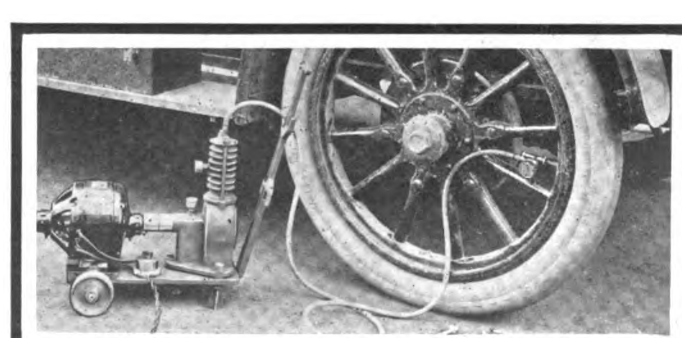


Fig. 6—Ingersoll-Rand electrically-driven garage tire pump

AUTOMOBILE SHOCK-ABSORBING DEVICE—In which a piston moving in a liquid together with a coiled spring effects the absorption.

The shock-absorber described in this patent consists of a pair of reciprocal supports R, Fig. 1, forming a housing which incloses a chamber partly filled with a liquid. Along the entire length of these supports extends a coiled shock-absorbing spring S which returns the two supports to their original relative position after it has been disturbed by the movement of either support. Within the chamber there is a piston P and a partition P1 spaced from the piston; the partition has a port in it and with the piston forms two walls of an auxiliary chamber in which there is a valve moved by and subject to the liquid pressure.

No. 1,033,348—to Emile Rimailho, Neuilly-sur-Seine, France. Granted July 23, 1912; filed December 30, 1909.

Spring Suspension for Automobiles—Composed of two rigid bars secured to each other by movable end-connections.

This patent refers to a spring device, Fig. 2, which consists of two elongated, curved, rigid metal bars B1, B2, extending in the same direction. They are separate from each other, but curve against each other, one being attached to the axle of the automobile and the other to the body. The ends E1, E2 of the two bars are connected to one another, and at least one of these two connections is movable. At different points between the bar ends are coiled springs fastened in vertical position to the bars.

No. 1,033,429—to Thomas J. Magner, Olean, N. Y.; George A. Larkin. Granted July 23, 1912; filed October 12, 1910.

Rear End Indicator Signal—In which a rotatable casing carries indicator signs.

This device, Fig. 3, combines the use of a substantially triangular casing C with a shaft S upon which the casing is mounted. The casing is so attached to the shaft as to rotate with it when the latter is turned. A pair of cranks set off against each other at an angle of 120 degrees are carried by the shaft, and an operating rod is connected to each crank.

No. 1,033,305—to Arthur B. Demuth, Diego, Cal. Granted July 23, 1912; filed June 26, 1911.

Recoil Checking Mechanism—Being a cylinder filled with a liquid in which a piston reciprocates.

The subject-matter of this patent, a shock and recoil absorber, is shown in Fig. 4. It consists of a cylinder C in which there is a piston P, a piston rod R attached to the piston and having a guiding bore and a valve chamber C1. Lateral ports open into this valve chamber presenting passageways with the main interior space of the cylinder. A sliding piston valve V in the chamber C1 is provided with a head having a cylindrical surface; the latter co-operates with the cylinder ports. The cylinder C carries an axial guide rod in engagement with the valve.

Wrench Construction—In which a rack on the shank end on the movable jaw are held in engagement to insure a fast grip.

This wrench, Fig. 5, comprises a shank S, the front side of which carries a rack R which is not as wide as the shank. The outer end of S carries a jaw J, and a jaw body B embraces the shank; a stem S1 has its inner end pivoted at P in the jaw body and is beveled to engage the rear side of the shank S. A longitudinal groove G is formed in the front side of the stem, in which one end of a flat spring S2 is mounted, the spring bearing against the rear side of the shank, thereby maintaining it at a fixed angle to the stem. A gripping block B1 is movably arranged in recesses formed in the jaw body engaging the shank.

No. 1,034,138—to William G. Natzmer, McKeesport, Pa. Granted July 30, 1912; filed March 29, 1912.

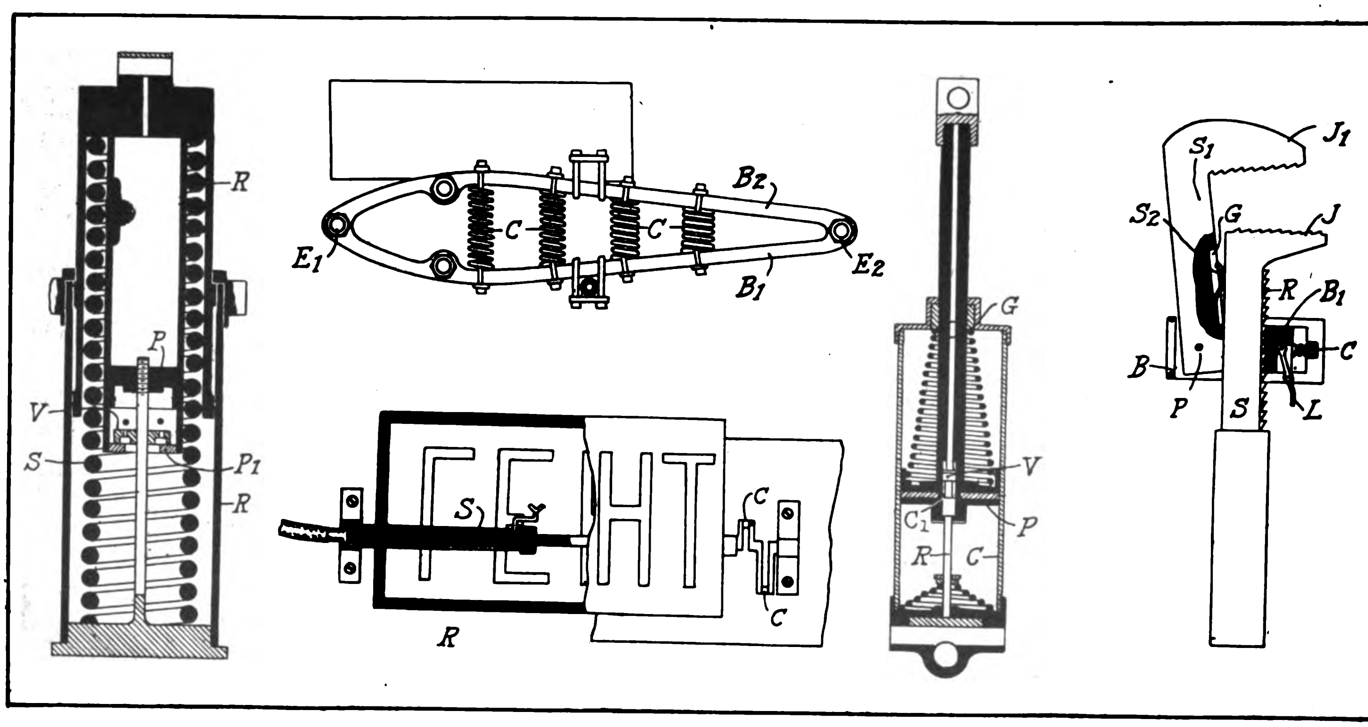


Fig. 1—Rimailho's shock absorber. Fig. 2—Wagner suspension. Fig. 3—Demuth rear-end signal. Fig. 4—Johnson recoil check. Fig. 5—Natzmer wrench

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The AUTOMOBILE

Metric or English Measurements?

Although American Automobile Engineers and Scientists Are in Favor of the French Units of Weight and Measure, Economic Considerations Render Their Adoption a Problem

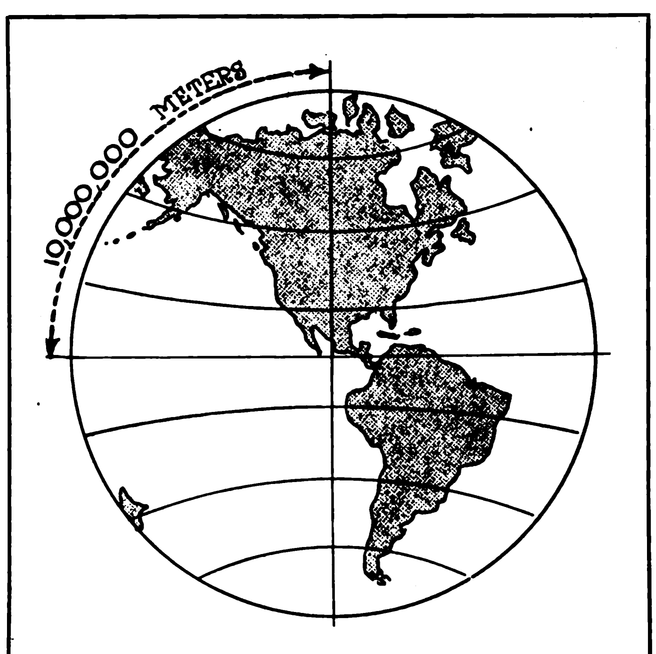
Anglo-Saxon System Has Progressed But Little in the Last Millennium, Whereas the Metric Is a More Recent Product and Is Better Adapted to Modern Conditions

Part I

FORTY-SIX years ago the United States government legalized the use of the metric system of weights and measures in this country. Today we are still struggling along with the incongruous English system of pounds, feet, and square and cubic units even though we acknowledge it to be inferior to the other system. We say that 12 inches make a foot, that 3 feet make a yard and go on laboring under this arbitrary arrangement when our French friends take the meter as their standard length unit, and say that the next larger measure is 10 times greater and that the next smaller is 10 times less.

Much discussion and argument, both by statesmen and by engineers and tradesmen, has been carried on for and against the metric system. **That it would be a distinct advantage to us if the metric system were in general use most authorities agree, but the great loss to our industries and manufacturers which the change would incur is the one insurmountable obstacle.**

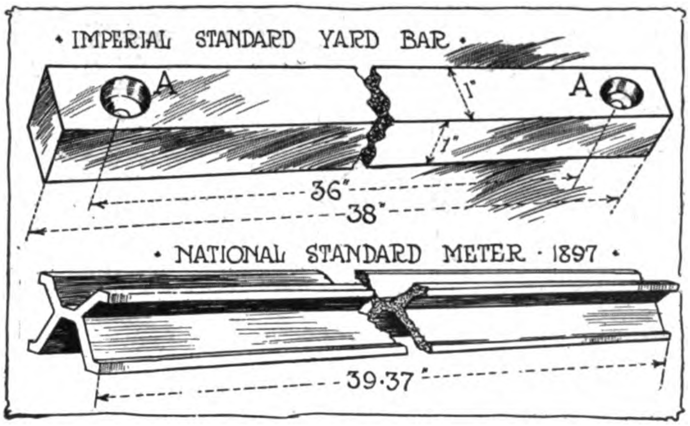
Automobile engineers are almost unanimous in agreeing that it would be a great saving and advantage to them once it was in use in place of the English system, but their machinery and equipment is all designed for the latter, and, quite naturally, none of them wishes to make the change, because it is a matter of dollars and cents. Their workmen are all educated to the foot, inch and yard system, and it would take considerable time to get them accustomed to any other method of determining the size of any piece. Draughtsmen are accustomed to figuring in inches and in incongruous fractions of the inch, and they would require some time to be able to think in any other units. These men are all on the commercial side of the question.



The quarter meridian of the earth was taken as the length from which the standard French unit or meter was determined as one ten-millionth part

The scientist will almost invariably argue in favor of the metric system, because it is logical and because to him its use in place of the English system does not involve any commercial consideration. He can buy his instruments graduated in centimeters, millimeters, grams and the like just as cheaply as he can purchase those apportioned in feet, inches, pounds and so on. Change from one system to another with him does not involve the scrapping of expensive equipment. He says that the metric system is the only logical one to use, and he has every point in his favor, except the one of the immense cost of the change.

And so here we have both sides of the question. On the one hand we see the scientific fraternity all fighting to get our government to adopt as compulsory a system of weights and measures which is based on solid and rational principles, and on the other the great army of manufacturers, merchants and tradesmen in general, who, from commercial considerations, do not wish to change. And they have won every fight against the com-



The standard prototype meter and yard, both of which are carefully preserved. The wells A-A in the yard bar are sunk half an inch, and at the bottom of each well a gold stud is inserted on which the defining line of the yard is engraved

pulsory use of the metric system, because the change would mean millions of dollars to them. Certain it is that, if the system is ever adopted, it must be done very gradually, so that there will be ample time for readjustment of this most important consideration to any people—that of weights and measures.

Few of us in these busy times stop to consider what an important part in our civilization the subject of weights and measures plays. Indeed, it is as old as language itself and evidences of its influence upon trade and conditions are to be traced back to the earliest days of the human race. Primitive man counted his possessions in terms with which he was familiar and according to the standards of his time. It was natural for him to consider distances in terms of his simple objects. He took the length of his foot or the width of his hand or the length of his finger as a basis of length comparison and it was but natural that these dimensions of the body should furnish the basis for his measurements. Perhaps such articles as gourds, egg shells and the like formed the foundation for his measurements of volume, while for weights he used seeds. These were rough standards, arbitrarily selected, and had no logical basis for their foundation. Yet today, in our own enlightened times, we make use of just such arbitrary standards and use them for a basis for some of our ultra-scientific and engineering considerations.

It is interesting to trace the science of metrology back to its early times and to see how little the English standards have developed in the last 1000 years. Most metrologists credit the origin of systems of weights and measures to Babylon and Egypt, which countries evidently derived their systems from a common source. The pyramid of Ghizeh, which dates back to about 4000 B. C., has been considered by authorities to contain various writings and other archæological records bearing upon some of the earliest methods of apportioning land and for fixing various standards of weights and measures.

In Greek and Roman Records

Greece was among the first to have weights and measures systems, of which we have accurate records. Rome naturally observed the same standards and between the two there seems to have been a close connection. It is certain as to where the early Anglo-Saxons derived their systems, but early they attempted to make them standard by various laws of more or less merit. In the Domesday Book, which was published in 1086, the Saxon yard was mentioned as a unit of measurement and soon afterwards, during the reign of Henry I, who ruled from 1100 to 1135, it is stated that the legal yard had a length equal to that of the ruler's arm. Richard I enacted laws providing for standards of length made of iron, and for measures of capacity the brims of which were lined with this metal also. The Magna Charta did much to establish uniformity by stating that there should be one measure of wine, one of ale, one of corn, and so on.

So on down through the reigns of the various English monarchs laws were enacted and standards constructed bringing the different measures down to the present. From time to time the statutes were changed to conform with the then-considered correct method of apportioning lengths, weights and volumes. We find many acts passed to carry out the intent of the fundamental standardization principle as laid down in the Magna Charta of 1215. From the time of the Saxon Kings, the unit of monetary weight was the pound, yet there was no law in actual force until 1266 specifically laying down the relations between weights and measures. This law of the Assize of Bread and Ale stated that "By the consent of the whole realm of England, the measure of our Lord the king was made, viz., an English penny called a sterling, round and without any clipping, shall weigh thirty-two wheatcorns in the midst of the ear; and twenty pence do make an ounce, and twelve ounces a pound, and eight pounds do make a gallon of wine, and eight gallons of wine do make a bushel, which is the eighth part of a quarter." This is the definition of the old Tower pound and it was the earliest form of the present British sterling pound.

With such arbitrary beginnings, it is no wonder the system which we know to-day is the intricate and irrational one that it is. There is no logical basis for the taking of 36 inches as a yard, nor for the progressing from 1 inch to a foot by 12 units.

The metric system, while it had an early beginning, is much younger than the English system and it has a sound foundation on which to rest. History of the metric system, which is founded on the decimal notation, dates back to about 1670, when one Gabriel Mouton of Lyons, France, proposed a comprehensive decimal system having as a basis the length of an arc of 1 minute of a great circle of the earth. Somewhat later, in 1720, a plan was proposed by Cassini, recommending the adoption of a unit equal to 1-6000 part of a minute of an arc of a great circle, which unit had a length of about half that proposed by Mouton. Du Fay, in 1747, brought forward a plan which involved the length of the second's pendulum as a unit. This was subsequently elaborated and continued by La Condamine, who took into consideration the variation in length of the pendulum at different altitudes in determining his standard unit. Several others at that time advocated in France the use of the pendulum unit instead of the proposed fraction of the arc of the meridian, since they believed that the former could be more readily determined.

Present System Adopted 1790

All through the eighteenth century, schemes based on these units were proposed for the improvements of the systems of weights and measures then in vogue. It appears that the French Government appreciated the necessity for some such uniformity throughout the country, but one after the other the schemes were considered and discarded, largely through fear of the immense amount of antagonism and confusion which their adoption would create.

It was not until 1790 that a plan which was the real instrument for causing the ultimate adoption of the present metric system was finally adopted by the National Assembly of France. This scheme had as its backer Talleyrand, the Bishop of Autun, who proposed as a fundamental unit the length of a second's pendulum at 45 degrees latitude, and as a unit of weight that of a cube of water the height of which should be one-twelfth the pendulum's length. After consideration by the Committee on Agriculture and Commerce, the proposal was accepted and sanctioned by Louis XVI in 1790. After settling upon the principle of decimal division the next important step was the selection of a unit. In 1791 three suitable units were under consideration. These were the length of the second's pendulum, the quadrant of a great circle of the equator, and the quadrant of a great circle of the meridian. After great care and deliberation, it was finally decided that the unit should be based upon the quadrant of the meridian, since, while it was not as easy a measurement as the pendulum length, it at the same time had a nearer relation to the accepted means of measurement of length. It was also considered that the length of a quarter meridian could be determined much easier than could that of a similar section of the equator.

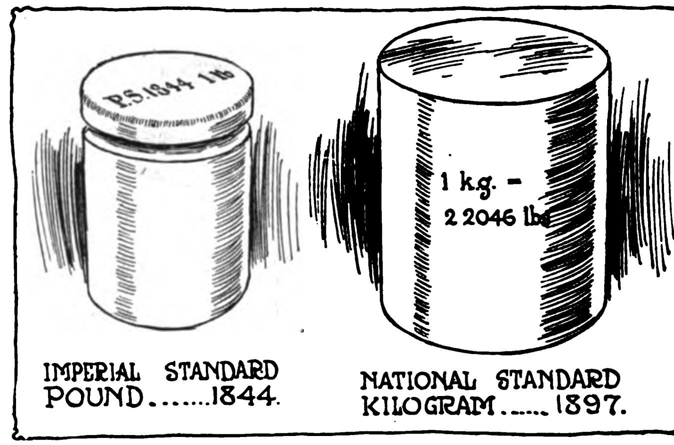
It was decided that after the arc had been measured by trigonometric methods, 1-10,000,000 part of this arc should be taken as the fundamental unit. The work was carried on in earnest by a committee of the National Academy. The actual meter, the name which was given to this fundamental unit and which is derived from the Greek word, *metron*, meaning, *a measure*, was finally determined in 1799 by the Commission and has an actual length of 39.37 inches.

From this time on until its adoption as compulsory in France the metric unit had a rather varied and stormy career. Of course, after the scientific determination of the unit, or meter, it only remained to have the system recognized and generally adopted throughout the country. Political conditions in France tended to delay the general acceptance of the new system. In 1,800 a decree was issued which stated that the decimal system would be put into effect the following year and a special nomenclature was proposed giving the various metric units French names. In 1812 the metric movement received a serious setback by an edict of Napoleon which established a system of measures termed *Usuelle* in place of the metric system as established in 1800, but which made use of the principles of the decimal system. Napoleon's law prohibited the use of any other save the *Usuelle* system. After its operation for a quarter of a century, the latter method of determining weights and measures was abolished by an act passed by the Chamber of Peers and the Chamber of Deputies in 1837. This decree provided that after January 1, 1840, all weights and measures should be of the decimal metric system and that any persons possessing any but these decimal weights and measures were to be punishable according to an article of the penal code.

Metric System Established

This act was the beginning of the metric system of weights and measures as now used in France. It has become firmly established and not only is it the compulsory and legal system in France, but also in the following countries: Argentina, Austria-Hungary, Belgium, Brazil, Chile, Germany, Greece, Italy, Mexico, Netherlands, Norway, Peru, Portugal, Roumania, Servia, Switzerland, Spain and Sweden. Its use is legalized in Egypt, Great Britain, Japan, Russia, Turkey and the United States.

The United States Government, after hearing considerable debate for and against the adoption of the system as the compulsory one in this country, in 1866 finally legalized its use.



Relative size of kilogram and pound. These are the exact shapes of these standards

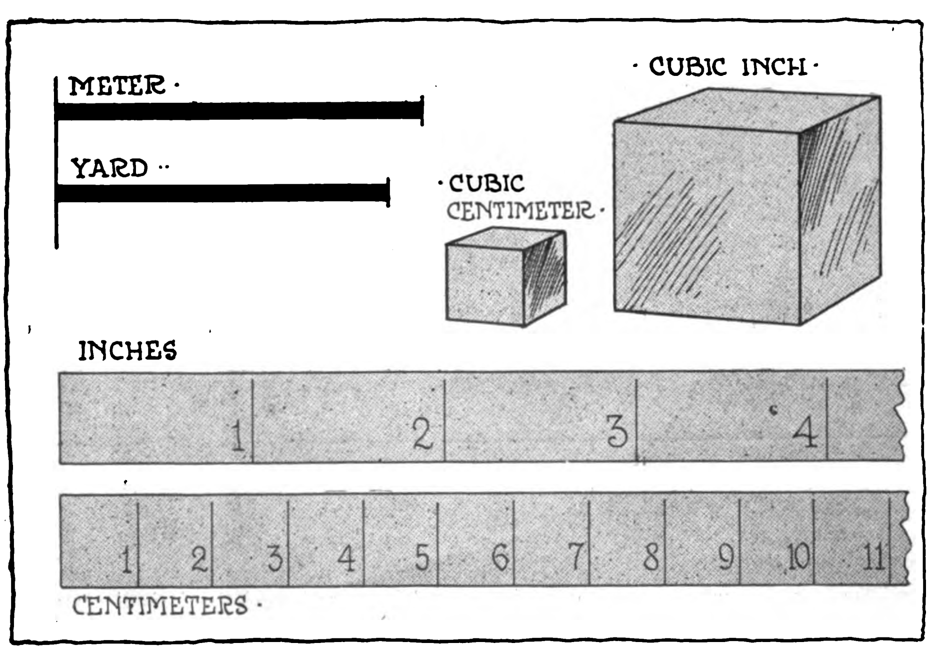
Congress on July 27 of that year approved, authorized and directed the Secretary of the Treasury to furnish each state one set of the standard weights and measures of the metric system, and with this start its use has grown considerably in this country and a large part of the public is continually urging its general adoption.

Recommended By Congress

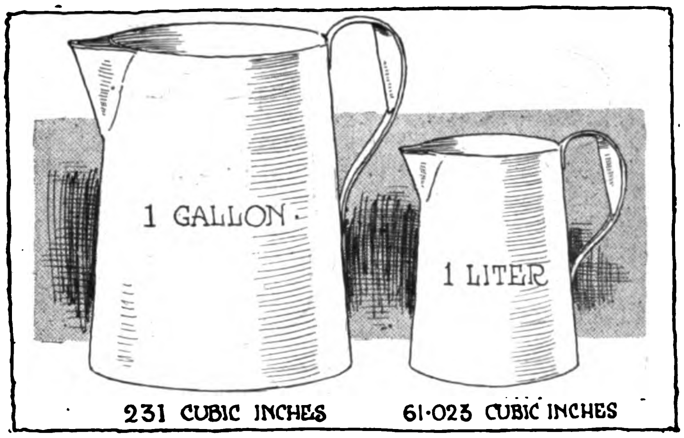
The progress of the system was brought out by the fact that Congress, in establishing a standard for measuring sheet iron and steel in 1893, expressed its standards in both the metric units and the common English units. One year later, Congress established the units of electrical measure, which are the international standards and based upon the metric system. In 1896 two reports were prepared by the House Committee on Coinage, Weights and Measures which recommended the French system for adoption. This recommendation was unanimously recommended for adoption, but did not pass a third reading. In 1901, 1902, 1903 and 1905 similar bills were proposed tending to have this country adopt as its legal standards for compulsory use the metric units. The Littaurer bill, however, which was formulated in 1905, provided only that the metric system be used in the governmental transactions.

Thus it will be seen that the question is a live one. For years the solons of England and America have wrestled with the problem of getting the people to realize the great advantage of such a decimal system once it is firmly established. It is from the engineers and manufacturing interests that the system receives its least support. Commercial considerations are their only reasons for opposing the system, which they know to be the logical one, and the adoption of which in this country would mean many dollars to them. They cannot see how the advantages to be gained from the use of these easier methods of length and quantity determinations would compensate for the great cost which the change would incur.

Scientists recognize the great advantage to be gained, but they do not consider the problem from the commercial standpoint. Lord Kelvin, the great British physicist and philosopher, was a leading exponent of the decimal system. He said, in one of his speeches, "I believe I am not overstating the truth when I say that half the time occupied by clerks and draughtsmen in engineers' and surveyors' offices—I am sure at least half of it—is work entailed



Relative sizes of the English and metric units. All save the meter and the yard are full size



Relative size of a liter and a gallon. The gallon equals nearly 4 liters

upon them by the inconvenience of the present farrago of weights and measures. The introduction of the French metrical system will produce an enormous saving in business offices of all kinds—engineering, commercial and retail shops.

"Nothing can be more convenient than the French metrical system for every kind of business and science. There is no case, large or small, in respect to measurement where the system is not satisfactory."

A brief explanation of the metric system is not out of place here. It is founded directly upon the decimal notation. The unit, as has been shown, is the meter. The base ratio is ten, and the subdivisions of the unit are either ten, one hundred, one thousand, times smaller than it. Correspondingly, the units above the meter are either ten, one hundred, one thousand, ten thousand, and so on, times greater. Thus if it is desired to change from one unit to another it is only necessary to change the number of ciphers, or the decimal point.

The table of decimal units will serve to show more clearly the progression from one unit to another by a ratio of 10:

10,000 meters	= 1 myriameter
1,000 meters	= 1 kilometer
100 meters	= 1 hectometer
10 meters	= 1 decameter
1 meter	= 1 meter
.1 meter	= 1 decimeter
.01 meter	= 1 centimeter
.001 meter	= 1 millimeter

The multiple prefixes employed are from the Greek and they apply to the multiples of the meter, while the submultiples are from the Latin. Thus, the Greek *deca* means ten, while the prefix *deci*, meaning one-tenth, comes from the Latin *decem*, meaning ten.

Volume and Surface Units From Length Units

The table given above is for lineal measurement only. The units for volume and surface are derived from length units, however. Thus, the unit of square measure, or surface is the square meter, from which the multiples and submultiples are obtained and are called square centimeters, square kilometers, and so on. Similarly, the primary volumetric unit is a cubic meter, from which are derived the cubic decimeter, the cubic millimeter, etc. The ratios of increase or decrease from the primary unit, however, are 100 for the square measure and 1,000 for the cubic. This follows from the fact that since the unit of length increases by the ration of ten, the unit of surface, which is derived from it must increase by the square of ten, or by 100. In like manner, the cubic unit must increase by the cube of 10, or 1,000. Thus the surface table becomes:

1 square kilometer	= 1,000,000 square meters
1 square hectometer	= 10,000 square meters
1 square decameter	= 100 square meters
1 square meter	= 1 square meter
1 square decimeter	= .01 square meter
1 square centimeter	= .0001 square meter
1 square millimeter	= .000001 square meter

Likewise for the volume table. The primary unit for the measurement of capacity is the liter, while that for mass is the gram. The progression from these units both for increase and decrease is done in the same way as outlined for the units of measurement, volume and so on. The prefixes are the same. To facilitate the transformation from units of volume and capacity, the originators of the metric system took the liter to be equal to a cubic centimeter. This, however, has been declared to be slightly inaccurate, and, for scientific purposes, the International Committee defined the liter as the volume occupied by a mass of 1 kilogram of pure water at its maximum density and under normal atmospheric pressure. This was adopted in 1901 in the Paris general conference. While the actual unit of mass is the gram, it is so small as to be rather impractical for average mass determinations, and, for this reason, the practical unit is taken as the kilogram. In 1901 also the general conference defined it as the basis for mass determinations by stating that "The mass of the international kilogram is taken as unity for the international system of weights and measures."

Lord Belhaven's Suggestion

Tables for the conversion of units from the metric to the English system and *vice versa* are found in handbooks dealing with mathematical or engineering subjects, so that we are today able with considerable labor to translate into our own units any measures or weights which are given to us in the French system. We find that

1 inch = 25.4 millimeters.

which indeed is an awkward figure with which to deal. Half an inch will obviously equal 12.7 millimeters, while 1-4 inch will equal 6.35 millimeters, and so on. A very useful suggestion was made by the Rt. Hon. Lord Belhaven and Stenton, who suggested that, for the conversion of measurements which did not require extreme accuracy, it would be more convenient to assume the inch equal to 25.6 millimeters. This figure would then give us a table as follows, which is seen to be very easy to determine, and which is sufficiently accurate for all ordinary measurements:

25.6 millimeters	= 1 inch
12.8 millimeters	= 1-2 inch
6.4 millimeters	= 1-4 inch
3.2 millimeters	= 1-8 inch
1.6 millimeter	= 1-16 inch
0.8 millimeter	= 1-32 inch
0.4 millimeter	= 1-64 inch.

In next week's issue of THE AUTOMOBILE *the opinions of the leading American automobile engineers on the relative values of Metric and English methods of measurement are given. The scientific superiority of the former is not denied by any one of them, but every expert admits that the sudden introduction of the French system would be well nigh impossible, owing to the tremendous investments now represented by tools adapted to operate on the English system and workmen accustomed to use them. Suggestions are made by some of the foremost engineers as to how a gradual introduction of the decimal system could be brought about.*

Legal News of the Week

Westinghouse and Bergdoll Differences Adjusted—Testing Mississippi Law—Republic Sues G. & J.—To Argue Dyer Suit

Efforts to Improve Pennsylvania's System of Licensing Chauffeurs—Suit Against Atlas Engine

Philadelphia, Aug. 19—A mutually satisfactory settlement of the legal proceedings recently instituted by the Westinghouse Machine Company, of Pittsburgh, Pa., against the Louis J. Bergdoll Motor Company, has been effected.

The litigation by the Westinghouse Machine Company was based on the terms of a contract entered into 2 years ago by which that concern was to build for the Bergdoll company 1,000 gasoline motors, to be delivered at certain specified quantities and times. After about three-fifths of the motors contracted for had been built a hitch occurred through the alleged failure of the Westinghouse company to make prompt deliveries of the balance, the Bergdoll company contending that by the delay in receiving the motors a consequent loss in automobile sales ensued, owing to inability to supply finished cars, and the latter company refused to accept or make payment for the balance of about 400 motors. The Westinghouse company brought suit to recover payment on the undelivered balance.

In the Court of Common Pleas No. 4, where the suit was heard, Judge Audenried awarded judgment for $104,000 to the Westinghouse company, which decision was promptly appealed. By the terms of the settlement the original contract will be adhered to, the motors to be delivered to the Bergdoll company as required.

Will Argue Dyer Patent Suit

Argument of the legal proposition involved in the motion of attorney Jay N. Emley, representing the Palmer and Singer Manufacturing Company to reopen the order granted to the Enterprize Automobile Company for a decree *pro confesso* for infringement of the Dyer patents, will be heard by Judge Holt, of the United States District Court late last week.

Under the order of court a confessed decree was granted against the defendant in July and subsequently the defendant went into court and entered objection to the action taken, petitioning for another chance to carry on the case.

The position of the Enterprize company is that the various stipulations for delay in the court proceedings have applied only to postponement of the time to answer the complaint and not to the extension of time for pleading or demurring.

Good News for Taxi Creditors

Columbus, O., Aug. 19—Receiver McDowell, of the Columbus Taxicab & Service Company, of Columbus, O., in a partial report made to the court recently, showed that the concern is making a profit under his management and promises to pay off all of the debts of the company.

Republic Rubber Sues G. & J.

Indianapolis, Ind., Aug. 19—The Republic Rubber Company, of Youngstown, O., has brought suit in the federal court in this city against the G. & J. Tire Company, alleging infringement of patents and asking an accounting. It is charged that the G. & J. company has infringed on patents for the improvement of tires, granted in 1908 to Tod J. Mell, of Youngstown, O. While the G. & J. Tire Company has its factory and offices in this city, it is incorporated under the laws of New Jersey.

[The Mell patent upon which the action is based is the same instrument upon which the Republic company proceeded against Morgan & Wright last year. United States Circuit Judge Noyes in writing the opinion of the United States Circuit Court of Appeals for the Second Circuit held that the patent was invalid, having been anticipated by the Healy British patent. That opinion, however, does not prevent the complainant from proceeding against alleged infringers in another circuit. Among the reasons for such action may be the discovery of new facts in support of the patent. Prior actions in the United States District Court had been favorably decided toward the patent by Judge Hazel who sustained it generally and held that the defendants in the suit had infringed. Manufacture of the alleged infringing tires was not checked by the decree as the defense filed a bond and continued. The final score as between the parties stands at one decision each, the latter taking precedence of the former.]

Fighting Mississippi's License Law

Jackson, Miss., Aug. 19—With all the care used in staging a play, Mississippi's state license law has been broken. All details for the "crime" were arranged beforehand by the judge, the attorneys for each side and the man who agreed to be the victim. Representative men were stationed at agreed points as witnesses. After a last review of just what would be done, the court and the attorneys stepped to one side to let the martyr chug forth. H. C. Laurence, manager of the South State Street Garage, is the volunteer who broke the law. He toured the principal streets of the capital with his untagged car and on returning to the appointed place the forewarned policeman stepped out and made the arrest. As per agreement, a criminal charge was made and a hearing was granted immediately that the appeal to the Supreme Court, as had been planned, could be asked and allowed. Mr. Laurence was then given his release without bond.

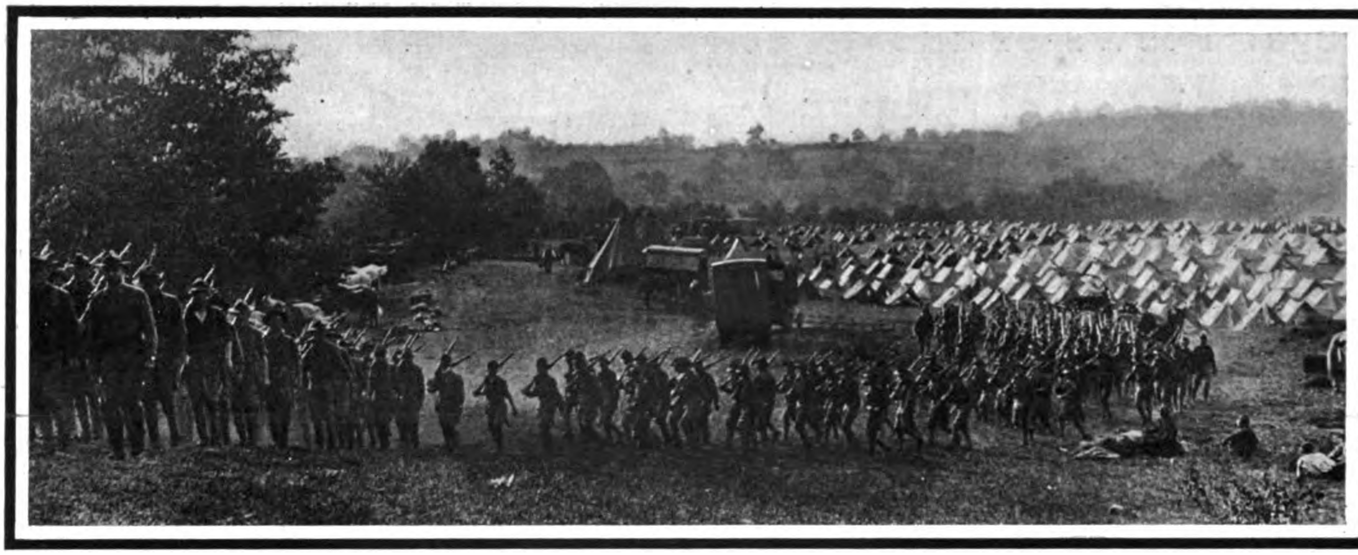
This case is the outgrowth of the action of the last session of the state Legislature when a law was passed providing for the assessment of a scale of charges based on the horsepower of the car.

May Amend Licensing System

Philadelphia, Aug. 19—Efforts are being made to have Mayor Blankenburg and Director of Public Safety Porter use their influence in having enacted remedial state legislation looking toward the abatement of the abuses claimed to have grown up under the present loose system of licensing chauffeurs. The assertion is made that under the present system of indiscriminate issuing of licenses there is no effective way by which the police can know the records of irresponsible persons whose reckless driving is a constant menace to the safety of the public.

Among the remedies suggested for enactment into law are legislation having for its object a thorough investigation of the applicant's character, with particular reference to his sobriety, a more thorough supervision of licensed chauffeurs and a closer tab kept of the records of chauffeurs to whom licenses are granted.

Indianapolis, Ind., Aug. 19—Suit has been brought in the circuit court by the Minnehaha National Bank of Sioux Falls, N. D., against the Atlas Engine Works, of Indianapolis, which is in the hands of a receiver. The action, also directed against Hugh H. Hanna, president of the Atlas works and the United States Fidelity and Guaranty Company, is to collect a judgment for $2696, upheld by the Indiana Appellate Court last April. The surety company gave an appeal bond for the Atlas company in the sum of $3,500.



Infantry of Red army leaving camp for battle line—trucks in middle ground followed the column with camp equipage

Motor Trucks Prove Worth as Army Supply Train

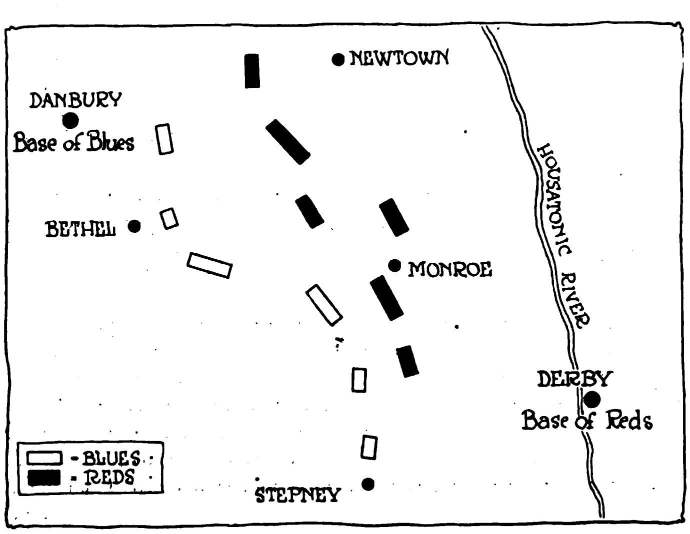
Maneuvers in Connecticut Under Bad Road Conditions Sound Taps for Mule—Mock War Operations Indicate Small Truck Is Better Than 5-Ton Vehicle Where Bridges Are Weak and Hill Trails Tortuous

THE good old army mule has heard the mournful sound of Taps. The army of the United States stands at the dawning of a new day—the day of motor transportation. During the military maneuvers in Connecticut last week, the automobile proved its case under conditions that more closely approximate actual war service than any that have gone before in the history of the country.

Approximately half of the work of supplying and providing for the fighting forces on both sides, the umpires, non-combatants and others connected with the maneuvers, roughly estimated at 20,000 men for 10 days, was done by means of automobiles.

They overwhelmed the mule wherever traction could be found; they covered distances that were outside the realm of possibility for the ancient beast; carried loads beyond the capacity of muledom and then went back and did it over again.

They proved that never again shall a mule train carry supplies from a main supply base to field depots. They indicated that in the near future the mission of the mule as a means of transport from the field depots to the fighting line shall end and that he will be displaced by the small swift motor wagon with a carrying capacity of about 2 tons.



Distance: Danbury to Stepney, 21 miles; Derby to Newtown, 16 miles

They showed impressive qualities to the regular officers who were in charge of transportation and convinced all but a few ultra-conservatives that the mule already had passed along to his reward.

A striking feature of the situation is shown in the experience of the Blue army, although its conclusions apply equally to the Reds or any other fighting force anywhere. The total amount of quartermasters' and commissaries' freight amounted to 961 tons. This was composed about half and half of rations and forage. Of course, the forage was destined for the calvary and artillery horses in large measure, but there were 220 mules that had to be maintained and every pound of hay and grain destined for their use had to be carried in some way. With the elimination of the mule and the decline of the cavalry arm of the military service, the forage supply becomes a small matter for future consideration, representing the keep of the artillery horses.

Traction First Road Quality

Of course, the road is a part of the automobile. In such hills as staged the scene of the campaign, cross-country work was out of the question as far as the motor truck was concerned, but this fact should be carefully borne in mind: it was also beyond the capacity of any mule that ever lived.

It is conceivable that in a flat country mules could go across the fields and so could the trucks, but the experience in Connecticut proved that mule-drawn wagons are on a par with motor trucks when it comes to traversing high ridges—for neither could do it.

A concrete example of the effect of the showing made by the trucks is contained in the remark made by the driver of an army mule team to the representative of THE AUTOMOBILE while riding to the front with a load of hay. The man watched a file of trucks pass with their loads and then turned and said: "Say where can a fellow learn how to drive one of them things?"

The motor equipment was picked up anywhere and everywhere. A few of the automobiles are owned by New York and Massachusetts, but the total number so owned was only five or six at the outside. The rest were rented, donated or commandeered on a time basis. Some of the owners were not much delighted with the arrangement when they say how tremendously their trucks were being pushed. The equipment included many of the well-known types and makes, as appears in the tabulations herewith.

The service of the trucks was largely that of transferring supplies from the base to the field depots and from the field depots to the line of battle or encampment. The Blue army, with a longer line to cover, delivered an average of 43.1 miles per truck per day according to the best figures available. The Red army figures were slightly below this average because of the larger motor equipment and the shorter line to be served.

Blue Army Haul 21 Miles

The Blue base was at Danbury during the crucial period of the campaign. From there the quartermaster's department served four field depots behind the line. These were located roughly at intervals of 5 miles in a line almost south from Danbury, the most southerly being in the rear of Stepney. The chief depot for forage was at Bethel, 5 miles southeast of Danbury and a branch of the railroad took care of the bulk of the hay, grain and wood destined for the fighting units in the field to the east and northeast.

From these four depots and also directly from the base supplies of all kinds were conveyed by field trains to the camps of the military organizations. The average distance from the base to the field depots on the Blue side was 12 1-2 miles and from the depots to the front 7 1-2 miles. This was arranged so that the mule teams could cover it, as the plans of the campaign were made on the basis of the mule and not the automobile truck.

On the Red side the base, or one of them, was at Derby and the distribution was from Newtown on the north to Monroe and Stepney on the south. The average haul to the field depots was 7 1-2 miles and to the front from the depots 5 1-2 miles.

The equipment of the Blues included twenty-three trucks and that of the Reds was about thirty at its maximum strength. On the Red side the available records were fragmentary, but among the vehicles in service were nine Whites, ranging from 5 tons capacity to 1,500-pound wagons; four Packards of 5- and 3-ton sizes; one G. M. C. of 5 tons; two Saurers of 4 1-2 tons; several Peerless trucks; Mais, two; Pierce-Arrow, several; Simplex, Stoddard-Dayton, Alco and perhaps others at various times.

Five of the White trucks are owned by the military arms of the states of New York and Massachusetts, the others were furnished by factory branches or hired from private owners. The same may be said for all the rest of the equipment.

The biggest truck used was a 10-ton Pierce-Arrow, which made the trip from the factory at Buffalo in 4 days' running. This truck had to be unloaded many times on account of weak bridges and its service was limited in the Connecticut hills because of its weight.

Transportation, as it applied to the quartermaster's department of the Blue army, involved the problem of moving 961 tons of freight. Results are always required of the quartermaster and the results attained by the officers entrusted with that post by the Blue army were largely reached by the use of the automobile truck.

MOTOR EQUIPMENT OF BLUE ARMY

Truck.	Organization.	Size.
G. M. C.	Quartermaster	5-ton
G. M. C.	Quartermaster	3 1-2-ton
G. M. C.	Quartermaster	3 1-2-ton
G. M. C.	Quartermaster	2-ton
Packard	Second N. Y. Brigade	3-ton
Packard	Second N. Y. Brigade	3-ton
Packard	Second N. Y. Brigade	3-ton
Packard	Second N. Y. Brigade	2-ton
Alco	Second N. Y. Brigade	3-ton
Sternberg	Second N. Y. Brigade	2-ton
White	Second N. Y. Brigade	3-ton
Packard	Provisional Artillery	3-ton
White	Provisional Cavalry	3-ton
Gramm	N. Y. Engineers	3,000-pounds
Saurer	N. Y. Engineers	4 1-2-ton
White	Forwarding Hospital	1 1-2-ton
White	Forwarding Hospital	1 1-2-ton
Decatur	First N. J. Brigade	2-ton
Alco	First N. J. Brigade	3-ton
Kelly	First N. J. Brigade	3-ton
Kelly	First N. J. Brigade	3-ton
Federal	First N. J. Brigade	2-ton
White	Both Armies	3-ton
Panhard	Headquarters	Pleasure Car
Mitchell	Headquarters	Pleasure Car
Cadillac	Headquarters	Pleasure Car
Cadillac	Headquarters	Pleasure Car
Franklin	Headquarters	Pleasure Car
Hudson	Headquarters	Pleasure Car
Stevens-Duryea	Headquarters	Pleasure Car
Pierce-Arrow	First Cavalry	Pleasure Car
Lozier	Second Cavalry	Pleasure Car
Matheson	Second Cavalry	Pleasure Car
White	Umpire	Pleasure Car
White	Official	Pleasure Car
White	Official	Pleasure Car

White 3-ton truck delivering commissary supplies to New York Blue brigade near Bethel—Part of the load has been left with regiment shown in rear

Baggage trucks only required traction

How the Massachusetts Reds received their daily rations
Big Saurer proved too heavy for conditions of highways

In fact, the troops of this army were short of mule-drawn equipment, according to the army regulations and the deficiency was cared for by trucks, propelled by gasoline power. There were twenty-three of them with the army, according to a careful canvass of the situation, but only four were directly connected with headquarters.

Service of Trucks Satisfactory

Broadly speaking, the services rendered by the trucks was satisfactory. They were mostly chosen at random, and were picked up wherever available. Nineteen of the twenty-three were assigned to the various military organizations as field trains. One of them was equipped as an ambulance. Still another served both armies at different times, thus leaving the actual number of trucks connected with the distribution of rations, baggage, forage and wood as seventeen.

The plan of supplying and providing for an army in the field was explained in THE AUTOMOBILE by Captain-Quartermaster Barker, of the United States Army, in charge of the supply depot for the Blues at Danbury, Conn.

There are two main divisions of the distribution. First, there is a general supply depot, located at some distance in the rear of an army. From this supply depot supply trains are run to various points in the rear of the fighting organizations. The supplies are transferred to the field trains of the fighting units which convey them to the quartermasters and commissaries of the regiments, troops or batteries. The total haul from the central supply depot to the line of battle must be less than 25 miles if mules are to serve for drawing power and if such perishable freight as fresh beef, for instance, is to be a portion of the loads. This limit is definitely placed by reason of the fact that a four-mule team, drawing a wagon loaded with 3,000 pounds of freight, can make only 2 1-2 miles an hour for a maximum of 10 hours a day. The army regulations contemplate the use of the mule exclusively for this service.

Last appearance of the good old army mule

The central supply depot is located as close to a railroad line as the circumstances will permit. The haul to meet the field trains of the regiments is usually laid out over country roads, but the route of the field trains to the battle line or the encampment may be over any course that will give traction. Almost always roads are available for such purposes, but sometimes the field trains have to go cross-country.

Functions of Supply Train

The result to be attained is a continuous supply of food, ammunition, forage, etc., in one direction and accommodations for wounded men and unavailable material in the other.

The actual experience of the Blue Army was about as follows: During the latter days of the campaign, the main supply depot was established at Danbury on a branch line of the New York, New Haven & Hartford Railroad, having connections with the sources of supply. The fighting line was established along the Housatonic River and as it retired westward the hauls became shorter and shorter until the left wing of the army rested upon the supply base. The railroad extended to Bethel, and the road was used in place of the ordinary supply train in a wide sense. The four trucks assigned to the quartermaster were auxiliary to the railroad. The main distributing point for forage was Bethel and the trucks were utilized for the longer hauls to the field trains of the regiments further to the right of line.

They were used almost continuously and averaged 48.7 miles a day, including the time two of them were stuck in the ditch, 3 miles south of Bethel during Tuesday night. This mishap was the result of unskillful handling, pure and simple. There was no other element in the situation. The drivers allowed their engines to run dry and one of the G. M. C. 3 1-2-ton trucks was laid out as a result. The other suffered to some degree from the same cause, but it was a skid from the road that could have been prevented by an experienced chauffeur that put it out of service temporarily. When the first car had cooled off, the 5-ton G. M. C., which was lightly loaded, pulled it and the skidded car from the ditch. Neither was materially damaged.

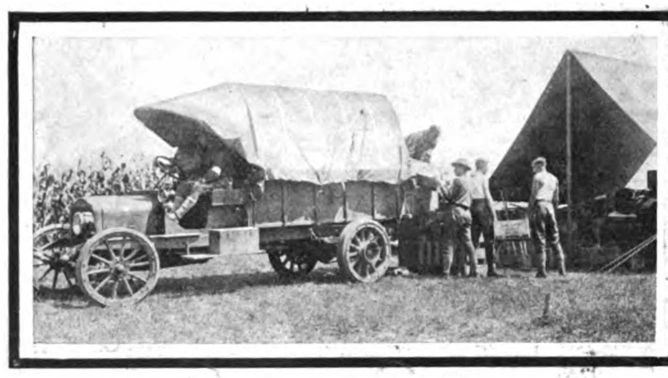
On Thursday the haul from Danbury to the field train of the regiment at the right of line was fully 20 miles by road, but the trucks covered the ground as required carrying an overload ranging up to 25 per cent. This, of course, does not apply to the 5-ton vehicle, which was always underloaded when its itinerary included any of the numerous weak bridges with which the country abounds. It was equipped with block tires on its driving wheels and except for its size which seemed excessive under the specific operating conditions performed well.

The service was tremendously hard on tires and it is certain that the tire equipment of every truck engaged suffered at least 200 per cent. as compared with the normal wear of the same mileage under normal conditions. The gasoline consumption of the quartermaster's trucks was about 3 1-2 miles to the gallon on the general average. The average mileage made by the quartette in 10 days was 487 and the total wagon mileage delivered was 1,948, based upon the performance of 8 days of the maneuvers.

No Cross-Country Work Attempted

There was no cross-country work attempted by any truck connected with the army, except where the cars left the roads to enter fields for the purpose of delivering freight. The road conditions on the general average were strenuous. The grades ranged up to 45 per cent. and there were nine distinct ridges of hills where the degree of inclination was in excess of 20 per cent. There were eighty-two bridges and culverts on the lines of communication in the rear of the Blues. Some of these were so weak and rickety that they gave way beneath the heavier trucks. An overloaded Sternberg went through a bridge near Stepney; a Packard with 4 tons of freight broke down a culvert at Redding Ridge, and another Packard in seeking to make a detour around a shaky bridge structure was mired down in a swamp and stayed there for several days. This latter car was assigned to the Provisional Artillery regiment.

The Second New York Brigade had for its field train seven automobile trucks. The cavalry and artillery were served to some extent by this equipment as well as two trucks specially assigned to that work. The New Jersey brigade had five trucks and there were four others assigned to the engineers, hospitals, etc. The remainder of the transportation was represented by



Delivering rations to Blue company commissary

mule and horse-drawn wagons, this type of transportation being used exclusively by the United States regulars. All told, the Blues had twenty-three trucks and fifty-five teams. This is about half the amount that would have been required by the same number of organizations on the basis of full war strength, reckoning also a full 50 per cent. allowance for the use of the railroad between the main base and the field bases.

Reckoning the average truck used by the Blue army at about 3 tons carrying capacity and estimating the general average daily mileage at 43.1, half of which would be under load, the truck equipment alone would seem to have had sufficient capacity to handle all the freight. But the transfer at the field depots and duplication of service cut down the actual figures to approximately three-quarters of the total service performed.

How the Trucks Carried Beef

As an instance of the work of the trucks the following may be cited: On Thursday it was necessary to transfer 3,000 pounds of beef from Danbury to the field supply depot behind Stepney. The meat was loaded upon one of the 3 1-2-ton G. M. C. trucks at Danbury and with sufficient other freight to make up 4 tons was delivered 21 miles from the main depot in a run of 3 hours. There, the load was transferred to a 3-ton Alco and was delivered to the commissaries of two regiments 4 miles to the eastward in less than 1 hour. The country about Stepney is mostly up and down and just south of Bethel there is a hill that would make the best mule that ever lived wonder why he had selected the army as a field of industry. This hill exceeds 20 per cent. inclination for 400 yards and has spots that are above 30 per cent.

It required 2 hours to load this truck and 3 1-2 hours to make the transfer to the Alco. It took the Alco 3 1-2 hours to deliver the last of the load to the commissaries. The excessive loading

New York troops had best motor equipment—This group of pictures shows three phases of military service, loading, loaded and unloading

Five makes and styles of trucks, mule-wagons and pack animal starting from a camp ground behind a column of Blue Infantry

G. M. C. 5-ton truck with a fair load of forage

and unloading time used was typical of the whole experience and may be charged in a measure to the varied character of the loads carried as well as to unskillful loading.

To summarize the experience:

Time running from base to field depot	3	hours
Time running from depot to front	1	hour
Loading time at base	2	hours
Transferring load	3½	hours
Time to last delivery	2½	hours
Total	12	hours

If mule teams had been used for the service three teams would be required in each relay and the result would have been as follows:

Loading time at base	3	hours
Transferring	5	hours
Delivery	2½	hours
Running time from base	8⅝	hours
Running time to front	1⅝	hours
Total	20½	hours

In estimating the loading and unloading time, the labor of the team crews alone is contemplated.

The motor trucks immediately proceeded to other service after completing this trip, but if mules had been used they would have been all through for the day, at least after a 21-mile pull over such hills.

The pleasure cars attached to the army completely displaced the horse courier. They averaged 90 miles a day and besides being used to transport the aides of the commanders, they served in the quartermaster's department to carry all sorts of miscellaneous loads. On account of the sharp rock to be found practically everywhere on the maneuver field, tire trouble was the common lot. On a single trip behind the Blue line, nine cars were observed making tire repairs along the road. The cars averaged rather less than 6 miles to the gallon of gasoline.

Extreme figures of service, as far as reported, were an average of 72 miles a day by the 3-ton Packard assigned to the Forty-seventh New York and a maximum of 82 miles made by an Alco 3-ton truck. Among the pleasure cars, the Matheson scored 200 miles in one period of 24 hours.

As a general thing the officers were pleased with the showing of the motor equipment and it was freely predicted that the day of the mule had passed.

Details of the experience of the Reds showed similar conditions, a trifle less strenuous.

Some Lessons of the Campaign

THE performance of the automobiles connected with the two armies was the most pressing subject of thought, if not discussion, among the Regular Army officers assigned to the campaign.

Their conclusions, guardedly expressed, are that the new element introduced into American military science will force a complete readjustment of war plans to conform with it.

No more unpromising field for the motor truck could be found than the hilly country chosen for the maneuvers. Horse and mule equipment was purposely left inadequate so that a severe test of the automobile under adverse surroundings might be made.

The conclusions of a majority of the officers, including those who had to deal directly with the trucks, are that the truck has come to stay; that it is still imperfect; that it will certainly displace the mule for handling supply trains to field depots.

The radius of action of the truck is from 20 miles up to 50 miles, making a single round trip of from 40 miles to 100 miles in a day. This difference depends upon road conditions and the necessities of the particular case.

Under present road conditions and particularly with reference to the strength of bridges, big trucks are unavailable. When

Automobile trucks loading commissary at Bethel

The baggage was often loaded into trucks in less than 10 minutes—The trucks had no difficulty in holding their places in column

roads and bridges have been improved, the limit of size will increase.

The present 5-ton truck is too heavy for use on the Connecticut bridges.

The overloaded 3-ton truck is at practically the same disadvantage.

The proper size for general army use should be less than 3 tons capacity. The 2-ton truck and the 1 1-2-ton truck and the 1,500-pound wagon did yeoman service.

Great speed is not necessary in army service. The mule's radius of action is not more than 12 1-2 miles maximum and his speed is 2 1-2 miles an hour. The average 3-ton truck extended its radius of usefulness to over 21 miles and made from 9 to 12 miles an hour.

The mule can be worked a maximum of 10 hours a day; the truck can be worked a maximum of 24 hours a day.

The mule must rest and feed; the truck can be gone over with a pair of spanners and a can of lubricant while it is being loaded.

The mule team can haul a 3,000-pound load 12 1-2 miles and return with the empty wagon in 1 day; the truck can haul 6,000 pounds over the same route twice in a day without undue strain on the mechanism.

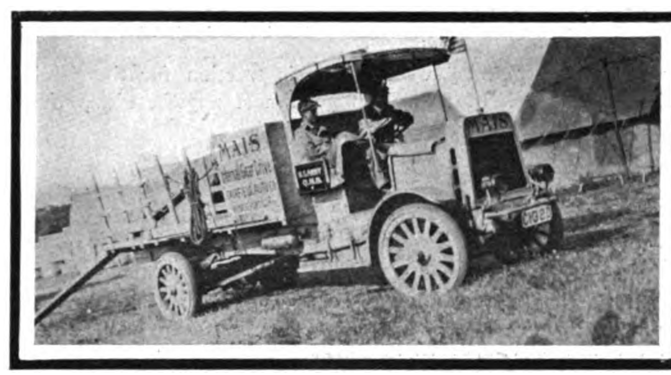
Truck Equals Four Mule Teams

Therefore, the truck can do the work of four mule teams under ordinary conditions and if both equipments work at pressure, the truck can do the work of eight teams.

In hauling perishable freight over long distances, the truck can do satisfactory work beyond the radius of action of the mule.

The mishaps encountered by the trucks during the maneuvers were due in large part to unskillful handling, lack of knowledge of the roads and to their size.

There were 11 White trucks of this type engaged



Mais trucks were employed on the Red side

Solid tires, dual on the drivers, gave the best service, although the pneumatics used by some of the smaller wagons gave a good account of themselves. One truck was equipped with block tires. One had pneumatics filled with composition rubber.

One truck was laid out because of tire trouble, a small Gramm machine which commenced service with a worn left rear tire. This truck was much overloaded and the tire gave out after 6 days of grinding on the rocks.

The tire cost of the campaign will never be known with accuracy because the tires in service were in various conditions at the time the campaign opened. But it is known that the overloading, overworking and overspeeding that was done all around will make itself apparent a little later in premature replacements.

The conclusions of those in position to observe the performances of the trucks are as follows:

The installation of automobiles will cut down the amount of forage and freight to be handled by the quartermaster's department by almost 30 per cent. through the elimination of provision for the mules.

When the cavalry arm is decreased in size, this item may be reduced by 50 per cent.

Trucks must have some kind of a road to operate upon. The better the road, the more satisfactory the service. The only cross-country work possible for the truck under the conditions in Connecticut was to leave the road a short distance to deliver its freight. Even this was fraught with considerable difficulty. Therefore, the conclusion reached is that while the truck has demonstrated that the mule must go as a means of transport from the base to the field depot, the mule will have another chance to show its fitness in the field trains.

This does not mean that the mule has shown superior quality in the field trains, but simply that the trucks available for that

New York troops had the only automobile ambulance

Forwarding hospital used two trucks of this type

kind of service could not go across country quite as certainly as the animals.

Trucks specially designed for this service may answer the question, but it is problematical whether the need of such a type is sufficiently important to call for much attention. It is self-evident that no automobile can be made that can follow a mule loaded with a pack through a pathless thicket or on a deer-trail across the side of a canyon.

In ordinary country where there is traction for the driving wheels, the truck of today can go almost anywhere any other wheeled vehicle can show the way.

What the Experts Suggest

Every truck in army use should be fitted with a set of ratchet sprags to prevent it slipping backward. An Alco truck in the campaign slipped back into a stone wall and broke its gasoline tank. The use of such a device might have saved one G. M. C. and one Packard truck from mishaps that put them out of commission temporarily.

After a rain, especially in the hills, traction is precarious. When the automobile trucks of the armies were wriggling around on the hills after the rain of Tuesday, several of them slid into ditches and could not get out without outside assistance. It is suggested that some means for locking the differential, by bolt or otherwise, be adopted generally so that a ditched truck with one wheel on tractional surface can help itself back to the road by its own power.

The trucks also should have a very low gear for use in such going, or worse, as that met with in the war.

Some suggestions were also made as to the advisability of using a truck with the drive on all four wheels and steering by both sets of wheels. This was the idea of some of the officers who were seeking to find the type of gasoline car that might displace the mule in the field trains.

Another suggestion that was probably the result of experience with poor traction after the rain was that a drum, about 10 inches in diameter, should be placed on one of the driving hubs, to be used in emergencies for extricating the truck from ditches, broken bridges or swampy land, but particularly the former. With two turns around the hub drum, a stout rope, one end of which can be fastened to some immovable object and the other held taut by a man, will probably prove of much service in case of lost traction, the engine of the automobile furnishing the power by which the car may be replaced upon firm going.

The most severe criticism of the truck in military service was delivered by a few of the older and more conservative officers. The head of the Blue army's transportation at headquarters had four trucks of various makes under his personal direction. They were all of 5 tons capacity and as a result proved too much for roads and bridges. He said that he wished he had a full equipment of mules in place of the trucks.

As has been stated, results are the main thing to be attained in army transportation and it is obvious that mules are better than 5-ton trucks if the mules can deliver their freight and the 5-ton trucks can not. If 2-ton trucks had been installed in place of the big fellows that broke the bridges, the chances are that the opinion of the Blue army's transportation head might been modified.

To Adopt N. A. A. M. Truck Standards

There are numerous indications that the commercial motor vehicle standards recommended this year by the N. A. A. M. will be freely adopted by manufacturers, both members and non-members of the association. Already some of the leading companies have given the word that the new models shall conform to the speed ratings, and frame widths and lengths recommended, and information is now at hand that twenty-two companies have adopted the standard truck warranty approved by the association June 5, or have expressed their intention of doing so, and will incorporate it in their new catalogues to be prepared this fall.

The warranty has been the subject of careful study on the part of practically all the makers since it was published and it is evident that it meets with general approval, as many manufacturers have expressed the hope that it will be adopted universally without change. Only two criticisms have so far been offered—one being that for electric vehicles the reference to ignition apparatus, gas tanks and generators is superfluous, which objection has been overcome simply by omitting these words; and the other the limitation of the warranty to 90 days.

The latter point has developed an interesting feature that illustrates plainly how the work of standardization can give stability to the industry. Up to the present it has been the practice of different makers to warrant their vehicles for different periods—some for 90 days, some for 6 months, others for 1 year and several for longer periods, up to 7 years. "We have made it a practice," says one manufacturer, "to warrant against defects in material and workmanship for 1 year and would prefer to stand back of our output in the broadest possible manner, as we are using, and expect to use, only the best of material and workmanship in the construction of our trucks. If, however, a large majority of the association feel that a 90-day warranty is better for all concerned, we will join in the matter.

The general manager of another well-known company says: "At the present time our guarantee reads for 1 year, but we believe this is entirely too long and that the 90-day guarantee is all right. We are not members of the N. A. A. M., but we shall be only too glad to co-operate with it in establishing a standard guarantee covering motor trucks."

The reason why a 1-year guarantee is too long is well illustrated by the experience of a company in the South, which is related as follows by the general manager:

"Last year we took up the manufacture of 1 1-2, 3 and 5-ton trucks and were forced, on account of Northern competition, to give 1 year's guarantee on all trucks sold. This has proven so unsatisfactory that we have practically suspended the manufacture of trucks."

Car Painting for the Tyro

Knowledge of Value to the Owner Who Contemplates the Renovation of His Automobile

Constituents and Proper Proportioning of Paints and Varnishes—How to Do the Work Well and Cheaply

TO BE qualified to get the best service from the paint and finish upon his car the owner should first of all be informed concerning the ingredients which compose the structure of pigment and varnish.

It may not be essential to his welfare, or to his pecuniary advantage, to know how to apply the various coatings, or to manipulate the manifold processes which underlie all this devious work of developing the finished structure, but to be informed in detail of the composition of the materials joined together on the car is great gain.

Getting it fixed in a general way in his mind, the car owner will be enabled to enforce a system of caretaking in every way calculated to prolong the life of the finish.

The first or preliminary coat is, in the main, composed of raw linseed oil, to which is joined a light body of some filling pigment—white lead, lampblack, yellow ochre, Venetian or Indian red. Raw linseed oil has been vouched for as the life of the paint, so that in the priming the oil is the essential thing and the pigment the non-essential.

Essentially, too, this coat should be well worked and brushed into the wood or metal so that a uniform distribution of material and the proper penetration are assured.

Less Oil in Paints for Metals

The metal surface, sheet steel or aluminum, as may be, requires a primer containing, as a matter of necessity, a smaller proportion of oil. Metal will not absorb and take care of as much oil as wood, hence the priming coat will need to contain proportionately less oil and proportionately more thinning and drying material when designed for metal.

After the priming coat comes a pigment regulated to go firm and secure over the priming. This coat may be made up of white lead and some coloring pigment thinned in three parts raw linseed oil and five parts turpentine. In speaking of turpentine we mean, of course, pure turpentine, the unadulterated product of the living pine. This is the thinner *par excellence.* It thins the paint or color and assists the painter to spread the pigment over the surface. Having accomplished this, it evaporates and leaves the pigment in the full possession of all native and original properties.

Adulterated turpentine, along with many of the turpentine substitutes, gives both the painter and the car owner trouble in various ways. Turpentine adulterated with some one of the various forms of petroleum imparts to the paint or the color an uncertain drying property, this lack of uniformity working harm to the durability of the paint structure. Thus trouble of a serious nature is visited directly upon the car owner.

Turpentine substitutes are often fearfully and wonderfully made, some of their component parts being grease and acids chemically acted upon and converted into a thinner, in connection with a fluid body which, while having many turpentine characteristics, is lacking in those properties indispensable to a thinner of the right kind.

Not infrequently the car finish goes to premature decline without apparent cause. If the chemical history of all things entering into the paint structure could be known, many of the early deaths might be traced straight back to spurious or substitute turpentines. Wherefore, concerning the use of turpentine the car owner may well write into his painting specifications a demand for the pure article.

Raw linseed oil is likewise a paint medium upon which the car owner in company with the painter should look with grave concern. Raw linseed oil is scarce, and the temptation to extend the volume by using an oil that is in no way related to linseed is correspondingly great. Adulterated raw linseed oil is difficult to detect except through the poorer paint service obtained from its use. About the best means of protection to adopt, all things considered, is that afforded by buying direct from a concern entirely above the business of dealing in or handling the impure oil.

With two coats of priming and filling-up material for the body surface, the next step takes us to the roughstuff. This is a coarse filler mixed with equal quantities of coach japan and rubbing varnish, and thinned with turpentine to the proper brushing consistency. Four or five, and even six coats of this filling-up pigment is put on at the rate, preferably, of one coat per day. After several days this foundation of roughstuff is rubbed down to a smooth and level condition with blocks of rubbing brick, otherwise known as artificial pumicestone. A good deal of skill and thought must necessarily go into this work, for right at this stage the ideal surface to finish upon is actually made possible. If the surface in rubbing is scratched and gouged no amount of varnish and no amount of skill in putting the varnish on will make up for the defects. If the surface be poorly rubbed, the ultimate finish will be poor. While varnish is a beautifier and a protector of the surface, it is likewise a graphic delineator of all surface imperfections. All of which explains the wherefore of making every lick count for good in rubbing the roughstuff.

Following this smoothing and leveling-up process the surface is lightly sandpapered and dusted off and two coats of color applied. In some cases one coat of color is deemed sufficient, a coat of varnish-color being flowed over the single coat of color. It all depends, or chiefly depends, upon the color and what the requirements of the work are. In the event of using some of the lake pigments, all of which are very transparent, the requirements are one coat of ground color, one coat of the lake mixed and applied as a flat color, and then one coat, or two, if the surface conditions demand it, of the lake mixed with varnish.

When dry, the gloss is beaten off with a soft sponge wet and dipped in pumicestone flour, and a coat of rubbing varnish containing a bit of the glaze or lake color is flowed on. In due time this coat is rubbed, and a second coat of rubbing varnish is put on. For first-grade work perhaps another coat of rubbing varnish is used. If striping or ornamental lines are employed they should be put on before flowing on the last coat of rubbing varnish. Comparatively little ornamentation is now done on the car, but this little is done exceedingly fine, as a rule.

The last coat of rubbing varnish, when dry, is rubbed very carefully, then washed up and the body-finish varnish applied. Within the last year or two an automobile line of varnishes has been perfected which dry very quickly in the course of a night in some cases.

No Water on Berlin's Streets

For some time a special soap-and-oil emulsion has been used for sprinkling the streets of Berlin. It is mixed with water in the proportion of 1 to 100, and one sprinkling every 4 to 5 weeks secures freedom from dust, to a certain degree, even on the streets with the densest traffic. As no sprinkling is done in winter, six sprinklings per year is the rule, and the cost of this method, which is continued and therefore seems to be satisfactory, is only 1-7 of what the cost of the old system of sprinkling with plain water would be. When the oil used is rich in asphaltum a certain saving is effected, because in that case the streets are found in better condition at the beginning of the following season and require less sprinkling.—From *Automobil-Betrieb. medio* July.

In the Export Field

Opportunities for Foreign Sales of American Automobiles Set Forth in Special Consular Reports

Canada and Great Britain Our Chief Outside Markets, Followed by France, Mexico and Italy

FOREIGN Markets for Motor Vehicles is the title of a compilation of special consular reports just issued by the Bureau of Manufactures of the Department of Commerce and Labor, covering the field up to the end of 1911. The book is designed to be of assistance to American automobile manufacturers and is of such a character that makers of motorcycles and of automobile accessories may also gain an idea of the opportunities for business in foreign lands. The number and values of the automobiles and parts exported to and imported from the various countries during 1909, 1910 and 1911 are given in tabular form. The book, which comprises 143 pages, takes up the western hemisphere first and then proceeds to give the trade conditions in the different countries in Europe, Asia, Africa and Australasia. At the end of the book is a list of the catalogues, pamphlets, etc., on file in the Bureau of Manufactures which may be borrowed by American automobile manufacturers interested in the export trade, together with a list of 163 reports received from consular officers which it was found impracticable to publish. A very brief digest of the book, taking up the countries in order, is as follows:

Canada is the chief market for American automobiles, purchasing in the fiscal year of 1911 almost 40 per cent. of American automobile exports. The sale of American cars has increased swiftly but steadily and promises to continue. Machines in most general use are of medium size. The main centers of automobile activity are the large cities, such as Ottawa, Quebec, Montreal, Toronto, etc., but the rapidly developing western districts are fast absorbing American automobiles. A number of American factories have established Canadian branches which are turning out cars in such numbers that the demand in the Dominion is not only fairly well supplied, but there is also a sufficient surplus of machines to permit of exporting in considerable quantities. The various officials reporting from Canada, however, estimate the number of families possessing sufficient means for the purchase and upkeep of automobiles to be considerably in excess of those at present owning motor vehicles.

Mexico Has No Car Factories

No automobiles are made in Mexico, every machine used being imported. The City of Mexico is wealthy. It is the distributing center of the republic and the buying center for the principal mining districts. All the streets are asphalted and most of the roads leading out of the city are macadamized. The American colony in Mexico City numbers about 10,000 persons, most of whom are well-to-do. Considering these general conditions, it is easy to see that there is a good market for automobiles, which, however, is already well supplied and extensively worked. There are more American cars in use than European, the medium-grade car predominating. Practically the same conditions obtain in Aguascalientes, Chihuahua, Durango, Guadalajara, Monterey and other Mexican cities. An excellent field for the American car are the haciendas, the proprietors of which often have to travel long distances. These proprietors are wealthy as a class and attractive literature printed in Spanish sent to them might result in many direct sales.

In Central America there are very few good highways and consequently comparatively few automobiles, most of these being of doubtful value. Local agents cover the countries and there is small opportunity for sales.

In the West Indies, except Cuba and the Dominican Republic, practically the same conditions are found as in Central America. The annual sale of automobiles in Cuba amounts to a little over 100 cars, about the same number being sold in the Dominican Republic.

Argentina leads the countries of South America as a market for automobiles, imports of cars into that country reaching 2,461 in 1911, most of these coming from France, while the United States sent comparatively few. There is much wealth in Buenos Aires and the country at large and American manufacturers are just beginning to cultivate the market. Compared with the methods used in the United States, the selling of automobiles in Argentina is not vigorously pushed.

Brazil offers an excellent market for American automobiles, there being 6,000 to 8,000 people in the Federal District alone who can afford to own motor cars. There is a large demand for high-grade machines, the purchasers desiring hill-climbing ability regardless of price, while cheap or low-grade cars find a poor market. Rio de Janeiro is the central selling point.

One-half of the 150 people in British Guiana who might afford an automobile are physicians or government officials. At present, pleasure automobiles in that country number thirty-seven and the average annual sale is not over fifteen cars.

Ecuador has twenty-two motor cars, eleven of which are of one American make. There are less than 300 miles of roads in the country suitable for automobile use.

The wild, rugged conditions to be found in Paraguay render the building of automobile roads out of the question for years to come and there has been no attempt to introduce motor cars into that country.

Road conditions also hamper the market for automobiles in Peru. Nevertheless, the sale of cars is increasing, although slowly. American cars are displacing the French in popularity.

Demand for Our Cars in Uruguay

The prejudice against American cars in Uruguay, so strong 3 years ago that sales were practically impossible, has been destroyed to such an extent that for 2 years the dealers have found it difficult to supply enough cars. At present, there is one automobile to every 2,000 inhabitants of Uruguay. Sales are being made at the rate of 100 cars a year, the fairly high-grade cars being most in demand.

The absence of suitable roads in Venezuela and the high cost of gasoline (65 cents a gallon) interfere with the wide use of automobiles, but there is room for more American agencies in Caracas. In opening an agency, however, it should be borne in mind that it is difficult to find active natives who could properly demonstrate a machine.

Austria-Hungary has excellent conditions for automobiling but is amply supplied as far as large high-priced cars go. However, inexpensive American cars of graceful appearance and ample power would find an excellent market in that country.

France offers only a fair market to the American manufacturer, largely on account of the preference for European cars, especially those of French make. Those American cars gaining a footing in France are mostly of the small, inexpensive variety.

The sale of American automobiles in Germany has been greatly restricted in the past, only about 100 machines having been sent there in the last year from the United States. The German purchaser prefers German machines as a rule, and, if this is not the case, hesitates to purchase an American car because of the lack of adequately-stocked repair shops with all spare parts and because the finish of the body is not often to his liking.

Owing to the large number of high-grade cars manufactured in Italy, American builders of this type of vehicle have not had much opportunity of invading that country. Makers of small, inexpensive runabouts and touring cars are finding Italy a very fair market, however, while there is a limited field for motor trucks.

While the United Kingdom is an extensive manufacturer of automobiles, and is near France, Germany and Italy, where the production is also large, that country is the second-best customer of the United States in the automobile trade, being surpassed only by Canada. The prevailing opinion in regard to American cars in the United Kingdom seems to be that they are becoming increasingly popular because of their low price, although the public is not inclined to think them as durable as the English makes. The United Kingdom is fairly well covered as a market, but there is a good opening for light cars under 16 horsepower, as they enjoy lower tax rate. In Scotland, the low-hung cars have the preference on account of the narrow Highland roads with their sharp turns, while in Ireland low-priced cars are popular.

Russia has not many cars because of the poor road conditions throughout the country, but there is a demand for light cars for business use about the cities, while moderate-priced, light-weight American cars should find a ready sale in many districts.

As in other European countries, the chief outlook for the sale of American automobiles in Spain is for the low-priced cars, of light but durable construction. The only way to market cars in Spain with any degree of success is to send the cars there and demonstrate them to prospective purchasers. So far, little energy has been shown in the sale of automobiles in Spain.

Afraid That Our Cars Lack Strength

In the Netherlands and Belgium, American makers would have to meet and overcome a feeling that their cars are not strong and durable enough before they could expect to make much headway. Actual demonstration is the best method of marketing.

Switzerland does not offer a promising market for American cars because of the prejudice against them based on the argument that they are not suitable for Swiss roads.

Competition is keen in Sweden and American cars are coming more and more into vogue.

American manufacturers have not demonstrated their cars in Norway as energetically as their European competitors. Otherwise, many American cars could quickly be sold in that country.

Denmark offers an excellent opportunity for the sale of delivery cars and motor trucks.

The future of the automobile trade in Turkey is very promising. The same is the case in Roumania, but Greece and Servia offer comparatively poor markets.

In China there is practically no market as the roads are bad and the natives care little for automobiles.

The market in the Dutch East Indies is well worked and offers comparatively little opportunity.

India's imports of American automobiles are rapidly increasing and that country offers a fair market which might possibly be developed to a considerable extent.

Easily Obtained Parts a Necessity

Japan offers a fairly good market for small cars, although the road and climatic conditions tend to restrict the number of automobiles in use.

Siam and Siberia offer fairly good markets, which, however, have not been worked to any great extent.

Algeria may offer a permanent market for certain classes of American automobiles, their introduction having been a pronounced success. Egypt presents practically no opportunities.

South Africa offers an excellent market, particularly for the low-priced and medium-priced car. American manufacturers have not developed this market and kept in touch with it as they should have done. At present, the manufacturers will have to overcome the prevailing prejudice against American cars based on the claim of lack of durability.

Imports of American machines in Australia have shown a phenomenal increase in the past few years, but the market, although vigorously worked, may be further developed, all prejudices against American cars having been overcome. Practically the same conditions are found in Tasmania.

From nearly all the reports it would seem that the main essential for the development of a foreign market is the establishment of a branch or agency well supplied with spare parts and with facilities for making all sorts of repairs. Many of the consuls state that the people in their territory are not satisfied with the body finish of American cars, while others complain of faulty packing.

EXPORTS OF AUTOMOBILES AND PARTS FROM THE UNITED STATES IN 1909, 1910 AND 1911 AS GIVEN IN THE BOOK JUST ISSUED BY THE DEPARTMENT OF COMMERCE AND LABOR

Exported to—	AUTOMOBILES						PARTS		
	1909		1910		1911		1909 Value	1910 Value	1911 Value
	No.	Value	No.	Value	No.	Value			
Argentina	109	$81,614	268	$174,677	343	$420,193	$8,244	$22,150	$19,522
Australia	127	81,426	437	268,274	1,046	874,112	14,227	21,533	53,940
Austria-Hungary	22	36,978	25	26,178	36	27,911			
Belgium	14	46,340	58	147,375	133	241,269			
Brazil	24	26,892	64	67,687	181	225,083	8,527	7,802	15,769
British India	7	5,320	26	22,372	150	130,421	4,623	6,387	11,741
British South Africa	26	22,152	75	61,185	135	126,734	4,088	14,655	15,486
British West Indies	42	77,164	102	157,459	91	117,124			
Canada	1,230	1,457,129	3,102	3,340,326	4,687	5,047,927	230,509	1,023,386	1,726,842
Chili	2	1,471	3	1,824	16	15,231			
China	4	3,369	8	13,785	42	40,261			
Colombia	1	1,976	12	22,482	14	13,579			
Cuba	74	140,160	120	187,392	157	208,960	27,385	49,088	31,323
France	201	643,692	246	771,869	310	473,122	17,833	54,035	58,999
French Africa	4	7,611	11	18,188	21	4,214			
Germany	45	136,966	100	265,218	99	209,663	4,090	10,023	41,966
Italy	62	240,516	93	333,193	139	188,145	1,144	4,421	26,626
Japan	6	4,996	12	26,759	61	58,933			
Mexico	200	282,462	245	459,077	350	614,160	104,984	81,248	35,506
Dutch East Indies	53	40,836	33	21,768	42	34,252			
New Zealand	60	41,826	77	55,236	413	383,449	1,392	5,150	16,306
Philiopine Islands	24	27,410	130	175,626	309	382,551	7,859	17,154	62,581
Russia in Europe	71	78,409	97	107,310	147	139,487			
Straits Settlements	14	12,040	21	20,955	36	28,951			
United Kingdom	593	1,680,154	1,271	2,415,593	2,249	2,273,222	131,937	240,621	322,457
Uruguay	4	5,657	20	23,666	96	147,142			
Other countries	165	202,455	270	363,226	500	525,953	38,337	83,867	105,106
Totals	3,184	$5,387,021	6,926	$9,548,700	1,1803	$12,965,049	$605,179	$1,641,520	$2,544,180

Selling Cars in Australia

The Antipodean Demands Good Treatment From the Agent and Insists on Plenty of Repair Parts

Small and Medium-Price Automobiles, Costing Up to $1600, Will Find a Market in the Island Continent

SYDNEY, AUSTRALIA, Aug. 5—There is a good field in Australia for the American motor car exporter to do a profitable business, but it must be done on lines different from those previously adopted. In the past the American exporter who wanted an agent for his cars generally sought the leading agent in each state, or, to put it in other words, the agent who has been doing the greatest business in cars of other countries, and these were in every case the leading cars of Europe. The evil results of this method has been in most cases to make the American line a secondary consideration. The agent who has been making a pet line of some European car has taken up an American car agency simply to fill the bill for a cheap car, and is in the habit of telling his customers that the American car is all right for light work, but advises the customers (if he can afford it) to go in for the higher grade European car for any solid work he desires to put the car. The result of this has been the education of the public to the belief that American cars are inferior in quality to those of other countries, and it has also been the means of many deserving cars having but a small market. Therefore the American exporter who proposes to do good business in Australia must secure an agent who will push his car in preference to any other.

Another mistake many exporters make is that they place their cars in the hands of agents who already have five or six different agencies, and although the agent is doing a good business for himself the return for the different makers is but small, taking it individually.

The high-grade and high-priced American cars have no sale at all, and in this respect their makers have themselves to blame, for they have allowed the makers of cheap cars to come here first and advertise their product as America's best, and as the public seems to get most of its motor education from advertisements, they have placed American cars as second grade. This superstition is going to be hard to remove. If the high-grade maker wants a market here, he will have to get an agent who will educate the people to believe that a good American car is as good in quality as any European car, and, with its high clearance and other rough-country features, is a most suitable car for our use.

Durability, Not Speed, the Requisite

In this country, the advertising of some speed record offers very little inducement for buyers to purchase, but records for durability, quality and the stocking of spare parts, do tempt people to buy.

As for public taste in this country, it must be said we follow the English style, especially as this is a British country. Numbers of motor buyers write home to England to their friends for the latest ideas, and apart from recommending English cars, English ideas are also driven into the minds of the buyer. The leading idea of all, seems to be the detachable wire wheel, which has a strong demand. The first high grade American maker who fits a detachable wheel will get a good market here among the better class of motorists.

Practical self-starters fitted to cars will also help to sell. The body work of good cars needs be of the latest design, and must be well finished, preferably of the style used in England. It might be mentioned there is a duty of $120 on touring bodies, which is sufficient protection to enable local body builders to make our "up-to-date style" of bodies here at about what it costs to import, and in this respect the European maker scores a point by exporting chassis only.

As there are no frosts in this country to speak of, air cooling has few points of advantage over water cooling, and in the matter of the latter type the thermo-syphon system is gaining favor.

In high-class cars finish counts a lot; that is to say, the finish of the chassis. Rough castings and the "gas pipe" appearance, as it is termed here, does not appeal to the public and cars with a rough finished chassis will never defeat the European car among the wealthier class.

Getting down to specifications: High clearance, well-sprung cars, and good hill climbers are the order of the day, and as fuel is costly, economical carbureters count a lot.

There is an immense field for light delivery wagons here, something to carry from about 1,000 pounds to a ton, which is lightly built yet strong, light on tires, fuel, etc. The retail firms are slow to take on light deliveries as they have not seen the kind to suit their requirements.

Large Cars Not Very Popular

Returning to the matter of agents, much depends as to how the agent is going to treat his customer after he has purchased, and upon the sort of repair shop he keeps. Another thing the maker wants to make sure of, and that is whether the agent will last in time of depression. We are at the present time enjoying prosperity, owing to good rainfalls; but if drought came, it is a matter of the survival of the fittest, for we all really depend upon the wool clip and the wheat yield for our prosperity. This year we have had a 2 months' stretch of no rain, and this means that the banks are slow to advance money; fortunately, however, the prospects of a drought have entirely disappeared, and city business is flourishing once more. The American maker who desires a good business here must secure an agent who can stand a drought, or even a bad season, for past history has shown that when an agency changes hands the line seems to fade away.

Getting down to the popular sizes of cars which will be in demand for the future, I will say that the big car of 40 horsepower and over will have a very limited sale. There are no millionaires in this country, and wealthy people are somewhat scarce, and of these, very few will entertain extravagant motor cars. The question of upkeep of large cars is most important in this country; for instance fuel is so scarce that gasolene is never used; naphtha and benzine are substituted and these cost in the cities 34 cents a gallon.

Tires are also expensive; most tires are imported and in addition to the usual freight, landing, and commission charges, there is a duty of 25 per cent., all which make tires about 50 per cent. dearer than in countries of their origin, so it can be understood that the expense of upkeep of large cars will render their sale very limited.

Touring cars up to 30 horsepower will do well in either four or six cylinders, and if good workmanship and finish are put into the car the price will not stop the sale, especially when the prejudice against American cars is removed. At the present time no American cars costing over $1,600 are being sold in the Commonwealth, but several costlier cars are now being imported privately, and people are beginning to realize that good cars are made in America. The cheaper class of American car sells well, however, as few, if any, European car makers can compete with the American small car builder.

The maker looking for a market for his car here will find Sydney full of American cars, but the other five big cities have not taken seriously to American machines as yet. The field there is well open, and only requires proper working for a successful trade. The exporter must remember we only have a population of four and one-half millions in the whole of Australia, including Tasmania.

Experiments with Various Types of Motor-Propelled Agricultural Tools Has Developed the Fact That Heavy Machines Do Not Pay—Lighter, More Elastic Implements Are Needed—Uniform Lubrication of Motor Cylinders

EVENTUAL Motor Tools for the Farm.—Experiments with agricultural motor machinery have served to convince Europe of the immense difficulties which are to be overcome in this field. It has been practically decided that the large, heavy and costly steam or motor plows never will return an interest on the investment which they represent—at least not where land values are high—unless used mainly for such work as subsoil plowing, ditching and the planing of meadows or rough-surfaced fields; work which may be carried on without close reference to seasons and weather and which does not require to be repeated year after year; in other words, work which would sort under civil engineering rather than under routine agriculture. The standard agricultural motor tool must be of an entirely different nature. The agricultural milling machine has been tried in many forms. It was based on the idea of the industrial milling machine for wood and metal working operations, which is that of working with cutting edges rotated at high velocity and intended to cut loose only a very small portion of the material at each cut. Difficulties in applying this principle to the milling of the soil arose everywhere. At the shop, the milling machine is stationary and its work is taken to it; in the field the machine must move, it must follow the undulations of the soil. The surface to be worked is immense and must be attacked by a tool of large dimensions. Whether this tool is long and turns rapidly or short and turns more slowly, its weight must always be considerable, so long as it is rigid, necessitating a powerful motor to work it, a heavy vehicle for carrying it. Such was the construction of the steam disk plows and similar machines and, though some weight reduction has been effected by substituting gasoline motors, such are still the characteristics of the more recent soil millers with rigid blades, as the Koszegi, the Quellenec and other ones. An apparatus of this kind cannot be light. If the rotary mass on which the blades are carried around at a speed of 150 to 200 revolutions per minute is suddenly stopped in its course by an obstacle there is produced a violent mechanical shock, an enormous accumulation of energy at the point of contact, a shock which reacts from the traveling blades attacking the control shaft, the pinions, chains, gears, the flywheel, the motor and the chassis.

Since, in fact, in this class of machines, rigidity has been found to be the fundamental vice which engenders all the subsequent defects from which these machines have suffered—great weight, high price, unsuitability for many forms of work—it was eminently logical to seek to replace the rigid soil-stirring tools with elastic ones, as has now been done. By taking this step the lack of homogeneity in soils was for the first time taken into consideration. The logic which has brought us to look upon the paws of fossorial animals as the best possible prototype for the tool sought to be incorporated in the mechanism of agricultural machines also finds itself confirmed in these considerations. It seems that the final solution must lie in this direction.—*Bulletin de la Société d'Encouragement pour l'Industrie Nationale*, March.

Compound Regulation of Cylinder Oiling.—The amount of lubricant splashed upon pistons, sleeve and cylinder walls in the Minerva-Knight motor—is not only regulated by the speed of the motor, but is also co-ordinated with the amount of gasoline taken from the carbureter, the aim being to make it approximately proportionate to the heat and power development of the motor. The construction serving this purpose is indicated in Fig. 1, which represents a vertical section in the central transverse plane of one of the four cylinders, through the lower half of the crankcase. B is the connecting-rod, V the crankshaft, M the crankpin, D a scoop secured to the connection-rod knuckle and G an oilboat which can be tipped more or less by means of the shaft A to which it is secured, thereby making the scoop D dip more or less deeply into its contents. The shaft A runs the length of the crankcase, at one side of it, as shown, and at its rear end, which projects to the outside of the case, a crank is attached which is moved whenever the gas admission is regulated by means of the accelerator pedal. A lug H under the middle of the oilboat limits its downward movement and thereby establishes a minimum or oil datum, below which the regulation depends upon the motor speed alone. The short end of the oilboat is formed as a cup and into this oil supply for the boat is received from the tube T, which is connected with the oil pump. The latter is located at the middle portion of one side of the casing where the aluminum casting is bulged especially to afford a housing for it. It is driven from the sleeve-actuating shaft of the motor and draws from the oil well R which constitutes the lowest portion of the crankcasing in the manner of construction now customary. Besides driving the oil to the four oilboats the pump drives a small stream to a sight glass device on the dashboard, making a little red indicator dance to show that the mechanism is working. The oil in the well may for that matter be kept so high as to submerge the oilboats, and, by this provision, if the oil pump for any reason gets out of order the means are handy for converting the oiling system into one of ordinary splash feed.—From *La Vie Automobile*, August 3.

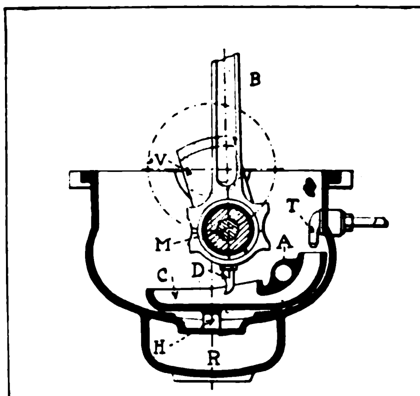


Fig. 1—Diagram of Minerva-Knight oiling system

IT IS CLAIMED by the *Revue de L'Automobile* that paper can be made incombustible by means of an immersion in a very strong solution of alum and that the result is still better if the immersion is repeated after the first coating is dry.

System in Retail Sales of Gasoline

How the Garageman Can Keep Track of Every Transaction—Carelessness of Employees Checked

Scheme is Compact, Simple and Effective—Lubricating Oil, Grease and Graphite Included

GASOLINE sales by a garage may mean profit or loss to the establishment, depending on whether the large quantities of this fuel are handled with little or great waste. To determine the degree of loss and to reduce it to a minimum, it is necessary for a garageman to keep a close eye on his gasoline sales. There are three courses open to a garageman in the way of handling gasoline and lubricants; he can keep a rough memorandum of every sale of fuel or oil. he can obtain and file a receipt from the chauffeur for every purchase of these materials or he can have these records prepared in duplicate and send one to the owner of the car for which these materials were bought. Furthermore, the garage operator may either record the receipt of gasoline every day and total the amounts at the end of the month and deduct therefrom the total of sales; or he may do this work from day to day, and, as it proceeds, see where he stands at any time. The greater the amount of business done by a garage, the more obvious is the necessity of an elaborate system to keep record of its development. Carelessness, which in a small garage may incur a loss of $10 or $20, will result in a debit ten times as high in a proportionately larger establishment, unless an efficient system is installed to prevent such abuses.

The essential features of gasoline-recording systems used by a number of large and medium-sized garages in New York City are considered in connection with the accompanying illustrations. The capacities of these garages range from thirty to 300 automobiles, and the most perfect systems are used by the largest establishments.

Gasoline received by the garage from the oil companies is, in all cases, entered in a book. At the end of each month these entries are totaled and the sum of gasoline sales are deducted

New York, July...... .1 12.

Day	8 A. M.	Rec'd Gals	Hour	8 P. M.
1	159 gals.			90
2	62 "	300	10 A. M.	304
3	253 "			169
4	94 "	250	11 A. M.	286
5	261 "			112

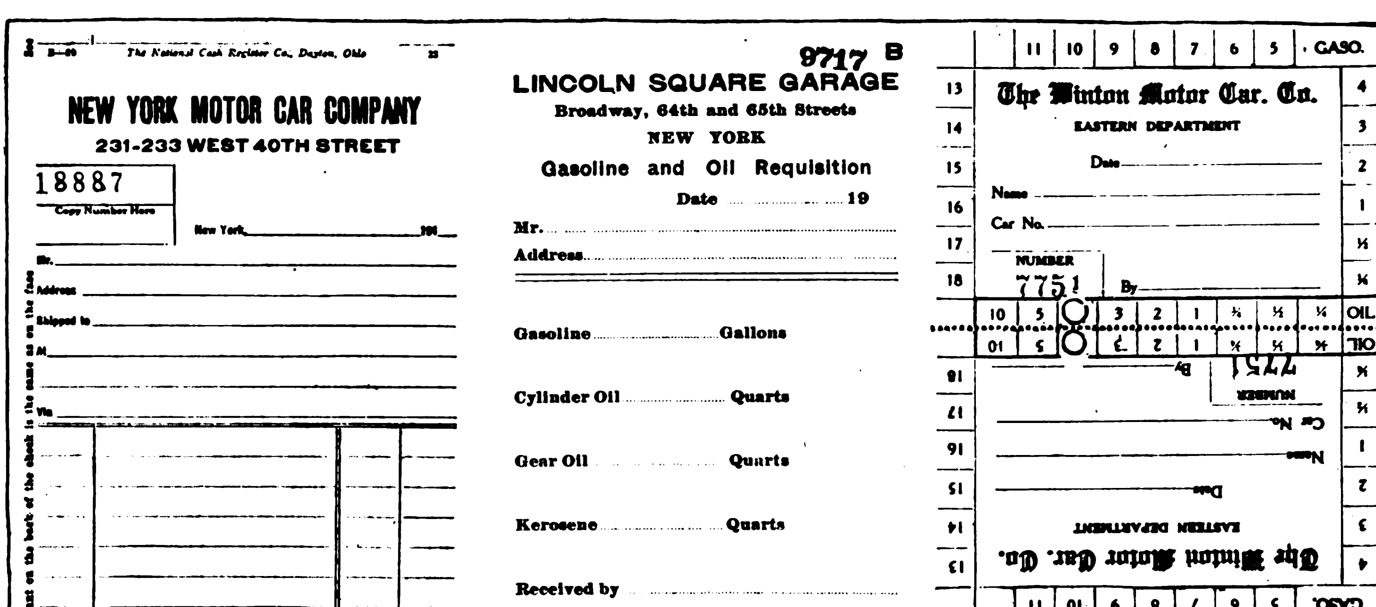
Form 1—Monthly continual gasoline inventory sheet

from the amount thus found. The same process is used in the making of the monthly inventory for oils and other lubricants.

The forms used in connection with gasoline and oil sales vary greatly as regards the details of their design. Some are ordinary receipt blanks with nothing but the name of the company printed on them; others have spaces specially marked for gasoline, motor oil, transmission grease, and some also for such material as waste. Some of the forms are made out single, others in duplicate, and in the latter case one copy of the gasoline receipt is sent to the owner of the car or reserved for him if he should demand it in the future. All forms either remain in their original books or binders, in numerical order, until the end of the month, or they are filed under the names of the customers whose purchases they record.

Cash Register Type of Recording

One of the simplest forms used in the sale of gasoline and oil is form 2. It is an ordinary type of blank suited for a continuous-band recording machine of the National cash register type, in which the operator writes out the name of the buyer, the date of the sale and the material sold, also the price. The form is signed by the owner or chauffeur, depending on who receives the gasoline or oil, and also by the man who delivers it to the buyer. The form here illustrated is given to the latter, while the garage retains a carbon copy of the hand-written information on a plain, white band of paper which runs under the printed strip of forms. This form is satisfactory for the opera-



Form 2—Simple form of gasoline receipt in duplicate. Form 3—Gasoline slip with most important materials. Form 4—Gasoline and oil duplicate sales card

JOSCELYN STABLE COMPANY
AUTOMOBILE GARAGE
112-126 WEST 52nd STREET NEW YORK
RECEIPT

Nº 576

______________19____

OWNER______________

____Gasolene
____Light Oil
____Medium Oil
____Heavy Oil
____Gear Case
____Grease
____Waste
____Cheese Cloth
____Kerosene

____
Chauffeur

No. 2347
Gotham Garage Company
102-104 West 46th St., New York
Lic. No. Date

Name............
Car............
Storage............
Wash, Polish............
Gasoline............
Oil............
Grease............
Waste............
Sundries............

Gotham Garage Company
102-104 West 46th St., New York

Delivered to______________
____
Salesman__________ Date__________

Gls. Gasoline ______
" Oil ______
" Kerosene______
Cans Grease______
Sundries:______

Form 5—Gasoline and lubricants blank of large garage. Form 6—Gasoline-and-oil card for out-of-town cars. Form 7—Blank used by the same company for its regular customers

tion of an establishment doing not too large a business in fuel and oil, as every detail of the sale has to be recorded by hand.

An advance over this type of blank is form 3, which contains the date, name of buyer and figures referring to gallons of gasoline or quarts of oil. This reduces the work of the person recording the sales to a considerable extent. The forms are numbered consecutively and come in pads, a tan-colored duplicate following every white original. This form is also signed by the person selling and the one receiving the goods.

Form 8 is designed for the recording of gasoline only and is a correspondingly simple blank. The blanks are numbered consecutively and come in duplicate in book form. The original of the slip is given to the buyer, while the carbon copy remains in the original book as a basis for the monthly compilation of the bills. Exactly the same design except for the substitution of the words oil (grease)—either of which is struck out when the slip is filled—is used in the handling of lubricants.

Special Blanks of Varying Details

The next simplest type is probably that shown as Form 7. It enumerates the most important materials, in the same way as the preceding forms, but also contains a space for whatever sundries the garageman sells to his customer. These forms come in duplicate. The original is white and is given to the buyer, while the yellow copy remains in the book. These forms are not numbered.

Another type of blank which specifies with greater detail the various classes of lubricants handled by the garage is form 5, which is made out singly. The copy here shown is printed on pink paper and bears a number, the forms being issued in series of consecutive numbers. As in the case of other forms, the chauffeur or owner receiving gasoline or oil signs for it.

A special type of blank is form 6, which contains spaces for gasoline and oil in addition to storage, etc. The company using it does considerable business in storing and serving the cars of the guests of several elegant hotels; it is the same company as the one issuing form 7. These machines are left in the garage for several days, sometimes for but a day, and therefore they do not appear on the regular customers' book, but when a car is brought to the garage, form 6 is filled out with the date, name of owner, make and license number of car and orders as to what is to be done with it. This form is filled out without a duplicate, as, if the latter were lost and the car claimed by someone willing to pay the storage and other dues on the car would have to be delivered to that claimant. All the charges appearing on the card, form 5, are billed to the customer when the car is delivered to him.

One of the most practical forms in use is form 4. It consists of a soft pasteboard perforated along its middle line and printed the same way on each half. The figures printed for the marking of gasoline and oil are arranged symmetrically with reference to the perforated line, so that, by bending the card along that line and punching a certain number, this is simultaneously punched out of both cards. Three sides of each half card are printed with figures referring to gasoline and the fourth side is reserved for oil. The latter figures are printed red to contrast with the black print of the gasoline-recording figures.

Aside from these small sales blanks, larger forms are used, which serve for bookkeeping and billing purposes. One of these designs is shown as form 8, which is used by a company recording gasoline and oil by a plain blank similar to form 2. Form 8 is a monthly sheet on which all materials bought by a customer are enumerated. The quantities of gasoline, other lubricants, supplies and sundries are entered on this sheet, which is 17 by 14

Mr.______________ Account No.__________
______________ Sheet No.__________

To THE MITCHELL-EDMONSTON GARAGE, INC. DR.
23 WEST 62ND STREET,
TERMS NET CASH. NEW YORK,__________191 TELEPHONE 9086 COLUMBUS

Gasoline	Oil and Greese	Storage	Supplies	Sundries	Total	Payments

Form 6—Monthly gasoline, oil and supply sheet made out in duplicate for each patron

WYCKOFF, CHURCH & PARTRIDGE, Inc.
Gasoline Slip

OWNERS OR CHAUFFEUR'S RECEIPT

Date	Charge to	Order No. Gas 17600

Received.....................gallons gasoline

Delivered in............................Car

Signed...............................

Form 9—Simple type of gasoline slip made out in duplicate

inches, together with their prices, so that the original sheet serves as a bill to the customer, while the duplicate is retained by the garageman.

The monthly, itemized statement, form 10, is somewhat similar to the preceding blank, but differs from it mainly by having the dates of the month printed on it for a daily recording of gasoline, oil and grease sold to the customer to whose purchases the page is devoted. In addition to these records, the form affords spaces for other supplies, the date of their sale, charges and credits to the customer, and his eventual balance at the end of the month. This form is also made out in duplicate, the carbon copy remaining in the original book, while the copy here shown is detached by tearing a perforation. This sheet is continued day by day, so that at the last day of the month it remains but to enter one day, post the items and send the bill to the customer.

Form 11 is a very ingenious type of blank which is used by the same company as form 5. Form 11 is a tan-colored envelope, 5 by 7 1-4 inches, in which all small gasoline, oil, supply and other memoranda are kept until the end of the month. Then they are added and the totals of the various classes of items entered in the proper places on the front of the envelope, from which they are copied on the monthly bill sent to the customer. After the bills have been sent out, all envelopes of 1 month are filed away alphabetically by the names of car owners and held on file for future reference during the next half year.

Standing Inventory of Gasoline

The company using term 6 has devised another blank proving a standing inventory of the gasoline stock. This is necessary, because the garage using this form does a very considerable business in gasoline and, therefore, has to keep very close tab on the quantities received and sold. The form serving for the gasoline inventory, form 1, is 8 by 10 inches, printed on white paper and designed with one line of space for every day of the month. The gasoline stock of the company is measured at 8 a. m. and at 8 p. m., and additions to the stock are entered between these times, giving the exact time of receipt and the quantity of fuel taken in. The differences in stock must be accounted for by sales slips, form 6, or stock requisitions, when gasoline is used by any of the employees for inside work in the garage.

Thus, by the use of a gasoline-and-oil sales form, a customer's monthly record form and a continual inventory form, a garage, no matter how large, can easily keep record of every gallon of gasoline and oil, every can of grease and graphite. The sales forms are made out by the man tending to the gasoline pump, the monthly record and the inventory by an office worker. This makes the whole system compact, simple and effective in that it permits the garageman to see, at any time he chooses to find out, what state his gasoline business is in and where it is necessary to exert increased care in watching the employees. Furthermore, the preparation of a monthly profit-and-loss account for the garage is an easy matter when all the minor items are taken care of by the use of a subsidiary system devoted to the recording of gasoline and lubricant deals.

Harking Back a Decade

FROM *The Automobile and Motor Review*, August 23, 1902: Consul-General Bellew, at Yokohama, Japan, reports that so far thirteen automobiles have been imported into that country, but that most of them still remain in the hands of the importers, who use them for advertising purposes. Automobiles are not classified under the Japanese tariff and they are admitted as carriages, paying duty of 25 per cent. ad valorem.

The 1902 Toledo touring car has a motor with three cylinders ranged vertically with its cranks equally spaced on the shaft, giving three power impulses for every two revolutions.

The commonest and most natural mistake of the novice who tinkers with his vaporizer is to give the engine too much gasoline. Most modern vaporizers, particularly those of the float-feed type, are provided with a drip outlet in the mixing chamber making it impossible to flood the latter, but occasionally a vaporizer is found which, when fed with more gasoline than the air passing through can take up, will allow the liquid to accumulate.

J. W. Packard, president of the Ohio Automobile Company, has designed a 12-horsepower car for his own use. The car has hollow steel axles running on 7-8-inch balls. The wheelbase is 84 inches. Eight of the principal bearings are oiled automatically.

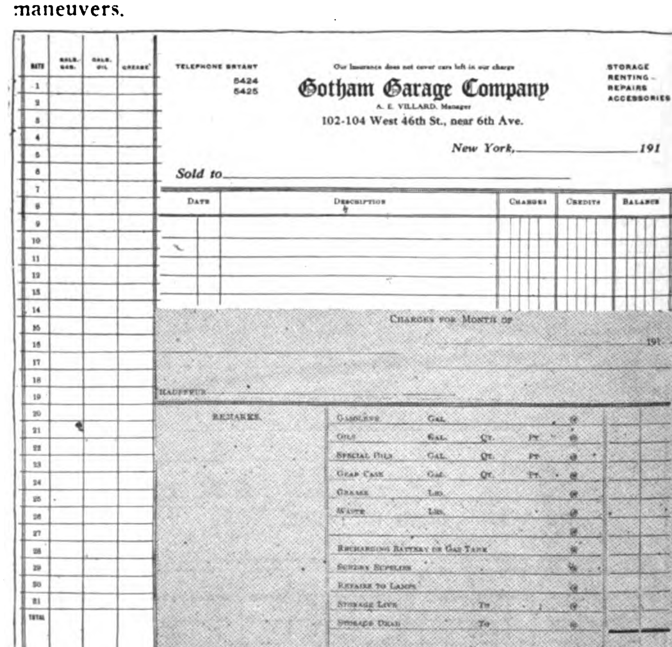
A. W. King, one of the pioneers in the manufacturing industry, has retired from the Automobile Company of America, and will shortly bring out a new type of motor vehicle.

The Pierce motorette entered in the recent endurance run of the Automobile Club of America, negotiated the 100 miles on 4 gallons of gasoline without making a penalized stop. Sixteen other contestants finished the run with clean scores.

The National Association of Automobile Manufacturers has adopted a standard guarantee to be used by all its members. The main feature of the guarantee is the clause providing for a 60-day limit to its effect.

Charles L. Fair, of San Francisco, and his wife were killed near Pacy-sur-Eure, France, when Mr. Fair's car skidded and ran into a tree. Mr. Fair was brother-in-law to W. K. Vanderbilt, Jr.

The automobile belonging to Major Eben Hill, of Brigadier-General Frost's staff, has proved very useful during the past week about the state military rendezvous of the Connecticut National Guard at Niantic. It proved so speedy that some of the staff officers failed to get into the saddle at all during the week of maneuvers.



Form 10—Monthly record and bill for gasoline, oil and materials used by each patron. Form 11—Envelope serving as basis for monthly compilation

Otho Electric Starter

Description of a Device Operated by the Automobile Motor Which Generates Current for Ignition, Lighting and Starting

AN ingenious starting and lighting system, which is unique in that it involves a motor with a stationary armature, field and commutator, has been brought out by the Otho Motor Company, of Boston, Mass. The only moving part of the motor generator is the flywheel of the automobile motor, a fact which stamps this starter as something distinctly new. The results accomplished by the starter are similar to those of other systems involving a motor generator and a storage battery. After starting the motor the device becomes a generator which stores up the current in an accumulator from where it is taken to light the lamps, furnish current for ignition purposes if desired and after the motor has been stopped to restart the motor. In the adaptation of the device, however, a marked degree of ingenuity has been used and a distinctly new method of construction evolved.

A comprehensive idea of the device is given in Fig. 1, which shows a part section through the installation. As may be seen, a special form of flywheel is required. The only moving parts of the device, the four brushes and pole pieces are carried on the flywheel. They are indicated in the illustrations, Figs. 2 and 3. The moving parts are firmly fixed on a solid foundation formed by the rear of the crankcase. This framework carries all the wiring so that there is not a moving wire in the whole arrangement. In addition to this it carries the commutator as seen in Fig. 4. The flywheel is formed in such a manner that it can be slipped over the stationary frame, allowing the pole pieces to take up their proper positions in relation to the stationary field and aramture.

Description of the Device

Armature winding consists of thirteen coils of No. 12 wire; laminations are placed between the coils and moulded in an insulating cement forming the stationary armature and field ring. There is one field winding consisting of 10 pounds of No. 12 wire. The battery outfit needed is six cells of Exide-lead storage batteries. These weigh about 10 pounds to the cell. Only Exide batteries can be used with this system. Using the full voltage of this storage battery, which will be slightly in excess of 6, the starter will operate at 35 amperes. The storage battery will start to be charged at about 200 revolutions per minute of the crankshaft, or at an approximate speed of 10 miles an hour. The motor-generator takes up the functions of a generator as soon as the motor starts to fire, but it does not start to charge the battery until the speed reaches that just designated. A centrifugal switch throws in the battery when this speed is reached and keeps it in until the speed mounts up to 35 miles an hour on the regular adjustment. Above 35 miles an hour the battery is cut out. The latter speed is adjustable, however.

The fact that the battery is disconnected from the motor-generator at lower speeds than 10 miles an hour will prevent the possibility of the batteries discharging through the motor when the car is standing idle should the switch be left in.

Simple wiring and a simple method of switching is used in the present form of the starter. To start the motor the gear-shift lever is moved over to a special notch; this throws in the switch and starts the motor-generator, which now performs the functions of a motor and starts the engine. The wiring is very simple also, as may be noted from a study of Fig. 4, which shows the two wires leading to the storage battery. A ground wire is the only additional wire necessary.

In fitting the starter to a motor any type of clutch may be used. The sectional view, Fig. 1, shows the device installed in a flywheel with a multiple disk clutch. The flywheel will be of a slightly greater diameter than is generally required in order that the extra fittings may be installed. The motor is sufficiently powerful to turn the engine at 75 revolutions a minute until the battery current is exhausted, although a long application of this power will never be necessary. There is no reduction gearing.

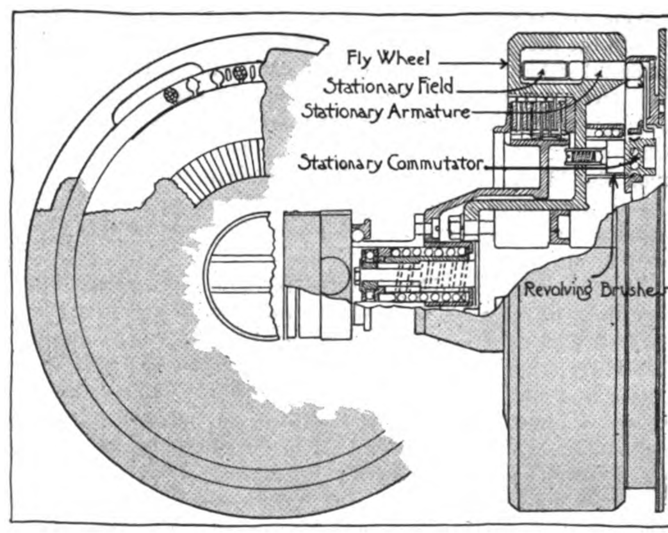
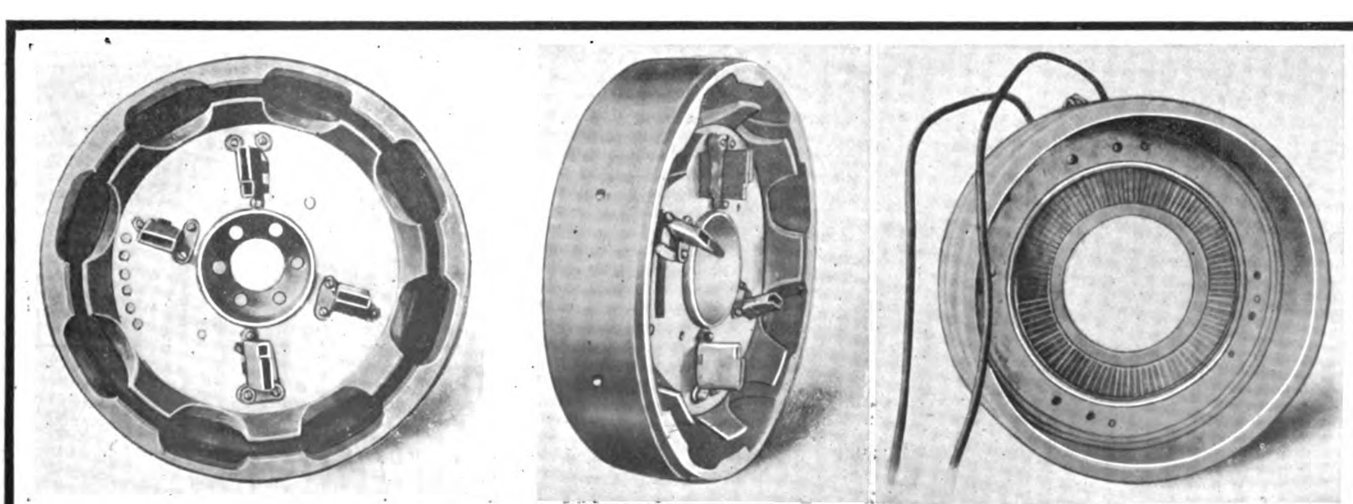


Fig. 1—Part section showing installation of Otho Electric starter



Figs. 2, 3 and 4—Showing the brushes, pole pieces and commutator disassembled

Properly Patching a Punctured Inner Tube—Information on Induction Coils—Schemes to Increase Power—How to Test for Leaks in Gas Tanks—Questions in Ball-Bearing Design—Job of Dentistry on Worn Brake Ratchet Teeth

Steps in Patching an Inner Tube

EDITOR THE AUTOMOBILE:—I have a 30-horsepower touring car and wish to know as to how to keep my tires in good condition. What I would like to know specifically is how many extra inner tubes I should have and what I should do to keep these so that they are always available. I would like to know the best method of applying patches to a tire, as I have tried it and always had the patch come off after a short time. There is evidently some step that I do not carry out in the application of the patch or I am sure that I would get better results than I am having now.

New York City. C. C. COPPER.

—In the first place, if you are doing any extensive touring, five inner tubes besides the four on the car would not be too many to carry. If you just use the car around the neighborhood, three will be sufficient. The main point to remember is to keep these tubes in good repair so that you will always have them to rely upon should you get a succession of punctures. The possibilities are that on a 50-mile trip three successive punctures may be sustained, while again a trip of 1,000 miles may be taken with none at all.

After the trip take the punctured tubes to the workbench and cure them of all leaks. It would be well for the car owner who does his own repairing of inner tubes to have a vulcanizing outfit. There are many small ones on the market which give entire satisfaction and which are very easily handled. If a vulcanizer is used, the method of procedure will be as follows: Carefully and thoroughly sandpaper the tube in the proximity to the leak, Fig. 1, removing all signs of dirt. When the tube is white and clean rub the surface of the rubber with a little gasoline. Cut the patch to the desired shape so that it will fit over the puncture and soften it by saturating it with gasoline. The patch will become gummy and can be kneaded in the fingers. The patch is then applied to the puncture and vulcanized. The method of application of the vulcanizer will depend upon the type used.

When a vulcanizer is not used the tube and the patch are prepared in the same manner as has been described. After the patch is ready to be applied to the tube put a thin coat of cement on the tube and another on the patch. Allow these to become thoroughly dry. Then apply another thin coat of cement to both the tube and the patch. When this is nearly dry apply the patch to the tube, being sure that the hole in the tube is as near the center of the patch as possible. The patch being placed upon the tube, it is necessary to exert considerable pressure to make a good, firm job. A clamp, such as shown in Fig. 3, can be applied to advantage.

Wants the S.A.E. Rating Formula

Editor THE AUTOMOBILE:—Will you kindly publish a formula for the S. A. E. rating?

Woodsfield, O. CLYDE TROUTMAN.

—This formula and its derivation were published in THE AUTOMOBILE of August 1, on page 231.

Induction Coil Information Wanted

Editor THE AUTOMOBILE:—What is the voltage delivered at the spark plugs using six cells dry battery and vibrator coil?

2. Does one make coil produce a hotter spark than another on the same number of cells? If so, give the make.

3. Are there any four-cylinder, four-cycle automatic intake valve motors made? What cars use them?

4. Will a set of six dry cells burn out a coil if left connected up? If so, how long will it take?

5. How will a motor act if it uses a burnt coil?

Lebo, Kan. J. H. DRESSLER.

—(1) This voltage is not exactly known. A current of 20,000 volts will jump a gap of 1 inch at atmospheric pressure. This is taken as a basis and estimates have been made using this as a criterion. The generally accepted opinion is that the potential of the current ranges between 8,000 and 10,000 volts, while the amperage of the current is negligible at the plugs.

(2) One coil will produce a hotter spark than another if it has more secondary windings, if it more carefully designed and if the secondary windings are laid closer to the primary. This is the case regardless of the make of coil. When you pay more for a coil you get a coil that has better quality insulation. When the highest grades of insulation are used on the secondary windings of the induction coil the effect is that the laminations of wire are closer to each other because the insulation is thinner. It must be understood that the efficiency of the induction coil

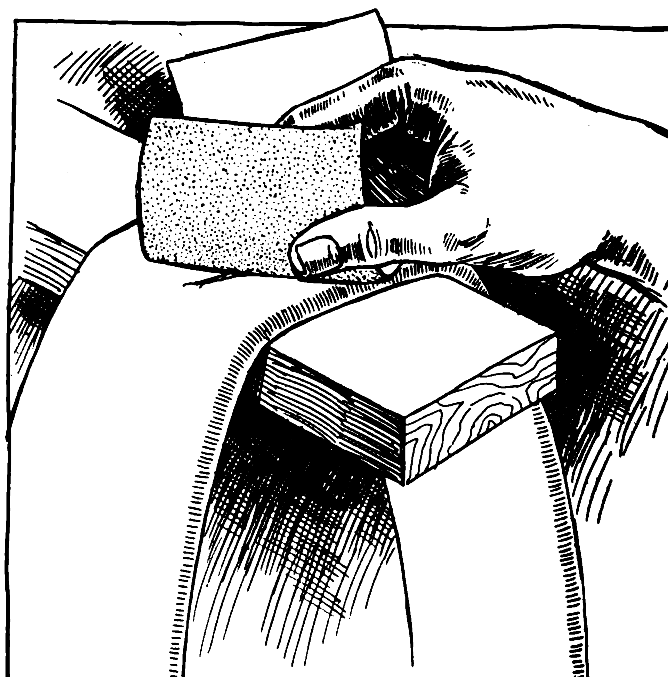


Fig. 1—Sandpapering tube—first step in vulcanizing

depends to a great extent on the number of secondary windings for a given size coil. The closer these are to the primary winding the better for the reason that the induction field is more intense the closer to the primary winding and therefore it may be stated as a fact that the thinner the insulation on the secondary wires the more efficient will be a given size coil so long as there is no leakage of current through the insulation.

(3) There are no more automatic intake valve motors made, all having been discarded in favor of the mechanically operated.

(4) As a general rule it may be stated that the batteries would be run down before the coil would be burned out.

Information on Racing Motor Gasoline

Editor The Automobile:—Will you kindly give the following information:

1. What is the best gravity of gasoline for racing, and would it be satisfactory for average running in the average car? Why?

2. Can you give me a formula for a compound which when applied to brakes will prevent them from squeaking, but will not interfere with their efficiency?

3. If an ordinary single-unit spark coil were inserted in the plus wire from the battery or magneto of a Ford car, as in Fig. 2, so that the current would flow through the primary winding only, and then four vibrators of the regular four-unit coil were

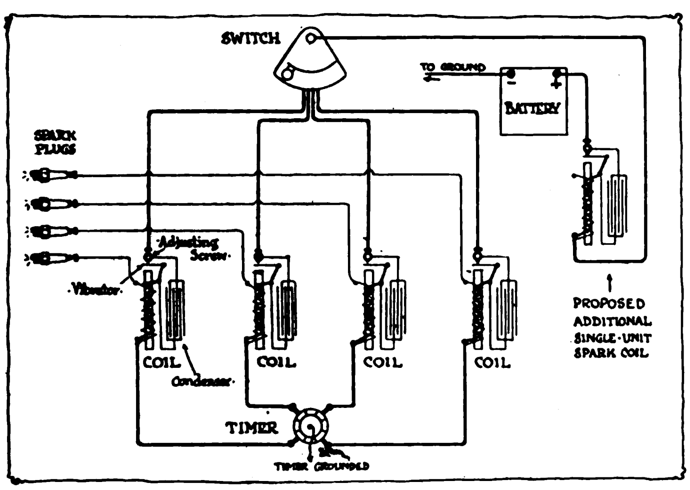


Fig. 2—Diagram showing single-unit coil inserted in positive wire from battery to magneto

short-circuited, would not the use of the single vibrator of the inserted single-unit coil give as good or better results than are obtained by the use of the four-unit coil and the four vibrators by giving perfect synchronism and by reducing the number of troublesome vibrators? If such were done, would it be better to short-circuit the secondary winding or not? Do you think the scheme would work with any satisfaction? If batteries alone were used, would this scheme consume more or less current than the original system?

4. If an extra plug were inserted over the exhaust valves of on Overland 1912 4 by 4 1-2 motor would there be any gain of power? Would the Splitdorf magneto employed on these engines generate sufficient voltage to operate the two plugs, when placed in series?

Oakland, Md. A. Jouce Riker.

—(1) The ordinary automobile naphtha or gasoline of a grade varying from .60 to .69 is used to the greatest extent in races. In former years racing drivers were under the impression that a high test fuel was the best, but soon found out that it did not have the power of the fuels of lower test, although it was easier to start the motor with these fuels. The demand for gasoline of a high test has now practically disappeared since the drivers have become educated to the point that the lower tests contained the greater number of heat units. Improvement in carbureters has also been responsible to a great extent for the use of the more

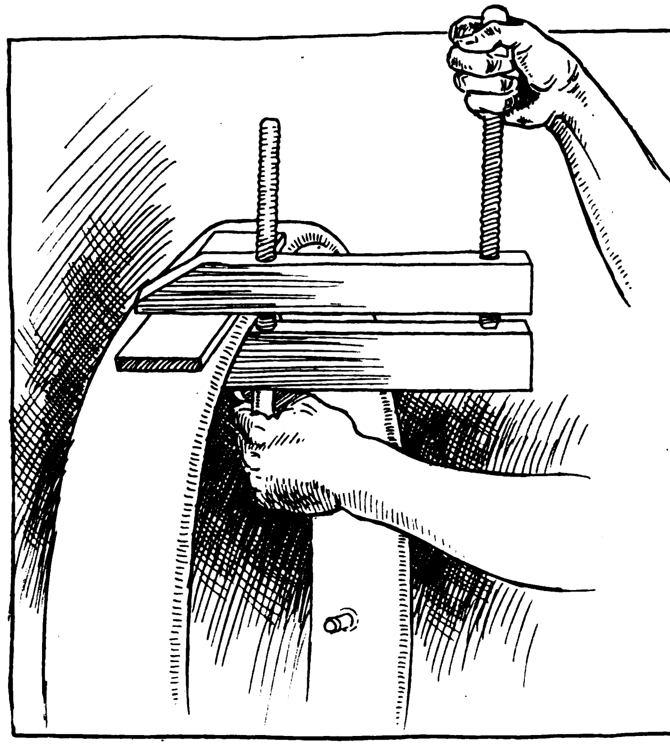


Fig. 3—Clamping patch on tube to insure adherence

powerful fuels, as the difficulties of starting are now not nearly as great as they were. Gasoline from one part of the country will have a different test than from another part, so that allowance will have to be made for this when stating the best quality for use in a racing car. In the Atlantic Coast States 66 gasoline is very good for racing. The best Ohio gasoline from Lima crude is from 58 to 60 test, and Texas and California crude produces a gasoline which is best at 56. In Maryland it may be said that the best is as stated, 66.

(2) The fault of a squeaky brake is in the fabric that is used as a lining. The best cure is to remove the fabric that you now have on the brakes and replace it with new material. The fault may be in the composition of the fabric or it may be that the fabric has been improperly placed on the shoe. It will occasionally happen that the fabric becomes torn and the wrinkle causes a squeak.

(3) In using a single vibrator from battery or magneto it will be necessary to short-circuit all four coil vibrators, using a common master vibrator in connection with the four-unit coils which would give a perfect synchronism, but you would be subject to the trouble that arises from running a master vibrator continuously in that the contact points burn out and cause defective spark timing. If you should short-circuit the secondary winding it would be impossible to get current at the plugs. As to current consumed, if the battery were used alone, there would be no more current consumed than with the original system providing the coils were kept properly adjusted.

(4) There would probably be a slight increase in power if you used a double set of spark-plugs and arranged them so that they would fire simultaneously, but this must be done with a double distributer magneto. There can be no good results expected from two plugs connected in series, as the second plug will introduce complications that make it very unsatisfactory in action. The result of such an arrangement would probably be a very weak spark in both plugs. The Splitdorf people state that this magneto would not and could not be expected to work well when connected to plugs in series.

Presto Tank Is Exhausted Rapidly

Editor The Automobile:—I do not seem to be able to get the service out of my Presto tanks that I did when I first got my car. I do not drive at night any more than I used to and yet

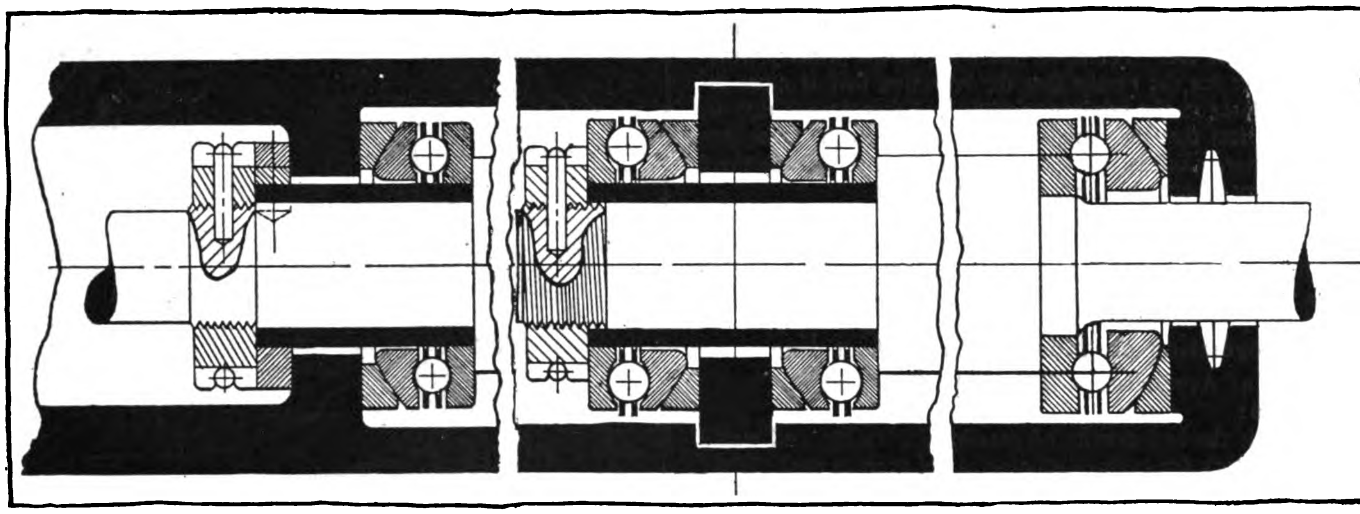


Fig. 3—Three types of ball bearings designed to take thrust in either or both directions

while I formerly got a whole season's use out of my tank I now find that the best I can do is a month. I am using tanks of the same capacity that I always did. It naturally must be due to a leak, but I do not know how to look for it. I have been advised to try by smelling, but I have sniffed along that pipe line as many as a dozen times without discovering anything that seemed as if it might be a leak. Will you please tell me what to do?

Bridgeport, Conn. C. D. WILLIAMS.

—THE AUTOMOBILE has just received a communication from Carl G. Fisher, president of the Prest-O-Lite Company. He gives the following information:

"Leaking pipe lines are a frequent but perfectly needless source of waste. The trouble lies almost always in the carelessness of the user. Complaints of short measure and excessive gas consumption are always traceable to leaks. The peculiar feature of this is that if the owner will spend but a few moments in testing the tubing from the tank to the lamp, the waste will be eliminated, and in many cases the life of each tank of gas will be doubled.

"First disconnect the rubber tubing at the lamps, and pinch or clamp the ends tightly. Go over every inch of the rubber and brass tubing and each connection with heavy soapsuds, seeing that every portion is thoroughly covered with it. Then turn on the gas. A leak at any place will be shown at once by the formation of a bubble. If it is formed at a connection, this should be tightened at once. If the bubble appears on any portion of the tubing (either rubber or brass) it is a sign that the tubing should be replaced or repaired. Rubber is a very treacherous substance and hardens and cracks very easily after exposure to air, heat and sunshine—yet some gas tank users are clinging to rubber tubing that they have used for a year or more.

"The places where the rubber is joined to the brass tubing should be watched carefully as they are a prolific source of leaks. Wherever the brass tubing is run through the frame or mud apron it should be protected from wear. Very often leaks are found at such spots. The rubber tubing, however, is the worst offender and a few cents spent in putting in new rubber connections will often pay for itself many times over in the gas saved. When all of the tubing and joints have been tested and connected to the lamps, the lamps themselves should be tried for leaks. Put soapsuds around the base of the tip and on the stem which holds the tip and on the rubber tube joints at the lamps. Then turn on the gas and light the lamps. If bubbles appear at the joint in the stem inside the lamp, this stem should be unscrewed and the threads covered with white lead.

"Every automobile owner should make this simple test, whether he suspects a loss of gas from leaks or not—and it should be done three or four times a year at least. Every Prest-O-Lite tank is charged to full capacity and fully tested at our charging plants, and wherever a user seems to be emptying his tanks too rapidly in nearly every case pipe-line leaks will be found responsible."

Route from Boston to Altoona

Editor THE AUTOMOBILE:—Will you kindly outline the shortest and most practicable automobile route from Boston, Mass., to Altoona, Pa., giving me distances, etc.?

Lawrence, Mass. J. RODNEY BALL.

—The best route to follow from Boston to Altoona, Pa., is by way of Boston, New Haven, New York City, Harrisburg and Altoona. Going from Boston direct to Providence, a distance of about 45 miles, to New Haven which is about 126 miles from Providence, and then on to New York City, 73 miles further, you will have the shortest route, covering about half the journey. From New York City, cross over to New Jersey by way of the Forty-second street ferry to Weehawken. By following route 41 of the Blue Book to Easton, you will find excellent roads. The distance is about 87 miles. From Easton you pass through Nazareth, Bethlehem, over the Lehigh river into Allentown, and thence into Reading, covering about 57 1-2 miles. Here you will turn west on Penn street with trolley across iron bridge under railroad and straight through village of Sinking Springs. From there on to Harrisburg, you pass through Myerstown, Lebanon, Palmyra, Hummelstown and then into Harrisburg, covering about 54 miles. From here to Altoona the roads are fair, covering about 138 miles. Starting out from Harrisburg, turn north on Second street past Soldier's Monument. Passing through Dauphin and thence on to Mifflintown, the roads are very rough, but from there on through Huntingdon, Alexandria, Birmingham, Tyrone, and into Altoona, they are excellent.

Advocates Left Steer, Center Control

Editor THE AUTOMOBILE:—Referring to your editorial in the August 1st AUTOMOBILE regarding the advantages and disadvantages of left-hand steer, the writer would call your attention to one point evidently overlooked:

You state that the driver sitting on the right side can gauge his relation to the ditch much more readily than one sitting on the left, but overlooked the fact that the driver on the left can watch an approaching vehicle much more readily.

The writer drove right-side steer cars for 5 or 6 years and this year is driving a high-powered car with left-side steer and center control. He finds the left-side steer far superior in all particulars, especially in being able to see how close the wheel of an approaching vehicle is to his own wheel when passing. Possibly in a country where the roads are lined with deep ditches, the necessity for watching the ditch might be greater than that of watching the passing vehicle, but in the writer's opinion the danger from careless and reckless drivers is much greater.

Were not the first American cars copies of foreign cars built with the right-side steer to accommodate the car to the foreign rules of the road where all vehicles pass on the left?

Do not most of the arguments favoring right-side steer come from those having had no experience with driving on the left side and from manufacturers whose policy it is to make no changes unless compelled to? Are not most of the largest manufacturers of high-priced cars today resting on their reputation and selling out-of-date machines to save the expense necessary to add these later improvements? Do not the purchasers of high-priced cars seldom do their own driving and for that reason remain careless as to features of construction of advantage to the driver? ABBOTT WIDDICOMB.

—If you will look on page 210 of THE AUTOMOBILE for August 1, 1912, you will find that the point you mention is cited there under advantages of left-hand steer and is illustrated at the top of the opposite page. As you say, this constitutes a great advantage in favor of the left steer.

Question of Ball Bearing Design

Editor THE AUTOMOBILE:—Are ball bearings that are used to take thrust in one direction only of substantially different design from those which take thrust in opposite directions? If so, please explain the different mountings.

Boston, Mass. E. D. FITZGERALD.

—There is a distinct difference in the ball bearings that are called upon to take loads in either direction and those which are only required to stand a stress from one side. The loads referred to are thrust loads and not radial loads. There are three distinct types of bearings which are distinguished by the different kinds of thrust load they are compelled to bear. The three types, as made by the Timken company, are shown in Fig. 3. The first of these shows a bearing which is designed for take thrust in one direction only. As may be seen from a study of this illustration, if the thrust should cease or should come in the opposite direction, the cage containing the bearings would be apt to drop slightly out of place and when the thrust was resumed the balls would become pinched between the plates. When there is a chance that there will be a cessation of the load so that the plates would separate, a nut, such as that shown in the second bearing, is necessary.

The second type of bearing is one in which a slight thrust in the opposite direction has to be sustained. A plain disk is inserted as shown for the purpose of taking up the load in this direction.

The third bearing is similar to the first in many respects. In fact, it is really two of the first type of bearings turned end for end so that the thrust in either direction is equally well taken care of. In giving these types of mountings the Timken company cautions the user not to allow an undue amount of thrust to be set up by an initial adjustment of the nut behind the one bearing. The setting-up process should not be carried to too great an extent, as a ball bearing is so designed that the friction is not perceptible to the touch except when the bearing is seriously overloaded. Aligning washers are also essential with the thrust bearings wherever the shaft axis can for any reason change position. As distortions may occur during service, the aligning washers are strongly recommended in all cases. Special stress is laid on the alignment of the shafts by all bearing manufacturers, who agree that while distortions may not occur during ordinary work there are very apt to be times when an extraordinary occasion will cause a serious disalignment unless there are special provisions made to brace the shaft. Of course, the extent of the injurious results consequent upon a disalignment of the shafts depends almost entirely on the degree of distortion of the plane of thrust.

Has Solution of Blow-Out Problem

Editor THE AUTOMOBILE:—Responsive to your request for other automobilists to explain Mr. Worseldine's tire trouble, I submit the following explanation:

Since a straight-side type of tire is generally held on a rim by the tension wires in the bead, it follows that after 1,000 miles or thereabout of use they slightly lose their tension. When this takes place it is evident that the casing either creeps a little or else tends to lap itself at some point on its periphery, depending on the elongation of the bead. The result is that it pinches the tubes and causes it to blow out immediately, or else while standing still, involving thereby the factor of the owner's luck. Having the flap in the tire makes little or no difference in my opinion.

I have had this trouble in a much more exaggerated form. A crooked dealer once sold me some clincher tires (soft-bead type) for use with quick detachable rims. While they were new they were all right, but after about 1,000 miles they would expand, often as much as 4 inches, and blow out the tube.

The remedy I suggest is Q. D. tires.

Chicago, Ill. L. O. SCHOPP.

Emergency Brake Lever Won't Hold

Editor THE AUTOMOBILE:—I wish to give a little experience I have just had happed to me, with the idea that it may help some of your other subscribers and prevent them having the same trouble that I had a little over a week ago. I left my car standing on a hill just above a railroad station on a prominent street in the upper part of New York City. I thought the car was perfectly safe where I left it, but it happened that the ratchet which held the emergency brake lever was worn nearly flat, and as a result the lever did not stay in place but slipped out, allowing the car to roll down the hill and out onto the track. Only the timely action of some workmen saved the car from being smashed to pieces by an oncoming train. I have since examined other cars to see if they were deficient in this respect and have found several that were. I made a couple of sketches showing the ratchet as it was on my car and another as it should be. These are reproduced in Figs. 4 and 5, and I would state that I believe it would pay the owner of a car to go over his machine with a file, touching up such points as these. On many of the smaller makes of cars these ratchets are not nearly as deep as they should be in the first place, so that it does not take long for them to wear away. In a short time they become so inefficient that they are likely to fail just as mine did.

New York City. J. T. TODD.

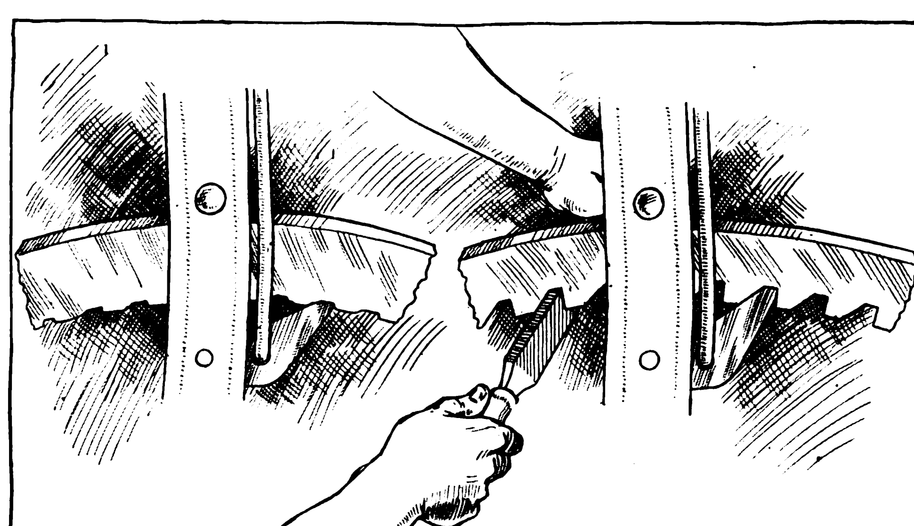
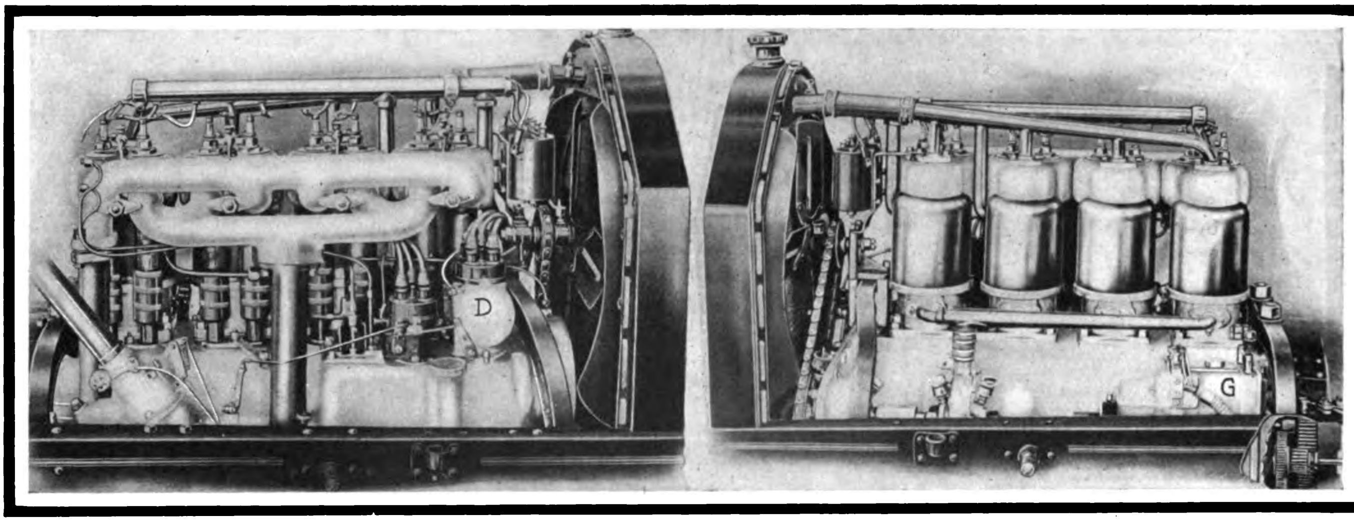


Fig. 4—Showing brake ratchet with worn teeth. Fig. 5—Filing up ratchet teeth to hold lever



Figs. 1 and 2—Side views of the 1913 Cadillac motor, showing copper water-jacketed cylinders and inclosed valve stems and springs

Cadillac for 1913

Increased Length of Stroke Most Marked Change in Motor—Efforts to Obtain Silent Operation

Carbureter Has But One Adjustment—Combined Electric Ignition, Lighting and Starting System Improved

CADILLAC cars for 1913 are in seven body styles, all of which are mounted on the one chassis as heretofore. Although a number of mechanical changes have been made —principally in the motor—the general Cadillac design features still hold.

The motor, while presenting all of the standard Cadillac features, such as separate copper water-jackets, separate cylinder heads of the L-type and five-bearing crankshaft, has a greatly increased stroke over that of 1912. This dimension has been increased from 4 1-2 inches to 5 3-4 inches. The cylinder bore remains at 4 1-2 inches, giving a stroke-bore ratio of 1.28, and putting the Cadillac motor unquestionably in the long-stroke class. The horsepower is increased 18 to 25 per cent. depending on the speed, the greatest percentage of increase being evidenced at speeds ranging from 12 to 35 miles an hour. This is due, of course, principally to the lengthening of the stroke. The S. A. E. horsepower rating for a motor of this bore is 32.4, but the rating which is given the car by the makers, and which is actually developed on block tests is from 40 to 50 horsepower.

Details of Motor Construction

The four cylinders are cast single, as shown in Figs. 1 and 2. The construction is shown clearly in the sectional view of one of the cylinders, Fig. 8. This cylinder design is peculiar to the Cadillac motor and has been used for a number of years. The cylinder heads H_1, Fig. 8, which contain the valve chambers are attached to the cylinders by right and left threaded nipples N_1. The water jackets W_1, which surround the cylinders are of spun copper and are so clamped in position, as shown in Fig. 8, as to preclude any possibility of water leak, it is claimed. The idea of the Cadillac designers in using this peculiar construction is that with an even thickness of cylinder walls and of water jacket, space is afforded around all the cylinders. It also makes it possible to replace any part of any cylinder without disturbing the rest.

The main bearings and lower connecting-rod bearings have all been increased in diameter and in length, which along with the five-bearing crankshaft make an extremely rigid construction, and serve to reduce whipping stresses and motor vibration. The camshaft has also been enlarged from a diameter of 3-4 inch to 1 3-16 inch, and it is mounted on three bearings instead of five as formerly. This three-bearing mounting is made possible because of the larger size and consequent greater strength of the camshaft. The cams are integral with the shaft.

The sizes of the various motor bearings are listed:

Crankshaft—Five bearings. Rear: Diameter, 2 inches; length, 4 inches. Remaining four: Diameter, 2 inches; length, 2 7-8 inches.

Camshaft—Three bearings. Diameter, 1 3-16 inch.

Wrist Pin Bearings—Length, 3 inches; diameter 3-4 inch.

Silent Operation a Feature

The crankshaft and generator shaft on the motor are driven from the crankshaft by silent chains which replace the meshed gears and tend to increase the motor's silence. The chain drive arrangement is shown clearly in Figs. 9 and 10. The valves are all inclosed separately by a special form of housings as shown at V, Fig. 6. The inlet and exhaust valves have been increased from their former diameter of 1 3-4 inch to 2 1-8 inches. All valves are interchangeable and are operated by the single camshaft on the right side of the motor. The valve tappets do not bear directly upon the cams, the lower end of each cam block being provided with a roller, which is constantly in contact with the cam.

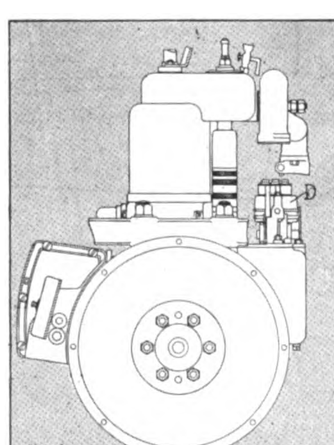


Fig. 3—Rear view of Cadillac 1913 motor

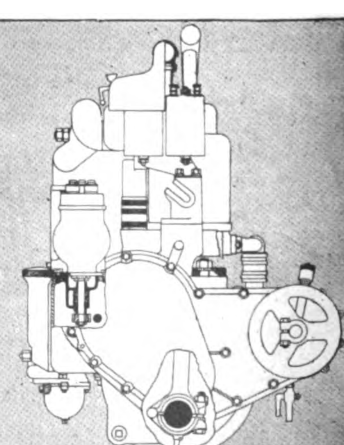
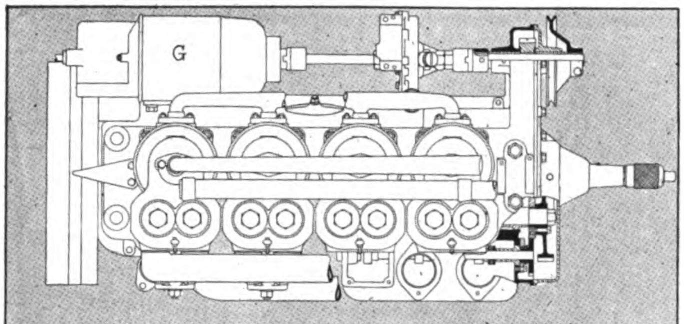


Fig. 4—Front of motor, showing hinged connecting-rod end



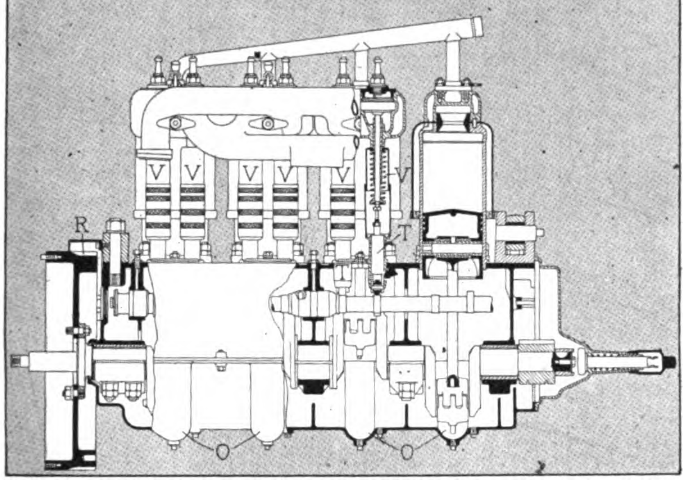


Fig. 5—Top view of the Cadillac engine, showing position of generator G

Fig. 6—Right side sectional view of motor, showing manner of inclosing valve springs and cylinder construction

The lubrication of the motor remains unchanged and is of the automatic splash type, the oil supply being maintained by a mechanical force-feed lubricator. There is a sight feed on the dash. The oil pan part of the crankcase is divided into four compartments into which the lower ends of the connecting-rods dip. The oil reservoir is at the right side of the motor, being a part of the base. In this reservoir to which the oil finally passes there is a double-acting force pump which forces the lubricant up through the sight feed on the dash and thence to the crankcase compartments. The sloping troughs on the sides of these compartments distribute the oil from one trough to another and maintain a constant level in all of them. These individual oil troughs for the lower connecting-rod ends are shown at O in Fig. 6. They are provided with drain plugs to remove all the lubricant for cleaning or other purposes.

The Cadillac carbureter for 1913 has only one adjustment, that being for the air supply. The gasoline adjustment is fixed. There is, however, an auxiliary air adjustment on the steering column. To assist in vaporization, the carbureter is water-jacketed, which is an especial advantage in cold weather.

Improved Delco System Used

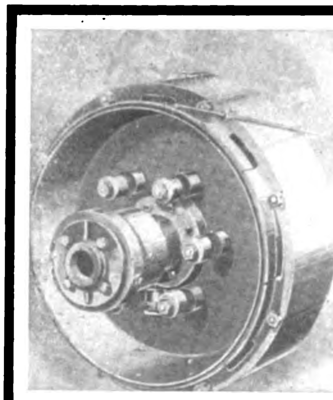
The cooling system is continued as on former models, the radiator being a Cadillac design consisting of 147 seamless copper tubes which pass vertically through 145 horizontal copper plates. Cooling is assisted in the conventional way by the use of a belt-driven fan at the forward end of the motor. The fan belt tension is regulated by adjusting the center distance of the fan pulleys.

The electrical system of the Cadillac is of the Delco type, somewhat improved from its form as applied to the 1912 model. This system combines all the electric functions of ignition, lighting and starting. The generator, which is temporarily converted into a motor when required to start the car, is on the rear left side of the motor at G, Figs. 2 and 5. The Delco system has been explained on numerous occasions in the THE AUTOMOBILE and will be only briefly taken up here. For starting the engine, the closing of a switch within the driver's reach temporarily transforms the generator into a motor. Pushing forward on the clutch pedal causes a gear of the electric motor to mesh with teeth cut in the outer rim of the flywheel as shown at R, Figs. 10 and 6. The electric motor then turns the flywheel and the crankshaft until the engine takes up its regular cycle of operation, after which the clutch pedal is released, disengaging the gears. The starting switch is then cut off and the generator operates as a generator and is driven by gears from the engine, furnishing current for ignition, for lighting and for charging the storage battery.

Ignition and Lighting Improvements

The ignition system consists of two complete, independent circuits and there are two sets of spark-plugs. In addition to the generator, there is a set of dry cells for emergency use and for furnishing ignition current when the storage battery energy is being used for driving the temporary motor which starts the gasoline motor. After the engine is running the dry cell current is cut out and the generator current switched on by means of a switch under the driver's control. In connection with the dry cell current a Delco distributer, shown at D, Fig. 1, is employed. Current for lighting head, side and tail lamps is furnished by the storage battery when the motor is idling or not running, while after it is up to speed the generator current becomes sufficient to provide for the lamps. Any excess current produced is passed to the storage battery. This current distribution is all provided for by automatic control switches. The storage battery has a capacity of 130 ampere-hours, and as soon as that capacity is reached the charging automatically ceases. Up to 280 to 300 revolutions a minute the ignition current comes from the storage battery but above that speed it is sent automatically direct to the spark-plugs from the generator.

By using two windings and two commutators on the generator armature, one for use when the electrical unit is driven as a generator and the other when used as a motor, it is possible to operate the motor-generator on 6 volts. This permits of the doing away with the formerly-used control switch and ampere-hour meter. The voltage regulator determines the rate of charge to the storage battery and the voltage to the lamps. It provides for the charging of the storage battery at a rate depending upon the condition of the battery. That is, a fully discharged battery is charged at a high rate, and vice versa. On the new model the gearing between the electric motor and the flywheel is made about 25 to 1, instead of 20 to 1 as heretofore. This change increases the cranking speed of the motor and the duration of cranking time. Another improvement in the system is in the spark timing which is automatically controlled by a ring governor, making it unnecessary to constantly regulate the spark lever on the steering wheel quadrant. The wires to the side lights are run through



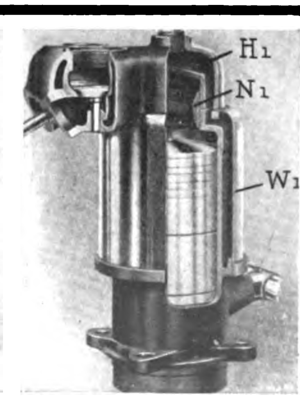


Fig. 7—The Cadillac cone clutch with spring ring in the flywheel

Fig. 8—Showing cylinder construction. Cylinder-heads and water-jackets are separate

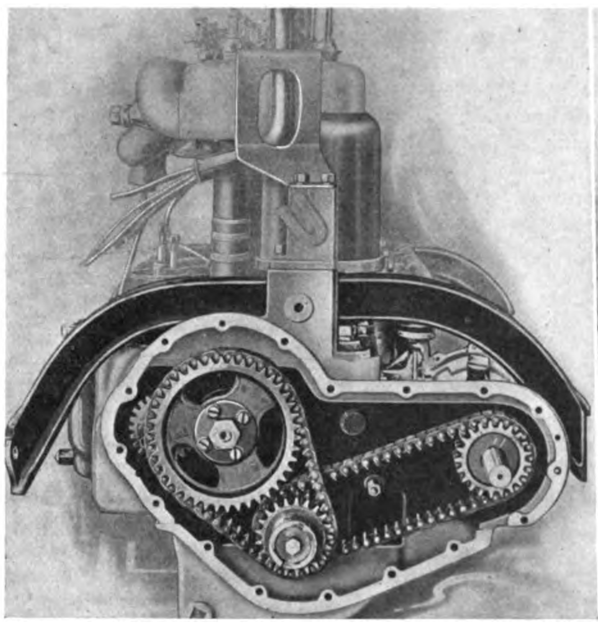


Fig. 9—Front view of Cadillac motor, showing silent-chain driven pump and cam shafts

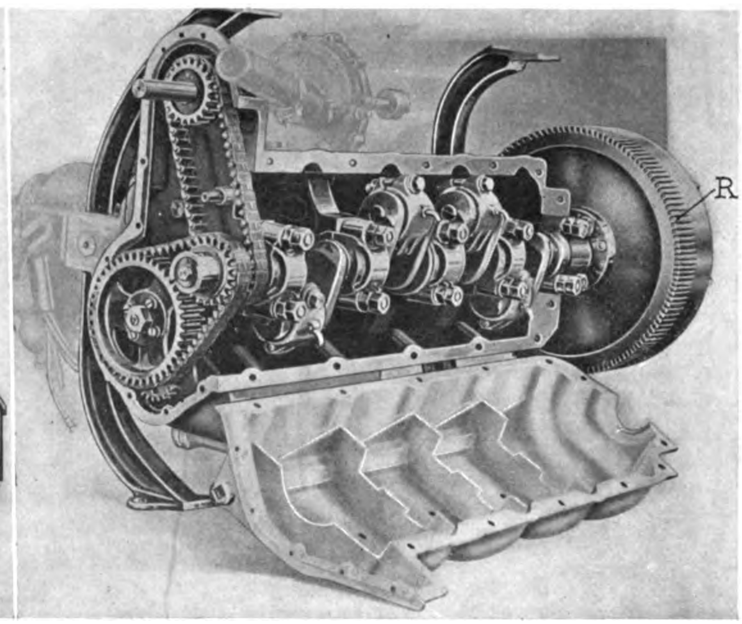


Fig. 10—Bottom of motor, illustrating 5-bearing crankshaft and oil compartments

the brackets which hold these lamps and are therefore invisible. This is a new feature. Fuses have also been placed on all lights and a Yale lock has been put on the ignition switch.

In considering the remaining features of the car, the clutch is next in order. It is of the cone type and leather faced, and has a special spring ring in the flywheel. This ring with which the cone engages is split at eight points of its periphery and part of each section is sprung inward. The idea of this arrangement is to make the clutch take hold gradually and to eliminate all the shock and jar which results from the clutch taking hold fiercely when starting the car.

The transmission is of the selective, three-speed, sliding-gear type with direct drive on high. Gears, transmission shaft and clutch shaft are of chrome nickel steel. The gear teeth are beveled in the conventional way. A view of the gearset is shown in Fig. 11. The main transmission shaft, the jackshaft and the clutch shaft revolve on a total of five annular ball bearings. The drive from the gear-box to the rear axle is by means of a heat-treated, carbon steel shaft, fitted with two universal joints. These are provided with hardened and ground bushings and pins. The joints are inclosed in spherical housings and run in oil baths. The forward universal is telescopic and is so constructed as to be self-centering. The torsion member is V-shaped and tubular. The rear axle is of Timken floating type with bearings of the same make, throughout. The driving pinion and bevel gear are of a special carbon steel. The front axle is drop-forged of I-beam section and has drop-forged yokes, spring perches, tie-rod ends and steering spindles. The front wheel spindles of the new chassis are fitted with Timken bearings at the top.

Brake and Chassis Specifications

The brakes are of the conventional type, bolted to the rear wheel spokes, drums with diameter of 17 inches and a width of 2 1-2 inches. Wheels are of artillery type and fitted with demountable rims. They carry 36 by 4 1-2-inch tires, whereas last season the tires were of the 36 by 4-inch size.

The frame is of pressed-steel channel, double-dropped a total of 2 1-2 inches. The frame width in front is 30 inches and 33 inches at the rear. The entire frame has been dropped 1 inch, giving the car 1-2 inch more action by lowering the front axle 1 1-2 inches more than last season.

The spring suspension is of the standard platform type in the rear while the front springs are half-elliptic. The rear side springs have been made 4 inches longer than on the previous model. The present spring sizes follow:

Front—Length, 36 inches, width, 2 inches.

Rear Sides—Length, 48 inches; width, 2 inches.

Rear Cross—Length, 39 1-2 inches; width, 2 inches.

The steering gear is shown in Fig. 12. It is of Cadillac worm and worm-gear sector type. It is adjustable and is provided with ball thrust bearings. The steering wheel has a diameter of 18 inches and has its rim corrugated. The spark and throttle levers have the usual location on the quadrant above the wheel.

A new feature this year is the placing of the emergency brake inside the car, making it possible to use the right front door.

On the new model the wheelbase has been increased 4 inches from 116 inches to 120 inches, while the tread is 56 inches. This serves to make the body more roomy and adds to the comfort of the passengers.

All open bodies are of sheet-steel construction, while the closed bodies have aluminum sides. A cowl appears on all the new open bodies instead of the dash, while the fenders follow the lines of the wheels. In all respects the new bodies are most attractive in appearance and the upholstery is of such a character as to make easy-riding a feature. The standard equipment for 1913 will include mohair top and side curtains, windshield and speedometer. These were not given as part of the regular equipment last year. A full complement of tools and accessories for all contingencies is found on 1913's Cadillac.

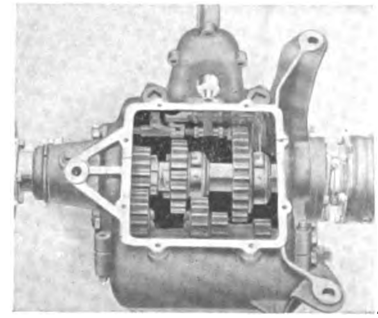


Fig. 11—The Cadillac 3-speed, selective, sliding gearset, showing suspension points

Fig. 12—The steering gear, which is of the worm and worm-gear sector type

La France Hauls Big Load

Pulls 11 Tons Up an 8 Per Cent. Grade 100 Yards Long at a Rate of 5 Miles an Hour

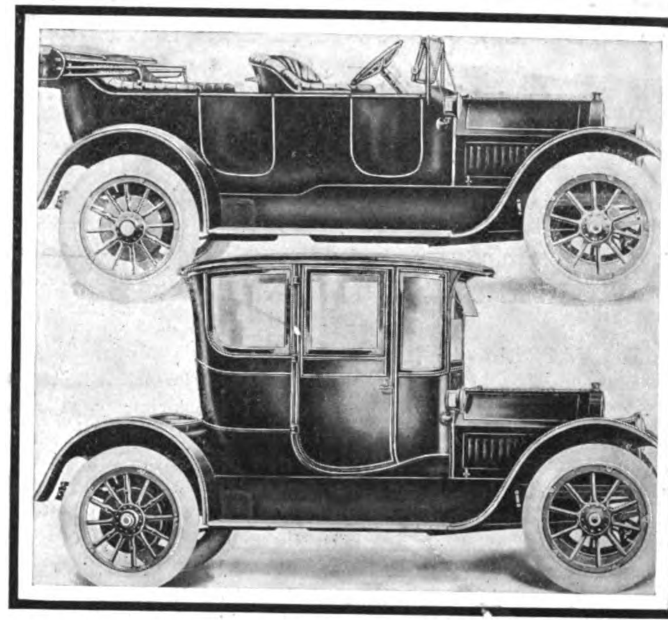
IN a demonstration of the 5-ton American-La France truck, manufactured by the American-La France Engine Company, Elmira, N. Y., which was given at Bergen, N. J., last Friday, this truck, which is equipped with a 40-horsepower, four-cylinder engine, hauled a total load of over 11 tons up an 8 per cent. 100-yard hill at a rate of 5 miles an hour. The truck has a wheelbase of 143 inches and an overall length of 227 inches, and a loading space of 154 square feet. It is equipped with a Manly hydraulic-drive system, which takes the place of clutch, transmission and differential.

For the demonstration the truck was loaded with about 11,200 pounds of bricks and a trailer was attached to it, which carried 11,550 pounds. This load was first transported over a level road about 1 mile in length at an average speed of 11 miles an hour, after which the train was driven up the hill. The train was stopped several times in the middle of the hill and was started again without any trouble.

Manly Transmission a Feature

The principal feature of the La France truck is the Manly hydraulic transmission. It consists of a five-cylinder piston pump, in which the cylinders are arranged in star manner around the driveshaft, which is directly coupled to the crankshaft of the automobile motor, and two similar devices on the jackshaft which are driven by the pressure of the oil entering them from the five-cylinder pump, thus acting as water motors which drive the sections of the rear axle by means of chains. The five piston plungers of the pump bear on a bushing which incloses an eccentric of the pump-drive shaft. The eccentricity of the bushing may be altered by an ingenious mechanism controlled by the driver so that the stroke of the pumps may thereby be changed, resulting in a corresponding change of the quantity of oil transported by the pump and an inversely proportionate change of pressure exerted by the pump on the oil forced into the motors on the jackshaft. When the control lever, which is attached to the steering post, is thrown forward, the stroke of the pump is lengthened and the speed of the whole system is increased, while a backward movement of the lever reduces the stroke, and eventually causes the eccentric to become concentric with the pump shaft and the pump stroke to become nil. This locks the oil in its passage and makes the motors act as brakes on the rear wheels. While the use of this drive makes the clutch superfluous, a device is used which serves its purpose. This is a by-pass valve, controlled by a pedal on the driver's seat, which interrupts the passageway from the pump to the liquid motors and causes all the oil to be circulated directly from the outlet back into the inlet of the pump.

American-La France truck and trailer, hauling a load of 11 tons of bricks over a Jersey hill at 5 miles an hour



New Cadillac body styles: Fig. 13—The touring car type. Fig. 14—The new coupe model

The accompanying illustration shows the 5-ton truck and trailer with the oil motors on the jackshaft. The absence of the propeller shaft is also noticeable, a pipe which branches from the pump to the two motors taking its place. The return of the oil to the pump is through two pipes laid directly under the loading platform.

Taxicabs for English Maneuvers

From the 1st of August until the middle of September there will be 500 fewer taxicabs in commission in the streets of London than usual. The War Office has commissioned these vehicles for use during the autumn maneuvers. The bodies of the taxicabs are removed, after which transport wagon bodies are fitted to the engines. The general scarcity of qualified cavalry horses in the British army is responsible for the innovation. At the same time it all goes to illustrate the impromptu efficiency of the motor vehicle in a case of emergency.

From Paris to Lyons is 320 miles. It is over this course that a successful trial has just been made with a "winged motor car." The car, designed by M. Bertrand de Lesseps, was driven by a revolving wing. In appearance the vehicle is not unlike an ordinary automobile, save that it is shaped like the prow of a ship in front. The wing is small, thick and strong, and revolves within a protecting cage. The engine, of 40 horsepower, rotates the wing by means of a shaft and chain transmission. No other mechanism is in evidence, the wheels of the car being free except in the matter of foot brakes. A single lever controlling the clutch is beside the driver, this lever also controlling the forward and reverse movement of the wing. The latter can be reversed at a moment's notice, thus affording an additional brake. The car weighs 1,300 pounds and attained a speed of 62 miles per hour with the wing making 2,100 revolutions each minute. The inventor is convinced of the car's practicability and hopes to capitalize his invention in the near future.

OWING to a mistake in calculation, the population per car in the state of California as given in the statistical story in the issue of THE AUTOMOBILE for July 25 was 300, whereas that state should have headed the list with one automobile for every thirty of the population.

Mais Truck Reorganized

Incorporated With $1,000,000 Capital—New Company Is Largely Composed of Stockholders in Old Company

Mortgage of $10,000 on the Plant—Stockholders in Old Concern to Receive Nothing

INDIANAPOLIS, IND., Aug. 21—The Mais Motor Truck Company has been reorganized and incorporated with $1,000,000 capital by the purchasers of the property at receiver's sale. Frank H. Wheeler, of Wheeler and Schebler, who will hold one-half of the stock, is the new president. Walter M. Pearce, Rushville, Ind., is vice-president, while Alvin S. Lockard, Indianapolis, is secretary and treasurer. William H. Brown, former president, will continue with the new company. The officers and Jacob V. Stimson, Huntingburg, Ind., and Harry G. Francis, Rushville, will constitute the board of directors.

The new management is composed largely of stockholders in the old company. Stockholders of the old concern will realize nothing on their shares. The new company has assumed a mortgage of $10,000 on the plant beside paying $71,000 for the assets.

Only one bid was submitted for the purchase of the company and the property was sold by the receiver, Franklin Vonnegut, to Frank H. Wheeler, of Indianapolis, and Walter N. Pearce, and N. G. Francis, of Rushville. The purchase price is $71,000 and the sale, of course, is subject to the approval of the court, which is in vacation.

Mr. Wheeler declined to give any details as to the future of the company until the sale is approved by the court. Mr. Francis and Mr. Pearce are stockholders in the old company. Mr. Wheeler will control about 50 per cent. of the stock.

Besides getting the plant and equipment, the purchaser will get about $12,000 in accounts and $10,000 in notes receivable. One-third of the sale price is to be paid in cash; one-third in 12 months and the remaining one-third in 18 months.

The receiver filed the following inventory in court: Finished stock, including two shop cars and parts in assembly, $26,759.32; automobile parts, now in process of machining, $6,327.89; automobile parts in the rough, consisting of rough castings and all unfinished parts, $19,481.55; bar steel, brass and steel tubing, $7,887.17; machinery, $55,236.82; factory equipment and supplies, including all belts, pulleys, motors, starting boxes, etc., $10,778.53; office equipment $2,784.05; paints, oil, etc., $460.56; patterns, manufacturing cost, $7,804.36; jigs and tools, manufacturing cost, $13,439.67 and real estate and buildings, $30,000. Total, $180,959.92.

The receiver expects to have approximately $85,000 to divide among the creditors. The liabilities of the company are said to amount to approximately $250,000.

Swinehart Declares Dividend

AKRON, O., Aug. 19—The Swinehart Rubber Company has declared a quarterly dividend of 1 1-2 per cent., which means the reduction of the regular dividend from 8 to 6 per cent. In a letter sent out with the dividend checks the statement was made that the company deemed it advisable to reduce the dividend and build up a larger working capital.

Rubber Trade Doubts Pool Rumors

No pressure to sell was apparent in the crude rubber market recently and the buying, while steady has been in jobbing quantities only. Little credence is placed in the reports of another giant scheme of valorization and the position is taken by many of the consumers that even should the plan be adopted, it is likely to have no more success than the one which was attempted last year.

The 1911 idea was financed under the auspices of one of the Brazilian states and bonds were issued to buy about 15,000,000 pounds at an average of $1.10 a pound. This rubber was retired from the market and the price advanced to $1.70. At that figure trade became stagnant and every attempt to liquidate the valorized stock found a sinking market with no buying force in it anywhere. The holders of the valorized stock became panicky at last and the whole mass of rubber was sold at about $1.18 a pound average. On the face of affairs the pool made a gross profit of $1,200,000 but as a matter of fact, brokerage, interest, commission, freights, storage and other items of cost brought the money level of the product to $2.60 per pound which netted the holders a stunning loss of over $18,000,000.

With the experience of the state-promoted pool in mind, the rubber trade does not figure that the present rumors of valorization are founded on much of a fact basis. Current prices are based upon about $1.19 1-2 per pound for up-river fine.

Bergdoll Agrees to Take Motors

PHILADELPHIA, Aug. 19—The legal hostilities between the Louis J. Bergdoll Motor Company, of this city and the Westinghouse Machine. Company, of Pittsburgh, were finally adjusted and

Automobile Securities Quotations

Goodrich common was the strong feature of the market for automobile securities during the past week. The stock advanced 5 points on impressive investment buying caused by excellent preliminary reports of extended business. Firestone was another strong feature among the tire makers. There was some realizing on recent purchases of Studebaker common and the market yielded a point as the result of such trades. General Motors was steady and United States Motor was fractionally lower on profit-taking sales. Reports from the manufacturing and accessory industries were all rosy. One of the most significant basic features of the market was the quiet strength of Rubber Goods. An outline of the reorganization plan for United States Motor will probably be announced early next week. Rumors as to changes in the personnel of the company have been circulated for a week but lack color of official sanction. Chairman W. E. Strong has announced that the 1912 business is closed and that so far the 1913 situation is satisfactory.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., common	..	..	145	165
Ajax-Grieb Rubber Co., pfd	..	..	95	100
Aluminum Castings, preferred	..	..	99	102
American Locomotive, common	38	38¼	45¼	46¼
American Locomotive, preferred	106	107	109	110
Chalmers Motor Company	..	..	145	150
Consolidated R. T. Co., common	5	10	16	18
Consolidated R. T. Co., pfd	10	20	50	60
Firestone Tire & Rubber Co., com	175	180	283	290
Firestone Tire & Rubber Co., pfd	105	107	106	108
Garford Company, preferred	..	..	99	101
General Motors Company, com	46½	47½	36¼	36¾
General Motors Company, pfd	82½	84	79	79½
B. F. Goodrich Company, common	242	245	77	77½
B. F. Goodrich Company, pfd	116½	118	107¼	108¼
Goodyear Tire & Rubber Co., com	230	240	330	334
Goodyear Tire & Rubber Co., pfd	105	107	105	107
Hayes Manufacturing Company	..	..	..	97
International Morot Co., com	..	..	27½	25½
International Motor Co., pfd	..	..	84	85
Lozier Motor Company	..	..	50	60
Miller Rubber Company	..	..	142	150
Packard Motor Car Co., pfd	..	..	105	107
Pope Manufacturing Co., common	45	50	39	40
Pope Manufacturing Co., pfd	77	81	74	75
Reo Motor Truck Company	8½	10	9¾	10¼
Reo Motor Car Company	23	25	22	24
Studebaker Company, common	..	..	44	45
Studebaker Company, preferred	..	..	95	96¼
Swinehart Tire Company	..	..	95	97
Rubber Goods Company, common	..	..	100	105
Rubber Goods Company, pfd	..	..	107	110
U. S. Motor Co., common	32	33½	41¼	41½
U. S. Motor Co., preferred	74	75½	17¾	18¼
White Company, preferred	..	..	107½	..

settled when full satisfaction was entered on the records of court of Common Pleas No. 4.

In May, of 1910 the Westinghouse company contracted to build for the Bergdoll company 1,000 gasoline motors to be delivered at the rate of not less than 100 per month. After receiving and paying for 600 of the 1,000 motors the Bergdoll company declined to receive or pay for the balance, alleging as its reason, failure on the part of the Westinghouse company to make deliveries as agreed, and consequent losses in sales of automobiles in the construction of which the motors in question were to be used. As a result the Westinghouse company brought the above action.

By the terms of settlement the balance of the motors are to be shipped to the Bergdoll company as its needs require.

Atlas Plant Closed Temporarily

SPRINGFIELD, MASS., Aug. 19—The Atlas Motor Car Company has practically closed its plant temporarily because of its inability to secure motors for its product. Plans are under way for a directors' meeting at which the capital stock will be increased from $250,000 to $350,000 and an arrangement made to build the motors at the plant. The question of a reorganization will also be discussed. The company has orders approximating $200,000 on its books and these would be largely increased if the company had not been handicapped just at this time in getting motors.

Market Changes for the Week

The most important feature of the week's market was the advance in the price of Bessemer and open-hearth steel. Each advanced $1.00 on Monday, as a result of the pressure for shipments. Copper experienced a fractional loss in price on Thursday, remaining unchanged throughout the week. Tin was also a prominent feature of the metal market this week, due to active speculative operations, advancing the price 75 cents per 100 pounds. Fine up-river Para rubber rose 2 cents a pound during the week, closing at $1.19. Lead advanced 5 cents on Tuesday, being much firmer in tone, closing at $4.55.

Oil and lubricants remained at their old prices, with the exception of cottonseed oil and linseed oil, the former varying in price throughout the week, closing with a loss in price of 3 cents. Linseed oil closed at 68 cents, experiencing a loss of 2 cents, due to lack of interest of the consumers. Gasoline remained unchanged. Antimony advanced 1-2 cent a pound on Thursday, closing at 7 5-8 cents per pound. The variations for the week follow:

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, lb.	.07⅛	.07⅝	.07⅝	.07⅝	.07⅝	.07⅝	+ .00½
Beams & Channels, 100 lbs.	....	....	....	....	....	....	....
Bessemer Steel, Pittsburgh, ton	21.50	21.50	21.50	21.50	22.50	22.50	+1.00
Copper, Elec., lb.	.17½	.17½	.17½	.17½	.17½	.17½	....
Copper, Lake, lb.	.17¾	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	— .00⅛
Cottonseed Oil, August, bbl.	6.41	6.50	6.50	6.50	6.43	6.38	— .03
Cyanide Potash, 1 lb.	.19	.19	.19	.19	.19	.19	....
Fish Oil (Menhaden)	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime	.85	.85	.85	.85	.85	.85	....
Lead, 100 lbs.	4.50	4.50	4.50	4.50	4.50	4.55	+ .05
Linseed Oil	.70	.70	.70	.70	.68	.68	— .02
Open-Hearth Steel, ton	22.00	22.00	22.00	22.00	23.00	23.00	+1.00
Petroleum, bbl., Kansas crude	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa., crude	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine Up-river Para	1.17	1.17	1.18	1.18	1.19	1.19	+ .02
Silk, raw Ital.	.....	4.15	....	....	4.15	....	....
Silk, raw Japan	....	3.70	....	....	3.72½	....	+ .02½
Sulphuric Acid, 60 Beaumé	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs.	45.88	45.70	45.75	45.75	45.95	46.63	+ .75
Tire Scrap	.09	.09	.09	.09	.09	.09	....

Insurance Men Plan Boost

Point to Rise of Automobile Accidents From 3 to 22 Per Cent. of Causalty Total as Reason for Increase

Overlook Basic Cause for Excessive Losses Which Result From Present High Rates

HARTFORD, CONN., Aug. 17—Bertrand A. Page, vice-president of the Travelers' Insurance Company, of Hartford, Conn., has just returned from the convention of the International Association of Casualty and Surety Underwriters, held at Fortress Munroe, where he read a paper on the question of motor accident insurance. He pointed out that because the losses due to automobile accidents amounted in 1911 to almost 22 per cent. of the total accident insurance men are becoming very much alarmed. He showed that in 5 years prior to 1906 automobile losses amounted to less than 3 per cent. of all losses, rising rapidly since then. To meet this the insurance men are considering higher rates or less liberal policies. Among other things he said:

Ten years ago, roughly estimated, there were less than 100,000 pleasure automobiles in the United States and Canada. To-day there are at least 900,000 in use. While the auto claims have been steadily on the increase, there has been no appreciable diminution in horse and vehicle accidents. The average amount paid for claims under this heading for the 5 years, 1902 to 1906 inclusive, was 10.4 per cent. of the total losses. In the year 1911 we find horse and vehicle accidents constituting 6.6 per cent. of the total in amount of claims, and automobile accidents 21.8 per cent. of the total.

Indemnity claims from auto accidents May, 1906, to April 1, 1912, in the amount paid were in excess of the death losses during the same period; 548 claims were paid last year for cranking accidents alone. Of the 1335 auto claims in 1911 1317 were for indemnity losses.

It is our experience that the greater number of claims do not come from the reckless use of an automobile, and from the nature of the accidents they might occur to anyone however cautious and conservative. When the automobile first came into popular use it was assumed that an extra rate to cover the hazard was not expedient, because the proper use of an automobile is one of the customary diversions of outdoor life. We do not contend that it is any more hazardous to run an automobile now than it was ten years ago, but we do contend that because of its use being almost universal, the exposure is one which must be considered in connection with insurance of the select and preferred classes. That the average automobile owner personally operating and caring for same should pay an extra rate is evident from the figures heretofore quoted. There are those who cannot safely be insured at less than extra special hazardous.

We charge a chauffeur $10 per $1000—yet his position depends on his care in operating the car. He is experienced and does the right thing instinctively. He has nothing to divert his mind. His interest is not in scenery nor the beautiful ladies who adorn the tonneau. He has not spent the evening at the club, and if he wished to hold his position he learns early that there is a strict prohibition, applicable to chauffeurs only, against the mixing of alcohol and gasolene, even in small quantities.

It cannot be said that exposure is only an incidental one, such as hunting, fishing and other sports. The insured is at it daily or nightly from eight to twelve months in the year. We can assume the hunting hazard for two weeks to a month each year, but if our insured makes hunting his business we advance his rate from $5 to $15 per $1000.

Much has been said about the necessity for higher rates or a less liberal policy contract. With automobile accidents constituting in the year 1911 about 22 per cent. of the claims in amount and over 10 per cent. in number, it would appear that the remedy for the situation lies in the securing of an adequate rate in connection with the insurance of those who use automobiles daily. It is unfair to charge the non-user for the claims incurred by his more exposed neighbor.

Ten years ago there was practically no such thing as an automobile accident. Last year, claims from select, preferred and ordinary class risks were increased by automobile accidents 28 per cent., and this does not take into account horse and vehicle accidents caused by automobiles, nor injuries to pedestrians and persons on bicycles, motorcycles, etc., who were run over or into by autos. During the past few years, the automobile has been the big factor in increasing claim loss ratios, although unwarranted liberalizations in the policy contract have not been without their effect.

Carl Fisher Buys Into Esterline

INDIANAPOLIS, IND., Aug. 19—Carl G. Fisher and James A. Allison of the Prest-O-Lite Company, this city, have bought $100,000 of the capital stock of The Esterline Company, West Lafayette. The plant will be moved to the new horseless city, near the Indianapolis Motor Speedway.

The Esterline Company manufactures a graphic registering meter and various electrical specialties, including an adaption of the Berden system of electric lighting for motor cars. The company has an authorized capitalization of $200,000 and employs 200 men.

Canadian Ohio Stock Out

Company Puts $90,000 Worth of 7 Per Cent. Cumulative Preferred on the Market

Factory Will Be Established at Colborne, Ont.—Working Agreement With American Ohio Company

TORONTO, Aug. 19—The Canadian Ohio Motor Car Company for public investment $90,000 worth of 7 per cent. cumulative preferred stock at $100 per share, carrying a bonus of 25 per cent. common stock.

The manufacturing plant will be established at Colborne, Ont., where the company has been granted a valuable site and exemption from taxes for a period of 10 years.

The operating agreement between the Ohio Motor Car Company and the Canadian Ohio Motor Car Company is of material advantage to the Canadian company, inasmuch as it provides that the Canadian company shall have the exclusive right to manufacture and sell the "Ohio" car, and to the use and benefit of all patents, blue prints, tools, dies and general engineering, together with free service of the draughting department of the American company, and to receive the benefit of all experimental work both now and in the future, of the American company.

Canadian Foreign Trade Lively

MONTREAL, Aug. 19—It has been known for some time past that the Montreal office of the New Zealand Shipping Company has been placing a number of Canadian made automobiles in Australia and New Zealand, but few will be prepared to hear the dimensions to which this trade has grown. During the year ending May 1, 1,292 Canadian automobiles had been sent by New Zealand liners, and it is hoped to forward at least 1,800 during the ensuing year. The total number already shipped from the opening of the summer navigation season to date is 629.

The Shell company, of Canada, advises that a large cargo of gasoline was shipped on board the steamer *Electra* which sailed from Singapore for Montreal on August 5. The shipment comprises 1,500,000 gallons of gasoline and is expected to arrive in the harbor before the end of September. It will be discharged at the Racine pier.

Fall Motor Festival in Chicago

CHICAGO, Aug. 19—Plans have been made by the Chicago Automobile Trade Association for its annual fall festival, which has been scheduled for the week of September 14-21. In reality this is to be a street show, with Michigan avenue lighted at night, all the stores decorated and the 1913 models on view. As attractions there will be parades and other affairs which will bring out the prospects. The opening night there is to be a parade of commercial vehicles, which will include those machines which have taken part in the Chicago Motor Club's demonstration, which has been scheduled for September 10-13.

Gotham Protests High Gasoline

High local gasoline prices have brought about a storm of protest from New York garage proprietors who claim that the metropolitan district is being subjected to adverse discrimination on the part of the oil companies. According to leaders in the business, the price of gasoline sold to automobilists in New Jersey, Connecticut and up-state is around 18 cents a gallon while they are obliged to sell at 20 and 25 cents a gallon in order to break even on their gasoline business.

They state that the local government will be obliged to charge 30 cents if there is to be any material profit in the business. The point is made that the garage operators realizing that gasoline at an exorbitant level will tend to check the use of the automobile are heartily in favor of a readjustment of prices so as to foster wider use of the car.

A meeting has been called early in September when the whole matter will be threshed out from the viewpoint of the garageman and the user.

The Standard Oil Company denies any discrimination against New York and states that the level of prices established in New York applies equally to all the metropolitan territory. This price is 16 cents a gallon in wholesale lots and 21 cents a gallon delivered to garages in steel barrels in lots of 200 gallons or more.

The reason for the difference in prices is said to be founded upon the overhead charges of the local trade including the expensive equipment necessary for handling gasoline under the local ordinance, higher rentals and the price of labor here as against the cost of running a country garage.

N. A. A. M. Clears Show Issue

Some confusion in the minds of the trade may have arisen through the unwarranted use of the term National Show Circuit, as applied to the local show circuit, some of preparations for which have been handled by the National Association of Automobile Manufacturers.

The facts in the case, according to official announcement of the N. A. A. M. are that the only national shows to receive sanction are those to be held in New York and Chicago. At all others, manufacturer as such are barred from participation.

But, a circuit of dates for local shows which shall be handled and entered only by the local trade and for which manufacturers are authorized to loan a chassis or show car and to be represented by salesmen, if desired has been arranged as follows:

Cleveland, January 6-11.
Philadelphia, January 20-25.
Detroit, January 27, February 1.
Minneapolis, Feb. 10-15.
Kansas City, February 17-22.
Pittsburgh, March 3-8.
Boston, March 8-15.
Buffalo, March 17-22.

The dates February 24, March 1 will be assigned in a short time.

Vancouver Show in Full Swing

VANCOUVER, B. C., Aug. 15—The Vancouver second annual automobile show held under the auspices of the British Columbia Auto and Motor Trades Association and Premier McBride, is now in full swing, and is one of the finest automobile displays ever seen in Western Canada.

The exhibit embraces cars of every description—commercial and pleasure, gasoline, steam and electric, as well as a wide range of all motor accessories.

A little over 2 years ago there were twenty motor trucks in this city, and at present there are over 200.

There are in this city about 1,700 power-driven machines, including motorcycles and business trucks.

BUFFALO, N. Y., Aug. 20—The pathfinding crew for the third annual reliability run of the Buffalo Automobile Club to be made September 11-14 completed its labors Friday night in the Studebaker 30 car, which was sent from Detroit for the work of mapping out the course to be taken on the annual run. In the 4 days consumed for the completion of the course to be taken, 838 miles were traversed, the pathfinder returning to Buffalo every evening. An average of 210 miles daily was made by the pathfinder.

The winner of the reliability tour will be awarded sweepkstakes trophy for the ensuing year.

Peugeot Enters at Elgin

Grand Prize Winner and Two Other Cars of That Make Scheduled to Compete

Boillot, Goux and Zuccarelli, Grand Prize Pilots, Probably Will Be the Drivers Chosen

CHICAGO, Aug. 21—The Peugeot car which won the French Grand Prix will contest for racing honors in America, with its first appearance in the Elgin road races of August 30-31, in which it will be entered in the Elgin National Watch Company trophy race and the free-for-all. From Elgin the team will proceed to Milwaukee for the Grand Prix and Vanderbilt cup races.

A cablegram received by Paul Lacroix, American representative of the Peugeot, announced Monday that the three cars that raced in the French Grand Prix were already on the water, accompanied by three drivers, with the intention of taking part in in the American road races. It is anticipated that they will reach New York Saturday and be shipped immediately to Chicago, reaching Elgin on Tuesday, where they will be given a couple of days for practice. Just who the drivers are is not known, but it is anticipated that they are Boillot, winner of the Grand Prix, Goux and Zuccarelli.

Following this cablegram E. C. Patterson, of Chicago, and R. J. Collier, of New York, who started the movement to import the Peugeots, agreeing to be sponsors for them in the American races, made four entries in the Elgin road races—each being represented in two races on the second day. The third car also will be entered by Mr. Patterson as soon as he is notified by Mr. Lacroix that this can be done. These entries are made provisional on the cars getting here in time, which seems most likely now. If the cars race at Elgin, both Mr. Patterson and Mr. Collier will enter them at Milwaukee also.

Many Expert Drivers Entered

The French dressing given the races adds greatly to the International flavor of the contests which are being promoted by the Chicago Automobile Club, and the Elgin Automobile Road Racing Association, for already nominated are the Fiat of Italy, and the Benz and Mercedes, of Germany, while the American representation consists of the Knox, National, Stutz, Mercer, Mason, Falcar and Herreshoff.

The roll-call of drivers engaged shows a rare lot, consisting of the French trio, Teddy Tetzlaff, Erwin Bergdoll, Ralph Mulford, David Bruce-Brown, Hughie Hughes, Spencer Wishart, Harry Endicott, Len Zengel, Billy Knipper, Charley Merz, Gil Anderson, George Clark, Neil Whalen, W. G. Wordingham and several others. In the case of Bruce-Brown, his entry hinges on his closing a deal with E. E. Hewlett of Los Angeles for the same Fiat which he drove at Savannah last fall. Bruce-Brown's car which he drove in the French Grand Prix was not shipped from Italy until today, so that there is no chance of it getting here in time. As Hewlett has all three of his cars at Elgin now there seems to be no doubt as to his coming to terms with the two-time winner of the American Grand Prix.

Course Preparations

Work on the course is progressing rapidly and unless it rains the rest of the week, which is unlikely, it will be in shape by Saturday. Practice, however, will not start until Monday. Several of the camps already have been established, the Fiat, Mercer and Mason being here already.

Wm. K. Vanderbilt, Jr.'s personal representative, E. G. Williams, inspected the course being prepared for the four big motor classics to be run under auspices of the Milwaukee Automobile Dealers' Association on September 17, 20 and 21, and returned to New York on last Saturday full of enthusiasm and highly gratified over the selection of the roads and the progress of the work of reconstruction.

"It is fine," was the expression of Mr. Williams after being hauled over the 8.2 mile course. "It is much better than the Greenfield course you Milwaukeeans first thought of using for the big races. Those two 3-mile straightaways will add a touch of the real sport of motor racing, and I think some new marks will be hung up if the course proves as fast as it looks today. One of the best features of the roads you have selected is that high speed can be maintained throughout its length, for your turns are wider than the rule and of such shape and dimensions that drivers will not have to slow down to the extent that they do on less safer turns on other courses."

The work of surfacing the roads with a 70 per cent. asphaltum composition, with screenings, began on Monday morning. A. B. Chamberlain, of New York, who has the contract for oiling the course, arrived on Saturday and has already organized his crews. The first oil has been applied on the Town Line road, the upper or north leg of the course, but the bulk of the work will await a thorough drying of the surface, following heavy and continuous rains.

Rain Hindered Road Work

During last week there were showers on all but 1 day, and this has interfered slightly with the progress of the road work. However, before the contract was taken, allowances were made for exactly such conditions, and the completion of the work will not be delayed 1 day unless some serious situation should arise which cannot be discerned at this time. One week from Saturday the course will be ready for the space-eaters. The drivers already entered for Milwaukee who will be seen at Elgin, will beat it from the Illinois course to Milwaukee and find the course ready for preliminary practice when they arrive.

It is likely that no definite idea of how many cars and drivers will run in the four events at Milwaukee until the Monday following the Elgin meet. It is known, however, that sixty cars have already been nominated, meaning that each field will average fifteen cars. The light car classes, the Pabst Blue Ribbon and Wisconsin Challenge trophy events, are being well filled, the extra large cash purses and the beautiful cups being an inducement.

Fall Races for San Antonio

SAN ANTONIO, TEX., Aug. 19—At a recent meeting of the board of directors of the chamber of commerce of this city it was decided that an automobile race meet shall be held here October 24, 26, 27, as a feature of the annual Harvest Jubilee. Prizes aggregating $3,000 will be offered. Dr. W. A. Hering, of the San Antonio Automobile Club, was selected chairman of the committee which will look after the matter of arranging for the proposed races. Extensive repairs and improvements will be made to the local track and everything possible will be done to insure the success of the event.

GREENVILLE, MISS., Aug. 20—Heavy rains contributed to the failure of the Memphis Auto Trade Association's endurance test. Of the twenty cars that entered only five reached Greenville, the others returning after the heavy rains began. Two Cadillacs, an Overland, a Studebaker-Flanders and a Hudson pulled through the mud to this city. The Overland was damaged by going through a bridge, but despite the serious damage, repairs were made by the driver at the site of the accident.

ST. LOUIS, MO., July 8—The Automobile Club of St. Louis will soon have all preparations made for the annual reliability run of the organization, which this year is to take place in September. The exact dates have not been settled upon as yet. The route will very likely be to Glasgow, in the center of the state *via* the Cross-State Highway and back by a different route. This has not been decided definitely either.

Fourth annual tour of the Minnesota State Automobile Association entering the city of Minneapolis on the return from Winnipeg, Man.

Marmon Wins Badger

Is Now Permanent Holder of the Journal Trophy—Eight Cars Running at Close of Event

Records of the Runabouts So Close That Decision Is Left to the National Contest Board

MINNEAPOLIS, MINN., Aug. 16—With the Marmon entry, No. 1, victor in the touring car class and winner permanently of the Journal trophy, the fourth annual tour of the Minnesota State Automobile Association, its first international tour and most eventful run of its history, ended Thursday noon.

Eight cars remained in the running at the close. The Cutting and MacFarlan did not appear at the start, the Staver withdrew at the end of the second day and continued as official car. The pilot, pacemaker and press car stayed through. One of the non-contestant cars, that of President H. J. Clark, was abandoned in the mud at the end of the first half of the third day's run. The other non-contestant, Dr. H. G. Blanchard, of Waseca, Minn, ran through, although breaking three springs and an axle and having some tire trouble.

Owing to the closeness of the records of the Hupmobile and the Studebaker car driven by W. H. Soules, the decision as to the award of the *Daily News* trophy for the runabout class has been left to the national contest board. The unofficial points are twenty-two for the Hupmobile and twenty-one for the Flanders.

SCORE OF CARS FINISHING MINNESOTA TOUR

DAY. No. Name.	1	2	3	4	5	6	7	Total
1—Marmon	0	0	0	0	0	0	0—	0
*2—Hupmobile	5	0	7	0	3	4	3—	22
*3—Studebaker	9	0	0	12	0	0	0—	21
5—Cadillac	0	0	35	148	272	0	0—	455
7—Mitchell	0	0	3	0	0	191	3—	197
8—Paige-Detroit	9	21	114	65	12	23	0—	244
9—War.-Detroit	0	0	15	276	27	2	0—	320
11—Reo	0	37	3	7	3	15	0—	65

*Scores unofficial, have been referred to National Contest Board for decision.

The second half of the 7-day run was much easier on cars and drivers than the up-trip. A large part of the distance in North Dakota was over the Meridian road, which is in fair condition. The route from Winnipeg to the border at Emerson was on the east side of the river and far superior to the north-bound road, which was one of the worst found in the first three days of the endurance run. At Emerson a short trip was made west to Pembina, where the cars were cleared at the United States customs house.

While it was discovered that the north route through the middle part of the state and the White Earth reservation is not yet ready for persons who want easy touring, a perfectly feasible road was discovered returning to Minneapolis. A great part of the road is posted, the whole length of the Meridian road having two signs at each corner and slow signs on bad turns. This made the work easy for the pilot as well as the pacemaker. At intervals, a short cut had been made by the pathfinder, usually along the right of way of a railroad, which always resulted in a disagreeable run, owing to the recent rains in the district. Most of the mire holes encountered were on these detour roads, owing to the fact that the railroad, being high, acts as a dike and causes the water to stand on the gumbo soil.

Wilkin County Has Best Roads

The first dust encountered was in the sandy soil the last day as the route neared Minneapolis. Fine roads exist in the vicinity of Fergus Falls and Alexandria, favorite touring spots. Wilkin county, however, between McCauleyville and Breckenridge and between Breckenridge and Foxhome appears to have the lead for the Automobile Club of Minneapolis good roads bronze statue, hitherto in possession of Renville county, won in 1910. The reason for the award will be that the roads are consistently smooth and with good connections at culverts and bridges. Absence of chuck holes also moved the chairman of tht good roads committee, Louis Koch, to decide for Wilkin. Douglas county, in the famous park region of the state, has excellent and well dragged roads, but the occasional chuck holes worked in favor of Wilkin.

The return route from Winnipeg, being the older one, is more traveled than the western road. The scenery on the return trip is perhaps more beautiful, yet to the tourist the eastern route through the Indian reservation, who likes wild and untouched nature will appeal strongly. It transpired on the trip that the offer of the club trophy had resulted in much road work by the traversed counties and in an advance in road making methods due to the publicity of standard road building rules.

Automobile dealers on the tour were encouraged to believe there is to be a good market in their line for the 1912-1913 season, owing to the tremendous crops already harvested and being threshed, and to the interest taken at all controls in the merits of the various cars entered.

Two cars went through without mechanical trouble, the Marmon with perfect score, the Cadillac used cars with many penalties, but mainly for broken spring work.

The developments of the tour as to the stability of the various cars are found in the accompanying table.

The tire record shows as follows: No. 1, four Goodrich tires, no trouble; No. 2, Goodyear tires, two blow-outs, nine punctures, all rear tires; No. 3, Studebaker, two Firestone in front, two Morgan & Wright in rear, three inners in front tires; No. 5, two Millers in rear, two blow-outs, one Goodyear and one Hartford front, no trouble; No. 7, same Kelly Racine used on pathfinder trip, all blew out, altogether three blow-outs and eight punctures; No. 8, Kelly Racine, one puncture, one blow-out; No. 9, Kelly Racine, one blow-out, two rear punctures; No. 11, Goodyear, six punctures, three blow-outs; No. 12, Goodyear (old), one puncture and one blow-out, came in on Michelins; Brictson press car, Pierce-Arrow, four Goodrich tires covered with Brictson treads, same air as in the 1911 Glidden, no trouble. Paige pilot, Kelly Racine tires, no changes; pacemaker, Stoddard-Knight, Hartford and one Goodrich, two blow-outs and four punctures.

Dallas to Have a Speedway

Dallas, Tex., Aug. 19—Ed. A. Vaughan, a prominent local business man, is promoting the construction of a motor speedway to cost $250,000. The corporation, which will be known as the Dallas Motor Speedway Company, is well advanced toward organization. It is the purpose of the company to construct a 2-mile speedway on the Miller farm in Oak Cliff, a suburb of Dallas. The plans and specifications for the course, grandstand and other features of the enterprise have been prepared. The grandstand will have a capacity of 20,000 people and in addition to this there will be bleachers with a seating capacity of 10,000 people. The entire race course will be in view from the grandstand and bleachers at one time. The site for the proposed speedway is ideal. Mr. Vaughan says it is intended to have the speedway finished and ready for formal opening next May during the monster meeting of the Shriners.

200-Mile Sunday Race at Columbus

Columbus, O., Aug. 19—Entries are coming in satisfactorily for the 200-mile automobile race to be run off on Sunday, Aug. 25, at the Columbus Driving Park under the auspices of the Columbus Automobile Club. Assurances are given that there will be at least ten entries and possibly more. Among the number will be several Cino cars, a Columbus Firestone and others.

The committee in charge of the event will make every effort to keep the dust down upon the track and to that end have purchased 15 tons of calcium chloride which will be spread upon the track before the race is started.

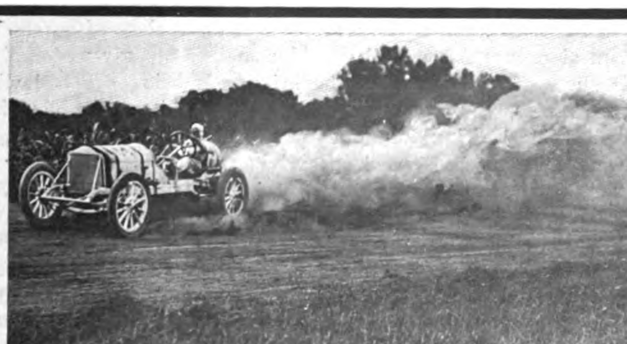
Burman Stars at Albany

Breaks New York State Record for Mile on Two-Lap Track, Covering the Distance in 1:12 4-5

Retains the Remy Brassard and the W. B. Trophy Besides Winning $50 Cash Prize

ALBANY, N. Y., Aug. 19—At the first official automobile meet ever held in Albany, Bob Burman in his Blitzen Benz car raced 1 mile in 1:12 4-5 on the two-lap track at Parr's Island here Saturday afternoon before 5,000 spectators, clipping 4 1-5 seconds from the previous record for a mile in New York State on a two-lap track, the previous record having been made at Binghamton 2 years ago. Burman was victor in five out of seven events, the first event being only for Albany drivers of high-powered cars and the final race being a non-stock, special event, free-for-all handicap, in which Burman, in Cutting, was defeated handily by Harry Kyle, driving his White car. However, Burman retained the Remy Brassard and W. B. Trophy, each valued at $2,500, winning two of three heats for Remy Brassard and easily beating Harry Kyle in fifth event for the W. B. Trophy. In addition, Burman captured a $50 cash prize by beating H. Kyle, in his White, in the third event, making 3 miles in 4:9 3-8. Summaries:

Driver	Car	
3-MILE RACE FOR ALBANY DRIVERS		
Dodds	Stutz	5:40
Earle	Jackson	
Cannon	Cole	
1-MILE DASH FOR RECORD		
Burman	Blitzen Benz	1:12 4/5
3-MILE RACE		
Burman	Cutting	4:09 3/5
Kyle	White	
3-MILE RACE FOR NON-STOCK CARS		
Burman	Ohio	4:20
Kyle	White	
Nickman	Mercedes	
Grennon	Benz	
3-MILE RACE FOR NON-STOCK CARS		
Burman	Cutting	4:07 2/5
Kyle	White	
3-MILE RACE FOR NON-STOCK CARS		
Burman	Ohio	4:18 3/5
Hickman	Mercedes	
Kyle	White	
Grennon	Benz	
3-MILE, NON-STOCK, FREE-FOR-ALL		
Kyle	White	4:45 2/5
Burman	Cutting	
Hickman	Mercedes	




Harry Kyle, who defeated Burman in the 3-mile, non-stock, free-for-all, kicking up the dust on the backstretch

News From Foreign Lands

Argentine Is a Great Automobile Country —Switzerland Prejudiced—New Dutch Substitute for Rubber

Motor-Driven Agricultural Implements of All Sorts Receiving Much Attention in France

BUENOS AIRES, ARGENTINA, Aug. 16—The Argentine Republic is keeping pace with other nations in her interest in and adaptation and use of the motor car. Buenos Aires is the center of activity in the rapidly-growing practice of making use of the motor vehicle in all of the phases of traffic where the automobile agreeably fits in—private pleasure cars, public conveyances, especially taxis, char-a-bancs to carry twenty passengers, post-office vans, commercial trucks, fire engines and accompanying apparatus, military and hospital ambulances, and the doctor's runabout.

Years before the motor vehicle was brought into use the public officials had seen to it that not alone the streets of Buenos Aires, but of the rural districts in general, were put into a travelable condition. The force of this statement must be apparent when it is known that there are 7,290,862.79 square meters of pavement in Buenos Aires alone. From these figures it will be seen that practically every street in the city is paved. So far as the country roads are concerned, their upkeep involves the latest methods, the steam roller and crushed stone entering conspicuously into the building of the public thoroughfares.

All motor-driven vehicles used in the republic are licensed in Buenos Aires, the rates for licenses varying from what in United States money equals $11 to $41 yearly. Every driver of a public taxi is required to carry a notebook containing a photograph of himself, together with traffic regulations affixed to its pages. The speed limit within all cities is 10 miles per hour. The law compels every owner or driver of a hackney carriage or taxi used for public service to be open, after the victoria pattern vehicle, this demand being made on the ground of hygienic necessities. Garages are not only numerous, but splendidly equipped and equal in efficiency to the best in any other part of the world.

The police, especially the mounted contingency, have supreme control in regulating street traffic.

All motor vehicles entering Argentina are required to pay a customs duty of 10 per cent. of value.

Of the 47,617 vehicles of all sorts in Buenos Aires 2,601 comprise private automobiles of all the best makes, the United States being well represented, 1,005 taxicabs and 140 motor trucks. Then there are the fire-engines and motor vehicles in other branches of public service. Of course, the automobiles in use in other sections of the republic bring the total number up much higher than indicated by the figures above. The people of that country demand the very best grade of automobiles and there is no other nation in which the possibilities of trade in high-class cars is greater. The cars must be demonstrated to their entire satisfaction. Besides, as is the case in other Latin countries, there are certain practices of credit to be observed. Custom has demanded it for generations, and it is the manufacturer who honors and pays heed to this rule who gets the business in Argentina. Another indispensable necessity is the practice of keeping a complete set of repair parts.

Down to the present time there is no factory in Argentina where the automobile is produced in its entirety. There are, however, quite a number of assembling plants, where imported parts are put together.

The fire department of Buenos Aires is essentially motor-supplied. The brigade is governed with military discipline and is dependent on the central police brigade and the minister of the interior. The brigade is 1,000 strong, having a complete complement of officers corresponding to a line regiment, with a colonel in command. A fully equipped station, involving motor fire-engines and every modern improvement, is installed in each police division. The cost of upkeep of the city fire brigade is $4,000,000 in Argentina (paper) money, equivalent to $1,760,000 of United States money, yearly. There is a similar automobile fire brigade, but smaller, maintained in each province of the republic.

In no other country in the world has the introduction of the automobile produced a greater revolution in traffic than in this aggressively modern Republic of Argentine.

Switzerland Still Unprogressive

Switzerland's heart is still in the wrong place, so far as its attitude toward motorists and motor cars is concerned. The car of the tourist is excluded from the most picturesque and romantic Cantons, even such as the Canton of Schwyz. Nor may the car traverse the glorious Grisons; nor over the lovely road from Landquart to Chur; the St. Gothard and Simplon passes; the lofty valley of the Engadine; the vicinity of the Maloja Lakes; the magnificent Axenstrasse high above the superlative Lake of Lucerne; St. Moritz; Davos; Pontresina; nor the Bernina, Maloja or Splügen passes. Not even the combined efforts of the Federal Government and the Swiss Automobile Club can succeed in overcoming the obstinacy of the Swiss people. And all because they declare that the dust kicked up by motor cars running over the roads would float over the fields, settle upon the grass and thus upset the digestive powers of the cattle. Evidently the Swiss are a people who do not hold that every cow is doomed to eat the conventional peck of dust during the period of her lifetime.

Rubber Substitute in Holland

A factory is under construction at Ymuiden, Holland, it is reported, where a rubber substitute invented by a Mr. Van der Heyden will be manufactured. The ingredients to be used are fresh fish meat and 15 per cent. of natural rubber which are mixed and treated by a secret process. Besides having all the desirable properties of natural rubber the new product is said to be insensible to the action of heat and benzine. It is also very cheap, as albumen is gained as a by-product and the wastes may be used for fertilizing purposes.

Motorizing Dublin's Fire Brigade

Captain Purcell, chief officer of the Dublin Fire Brigade, has set out on a mission of economy, by means of which he hopes to revolutionize the fire-fighting system of the United Kingdom. His plans fall nothing short of motorizing every brigade, and at the same time preventing the present existing patterns of horse-drawn fire engines from being consigned to the scrap-pile. Captain Purcell's scheme is to strip off the pole and whiffletrees from the engine and attach a motor tractor in place of horses.

Not alone are some of the Dublin engines already undergoing this stage of evolution, but the brigade is being supplied with four-cylinder, 50-horsepower engines of the internal combustion type, having dual ignition, and forced lubrication to all bearings. The transit gear is stopped on arriving at a fire, and a lever is moved by means of which the pump is coupled up to and driven by the same engine. This pump is of the centrifugal pattern, manufactured in gun-metal, and, when connected up to the hydrants, considerably augments the pressure available in the water mains. In order to create an instantaneous vacuum, a special air pump is provided, when it is found necessary to lift water by suction from an open reservoir. The capacity of this pump, while making its normal speed of 1,750 revolutions per minute, is 350 gallons every 69 seconds, forcing the water to a height of 300 feet, while maintaining a pressure on the hose delivery of 120 pounds to the square inch. At a lower pressure it will deliver even a greater quantity.

Each engine has accommodations for carrying ten men, in addition to .26 gallon of fuel in lockers—tools, standpipes, smaller appliances, 2,000 feet of delivery hose, and 32 feet of 5-inch suction hose. The method of steering the motor comprises an apparatus by which the front wheels pivot in the center of the hubs, thus relieving the gear from shocks and transmitting them to the axle direct. The tires, broad and flat, are of the solid rubber sectional block type, built to encounter snow or soft ground with no danger of skidding.

Not alone is Dublin's fire brigade equipped with the new motor fire engines, but many of the suburban towns, like Ball's Bridge, Blackrock and Kingstown are provided with up-to-date motor fire-fighting apparatus.

Automobiles in Yucatan

According to tax records, there are today 103 licensed private automobiles in Merida, 6 of which are electric. Commercial vehicles have not been introduced, and it is not likely that they would find ready acceptance, in view of the cheaper mode of transportation by cart. The most popular types of car are the 5-passenger touring car and the runabout, of 20 to 30-horsepower, four cylinders, and a gear ratio of 3.5 or 4.2 to 1. No particular attention seems to be paid to the finish. A chauffeur's license costs 75 cents and an automobile license for any size car costs $5 monthly. There are four garages in Merida, but they do not carry on hand a large supply of repair parts. The local market seems to have been well looked after, but it is probable that there will be further opportunity for sales when conditions improve. American cars have given good satisfaction, as is shown by the fact that in the last 3 years importations of automobiles from the United States amounted to $43,990, as compared with $19,002 from France.

French Agricultural Motor Tests

WASHINGTON, D. C., Aug. 19—Bartley F. Yost, consular assistant at Paris, reports to his department that the subject of motor power for agricultural implements is receiving more and more attention in France. The third annual contest of the Automobile Club of France, in which prizes are offered to farmers having attained the greatest success in the use of motors, will be opened this year in a dozen different departments. Farmers who wish to take part in these contests, according to Mr. Yost, are required to furnish information as to the area of their tillable soil, nature of crops produced, number and kinds of animals used in their work, designation and origin of motors used in their work, name of the manufacturer of the motor, nature of combustible used, force in horsepower, kinds of implements and machinery propelled, date of installation of motor, and results obtained.

American concerns interested in the results of these tests should apply to the president de la Commission agricole de l'Automobile Club de France, 8 Place de la Concorde, Paris.

American Automobiles in Ceylon

WASHINGTON, D. C., Aug. 19—Charles K. Moser, United States consul to Colombo, in reporting on the trade and industries of Ceylon, says, under the heading, "Automobile Trade-Gasoline Imports:"

"During 1910-11 193 motor cars were imported, of which 9 came from the United States. During the last six months of 1911, 118 motor cars were imported, of which the share of the United States, according to the official figures, was 17. Probably half as many more cars of American make were brought into the island from other countries. It is expected that during 1912 from 100 to 150 motor cars will be imported, and there is a good market here for American cars that can carry out cata-

Calendar of Coming Events

What the Months Ahead Have in Store for the Automobilist—Shows, Conventions, Race Meets, Etc.

American and Foreign Fixtures of Importance Set Down in Chronological Order

Shows, Conventions, Etc.

Aug. 24-Sept. 9....Toronto, Can., Display of Automobiles, etc., at Canadian National Exhibition, Transportation Building.
Sept. 5-15.........San Jose, Cal., Automobile Show, San Jose Automobile Dealers' Association.
Sept. 14-21........Chicago, Ill., Annual Fall Festival and Show, Chicago Automobile Trade Association.
Sept. 17-20........Denver, Col., Convention International Association of Fire Engineers.
Sept. 23-Oct. 3.....New York City, Rubber Show, Grand Central Palace.
Dec. 7-22 ....Paris, France, Paris Automobile Show, Grand Palais.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 11-25, 1913...New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Feb. 1-8...........Chicago, Ill., Annual Automobile Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 24-March 1...St. Louis, Mo., Annual Automobile Show.
March 3-8.........Pittsburgh, Pa., Annual Automobile Show.
March 8-15........Boston, Mass., Annual Automobile Show.
March 17-22.......Buffalo, N. Y., Annual Automobile Show.
March 19-23.......Boston, Mass., Annual Truck Show.
March 24-29.......Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Aug. 30-31........Elgin, Ill., Road Races, Chicago Automobile Club and Elgin Automobile Road Racing Association.
Sept. 1-2..........St. Louis, Mo., Track Races, Universal Exposition Company.
Sept. 2............Indianapolis, Ind., Speedway Meet.
Sept. 2............Winnipeg, Man., Track Meet.
Sept. 3-6..........Chicago, Ill., Commercial Vehicle Reliability Run, Chicago Motor Club.
Sept. 11-14........Buffalo, N. Y., Third Annual Reliability Tour, Automobile Club of Buffalo.
Sept. 17...........Milwaukee, Wis., Grand Prize Race.
Sept. 20...........Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.
Sept. 21...........Milwaukee, Wis., Vanderbilt Cup Race.
Sept. ....Washington, D. C., Reliability Run, Automobile Club of Washington.
Oct. 7-11..........Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 12............Salem, N. H., Track Meet, Rockingham Park.
Nov. 6.............Shreveport, La., Track Meet, Shreveport Automobile Club.

Foreign.

Sept. 26-Oct. 6....Bourges, France, Agricultural Motor Car Exposition.
Nov. 8-16.........London, England, Olympia Automobile Show.
Jan. 11-22.........Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.

logue promises. The great complaint one hears against American motor cars is that they are lightly and carelessly built and that they do not stand up.

"The steady increase in the market for motor cars is reflected in the imports of gasoline. In 1909, 66,203 gallons were imported; in 1910, 136,646 gallons; in 1911, 206,028 gallons, valued at $83,533. Of this amount only 800 gallons were American gasoline, and yet American gasoline is admittedly far superior to Borneo gasoline and is sold to local consumers at from $0.06 to $0.10 per gallon cheaper. A local dealer gives two reasons for this: The prejudice which exists in this community against most American products, and the fact that the Borneo gasoline was first in the market and is now sold to wholesalers and consumers under a contract by which they are bound not to use any other."

GLASGOW has done away with every horse-drawn fire-engine in the city, with a single exception. Her fire brigade is now equipped with sixteen motor fire vehicles. The last instalment comprised eight turbine pumps and one motor car.

FRANCE now has in use 85,000 motor cars, her last year's production having been 40,000; Germany, in use, 50,000; production, 15,000; Italy, in use, 15,000; production, 5,000.

The AUTOMOBILE

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The Designing Program

THERE are some cars that are designated one-engineer machines; there are others that are engineering-corps machines; these two classes of cars are very different products.

The first class is the outcome of the brains of one man, together with whatever good he abstracts from the products of other makers. If he is not too individually obstinate, to avail himself of such opportunities.

The second class is the product of several engineers, some of whom may be chief engineers and the others engineers who have been called into consultation on different points that arise in conjunction with the bearing problems of the machine, the ignition problems, the self-starter questions, carburetion, axle design and the many other departments that call for special engineering knowledge.

History reveals in the short span of American automobile history many examples of the one-engineer machine and there is a common factor in nearly all, namely, that the course has been an expensive one to the maker and is generally a course that has had to be reformed because of financial exigencies. The one-engineer car is really almost impossible to conceive, particularly when that engineer looks upon himself as a magneto expert, an efficiency factor in the carbureter problems, a quantity to be reckoned with in bearings and their manufacture, the last word in suspension, the Alpha and Omega in gearbox design as well as the oracle of a score of other departments of engineering in automobile manufacture.

The last 10 years of automobile history show how expensive the one-engineer principle has been to a few makers, where the one man was responsible for everything from the rear axle to a new lubrication system for the motor, at the same time serving as factory superintendent and advisory head for every department in the factory. A new model brought out under such individual pressure is launched on the stormy seas of its career and scarcely has it cleared the harbor than the rocks have grated on the keel. The rear axle has developed a noisy differential, it has developed a weak bearing, it has developed weak studs in the differential, it has developed an oil leak which eventually reaches the brakes and it has developed not a few other structural weaknesses.

The gearbox of this one-engineer car has shown similar defects and the cost of correcting them after the model has been launched becomes enormous. It may be that the clutch brake has not had adequate adjustment provisions; accessibility has been unnecessarily sacrificed between the motor and gearbox, the brakes have not been increased commensurately with higher motor power due to larger valves, lighter reciprocating masses or improved ignition. The one engineer could not do it all. The final result has been expense from first to last, expense coupled with a reduced reputation, expense coupled with overworked maintenance departments and expense coupled with a club placed in the hands of every rival maker.

With an engineering-corps organization such troubles are largely eliminated, they being met face to face in the early evolution of the design and corrected before placed on the 1913 market. One of the best-known American automobile engineers was quite free recently in telling about the different consulting engineers whom he engaged to wrestle with him in the problems of his new model. He engaged the best to eliminate the bearing noises in the gearbox; he engaged others to work out the weaknesses of the self-starting outfit; he engaged others to solve the problem of proper motor size with reference to car weight and speed; he engaged a transmission expert to aid in the selection of gear ratios between motor and rear wheels for the different speeds; he engaged others who were expert in body work, with the hope of reducing body squeaks to the minimum; and this engaging of or consulting with experts could be described still further, but sufficient examples have been cited to show the wisdom of the engineering-corps cars as well as to indicate how it is economy to develop a new model along such broad-gauge lines.

A company bringing out a car under the engineering-corps system is assured of the kinks being eliminated before the model has been passed upon; it is assured that the whims of individual engineers will not find a place in the car total without having been laid threadbare before the other engineers who were called into consultation or were on the regular engineering staff. It is assured that some discarded feature of design will not be continued because one engineer desires that it should be so; it will be assured that some valuable new factor will not be left off the design because one engineer had some whim against its adoption; in a word, the car will be an engineering construction and not a composition of the whims of one man. The car will be a rational unit rather than a motor with entirely unsuited chassis parts, or as it has been in some cases a new type of carbureter with the remainder of the car subservient to this one part. The business factory must insist on the engineering-corps method of production. It is the only safe one, it is the only one that will keep abreast of the times and produce for the company that share of the industry's profits which its organization merits. The manufacturer who, led by a false sense of economy, tries to make larger profits by conducting his works on a one-man basis, is bound to court failure in the long run if he keep up his policy, and a big loss even if he drops it after having at length learned his lesson. Competition is growing keener every day, and the sooner he will see his way to fall in line with the trend, the surer will be his success.

Henry F. Donaldson, S. A. E. President, Dead

Had Been An Important Figure in the Automobile Industry for Over a Decade—After Wide Experience in Journalistic Work, He Became Prominent in the Motor Publication Field—For Several Years Editor of "The Automobile"

HENRY F. DONALDSON, president of the Society of Automobile Engineers, died suddenly at his home, 508 West One Hundred and Forty-ninth street, New York, on Tuesday, August 13. Mr. Donaldson had been an important figure in the automobile industry for 10 years and his sudden death came as a shock and a sorrow to his multitude of friends and business and personal associates.

Henry F. Donaldson

Mr. Donaldson's progress in the industry was rapid and steady and he was at the summit when death's summons reached him. He was a man of broad sympathies and warm-blooded friendships. As a star reporter 20 years ago it was not below his dignity to extend a helping hand to the struggling cubs and for that reason, among others, his name is held in respect throughout that mysterious realm known as the Fourth Estate.

As an engineer he was well founded by careful preparation at one of the great Glasgow universities where he took the classical course as well as that in marine engineering and was an honor man in his class. As a writer and editor, he graduated from the mill of metropolitan journalism and carried his wide knowledge of technique into his automobile work.

He was of Scotch-Irish descent, like many thousands of others who have made their mark in journalism. His first work was in a Glasgow shipyard, where he rose to a position of authority in a short time. Despite his powerful physique of late years, he was a delicate youth and the exposure and irregularity of his work in Glasgow undermined his physical stamina, causing him to seek health in the United States. About 1888 he worked as a reporter in Chicago and when the Chicago *Times* was reorganized he was employed on the local staff, handling many of the leading stories. Later he worked on other Chicago newspapers and eventually heard the call to New York. His daily work in the metropolis was largely on the New York *Times*, where he was employed until about 1895. He was one of the founders and chief editor of *Marine Engineering*, the leading marine engineering publication of the world. About 1900 he sold his interest in the paper to his partner and in 1902 was appointed editor of The Automobile.

After being engaged for that work, Mr. Donaldson was sent on an extensive foreign and American tour to inspect the status of the industry, assuming the editorial chair in the fall. He continued as editor of The Automobile for several years. He was one of the pioneers to recognize the tremendous importance of the automobile truck as a factor in commercial life and was one of the founders of the *Commercial Vehicle*.

When the reorganization took place last year, Mr. Donaldson sold his interest in the publication and went into partnership with Joseph Tracy as consulting automobile engineer.

He had always been interested in the organization work of the Society of Automobile Engineers and assisted in every way possible. The work was recognized by the society and Mr. Donaldson was honored by election as its president last January. He was a leading spirit in getting up the European trip of the society last fall and aided in making that trip a big success. He was largely accountable for the recent summer excursion of the society, when the sessions of the organization were held on board a lake steamship, which proceeded from Detroit to the head of Lake Huron and return.

Mr. Donaldson was 45 years old. He leaves a widow, but no children.

The Council of the Society of Automobile Engineers has passed the following resolution on the death of President Henry F. Donaldson:

RESOLVED, that the Society of Automobile Engineers, through its Council, greatly deplores the death of its President, Mr. Henry F. Donaldson, whose capable and energetic work for the Society during the past year is widely recognized and who was respected and beloved by all of his associates for those brilliant attainments of mind and sterling qualities of manhood that raised him above the ordinary level of mankind, making him a natural leader and an unwavering advocate of that which was right and noble and generous; and be it further

RESOLVED, that the Society extends its deepest sympathy to his immediate family and other relatives in their grief over their great and irreparable loss.

Annual convention of Mitchell distributors at the Mitchell-Lewis factory, Racine, Wis., where they inspected the 1913 models

DETROIT Demountable's Yearly Meeting—The Detroit Demountable Rim Company held its annual meeting at Detroit, Mich., last week, when new officers were elected. The company has been manufacturing rims for but one year and has sold about 100,000 sets of various types of rims.

Buick Ships 1913 Models—The Buick Motor Company, Flint, Mich., has made its first shipment of assembled cars of the 1913 model. A carload went to San Francisco, the first city to receive next year's line of cars. Shipments will be made from day to day to the agencies farthest from Flint in order that the distant points may be served at the same time as the closer ones. To-day 3,000 men are on the payroll, the production is 90 days ahead of last year and the shipments are 60 days ahead of time.

Cole Representatives Confer—Cole representatives from all parts of the globe spent a day recently familiarizing themselves with the Cole product at the plant, Indianapolis, Ind.

Rowan Joins Clark-Carter—F. S. Rowan has assumed the position of advertising manager of the Clark-Carter Automobile Company, Jackson, Mich., manufacturer of Cutting cars.

Eisemann's Factory Sales Branch—The Eisemann Magneto Company has opened a factory sales branch in Indianapolis, Ind. The branch has a complete repair shop and service station.

Ward with American—J. M. Ward, secretary of the Indiana Automobile Manufacturers' Association, has been appointed assistant sales manager of the American Motor Company, Indianapolis, Ind.

Callan to Explain Law—Hon. Albert S. Callan, author of the present New York State automobile law, is to speak at the West Side Y. M. C. A. August 29; at 8.15 p. m., on the New York State Automobile Law.

Add Supply Department—The New York Coach and Auto Lamp Company, New York City, manufacturer of automobile lamps, has added an automobile supply department to do wholesale jobbing in accessories of all kinds.

India's Pioneer Automobile Man—Kavashah D. Wadia of Bombay, India, is in America for a week's stay. He is the pioneer automobile man of India. While here he will probably take up the matter of introducing more American cars in India. He will stop at the Prince George, New York City.

Moore with Gramm-Bernstein—W. H. Moore has given up his position as sales manager of the Gramm Motor Truck Company, Lima, O., to take the position of general sales manager of the Gramm-Bernstein Company, of that city.

Adds Automobile Supply Department—The New York Coach & Automobile Lamp Company, New York City, has added an automobile supply department where wholesale jobbing will be done in automobile accessories of all kinds.

Kraatz with Beaver Company—F. O. Kraatz has been employed by the Beaver Manufacturing Company, Milwaukee, Wis., to act as outside man for the purchasing department. He will assist in securing prompt shipments of raw materials.

Indianapolis Company Opens Salesroom—The Indianapolis Motor Car Company, Indianapolis, Ind., has opened a new salesroom where it will handle the Flanders electric and Everitt. It will continue the truck salesroom and garage as heretofore.

Fosdick with Hupp Company—An important addition to the forces of the Hupp Motor Car Company is announced in the appointment of Harry Fosdick as assistant general manager with particular reference to the supervising of agencies and sales distribution.

Splitdorf Service Station Complete—After September 1 the premises at 18-20 West Sixty-third street, New York City, will be the New York headquarters for the whole line of Spiltdorf ignition devices. Oscar J. Rohde will be in charge of the new Splitdorf headquarters.

Makes 90 Miles Speed Limit—The old town of Westmoreland, near Huntington, W. Va., has made a revolutionary step and fixed the speed limits within its borders at 90 miles an hour, as is announced on huge signboards. The reason for this ordinance is that lower speed limits are apt to be ignored.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Boston, Mass.	Abbott-Detroit	Frederick A. Dutton
Boston, Mass.	Krit	Dayton G. True
Baltimore, Md.	Marmon	Walter Scott
Battle Creek, Mich.	Franklin	American Motor Co.
Boswell, Ind.	R-C-H	Levi S. Orr
Casper, Wyo.	Cole	Casper Machine & Garage Co.
Charleston, S. C.	Cole	King Auto & Repair Co.
Cheyenne, Wyo.	Cole	Boyle & Joffee
Conrad, Mont.	Chalmers	C. H. Drake
Baltimore, Md.	Rambler	Chesapeake Garage Co.
Baltimore, Md.	Studebaker	Colonial Garage Co.
Buffalo, N. Y.	Hudson	Chas. E. Flory
Canton, Ill	Henderson	Meade McClatchey
Chicago, Ill.	Henderson	J. G. Tennant & Co.
Dallas, Tex.	R-C-H	R. H. Davis & L. P. Turney
Davenport, Ia.	R-C-H	Knueppel & Ott
Decatur, Ill.	Henderson	F. D. Parker
Edmonton, Alb.	Henderson	Standard Motor Car Co.
Elizabeth, N. J.	R-C-H	Franklin Auto Co.
Elizabethtown, N. Y.	R-C-H	V. W. Prime
Enderlin, N. D.	R-C-H	B. N. Eagle
Fall River, Mass.	Henderson	F. W. Davis & Co.
Galveston, Tex.	Cole	John Christenson & Co.
Granville, N. Y.	R-C-H	G. C. Walker
Hamilton, Mont.	Chalmers	W. H. Beck
Harvard, Ill.	R-C-H	W. F. Wittmus
Haverhill, Mass.	R-C-H	Samuel E. Cass
Independence, Kan.	R-C-H	J. A. Pinkston
Indianapolis, Ind.	Nyberg	Finch & Freeman
Landor, Wyo.	Cole	Cole & Co.
Beads, S. D.	Cole	Blodgett Brothers
Lewiston, Mont.	Chalmers	J. H. McCraskey
Louisville, Ky.	Stutz	Commercial Car Co.
Lowell, Mass.	R-C-H	City Hall Garage
Madison, Wis.	Chalmers	W. H. Hobbs Supply Co.
Madison, Wis.	Ford	Schoellkopf Co.
Madison, Wis.	Kisselkar	Spooner-McConnell Auto Co.
Madison, Wis.	R-C-H	Spooner-McConnell Auto Co.
Milwaukee, Wis.	Marion	W. E. Allen Co.
Milwaukee, Wis.	McFarlan	W. E. Allen Co.

PLEASURE CARS

Place	Car	Agent
Milwaukee, Wis.	Regal	Wagner & Johnson
New Brunswick, N. J.	R-C-H	New Brunswick Garage Co.
North Yakima, Wash.	Franklin	Franklin Auto Sales Co.
Norton, Mass.	R-C-H	A. W. Sibley
Oconto Falls, Wis.	Ford	Munsert-Carlson Co.
Paterson, N. J.	R-C-H	F. P. Venable
Philadelphia, Pa.	Warren-Detroit	Boulevard Garage & Sales Co.
Plattsburg, N. Y.	R-C-H	R. W. Squires
Plymouth, Pa.	Michigan	L. R. Koons & D. F. Hallier
Portland, Ore.	Buick	Buick Motor Car Co.
Portland, Ore.	National	Buick Motor Car Co.
Red Lodge, Mont.	R-C-H	J. P. Plunkett
Ridgeville, Ind.	R-C-H	J. Carpenter
Rutland, Vt.	Cole	Coton-Brewster Co.
Seattle, Wash.	Detroiter	Olympic Motor Car Co.
Seattle, Wash.	Franklin	A. W. Wicks
Sheboygan, Wis.	Studebaker	Sheboygan Automobile & Supply Co.
Somerville, N. J.	R-C-H	Thomas Motor Car Co.
South Bend, Ind.	R-C-H	Johnson Beattie Auto Co.
Spokane, Wash.	Peerless	W. J. Healy.
Spokane, Wash.	Rauch & Lang	W. J. Healy
Springfield, Ill.	R-C-H	R. Haas Elec. & Mfg. Co.
Springfield, Mass.	Henderson	Forest Park Garage
Sullivan, Ind.	R-C-H	E. S. Crowder
Toledo, O.	Regal	Bowersox Motor Sales Co.
Twin Falls, Ida.	Franklin	Swim & Aldrich
Victoria, B. C.	Franklin	G. Harold Grant
Worcester, Mass.	Pope-Hartford	Coton-Brewster Co.
Zion City, Ill.	R-C-H	Duncan G. Bellows

ELECTRIC CARS

Buffalo, N. Y.	Hupp-Yeats	Louis G. Schoepflin
Louisville, Ky.	Standard	Dunham Auto Co.

COMMERCIAL VEHICLES

Dallas, Tex.	Lincoln	Fife & Miller
New York City	Lincoln	Rockwell Motor Transportation Co.

Sudrow Sales Manager Marion—F. G. W. Sudrow has been appointed sales manager for the Marion Motor Car Company.

Williams with Swinehart—The Swinehart Tire & Rubber Company has secured A. E. Williams as advertising manager. He was formerly with the Firestone Tire & Rubber Company.

Change in Pope Hartford Agency—The Pope Hartford Company has made a change in its agency at Worcester, Mass., giving it to C. D. Brewster, of Marlboro, and Eugene L. Caton, of Worcester.

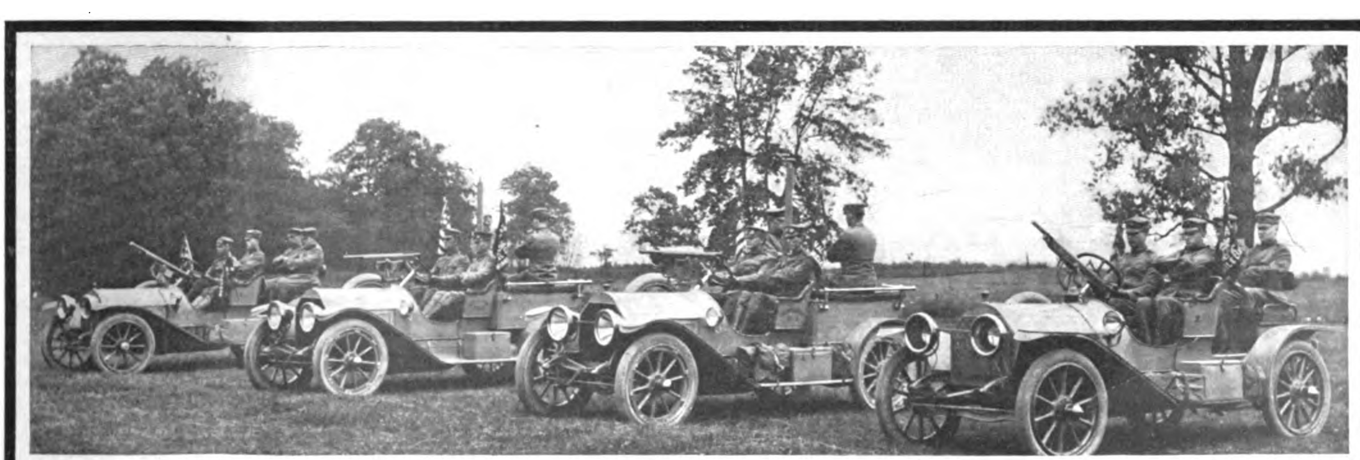
Paige Goes to Boston—M. R. Paige, sales manager of the Moline Wagon Company, Moline, Ill., has gone to Boston, Mass., to join the Boston branch of the Velie, taking charge of the commercial department.

Goodyear Branch Moves—The Goodyear Tire & Rubber Company's branch has been removed from 1026 Connecticut avenue to 1016 Fourteenth street, Washington, D. C., where a three-story brick and stone building has been erected by the company.

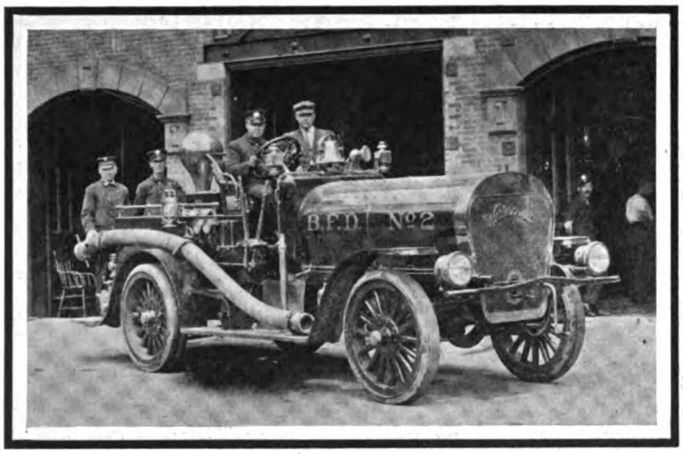
Marathon Agency Expands—The Marathon Sales Company, Baltimore, Md., which handles the Marathon cars, has opened showrooms at 1117 Hunter alley. The service station will be continued at 10 Morton street.

Mitchell Service Building Enlarged—The Mitchell Automobile Company, Milwaukee, Wis., has reopened its service building and sales headquarters. Two stories have been added and the equipment of the plant doubled. N. R. New is manager at Milwaukee.

Guatemala Buys Cars—The Government of the Guatemalan republic recently bought four Cadillac automobiles for the use of its army. The cars, which are shown on this page, were equipped with a field piece each, and two of the four were also fitted with wireless equipment. Mr. Camacho instructed a number of soldiers in the operation of the cars, a class for this purpose being organized in the Guatemalan military academy. After 4 months' tuition, the soldiers proved efficient chauffeurs, although there are practically no roads outside of Guatemala City, the capital of the republic, where all the instruction was given.



Four Cadillac cars fitted with field guns purchased by the Government of the Republic of Guatemala for army use



Watrous pumping engine in use at Bridgeport, Conn.

Wishart to Drive Mercer—Spencer E. Wishart has been added to the Mercer racing team. He will drive a Mercer raceabout in the series of contests to be held in middle West.

Fitzsimons Leaves Thomas—George Fitzsimons has resigned his position as sales manager of the E. R. Thomas Motor Car Company, Buffalo, N. Y., to take effect September 1.

Change in Cole Agency—The firm of Setzer & Beach, Bridgeport, Conn., has been dissolved. The new organization, under the name of Bernard Setzer, will continue to handle the Cole.

Taylor with Philadelphia Garage—William T. Taylor, formerly local branch manager of the Warren, has been appointed sales manager of the Boulevard Garage & Sales Company, Philadelphia, Pa.

Stuart Joins Hatch Forces—Arthur J. Stuart, formerly connected with the Kissel Kar Company, has been appointed sales manager of the Mason B. Hatch Company, Main and Northampton streets, Buffalo, N. Y.

Potomac Company to Move—The Potomac Motor Car Company, Washington, D. C., has leased 1226 Connecticut avenue N. W. for a term of years, and after exclusive improvements will remove from its present quarters.

Baker Abandons Yearly Models—The Baker Motor Vehicle Company, Cleveland, O., has abandoned the idea of the yearly announcement of new models. That they have found it a better policy to simply give continuously to the purchaser the benefit of the best and latest improvements.

Buffalo Company Reorganizes—At a reorganization of the Positive Clutch & Pulley Company, Buffalo, N. Y., manufacturers of patented power transmission appliances, Ulysses L. Caudell was elected president; Thomas A. Chisholm, vice-president and Geoffrey T. Clarkson secretary-treasurer.

Leech Oakland Philadelphia Manager—Edward K. Leech will assume the management of the Philadelphia, Pa., branch of the Oakland Motor Company, Pontiac, Mich., to be established here September 1. Mr. Leech came from the *Commercial Car Journal*, Philadelphia, Pa., where he was general manager.

Ewing Resigns from Nyberg—Oscar R. Nyberg has resigned from the Nyberg automobile Works, Anderson, Ind., as head of the publicity and advertising department, to return east to complete his course in the Harvard Law School. C. A. Lawrence, city editor of the Anderson Morning Herald, will succeed him.

Philadelphia Trolley Company's Complaint—The Fairmount Park Transportation Company, Philadelphia, Pa., has lodged a complaint against the sightseeing automobiles, claiming that the use of the roads through the park for business is a violation of a rule of the commission barring business vehicles from the park drives.

Bridgeport Buys Pump Automobile—The city of Bridgeport, due to the demands of the Board of Fire Commissioners, has purchased a new $10,000 Watrous gasoline pumping engine. This will be stationed in the thickly populated section east of the Pequonnock. The engine is rated at 126 horsepower and is capable of driving the machine at a speed of 40 miles an hour.

North Shore Express Line—The People's Express Company, operating a fleet of motor trucks along the North Shore of Massachusetts from Boston to Newburyport and Amesbury, has found the business so profitable that an order has just been placed with the Myer Abrams Company of Boston for three 3-ton and one heavy-duty 5-ton Lauth-Juergens vehicles for additional service.

May Have Bus Line—A big transportation company of New York that has been studying the park resorts of New England has made overtures to the officials of Riverside park, Springfield, Mass., for permission to run a bus line from Springfield to the park next season. The transportation company promises a 20-minute run with five big machines, the route to follow the river road in Agawam. The street cars are so crowded now that it is impossible often to get seats or even standing room on the electric cars.

Automobile Incorporations

AUTOMOBILES AND PARTS

AKRON, O.—Ideal Commercial Car Company; capital, $200,000; to manufacture motor cars, engines trucks, etc. Incorporators: H. C. Gates, A. Tschantz, A. J. Dettoff, M. Stump, E. E. Quirk.

BOSTON, MASS.—Republican Motor Company of Massachusetts; capital, $1,000; to manufacture automobiles. Incorporators: Norman J. MacGaffin, E. M. Churchill.

BOSTON, MASS.—Motor Monitor Company; capital, $20,000; to manufacture engines. Incorporators: Howard P. Soule, Gardner W. Chase, Richard S. True, Jr.

COLUMBUS, IND.—Columbus Automobile Parts Company; capital, $45,000; to manufacture motor parts. Incorporators: F. H. Penfield, Fletcher Goodwell, Benjamin S. Dean, J. J. Handley.

HAMILTON, O.—Ideal Steel Wheel Company; capital, $500,000; to manufacture and deal in spring wheels for automobiles. Incorporators: J. E. Strietelmeier, A. F. Parker, D. E. Kiegan, Walter C. Taylor, James B. O'Donnell.

INDIANAPOLIS, IND.—Hydraulic Transmission Company; capital, $200,000; to manufacture a hydraulic clutch for automobiles. Incorporators: W. K. Millholland, Paul Millholland, Ernest Millholland.

LOUISVILLE, KY.—Edwards Motor Car Company; capital, $750,000; to manufacture motor trucks.

LOUISVILLE, KY.—Commercial Automobile Company; capital, $1,500. Incorporators: J. N. Gibbons, W. B. Williams, E. N. Williams.

MADISON, WIS.—Power-Stevens Fan Devices Company; capital, $150,000; to manufacture fans for cooling motors, and for vacuum cleaners, ventilating devices. Incorporators: Joseph C. Schubert, J. J. Power, John E. McWilliams, Leroy W. Stevens.

MIDDLETOWN, N. Y.—Industrial Motor Car Company; capital, $350,000; to manufacture motor vehicles. Incorporators: William Courtland, Cuthbert Jewell, M. Crawford.

NEW YORK CITY.—Hurlburt Motor Truck Company; capital, $150,000. Incorporators: Joseph P. Carroll, William B. Carswell, F. D. Peale.

NEW YORK CITY—New York Electric Vehicle Association, Inc.; capital, $50,000; motor vehicle business, especially electrics. Incorporators: George Tiernan, Frank H. Parcells, Robert G. Reblefsen.

RICHMOND HILL, N. Y.—Dillman-Helin Motor Company; capital, $20,000 to manufacture motors, etc. Incorporators: William C. Dillman, Richard Dillman, Fero Helin.

SOUTH BEND, IND.—South Bend Automobile Body Company; capital, $20,000; to manufacture automobile bodies. Incorporators: S. W. Nicholson, J. C. Paxson, V. E. Paxson.

THOMASVILLE, GA.—Logan Automobile Exchange; capital, $15,000. Incorporators: W. A. Logan, E. E. Mack, Roscoe Luke.

TORONTO, ONT.—Central Garage & Supply Company, Ltd.; capital, $150,000; to manufacture automobiles, engines, etc. Incorporators: Robert B. Haley, Ernest S. Benyon, Roydon J. Haley.

WORCESTER, MASS.—Morgan Truck Company; capital, $300,000. Incorporators: Charles B. Foster, Evan F. Jones, C. H. Derby, J. R. George, John E. Bradley, C. B. Foster, L. P. Clark.

GARAGES AND ACCESSORIES

AKRON, O.—Dutch Rubber Company; capital, $1,250,000; to manufacture rubber articles and automobile tires. Incorporators: E. L. Schnee, C. R. Grant, I. A. Grant, F. E. Sherman.

AKRON, O.—Marathon Tire & Rubber Company; capital, $10,000; to deal in automobile tires and other rubber goods. Incorporators: Ellis R. Diehm, C. C. Owens, Sterling Newell, Donald McBride, H. J. Crawford.

AKRON, O.—Mutual Oil & Supply Company; capital, $10,000; to handle Cleveland Automobile Oils, etc. Incorporator: M. L. Stuer.

BELAIR, MD.—Harford Garage; capital, $3,000. Incorporators: Joseph S. Archer, Richard Dallam, Philip H. Close.

BOSTON, MASS.—Cambridge Station Garage; capital, $6,000. Incorporators: John J. Guiney, Frank W. Roberts, David J. Murphy.

BROOKLYN, N. Y.—Revilo Automobile Company; capital, $5,000. Incorporators: Philip Roth, Donato Cella, Frank Dunn.

New Schacht Truck—The Schacht Motor Car Company, Cincinnati, O., will soon put on the market a new 1-ton worm drive truck equipped with pneumatic tires.

Fitch Garford Manager.—Herbert G. Fitch, of the Willys-Overland Company, Toledo, O., has been made general manager of the Garford branch of the company.

To Handle Marvel—Frank P. McLellan has been appointed Indiana representative for the Marvel Carburetor Company, which is moving from Indianapolis, Ind., to Flint, Mich.

Electric Ambulance for Dumb Animals—The Pennsylvania Society for the Prevention of Cruelty to Animals has installed an electrically driven horse ambulance to minister to the wants of abused and suffering dumb animals.

Marvel Moves to Flint—Arrangements are being completed to move the plant of the Marvel Carburetor Company from Indianapolis, Ind., to Flint, Mich. The stock has been sold to a number of automobile manufacturers by the local stockholders.

Hamilton Is Manager—Roberts & Sherburne, who have taken on the American for Boston, Mass., have placed G. W. Hamilton in charge as manager of the agency. George Brown, who went to Boston from the American factory at Indianapolis, is manager of the service department.

Automobile Incorporations

Buffalo, N. Y.—William Guillott Manufacturing Company, Buffalo; capital, $10,000; to manufacture stamped metal goods for the automobile trade. Incorporators: William Guillott, A. S. Guillott, Edward W. Reynolds.

Buffalo, N. Y.—Studebaker Sales Company; capital, $25,000; to engage in selling automobiles. Incorporators: Arthur Haile, Bradley H. Phillips, E. C. Schlenker.

Cleveland, O.—South End Garage Company; capital, $5,000; to operate a garage and general repair shop. Incorporators: A. Haskin, H. Lewis Mock, H. Sadugar, J. E. McNemar, J. Goldstein.

Columbus, O.—Southern Taxicab Company; capital, $10,000; to conduct a taxicab service. Incorporators: James J. Keating, James A. Allen, Thomas Decker, Jack Williams, A. P. Carmichael.

Columbus, O.—Pomeroy Automobile and Garage Company; capital, $25,000. Incorporator: A. R. Clifton.

Columbus, O.—Engle & Vincent Automobile Company; capital, $15,000; to deal in automobiles and accessories. Incorporators: Charles H. Engle, G. A. Marquardt, Frank L. Vincent, Charles W. Engle, John K. Henry.

Davenport, Ia.—Meinert & Rogers; to conduct a taxicab and automobile repair business. Incorporators: E. C. Meinert, W. E. Rogers.

Detroit, Mich.—Michigan Motor Specialties Company; capital, $75,000; to manufacture automobile accessories and electrical specialties. Incorporators: N. M. Beck, C. W. Beck, Charles Wright, Jr.

Geneva, N. Y.—D. M. Dorman Company; capital, $10,000; to engage in automobile business. Incorporators: D. M. Dorman, Charles C. Runyan, Louis J. Licht.

Jacksonville, Fla.—Miller Automobile Company; capital, $10,000. Incorporators: H. Clay Stanford, C. D. Hyatt, J. J. Griffin.

Lexington, Ky.—Commercial Automobile Company; capital, $11,500. Incorporators: J. N. Gibbons, W. R. Williams, E. N. Williams.

Louisville, Ky.—Auto-Print Company; capital, $20,000. Incorporators: W. T. Givan, B. S. Wasmer, A. H. Bowman.

Nashville, Tenn.—Seaton Wheel Company; capital, $130,000; to manufacture automobile wheels. Incorporator: John T. Landis.

Newark, N. J.—Sullivan Automobile Company; capital, $25,000. Incorporators: Jas. Sullivan, Chas. Bagole, William N. Franzel.

New Castle, Pa.—Lawrence Automobile Company; capital, $40,000. Incorporators: L. C. John, George Greer, Roy Jamison.

New York City.—Rubberine Tire Filling and Sales Company; capital, $500,000; to manufacture rubber and substitutes for rubber. Incorporators: James D. Bridges, J. Curtis Clarke, George H. Davis.

New York City—Cukor Safety Crank Company; capital, $40,000. Incorporators: Bela Cukor, Isadore Eustaedter, Hyman J. Rosenbaum.

New York City—McGraw Tire & Rubber Company; capital, $100,000; to manufacture automobile tires and rubber goods. Incorporator: Raymond Collins.

New York City—Tredvent Tire Company; capital, $100,000; to manufacture automobile tires, etc. Incorporators: Nathan A. Sterling, David A. Sterling. Samuel Bing, Morris Rachmil, Louis Cantor.

New York City—Pioneer Motor Car Company; capital, $10,000. Incorporators: Henry J. Richardson, Northrop R. Holmes, George N. Nay.

New York City—Blitzen Company; capital, $1,000; to deal in automobile specialties. Incorporators: William C. Decker, James B. Mackie, Fred B. Scofield.

Oconto Falls, Wis.—Munsert-Carlson Automobile Company; capital, $5,000; to conduct a garage and deal in motor cars. Incorporators: W. J. Minsert, C. W. Carlson.

Ottawa, Can.—Hull & Ottawa Garage Company; capital, $40,000.

Sherbrooke, Can.—Canada Lifting Jack Company; capital, $20,000; to manufacture automobile jacks.

St. Louis Mo.—Swap-Benyon Automobile Repair Company; capital, $2,100. Incorporators: T. W. Swap, Charles A. Madill, Albert Banyon.

Toledo, O.—Heavy Tonnage Transportation Company; capital, $150,000; rapid transit of merchandise in motor trucks. Incorporators: Wm. J. Seitz, E. A. Mallory, Jacob Brecheisen, Clarence B. Hadden.

C. Y. Knight and Paul Daimler examining an American car

Cincinnati May Not Have Show—Cincinnati may have no automobile show next year. The Dealers' Association, which annually promotes these exhibitions, is not in favor of holding any more. They say that it practically puts business at a standstill for months, prospective buyers standing them off until the show.

Warren with Abbott—Joseph D. Warren, formerly with the Metzger Motor Car Company, has become New England manager of the Abbott Detroit, and he is negotiating now with some Bostonians to take over the Boston agency that has been at a standstill since the death of Willard M. Jenkins a few months ago.

Many Canadian Cars Exported—During the year ending April 30 the New Zealand Shipping Company of Montreal, Que., shipped 1,292 Canadian made automobiles to Australia and New Zealand, while this year they expect to ship to those countries 1,800 machines, 629 having been shipped already during the present season.

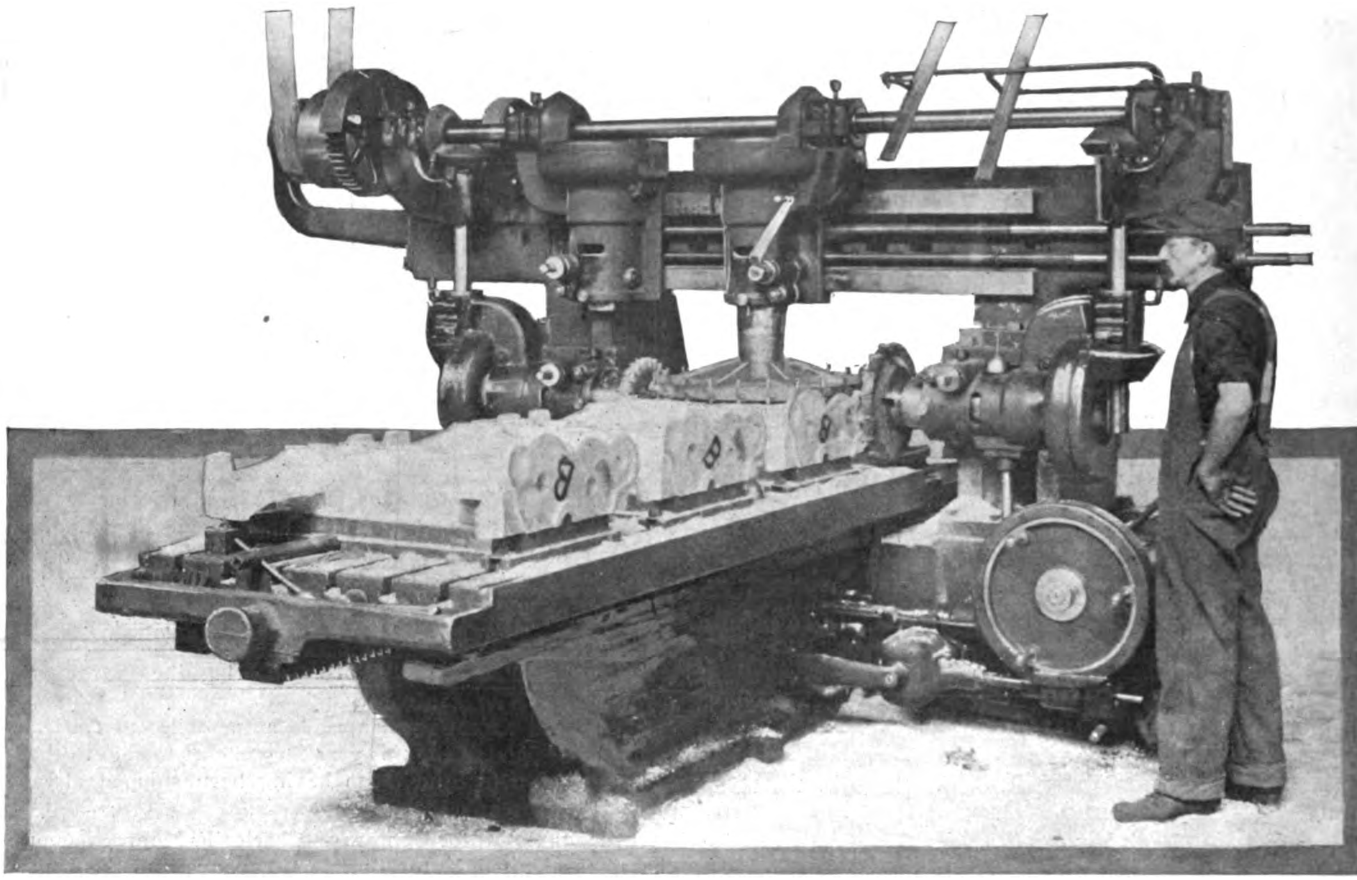
Buys Buffalo Motor Company—Charles F. Monroe has purchased the United Motor Buffalo Company from the United States Motor Company. Mr. Monroe, who was manager of the Buffalo company, will continue the distributing of the United States Motor Company products for the northern part of New York and Western Pennsylvania.

Knight and Daimler Confer—Charles Y. Knight, inventor of the sleeve valve motor, recently took an American car with his engine over to Europe, where it was inspected by Mr. Bush, chief inspector of the Daimler Company. The accompanying photograph shows Paul Daimler, head of the Mercedes factory, and Charles Y. Knight, studying and examining the construction of an American car.

Brayton Elected President—W. B. Brayton, of Cleveland, O., has been elected president of the Regal Motor Sales Company, the new Buffalo, N. Y., branch of the Regal Motor Car Company, Detroit, Mich. Mr. Brayton will act as sales manager only of the Buffalo district, while C. A. Hamilton, general manager of the new sales concern, will devote his entire time to Western New York business.

New Marmon Delivery Car—The Nordyke & Marmon Company, Indianapolis, Ind., will add a light truck to its pleasure car line. The motor will have a 4-inch stroke and there will be an automatic governor limiting the speed to 20 miles an hour. The truck will have a capacity of from 1,200 to 1,500 pounds. A distinctive feature will be the use of dual rear wheels, such as are used on the heaviest type of trucks. Pneumatic tires 32 by 4 are used on the new truck and the wheel base is 120 inches.

Factory Miscellany



Ingersoll crankcase milling machine used in the plant of the Haynes Automobile Company, Kokomo, Ind.

The above is a view of the big Ingersoll crankcase milling machine used in the manufacture of Haynes cars. The machine is in use at the Kokomo, Ind., factory of the Haynes Automobile Company, and, as may be seen from the illustration, is capable of handling three crankcases on the sliding table. There are three milling cutters in operation at the same time on three sides of the crankcase, and when this operation is complete the aluminum casting is ready to be transferred to the assembling department.

GOODRICH to Build Office—Building Inspector Goodwin, Akron, O., has approved plans prepared by the B. F. Goodrich Company for the erection of a large addition to the office building. It is the plan of the officials of the company to combine the office forces of the Goodrich and the Diamond companies, so a larger office building will be necessary. The estimated cost of the addition will be $100,000. When completed the structure will be 228 feet long and five stories high. The lower floors of the addition will be used for the general offices while the fifth floor will be reserved for the offices of the officials of the corporation. The work of construction will be started at once.

Firestone Plans Growth—Plans have been made to increase the capacity of the plant of the Firestone Tire & Rubber Company, Akron, O., at least 25 per cent. The Firestone company will also build a fireproof employment office to cost $13,000. Another large factory building is to be added to the present group.

Milwaukee County's Share—Milwaukee county, Wis., will receive the sum of $17,420.82 as returns on the payment of automobile registration fees to the state during the fiscal year of 1911-12. The registration law provides that after the secretary of state pays the expenses of administration of the registration division the remainder shall be distributed pro rata among the counties. The counties must use the returns for good roads purposes.

Toronto Plant Progressing—The plant of the Toronto Rubber Company, Toronto, O., will be completed about September 15, when it will be placed in operation. All of the repair work and improvements on the plant, which was formerly occupied by the American China Company, will be completed by that time and the machinery installed. It is the intention to employ about seventy-five men at the start. The company will manufacture all kinds of rubber articles, including automobile tires and other accessories.

To Make Hydraulic Clutch—An automobile clutch operated on the hydraulic principle will be manufactured by the Hydraulic Transmission Company, which has been organized in Indianapolis, Ind., by W. K. Millholland, Paul Millholland and Ernest Millholland, who conduct the W. K. Millholland Machine Company. The Millholland company is a contractor and manufacturer of automobile parts and will be closely allied with the new concern, which is incorporated with an authorized capitalization of $200,000.

Perfex Company Enlarges Plant—J. R. Fouch, vice-president of the Perfex Company, Los Angeles, manufacturers of the Perfex car, makes announcement that the Los Angeles plant will be greatly enlarged.

Milwaukee Rubber Company Moves—The Milwaukee Rubber Works, Milwaukee, Wis., has taken large quarters at 1928-1930 Vliet street. The company manufactures inner-liners and other tire and rubber specialties.

New Body Factory—The R. J. Irvin Manufacturing Company, Indianapolis, Ind., which makes automobile bodies and tops, has awarded the contract for the erection of a two-story factory building in Indianapolis which will cost about $50,000.

Cutting's Four-story Addition—Clark-Carter Automobile Company, Jackson, Mich., manufacturer of Cutting motor cars, has nearly completed its large and extensive four-story addition to the present plant. The company expects to occupy it by August 15.

Chevrolet Buys Plant—The Chevrolet Motor Company has purchased the plant of the Imperial Wheel Works, Flint, Mich., and will open it about September 1. The Chevrolet company is one of the organizations owned by the Republic Motor Company recently capitalized in Delaware for $65,000,000.

Top Company Moves—The Iroquois Auto Top Company, Utica, N. Y., has removed its factory from the Whiffen Block to the Cox Building. The firm has received large contracts from automobile plants in Detroit and other Western cities and increasing business necessitated the removal to larger quarters.

Racine Rubber to Grow—The Racine Rubber Company, formerly the Kelly-Racine Rubber Company, Racine, Wis., is adding a large list of new equipment which will greatly increase its plant's capacity. The company is confining its business to the manufacture of pneumatic tires for automobiles and motorcycles and has had a most profitable year.

Imperial's Increased Facilities—The Imperial Automobile Company, Jackson, Mich., has purchased the Jackson plant of the Buick Motor Car Company. This gives the Imperial two finely equipped factories, the new plant having a capacity of 8,000 cars a year, bringing the total output of the company to over 10,000 machines a year.

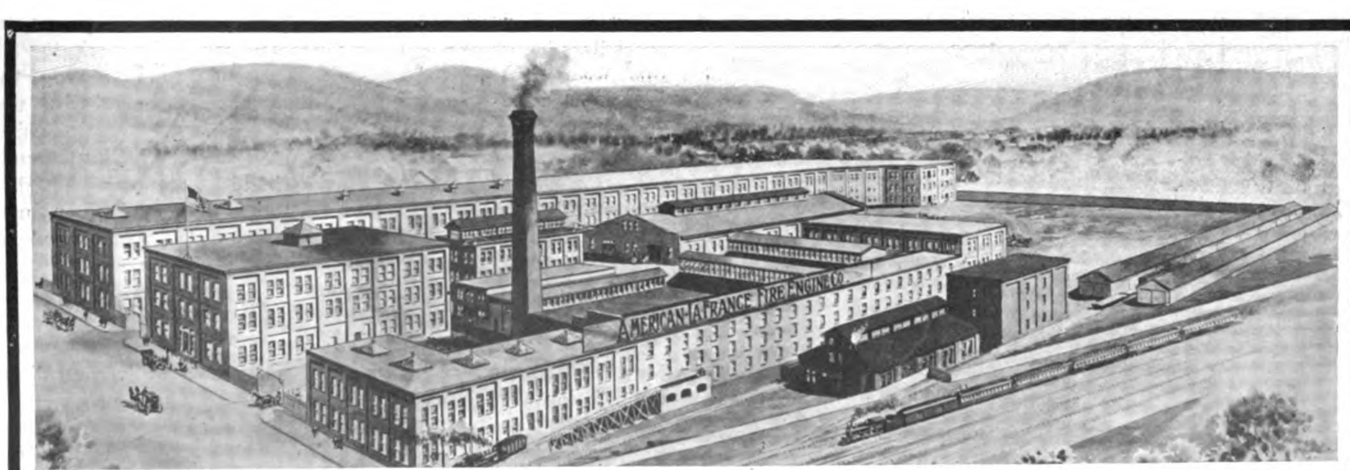
To Make Windshields Only—Manager Edward F. Adams, of the Columbus Auto Parts & Machine Company, Columbus, O., announces that in the future the concern will confine itself to the manufacture of windshields instead of covering a general line of manufacturing. Within a short time the company will put out a 1913 model windshield which will have a rain vision and a ventilator.

To Build Pleasure Cars—The Buffalo Electric Vehicle Company, the new Buffalo, N. Y., million-dollar automobile industry, has secured a lease on the building which was formerly occupied by the Denniston Company, makers of bodies for motor cars, which concern recently went into bankruptcy, and within a few days will open their pleasure car factory in that building. The branch office and showroom also will occupy this building, while the salesrooms and executive offices will be located at 200-246 West Utica street, in that city.

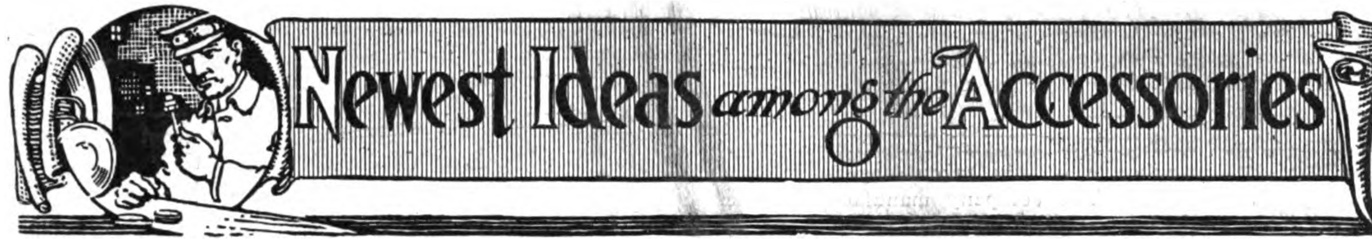
Bosch Magneto Not to Move—Chief Engineer Albert Klein, of the Bosch Magneto Company's plant at Springfield, Mass., has told the committee of 100 of that city that the Bosch company will not move to another location, at least for the present, but that until it is definitely settled whether or not the meat-rendering companies located near the Bosch plant, and against which many complaints have been made, are to move, the Bosch company will not make any plans to extend its factory buildings. The company is building a restaurant for its employees now and if the rendering companies were ousted it is probable that the magneto company would build additional extensions to its big manufacturing plant.

Goodyear Installs Fountains—By the installation of fifty-three fountains, through which is constantly bubbling a supply of fresh spring water, the Goodyear Tire & Rubber Company, Akron, O., has solved the problem of the summer drinking water supply for 5,000 workmen both from a sanitary standpoint and that of efficiency. A contract has been let to install a circulating system of galvanized iron piping to all parts of the factory and at convenient spots throughout the plant fountains will be located. The piping will be covered with cork to a thickness of over a half inch to insure a reasonable amount of coolness for the water, but if this is not satisfactory a refrigerator plant will be erected, through which the water will run.

New Departure Plant Busy—The New Departure Manufacturing Company, at Bristol, Conn., is working its big plant 127 hours a week in all departments and 152 hours a week in some departments with day and night shifts of skilled mechanics. This remarkable condition is assured for months to come by actual contracts for 1912 and 1913 delivery. Further increased business has been provided for by factory additions now in process of construction. These additions will give nearly 75,000 square feet of floor space, which will be available late in the fall of the present year. Three outside machine building plants and the company's own extensive manufacturing machine shop are busy on special mechanical equipment for the new buildings and is being rushed to put all departments in an efficient condition.



View of the Elmira, N. Y., factory of the American-La France Engine Company, manufacturers of heavy-duty motor trucks



Wauto Pail; Red-Head Plug; Measuring Tapes; Tri-Radiant Burner; Acorn Tire-Gauge Air Cock; Portable Grinder for Tourists' Tools; Spark-Plug Testing Device; Alcohol Headlight; Blowout Patch


Fig. 1—Wauto pail

AMONG the latest additions to the accessory market is the Wauto tourists' pail, manufactured by the Wauto Pail Company, Broadway and Columbus Circle, New York City. The pail, Fig. 1, is made of a heavy sort of canvas sewed with a double seam all around, and no hinges, pins or rivets are used in the making of the pail. The pail is very light and may be carried flat in any suitable compartment of the tonneau, making it very suitable for camping and similar uses.

Red-Head Platinum Point Plug

Emil Grossman Company, 250 West Fifty-fourth street, New York City, announces a new spark-plug design, which is especially constructed for use with high-tension ignition systems. The plug, Fig. 2, is very similar in shape to other Red Heads, but differs from them in three principal points: The positive electrode is coated with a platinum cap 1-32-inch thick and as deep, which covers the sparking point proper and insures it against fusing even under the heat of a very strong spark; a terminal cap of special form, Fig. 3, is used, which is equally adapted for the use of ring, slip or snap cable connections; the shell is heavily nickel-coated and highly finished, mainly to give the plug a different appearance from other designs made by the same company. A further innovation is the box in which the plug is furnished; this is shaped as a torpedo, and in its base carries a wooden block threaded to fit the plug shell and hold it securely in place before it is taken out for use.

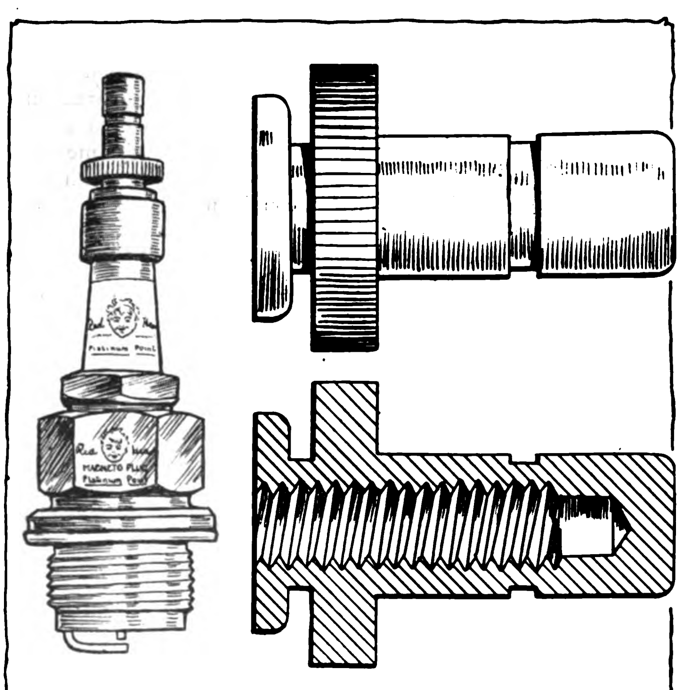


Fig. 2—New design of Red-Head spark-plug. Fig. 3—Enlarged view of Red-Head special terminal cap

Tri-Radiant Acetylene Burner

In order to utilize the whole surface of a headlight reflector, the Lenhart Burner Manufacturing Company, 246 North Delaware avenue, Philadelphia, Pa., has designed a triple acetylene burner, the Tri-Radiant, which provides three individual flames, all of which are spaced the same distance from the reflector. The acetylene enters the burner, Fig. 4, through the bottom of the bored stem and at the point where the burner branches out to the two sides a valve is provided to open or shut off the flow of gas to each of the side burners. This feature permits of regulating the amount of acetylene used according to the operating conditions.

Luther Portable Tool Grinder

Tourists desiring to carry a small and handy tool grinder with them while traveling will find the Luther device, Fig 5, an instrument well adapted to their needs. This tool is operated by hand, using a long crank which is geared to the grinding wheel at a ratio of 1 to 20. The wheel is of Dimo-Grit, a very hard material, and is hollowed out to accommodate four pinions which bring about the gear reduction specified above. The wheel has a diameter of 5 1-2 inches and, with all the other parts of the apparatus, may be packed in a box 5 3-4 inches square. The tool rest and clamp which are furnished with the grinder permit of attaching it to the car quickly and in any suitable position.

Novel Steel Measuring Tapes

A complete line of measuring tapes is manufactured by the Lufkin Rule Company, Saginaw, Mich. Some of these devices use linen tapes, others steel, and the housings in which they are inclosed are either of leather or brass. In Fig. 6, a type specially adapted to engineer's uses is shown. The steel tape of this design is 1-4-inch wide and is wound around a spool by means of a folding, winding handle attached to the spool on the front of the casing. The latter is made of brass and nicely finished with nickel plating. The outside of the tape passes through the eye of a steel frame to which a handle is attached, but this frame is detachable. The tape is marked in tenths of an inch on one side and in twelfths on the other and is supplied in lengths of from 33 to 300 feet.

Acorn Tire-Gauge Air Cock

Stevens & Company, 375 Broadway, New York, manufacture the Acorn air cock, Fig. 7, which is used while controlling the inflation of a tire with a Stevens gauge. The air cock is attached to the end of the hose through which the compressed air is led into the tire. The top of the cock is screw-threaded internally to fit any external 1-8-inch thread; the tire gauge is threaded into this passage and when the cock is opened and the air passes through it, it also presses on the gauge and there indicates the degree of inflation. When the desired pressure has been reached, the cock is shut off and removed. If no gauge is used in the inflation work, the thread may be closed by a standard 1-8-inch plug.

Hardy Plug Testing Device

Spark-plugs which miss fire may be easily located by the R. E. Hardy Spark Plug Company's tester, Fig 8, made at Austin avenue and May street, Chicago, Ill. It consists of two contact pieces which are separated by a small spark-gap and to which is fitted an insulator handle. In testing the plug which is suspected as misfiring, one of the contacts is placed against the binding post and the other against the plug shell, and in case there is no spark between the two electrodes, a spark will jump the inclosed gap of the tester. The use of this device is very comfortable, as the spark-plugs need not be disturbed in any way while being tested.

Butylite Alcohol Headlight

An entirely new line of automobile headlights has been evolved by the Butylite Automobile Headlights Company, New York City, which use alcohol as a fuel and therefore does away with electric or acetylene generator, tanks or other means of carrying or producing a light-generating medium. The fuel is carried in a small vessel under the lamp and is forced to the burner by the pressure of air which has been pumped into the container by a small hand pump. One filling of the vessel is sufficient to keep the lamp burning for 20 hours, the alcohol being vaporized and burned in a small, thick Welsbach mantle which is claimed by the maker to be shock proof.

Essex Rubber Blowout Patch

The Westchester Appliance Company, 8 West Sixty-second street, New York City, distributes the Essex rubber blowout patch. This patch is made of seven plies of sea island cotton, frictioned together with a fine grade of rubber. It goes between inner tube and casing, and is so shaped that it may be folded around the bead of the casing. The patch is made in five sizes for application to 3, 3 1-2, 4, 4 1-2 and 5-inch tires.

Accelerator for Ford Cars

Owners of Ford model T cars will be interested in a simple outfit made by the Lincoln Machine Shops, Lincoln, Ill., which provides an accelerator pedal for this type of automobile. This equipment comprises a triangular plate to the end of which a bell crank lever is attached, a small connection from the bell-crank lever to the hand throttle rod, a cable connection from the lever to an accelerator pedal on the footboard and a spring which returns the bell-crank lever to the closed-throttle position. The triangular plate is attached by bolting under the two-cylinder head bolts of the last two cylinders, and the connection between bell-crank and throttle rod is so made that when the bell-crank lever

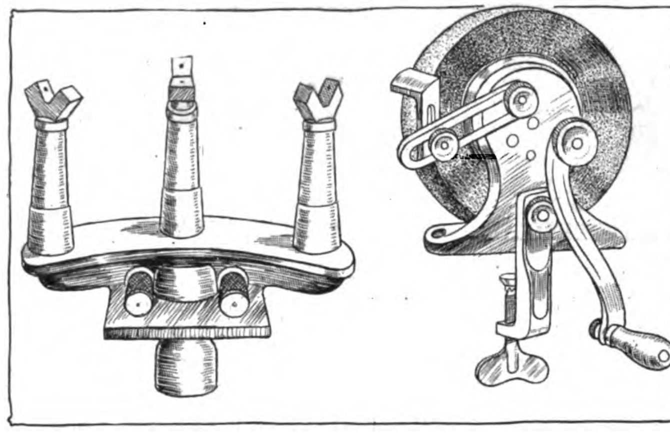


Fig. 4—Tri-Radiant acetylene burner. Fig. 5—Dimo-Grit tool grinder for touring use

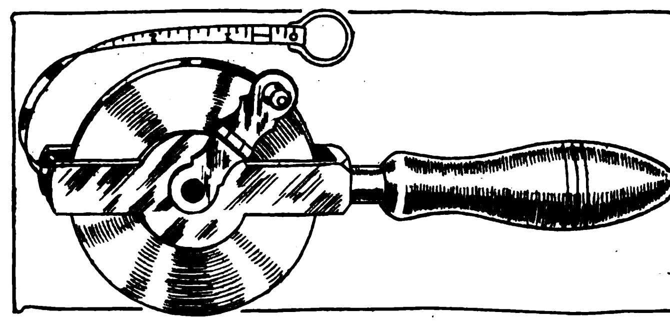


Fig. 6—Lufkin Steel measuring tape for engineers' use

is turned, as the operator depresses the accelerator pedal on the floorboard, the throttle rod is twisted and the carbureter throttle opened.

Stellite Composition Metal

Elwood Haynes, the original designer of the Haynes car, 305 N. Washington street, Kokomo, Ind., has succeeded in compounding a new metal which is of extraordinary hardness and thereby fit to take the place of steel, while it is not subject to rust, being oxidized only at red heat and then but slightly. The material stands between steel and silver in whiteness and brilliancy. Its elastic limit is 85,000 pounds and its tensile strength 110,000 pounds. The co-efficient of expansion is almost as low as glass, and the metal is chemically inert, being attacked only to a slight degree by dilute muriatic or sulphuric acid, but not by sublimate, alkali solutions, etc. As the metal is an alloy, its elements may be mixed in various quantities, and the range of hardness obtainable in this way is between high carbon steel and rock crystal.

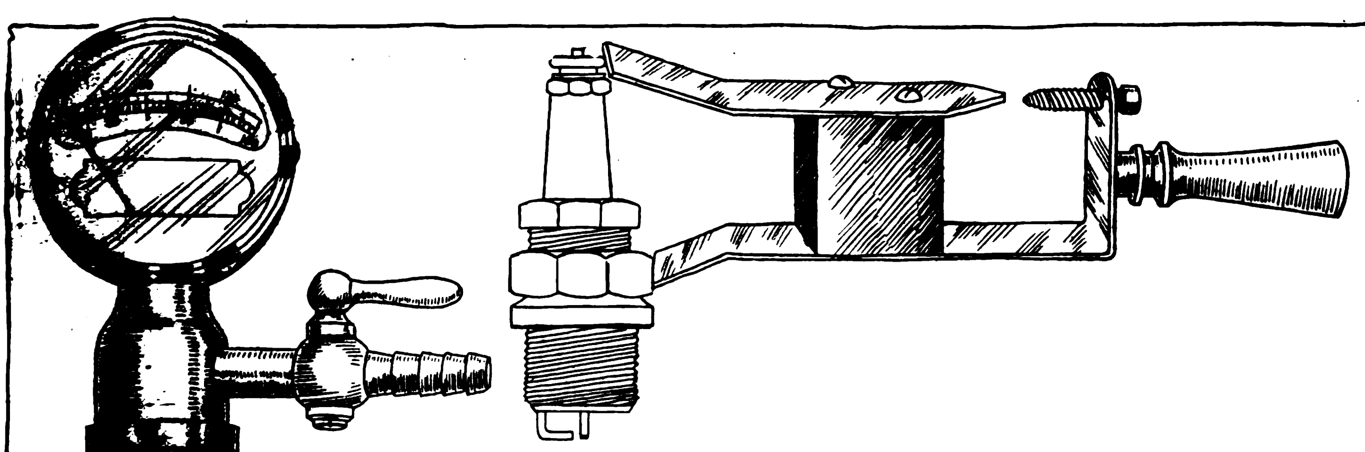


Fig. 7—Acorn air cock used while controlling inflation of tire with Stevens gauge. Fig. 8—Hardy device for testing spark-plugs

INTERNAL-Combustion Motor—In which the feeding of fuel from a reservoir is accomplished through a cam-operated valve.

The patent relates to an engine construction, Fig. 3, consisting of a working cylinder, frame and crankshaft C, which latter drives a camshaft C1 by means of gearing. The fuel used by the engine is fed from a receptacle F through a passageway M, and its flow is controlled by a valve V. The latter is carried by a rod R which, at its lower end, carries a cam follower. A cylindrical sleeve S is in position on the camshaft and rotates therewith, and there is a cam tapering down to the sleeve and a cam which extends a little beyond the other end of the sleeve. These two cams actuate the rod and valve so that fuel is passed intermittently from the receptacle F to the interior of the cylinder.

No. 1,034,732—to James H. Pierce, Bay City, Mich. Granted August 6, 1912; filed September 18, 1911.

Flexible Shaft Connection—In which driving and driven member are connected, at a varying distance, by a sleeve.

The subject-matter of this patent, a flexible connection for shafts, as shown in Fig. 1. The device consists of a sleeve with an opening which is non-circular in transverse section and into which a driving and a driven member project. Each of these two members fits the sleeve closely at all points of the engaging surfaces, and sections are so formed in the sleeve as to permit relative tipping movement of some parts. The sleeve is pivoted at one to a lateral extension of a rotating shaft.

No. 1,034,453—to Lindley D. Hubbell, Hartford, Conn. Granted August 6, 1912; filed July 24, 1906.

Vehicle Cushioning Device—Comprising two hollow sections which are in telescoping, airtight engagement.

This patent describes a construction, Fig. 4, which consists of two relatively movable sections, an upper one V and a lower one L. The upper section is so shaped as to form a longitudinally extending chamber between its portion O and I. This chamber is adapted to receive the lower section L, but is wider than the thickness of that section, so that a certain lateral play is insured between V and L. The inner portion I of the section V is considerably longer than O, and its outside is shaped with two annular grooves, one above and one below the level of the lower edge of O. Likewise, O has an annular groove on its inside and near its edge, and packing rings R in these three grooves provide an airtight engagement of the sections V and L.

No. 1,035,022—to Laurence L. Leasure, Winfield, Kan. Granted August 6, 1912; filed September 13, 1911.

Internal-Combustion Motor Valve—Being a gear designed to actuate the inlet and exhaust valves of a cylinder.

The motor valve design here described is shown in Fig. 2. It consists of a cage which has an outer wall O provided with ports, an inner cylinder wall W and a hollow guide structure S supporting a valve stem S1, the end of which carries a valve V1. Within the inner cage wall a sleeve valve V is mounted. This is formed with a flange F capable of seating simultaneously upon the ends of the walls O and W. In the hollow valve guide a coiled spring controls the normal position of the stem S1 and the valve V1, and another spring is coiled around the guide structure serving the same purpose in the case of valve V. Bar connections to the camshaft of the engine are so constructed that, upon moving a bar in one direction, one valve is operated, while moving it in the other direction the other valve is moved.

No. 1,034,708—to William Henry, Philadelphia, Pa. Granted August 6, 1912; filed September 18, 1907.

Transmission Gearing for Automobiles—Comprising two rotors, the engagement of which is controlled by a movable transmission shaft.

This patent relates to a transmission comprising a transmission shaft of such length and texture as to permit of slight flexure and so supported as not to interfere with the flexure of the shaft. A friction rotor is carried by this shaft, bearing normally against a driving rotor. Means are provided to spring the transmission shaft so that the driving and driven rotors are separated.

No. 1,032,350—to Gustave Dumont, Neuilly-sur-Seine, France. Granted July 9, 1912; filed February 15, 1909.

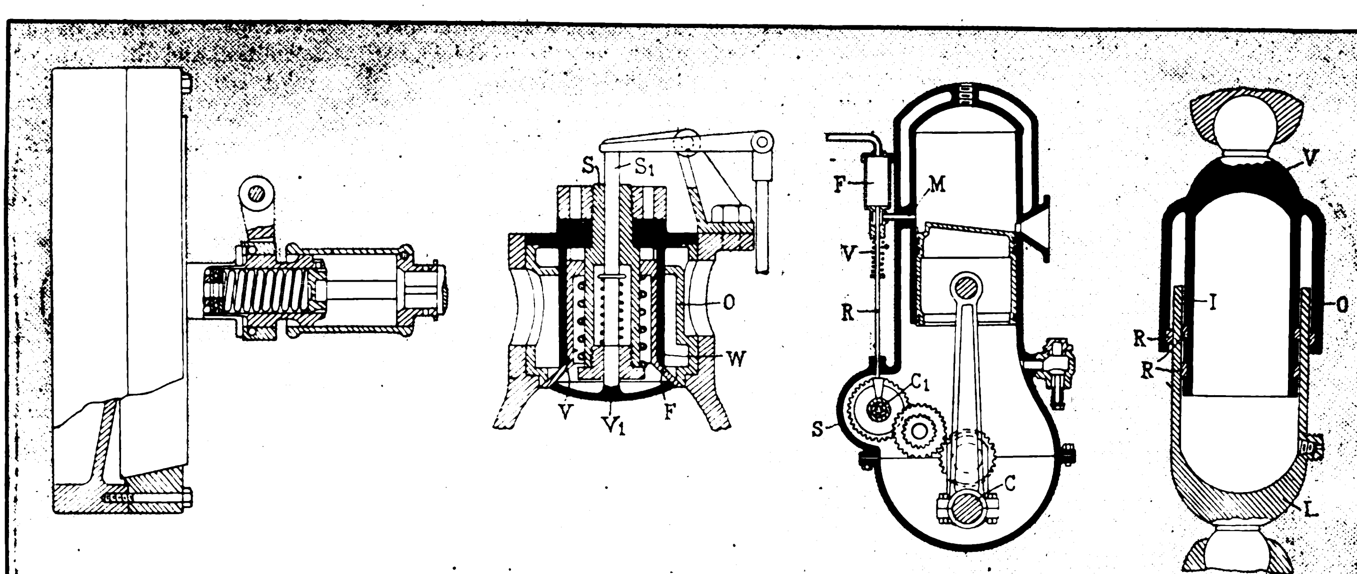


Fig. 1—Hubbell flexible connection. Fig. 2—Henry valve. Fig. 3—Pierce motor. Fig. 4—Leasure cushioning device.

The Automobile

Metric or English Measurements?

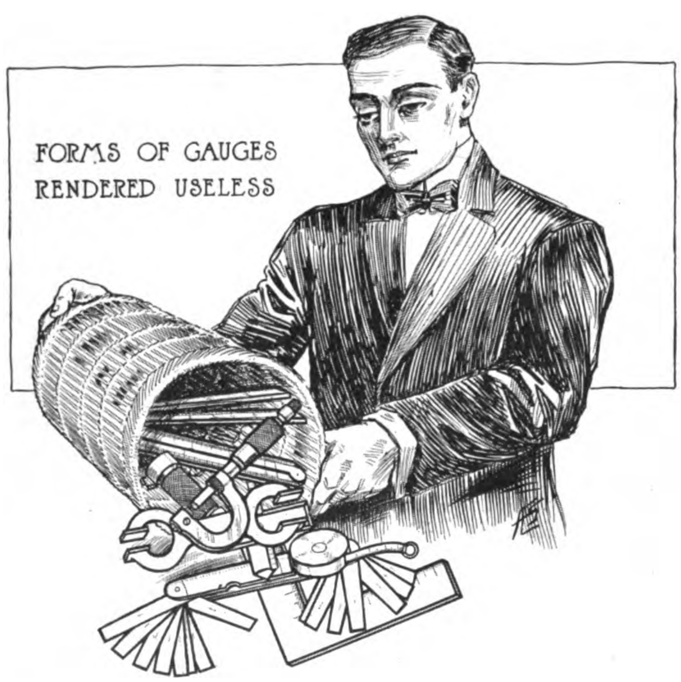
Prominent Engineers Representing Some of the Best-Known American Automobile Manufacturing Concerns Express Their Views as to Possibility of Adopting the Metric System

Majority of Engineers Believe That, While System Would Be Advantageous if Adopted, the Enormous Expense Involved Prevents—A Minority Are of the Conviction That Change Could Be Made

Part II

LAST week The Automobile explained at some length the metric system, discussing its history and that of the English system. It was pointed out that the great obstacle in the way of the general adoption of the far more useful and logical metric scheme was the great resistance offered to it by the engineering and commercial fraternity, due to the large expense which the change would incur. This cost would be largely through the necessity for scrapping much valuable machinery, which is based upon the foot and inch system, through the necessity of educating the American workmen to a new system with which they are not familiar and the consequent mistakes which they would make at the start; through the necessity of changing much design which has been worked out with English units and the great amount of work which draughtsmen and designers would have to do to bring about such a change.

This week we publish the views of a number of eminent American automobile engineers on the subject, which is a live one with us as a nation to-day. The letters herewith are not all against the general adoption of the metric system by the automobile industry—some come out squarely for it. Others are of the opinion that, once installed, it would be a great benefit to them, both as regards their foreign trade with such countries as have it as a standard system and on account of the time it would save in their engineering departments. Yet many of these men who favor it as a system believe that the cost of its introduction is prohibitive. Others are of the opinion that if all manufacturers would agree after a certain date to use the metric system the system in use at present would soon become obsolete.

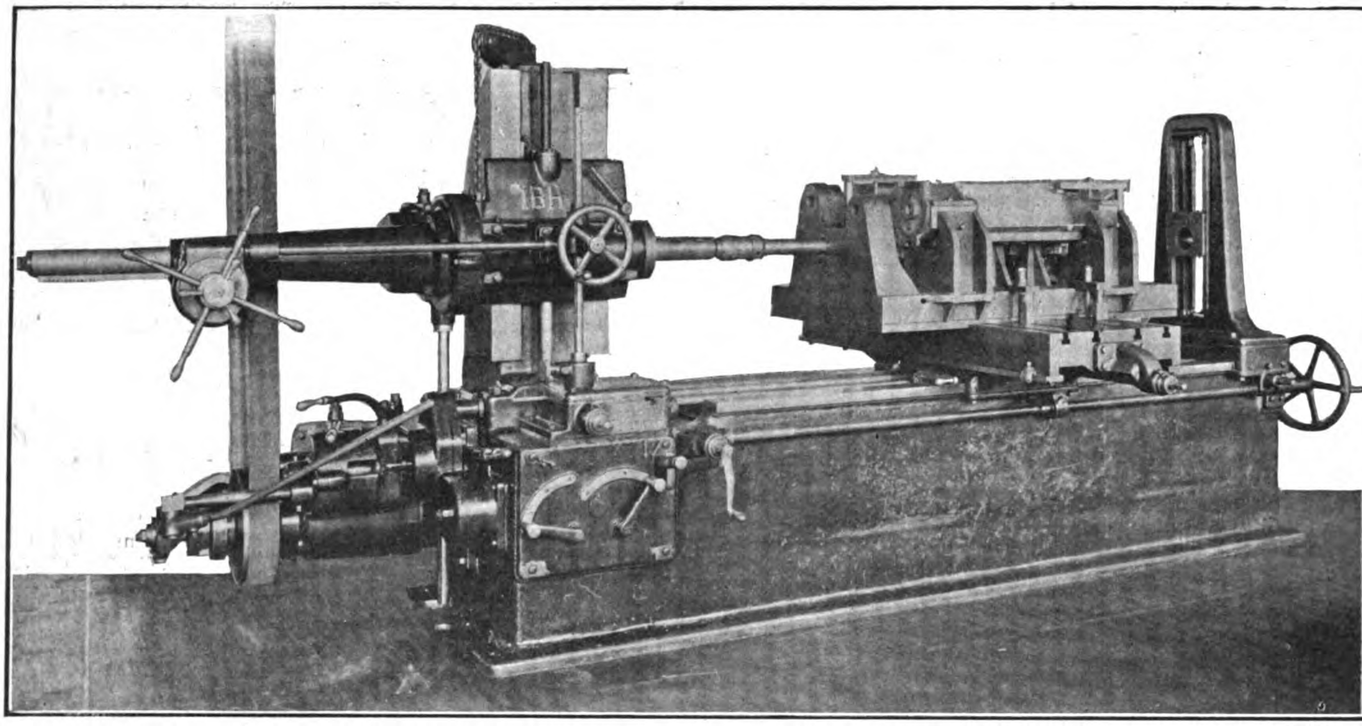


Our micrometers, gauges and measuring instruments would be useless

It is the opinion of many that should one branch of manufacturing, such as the automobile industry, attempt to arbitrarily adopt as its standard a system which was not generally accepted by all branches, there would be no end of difficulty in getting material on a measurement basis which was at odds with that in general use.

One engineer gives it as his belief that the American car manufacturer will not be handicapped in the export market on account of the variance or difference in measuring systems, even though he acknowledges it to be true that the international nature of the automobile demands a universal scheme of measurement. His letter is given below:

"There is not the least question but what the adoption generally of the metric system would prove convenient in more ways than one. It is true that the international nature



Boring mill and jig used on Stearns-Knight crankcases. Change of setting scale would involve replacement of speed-gear trains

of the automobile demands a universal scheme of measurements. The American automobile manufacturer will not, in my estimation, be handicapped in the export market on account of the variance or conflict in measuring systems. The reason for this belief is that both measuring systems are so well and universally known as to make them easy of comparison and interchangeability in figures at any point in the civilized world.

"Here in America the automobile manufacturer would have to contend with several different things in attempting to adopt the metric system. If the American automobile manufacturers were to adopt the metric system this step on their part would be retroactive on allied industries, meaning all companies now supplying mechanical parts necessary in making up automobiles. These allied industries, while in some instances dealing entirely in automobile products, are still, for the most part, supplying other industries.

"To have, therefore, a successful application of the metric system to our designing and manufacturing, it would be almost necessary to prevail upon different manufacturing industries, railroads and the United States Government to join hands in the movement.

"The changes necessary in manufacturing would be more noticeable, perhaps, in the jigs and fixtures than in the machinery itself, but I do not feel able to say just how great the changes necessary would be."

He, too, believes that for successful adoption of the French system all must join in the movement with the government.

Engineers Favor Metric System

That engineers see the possibilities of, and drawbacks to, the decimal system is evident from the way in which they have met the issue. We are pleased to present their views:

M. H. Roberts, Chief Engineer of the American Locomotive Company, states: "The engineering department of this company favors the use of metric measurements, but finds it a handicap because so few American manufacturers have adopted the metric system. On account of the difficulty of securing material when it is ordered in metric dimensions we were forced during the past year to change our truck drawings from metric to English measurements.

"The use of the metric system is largely a matter of public opinion and if it should come into general use it would be found to be very convenient, but its retention by the manufacturers who have already adopted it in this country depends upon a much more common use of the system than exists at the present time."

Charles Boyden, of the American Motors Company, favors the change. He says in part: "Our engineering staff is strongly in favor of the adoption of the metric system as applied to automobiles. The reasons for this are quite obvious.

"It certainly will, in the writer's opinion, take considerable time to effect a change of this kind, inasmuch as it would necessitate change in all machinery, tools, jigs, etc., and the expense would, indeed, be enormous."

Dual System a Temporary Result

V. E. Lacey, of the Cunningham Company, thinks that the change would have to be abrupt, as may be seen in the following: "The most serious obstacle in the way of the adoption of the metric system seems to be this one element of cost. Another difficulty of course is that all factories would be required for some years to come to maintain both equipments in their factories so as to be able to supply repairs for machines manufactured under the old system.

"As to how this transition should be made is a very serious question, but it is the writer's opinion that in automobile work it would have to be made abruptly; that is, to jump direct from the old system into the metric, adopting every phase of the new system at the same time. It is the writer's opinion that this would cause less confusion than by adopting the system piecemeal.

"As to changes in factory machinery, it seems to the writer this would be very great. Every machine turning out metric parts such as threads, gears and the like, would have to be arranged for the purpose. This would mean that new machinery would have to be purchased for the purpose. The old machinery would have to remain in service for some considerable time to take care of past work."

T. A. Peck, of the Empire Company, favors the change strongly. He says: "We have no comment to make except that in our opinion the adoption of the metric system of measurement is as badly needed here in America as the American decimal system of coinage is needed in the old world."

H. Nyberg, President of the Nybert Company, thinks this country is in need of the metric system. He states: "To-day America is rapidly becoming the greatest manufacturing country in the world. She should do everything in her power to develop and increase her industries in legitimate ways. Americans use one system of measurement when most of the civilized world uses another. This puts our salesmen at a disadvantage, for they must translate the measurement on their machines into the foreigner's system in order to make him understand, which entails a loss of time, a loss of money and untold annoyance.

"This might be justified if our system were better than the metric, but it is not. Our British forefathers took the length of an English king's foot as one unit, and the distance between two joints on his forefinger as another, which shows that it has no basis of reason upon which to rest. Moreover, our units do not increase in logical order, but by 12 and 3 and so on.

"No such objections can be made to the metric system. It has but one unit, and then increases and decreases by decimals, thus harmonizing with our number system. The metric system is logical and orderly, and it is my earnest wish that not only American automobile manufacturers would adopt it but also that Congress would make it the standard system of measurements throughout our country."

Missionary Work a Difficulty

F. N. Nutt, Chief Engineer of the Haynes Company, has little doubt but what the metric system would be satisfactory. His views are as follows: "There is no doubt but what the metric system if universally adopted would be all right, but the missionary work and trouble to be encountered by the above adoption would be annoying. The rising generation should be educated to one or both systems and the present day manufacturer would have to shoulder numerous mistakes and delays in trying to educate the present day mechanic. In order to adopt the metric system present factory machinery and tools would have to be changed, gear centers and gear calculations would have to be worked over, as well as gear reduction on lathes and other shop tools in order to cut threads according to the metric system. Each and every mechanic would have to buy new scales and other measuring instruments."

C. P. Brockwar, of the Inter-State Company, believes the change should be made, but he is in no hurry, as may be seen by his remarks, which follow: "Regarding the adoption of metric system in automobile factories, will say that we have no doubt about its benefits, but we believe it will be some time before this change can be made.

"We do not feel that we would care to pioneer in a campaign of this kind, as it will undoubtedly mean a great deal of expense, change of machinery and tools. We do not believe that the American car owners would be pleased with a change of this kind, unless change would be general with all manufacturers, which would be impossible.

"We believe that a gradual change can be made through the automobile engineers by standardizing on one or more parts at a time, to be made to the metric system."

H. G. Farr, Chief Engineer of the Knox Company, believes that the change will take place in the future. He says: "I believe that this is going to come sometime and would much prefer it if we had no past history to contend with.

"Of course, you understand that it would mean a complete re-start from everything, drawings, patterns and jigs, to adopt this system, involving a tremendous expense and about three years' time to make the change. The change in factory machinery he does not believe would be so important other than in jigs and fixtures, with the possible exception of all threading machinery, which of course would have to be changed to the metric pitches.

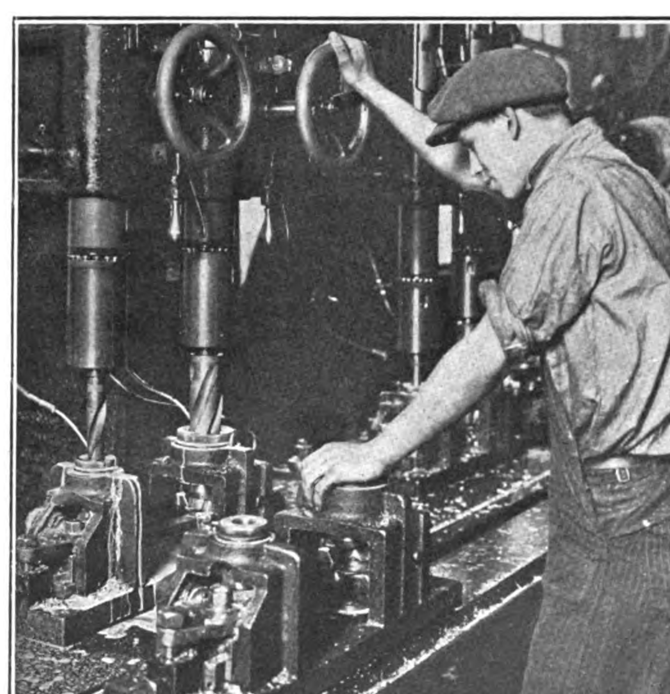
"We do not believe that it would be of any particular benefit to take the metric equivalents of English sizes throughout an automobile and say that you had adopted the metric system. It would not be adopting it, it would be simply English dimensions in metric figures and would involve a great amount of decimal millimeter dimensions which would mean more work."

Thinks Decimal System Superior

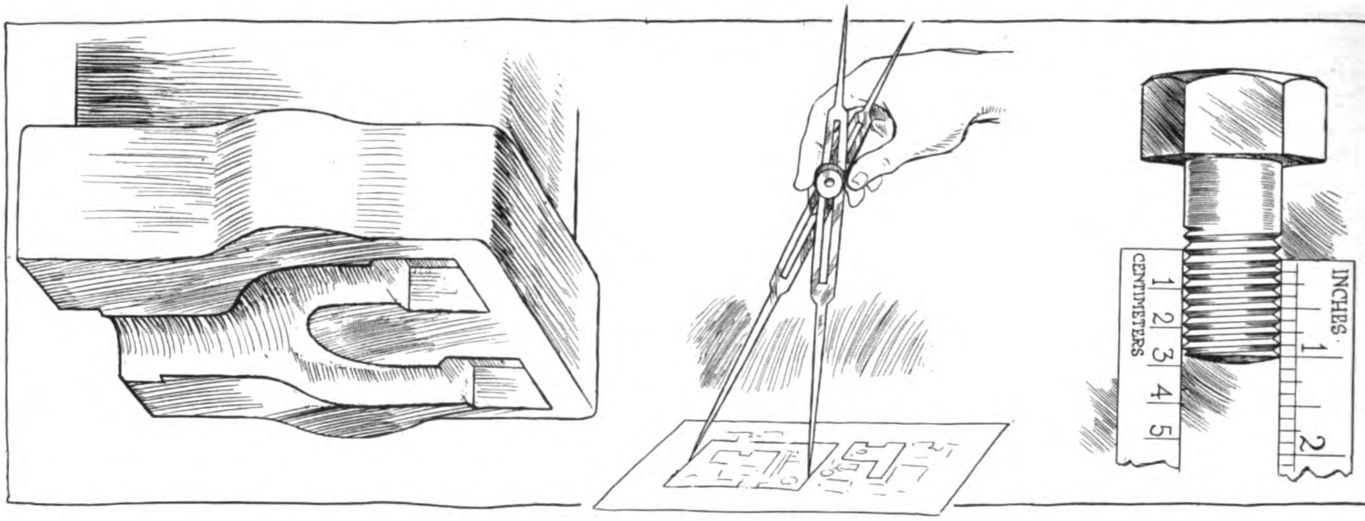
H. J. Edwards, of the Edwards Motor Car Company, sees necessity of fixing a certain date for the change. He states in part: "In my opinion the decimal system of measurement has the same advantages over the English system of yards, feet and inches as the decimal system of coinage has over the English system of pounds, shillings and pence. In the Daimler factory they are using the metric system of measurement entirely, and from what I learned in the shops they did not have very much difficulty when they installed it. I should like to see the decimal system of measurement inaugurated in this country, not only in automobile practice but universally. It is just as easy to talk kilometers, meters and millimeters as it is to talk miles, yards, feet and inches, and with a very little practice it is quite easy to carry in your own mind what these dimensions represent without having to resort to changing them to miles, etc.

"So far as automobile practice is concerned, the only way I can see at present in starting the movement would be that any manufacturer commencing the design of a new model after a certain date would use the metric system. The present system would then gradually become obsolete by elimination. It would be much easier for a company manufacturing all, or the greater portion, of their parts to do this than one who buys their parts and assembles their cars, unless the rule of inauguration would apply not only to automobile concerns, but also to the parts people as well. It is true, it might create considerable confusion for a while, but I am confident that in the end it would be worth while."

Wm. G. Wall, Chief Engineer of the National Company, believes the majority of factories would be willing to make



Drill used on Chalmers connecting-rods. Change would affect drill diameters as well as gear relations, etc.



The introduction of metric standard would necessitate the discarding of English dies, gauges, screw threads and other factory accessories

the change, saying: "I believe that, regardless of the expense and trouble occasioned by the changing from our present system to the metric system, the majority of automobile factories would be willing to do this, provided some agreement could be made whereby the entire industry would within a certain number of years discontinue the present system and take up the metric system exclusively.

"The necessary first steps in beginning a campaign of this kind would be the interesting of the Society of Automobile Engineers and the Automobile Board of Trade in this. If both of these organizations would sanction such a change it could probably be carried through. With either one of these organizations against it, however, it would be almost impossible to change to the metric system in this country."

George T. Handutt, Consulting Engineer of the United States Motor Company, believes the automobile industry too small to swing other forces into line. Part of his statement is: "We do not question for one moment the desirability of metric measures for manufacturing purposes, but we believe that the automobile industry is too small a factor in the industries of the United States to attempt to force the issue, because it has not full control of the situation.

"Let us assume for the moment that the automobile factories acting in concert agreed to adopt the metric measure and incorporate it into their product.

"The first thing would be the enormous loss of equipment in the form of reamers, dies, punches, gear sets and the redesigning of special machinery. This loss in the larger companies might easily exceed one million dollars.

"In the second place the entire working force would have to be instructed in the use of the new measure. Mistakes would be frequent and the delay in producing the product would be serious.

Conversion Would Cause Delay

"Thirdly, additional delay would be entailed and more mistakes by the use of conversion tables from English to metric measure, which would of necessity be used until the period of transition was completed, representing another large loss. Tools and machinery would have to be largely special at first and for a time at least cost a great deal more.

"Finally, many factories which do not come under our control would create further expense; for instance, the size of rods, tubing and stock of various kinds which is now supplied according to inch measure could no longer be selected by these dimensions, but with reference to the nearest metric dimensions, entailing a large amount of machining and waste of material.

"It is a conservative estimate that it would cost large companies not less than two million dollars to make the change.

"Set off against this expenditure and justifying it are convenience and speed of manufacturing which will undoubtedly eventuate in the ultimate. The progress would be by slow degrees and it would be many years before the automobile industry could begin to realize on this investment.

"It is the writer's belief that metric measures can only be introduced into this country by first legalizing them by an act of Congress to the exclusion of all other measures, and set an example by transacting all government business on the metric basis.

"No one industry of which I am aware is capable of forcing the rest of the country into line, and the interdependence of one industry upon another is so great that enormous expenditure without adequate return is entailed in every instance.

Government Adoption Necessary

"The adoption of the metric system in laboratories and places of such character where commercial consideration does not enter is a comparatively easy matter. But in commerce where money is not spent for any consideration except immediate and adequate return the adoption of the metric system is utterly impossible by individual effort, practically impossible by the concerted efforts of an entire industry, however large, and only a matter of very slow probability where it is made a national issue. In France and Germany it was only successfully introduced after government upheaval."

H. C. Stutz, President of the Stutz Company, believes in letting well enough alone. He says: "I am of the opinion that the S. A. E. standard and the A. L. A. M. standard is a mighty good proposition.

"It has grown very successful and has just gotten our screw machine people and tool makers in line, and to adopt some other system and discard the one we have at present does not look as though it was good judgment on an engineer's part."

J. G. Sterling, Chief Engineer of the F. B. Stearns Company, thinks that the benefits would not justify the trouble in making the change. Part of his statement follows: "Replying to your communication of August 6 asking our opinion in connection with the adoption of the metric system will say that my personal inclination would be toward the universal adoption of this system as early as possible, but I do not believe that the benefits to be gained by changing to the metric system as applied to lineal dimensions alone would justify the trouble and inconvenience that would necessarily arise from its adoption at the present time."

G. R. Wadsworth, of the Peerless engineering staff, states that the loss of money in making the change would be too much. He says: "Changing from the present system to the metric practically means scrapping a great deal of machinery, gauges and other expensive apparatus as well as redesigning all these units. The loss to be encountered is more than American manufacturers care to undertake at this time, or possibly at any time."

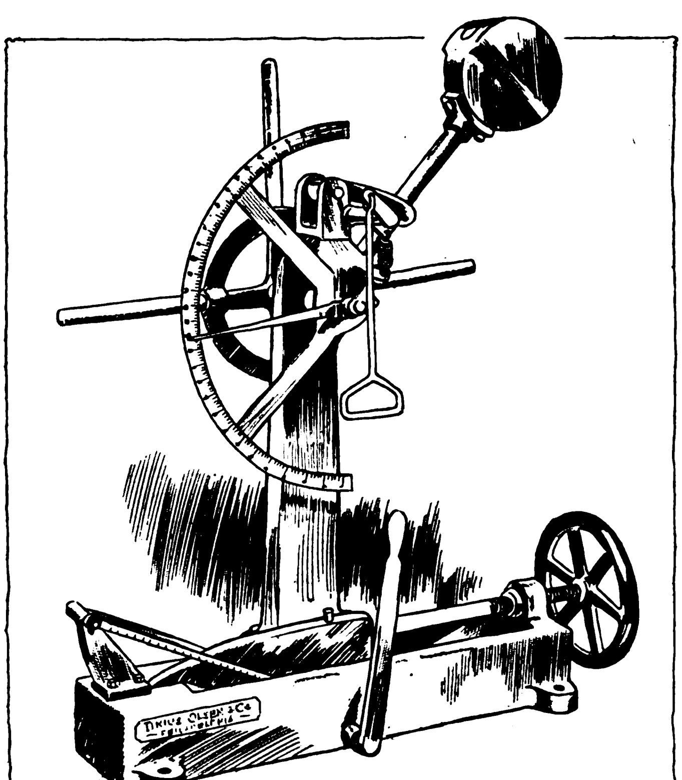
C. B. Rose, Chief Engineer of the Velie Company, does not think that the change could be made by the ordinary manufacturer, as may be seen from the following statements made by him: "Due to existing conditions a considerable length of time would be consumed in putting this system into effect. I believe that the proper way to do this, providing it should be decided to do so, would be to gradually change on all new work going through the factories. That is, if a new design was brought out at any time incorporate the metric system of measurements in this design rather than endeavor to change over on present design.

Benefits Only for Export Trade

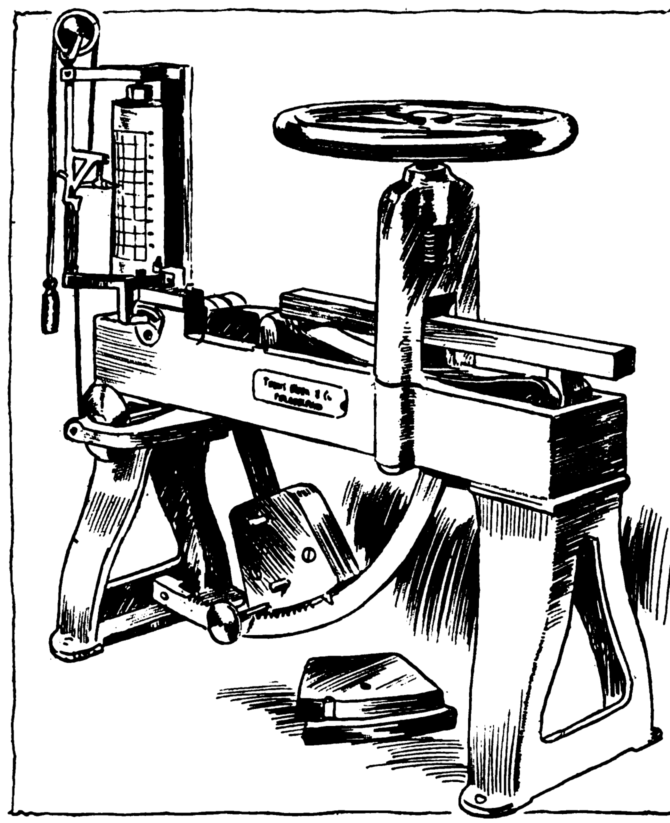
W. H. Callier, General Manager of the Marathon Motor Works, sees benefits only for export trade if change was made. He says: "A few years ago the adoption of the metric system was thoroughly discussed by the American Society of Mechanical Engineers, of which the writer is a member. The objections made by the society to the adoption of the metric system at that time, we believe, hold good in the construction of automobiles. We do not see how the adoption of this system would be of any benefit to our cars other than those exported."

P. W. Klinger, a Speedwell engineer, says: "My personal feeling is that the metric system would be a very desirable one if used universally. One of the largest objections we can see to it would be first, the very large number of changes which would be necessary in machine tools and equipment and all measuring apparatus, and secondly, the endless amount of confusion which would necessarily take place in the transition period from the old to the new method of gauging.

"For the automobile world it would seem that the S. A. E. should, after due deliberation, decide upon a period of time



Impact testing machine adapted for metric and English units



Transverse tester for cast bars graduated for English measurements

in which the change should be made, say two or three years, during which time all new drawings produced could be worked on the new standard with the old figures given as a check up to the expiration of the transition period."

W. H. Vandervoort, of the Moline Company, thinks the change would be a foolhardy undertaking. He says: "The first question I would naturally ask is, 'What are the advantages when our present system is so thoroughly installed?' The great mistake made by the engineers of this country was that they did not adopt the metric system as to the desirability of the system, but when you stop to consider what it would mean to adopt it at the present time I feel that it would be a foolhardy undertaking.

"Think of the widespread campaign of education that would have to be started in order to get our workmen to a point where they could intelligently handle this system. It would be many, many years before the English system could be entirely discarded, and during that time of necessity both systems would have to be used in all factories, or at least so long as their was possibility for call for repairs for product that had been delivered."

G. G. Behr, of the Hudson Motor Car Company, doubts if any real benefit would arise from the change. He says: "I have talked this over with the heads of the various departments of our company who would be interested in such a change and from our standpoint a change of this sort would not seem advisable for various reasons. To begin with, it would take years to work it out properly, during which time there would, undoubtedly, be considerable confusion. It would, no doubt, to a great extent interfere with the operation of our service and repair departments and in view of the fact that practically all of our parts are built by outside concerns we would, no doubt, experience great difficulty in getting them into line.

"Taking all these points into consideration, it is a question in my mind whether or not any real benefit would be derived by changing to the metric system, owing to the numerous difficulties which we would undoubtedly encounter if such a change were attempted."

Where the Trucks Are

National Association of Automobile Manufacturers Presents Tables Showing Distribution

Geography, Population, Paved Streets and Roads Are Considered as Relative Factors in the Problem

ONE of the most remarkable compilations ever made since the beginning of the automobile industry is the following series of three tabulations and explanatory notes and conclusions sent out by the National Association of Automobile Manufacturers covering the geographical distribution of automobile trucks and its relation to population and improved streets and roads.

Due credit is given by the association for the painstaking effort used by *The Commercial Vehicle* in collecting the data upon which the tabulations are based, but the association elaborated upon the tables and introduced a mass of data upon which the conclusions drawn in the accompanying article had their foundation.

Scrutiny of the tables shows that there are certain spots in the United States where population and roads would seem to warrant a wider use of the commercial car where the showing is not favorable. These sections deserve the attention of manufacturers. Other states and districts have a considerable excess of motor equipment which may be accounted for on the hypothesis of unusual local conditions. In Oregon for instance the horticultural and mining industries in connection with the wide use of trucks in the city of Portland bring the state to a rank above Connecticut in the number in use. Where such conditions exist it might be possible to utilize that fact to advantage.

New York's showing is interesting. The Empire State ranks first in number of trucks, total population, and in the number of residents who live in cities of and above 25,000. It is also first in the number of miles of paved streets in the cities.

But in the matter of improved country roads it is behind Indiana and Ohio. If this condition proves anything, it shows that street pavement is a more important element in truck use than the improvement of country roads; thus indicating that the truck at present is a creature of the city. This, however, is not borne out by a digest of all the figures. Good roads and streets are required for advantageous operation, but they have to be considered together in order to justify an intelligent opinion or conclusion.

The other side of the proposition is shown in California where the percentage of paved streets is 50 and of improved roads 17.87, while New York is 54 and 16.13 per cent., respectively. The percentages of paved streets in both states is not dissimilar, considering the fact that the city of New York is included in the tabulation. The improved country roads are proportionately more numerous in California than in New York and the ratio of automobile trucks per 1,000 of population is greater in California than New York. Considered on the basis of city streets this ought to be reversed, but the difference is made up in the excess of good country roads; thus proving that both elements are required in reaching the correct conclusion.

The states south of the Ohio River, particularly Kentucky and to a lesser degree Tennessee, where the percentage of improved country roads to total roads is higher than their respective ranks in population, show a marked deficiency in the normal number of trucks. There is an immense amount of work in Kentucky and Tennessee that could be shifted to the automobile truck and on the poor showing in each state it would seem that a market for more trucks might be cultivated.

Such efforts as that, however, call for combative marketing.

TABLE 1—SHOWING RELATION OF DISTRIBUTION OF MOTOR TRUCKS TO POPULATION AND GOOD ROADS.

State.	Number of Commercial Motor Vehicles in Use in 1912.	Population of State in 1910.	Population per Square Mile.	Population in Cities of 25,000 and Upwards.	Miles of Improved Country Roads in 1909.	Miles of Paved Streets in Cities of 30,000 and Up in 1907.
New York	7,892	9,113,000	191	6,355,280	12,787	2,952
Pennsylvania	2,664	7,665,000	171	3,015,161	3,365	2,154
Illinois	2,551	5,638,000	101	2,624,656	8,914	1,947
California	2,198	2,377,000	15	1,095,120	8,587	1,066
Massachusetts	2,045	3,366,000	419	2,155,475	8,463	1,912
Ohio	1,171	4,767,000	117	1,784,210	24,106	1,643
Michigan	1,146	2,810,000	49	939,929	6,900	687
New Jersey	1,080	2,537,000	338	1,368,927	3,377	687
Indiana	970	2,700,000	75	479,071	24,955	482
Minnesota	970	2,076,000	26	594,618	5,417	326
Missouri	832	3,293,000	48	1,080,087	4,755	1,119
Iowa	730	2,225,000	40	330,092	2,505	253
Wisconsin	580	2,333,000	42	592,885	10,167	590
Oregon	526	673,000	7	207,214	2,799	292
Connecticut	519	1,115,000	231	484,034	3,030	389
Rhode Island	410	543,000	508	367,851	1,042	377
Texas	382	3,897,000	15	473,375	4,892	358
Maryland	371	1,295,000	130	558,485	2,142	506
Colorado	239	799,000	8	286,854	320	118
Nebraska	220	1,192,000	15.5	194,328	249	167
Dist. of Columbia	218	331,000	5,518	331,069	......	325
Utah	181	373,000	4.5	118,357	1,018	14
Washington	170	1,142,000	17	450,153	4,520	170
Georgia	155	2,609,000	44	301,608	5,978	249
Kentucky	146	2,290,000	57	352,607	10,114	354
Kansas	120	1,691,000	21	178,465	374	122
Virginia	100	2,062,000	51	292,638	1,903	191
North Carolina	96	2,206,000	45	59,762	2,313	.....
South Dakota	96	584,000	8	....	286	.....
Florida	83	753,000	14	95,481	1,752	54
Maine	78	742,000	25	109,421	2,703	115
Delaware	78	202,000	103	87,411	186	59
Tennessee	78	2,185,000	52	322,419	5,353	427
South Carolina	54	1,515,000	50	85,152	3,534	36
Arkansas	51	1,574,000	30	69,919	1,085	25
Alabama	48	2,138,000	42	222,342	3,264	118
New Hampshire	48	431,000	48	96,068	1,448	29
North Dakota	46	577,000	8	....	140	.....
Louisiana	44	1,656,000	36.5	367,090	329	222
Oklahoma	42	1,657,000	24	89,483	361	40
Mississippi	36	1,797,000	39	....	342	.....
Montana	34	376,000	3	39,165	95	3
Vermont	34	356,000	39	....	2,650	.....
West Virginia	32	1,221,000	51	72,802	591	32
New Mexico	29	327,000	3	....	104	.....
Wyoming	28	146,000	1.5	....	416	.....
Nevada	26	82,000	.7	....	46	.....
Idaho	22	326,000	4	....	510.5	.....
Arizona	21	204,000	2	....	273	.....

The districts where an excess of trucks is indicated embrace localities where the use of trucks is common and their worth has been demonstrated. It would appear as if the marketing of more trucks in those localities would work out by following the line of least resistance.

Take the farming state of South Dakota, for example. The state has several big railroads, but it is so large that they appear rather inadequate. It has no big cities and ranks thirty-sixth in population. It is a state of seasons. When the harvests are made there is intense activity to get to market. The state ranks twenty-ninth in the number of automobile trucks and only 1-2 mile in every 100 of its highways has been improved.

After a prolonged dry spell such as generally follows the harvest, the roads are passable for trucks and the pressure of freight originating on the farms calls into service every available means of transportation. These facts account for the excess of trucks in South Dakota under all the conditions. When road improvement is extended the demand for trucks should be much larger in such territory as that represented by that state.

Close study of the three tables will disclose scores of interesting facts about truck distribution as the data is sufficiently detailed to allow of some close approximations of actual facts.

Following is the complete article:

The controlling factors in the geographical distribution of motor trucks are somewhat complex. Interesting results have been obtained in an effort to trace some of the principal factors, as shown in the accompanying tables.

It has been said that the motor truck is essentially a good roads proposition and consequently an attempt was first made to show a direct relation between the number of commercial motor vehicles in each of the

States and the total mileage of good roads in the States. The result indicated that some other factor had a greater influence on distribution. It was assumed that this must be population, and therefore the total population of the States and the population of each State per square mile were compared with the number of trucks in each State. The result was better this time, but still not up to expectations. Hence the conclusion was reached that, as large cities are known to be the centers of motor trucking, there must be a closer relation between the number of trucks in a State and the number of people living in large cities in the State.

This was found to be the case, but an ever closer relation is shown between the number of trucks and the number of miles of paved streets in such cities, so that the final conclusion is that the use of trucks is dependent in greatest degree upon the number of people living in large cities and the condition of the streets in such cities. It is evident, however, that there are still other influences having important effects, such as the temperament and occupations of the people and the degree of prosperity of the communities.

Referring to Table 1, the figures relating to the vehicles in use were compiled by *The Commercial Vehicle* from three principal sources of information—production as reported directly by manufacturers to March 1, 1912, State and city registrations of motor vehicles, and reports of trucks in use in the principal cities by reliable observers and well-informed persons. These figures show a total of nearly 30,000 commercial vehicles in use, which correspond fairly closely with the results of the statistical investigation into production and sale made by the National Association, and are believed to be the most reliable figures available showing the distribution of trucks by States.

The population figures and percentages were taken from the United States Census report for 1910. The mileages of improved roads and the percentage of improved roads to total miles of roads in the various States are from a report for the year 1909 by the United States Office of Public Roads and relates solely to country roads that have been graded, drained and hard surfaced or treated with some preparation. The mileages of paved streets in cities of 30,000 population and upward are from the Census report of 1907, the figures for 1909 being now in course of preparation and not yet available.

Examination of Table 1 shows that, while New York State, which heads the list with 7,892 trucks, has the largest total poulation, the largest population in cities of 25,000 and up, and also the largest mileage of paved streets in cities of 30,000 and up, it has an average of only 191 persons per square mile as compared with 508 in Rhode Island, 419 in Massachusetts and 338 in New Jersey, and has only 12,787 miles of improved country roads against 24,955 miles in Indiana, 24,106 in Ohio and more than 10,000 miles each in Wisconsin and Kentucky. On the other hand, California, which ranks fourth with 2,198 trucks, stands twelfth as regards total population, with 2,377,000, and numbers only 15 persons per square mile, but nearly one-half its population lives in cities of 25,000 or more. and it stands seventh in miles of improved country roads and miles of paved city streets. Again, Texas, with a population of 3,897,000 and 4,896 miles of good roads, is credited with only 382 trucks, whereas on these two factors alone it should have more than Missouri, with her 832 trucks. But, on examination it will be seen that only 473,375 of her great population live in cities of any size and that there are only 358 miles of paved streets in those cities, while practically one-third of Missouri's people live in cities and the cities have 1,119 miles of paved streets.

In order to render such comparison easier, Table 2 has been prepared. This shows the rank or standing of each State in each of the factors mentioned, and it is necessary only to follow across the line after each State to determine whether it has its full quota of trucks in proportion to population and good roads and streets. Examination will show, as already stated, that the most direct relation is found between the rank in actual number of trucks and the rank in population in cities and the paved streets in the cities; that is, between columns one, four and six.

Thus, it appears that those States having a normal quota of trucks, or in which the distribution is about uniform with city population and street paving, are New York, Pennsylvania, Illinois, Massachusetts, Ohio, Michigan, Connecticut, Rhode Island, Texas, Georgia, Maine, South Carolina, Montana, New Mexico, Nevada, Washington and Delaware.

Those States having an excess of trucks above normal are California, Indiana, Nebraska, Utah, Iowa, Oregon, Kansas, Arkansas and Florida.

Those having deficiencies are New Jersey, Missouri, Washington, Maryland, Kentucky, Virginia, West Virginia, Tennessee, Alabama, New Hampshire, Louisiana and Oklahoma.

Evidently, local conditions affect the situation in most of the abnormal States. Take Tennessee, for example. It has less than two-thirds as many trucks as it should have to be on a basis with the normal States. This may be accountable for on the ground of comparative backwardness in industrial and commercial progress or because the field has not been cultivated sufficiently by the truck manufacturers' agents. Louisiana is another instance, due perhaps to temperamental and industrial factors. Where blanks occur in the fourth and sixth columns they indicate that there are no cities in those States having 25,000 population in 1910.

The percentages in Table 3 show almost the same results as the relative standing in the States on the basis of actual numbers in Table 2. In explanation of this table, California has 92½ per cent. of one motor truck to each 1,000 inhabitants, giving it the largest number of trucks to population. Forty-seven per cent. of her people live in cities of 25,000 and up, giving her fifth place in this respect. Of her total road mileage, nearly 18 per cent. has been improved, and just half of the street mileage in cities of 30,000 and up had been paved up to the year 1907. Louisiana has an average of less than one truck to 37,000 inhabitants, as compared with nearly one truck to 1,000 in California.

TABLE 2—SHOWING STANDING OF STATES IN NUMBER OF MOTOR TRUCKS, POPULATION AND MILES OF GOOD ROAD

State.	Rank In Number of Motor Trucks.	Rank In Total Population.	Rank In Population per Square Mile.	Rank In Population In Cities of 25,000 and Up.	Rank In Miles of Improved Roads.	Rank In Miles of Paved Streets In Cities of 30,000 and Up.
New York	1	1	6	1	3	1
Pennsylvania	2	2	7	2	18	2
Illinois	3	3	11	3	6	3
California	4	12	36	7	7	7
Massachusetts	5	6	3	4	8	4
Ohio	6	4	9	5	2	5
Michigan	7	8	18	9	9	8
New Jersey	8	11	4	6	17	9
Indiana	9	9	12	14	1	13
Minnesota	10	19	30	10	11	18
Missouri	11	7	19	8	14	6
Iowa	12	15	25	21	24	21
Wisconsin	13	13	23	11	4	10
Oregon	14	35	42	27	21	20
Connecticut	15	31	5	13	20	15
Rhode Island	16	38	2	17	31	11
Texas	17	5	37	15	13	16
Maryland	18	27	8	12	26	11
Colorado	19	32	39	25	40	28
Nebraska	20	29	35	28	43	26
Dist. of Columbia	21	43	1	20	..	19
Utah	22	41	43	30	32	38
Washington	23	30	34	16	15	25
Georgia	24	10	22	23	10	22
Kentucky	25	14	13	19	5	17
Kansas	26	22	33	29	36	27
Virginia	27	20	15	24	27	24
North Carolina	28	16	21	39	25	..
South Dakota	29	36	40	..	41	..
Florida	30	33	38	33	28	32
Maine	31	34	31	31	22	30
Delaware	32	47	10	35	44	31
Tennessee	33	17	14	22	12	14
South Carolina	34	26	17	36	16	34
Arkansas	35	25	29	38	30	37
Alabama	36	18	24	26	19	29
New Hampshire	37	39	20	32	29	36
North Dakota	38	37	41	..	45	..
Louisiana	39	24	28	18	39	23
Oklahoma	40	23	32	34	37	33
Mississippi	41	21	26	..	38	..
Montana	42	40	45	40	47	39
Vermont	43	42	27	..	23	..
West Virginia	44	28	16	37	33	35
New Mexico	45	44	46	..	46	..
Wyoming	46	48	48	..	35	..
Nevada	47	49	49	..	48	..
Idaho	48	45	44	..	34	..
Arizona	49	46	47	..	42	..

TABLE 3—PERCENTAGES SHOWING RELATION OF MOTOR TRUCKS TO POPULATION AND GOOD ROADS

State.	Per Cent. of Trucks to Each 1,000 of Population.	Per Cent. of Population In Cities of 25,000 and Up.	Per Cent. of Improved Country Roads to Total Roads.	Per Cent. of Paved Streets In Cities of 30,000 and Up.
New York	86.6	71	16.13	54
Pennsylvania	34.7	39.3	3.84	55
Illinois	45.2	47	9.47	38
California	92.5	47	17.87	50
Massachusetts	60.7	65	49	61
Ohio	24.5	35	27.13	50
Michigan	40.8	30.7	10	46
New Jersey	42.5	54	22.76	56
Indiana	36	17	36.7	42
Minnesota	46.7	28.6	6.83	17
Missouri	25.3	32.8	4.4	54
Iowa	32.8	16	2.45	19
Wisconsin	24.8	25	6.64	56
Oregon	78.1	30	9.49	37
Connecticut	46.5	45	24.08	50
Rhode Island	75.5	68	49.14	80
Texas	9.8	12	3.8	26
Maryland	28.6	43	12.77	92
Colorado	30	36	1.08	8
Nebraska	18.3	16	.31	24
Dist. of Columbia	65.8	100	.....	72
Utah	48.5	32	12.23	4
Washington	14.8	41.5	13.19	6.7
Georgia	5.9	11.5	7.27	48
Kentucky	6.3	11	18.82	64
Kansas	7.9	10.5	.38	16
Virginia	4.8	15	4.38	61
North Carolina	4.3	2.7	4.79	..
South Dakota	16.4	....	.5	..
Florida	11	12.5	9.97	40
Maine	10.5	14.7	10.59	80
Delaware	38	43.2	6.22	63
Tennessee	3.5	14.7	11.66	46
South Carolina	3.5	5.5	11.02	51
Arkansas	3.2	3	2.97	13
Alabama	2.2	10	6.58	22
New Hampshire	11.1	22.2	9.58	14
North Dakota	8	....	.23	..
Louisiana	2.6	22	1.32	41
Oklahoma	2.5	5.5	.5	17
Mississippi	2	....	.86	..
Montana	9.4	10.4	.41	3
Vermont	9.5	....	18.4	..
West Virginia	2.6	6	1.84	50
New Mexico	8.9	....	.61	..
Wyoming	19.1	....	3.94	..
Nevada	31.7	....	.36	..
Idaho	6.7	....	2.77	..
Arizona	10.3	....	4.56	..

Trade News of the Week

Petition In Involuntary Bankruptcy Is Filed Against King Motor Car Company—Liabilities Are $304,000

Rubber Market Lively—Standard Oil Explains Recent Continued Rise of Gasoline Prices

MERCHANDISE creditors of the King Motor Car Company, of Detroit, held a meeting in that city last week, elected a creditors' committee consisting of Messrs. Mallory, Oglesby and Hayes and seriously considered the matter of the company's finances.

Sidney S. Meyers, of New York, was selected as counsel for the creditors' committee and after viewing the situation from the standpoint of the creditors, Mr. Meyers advised immediate bankruptcy proceedings.

A petition in involuntary bankruptcy was drawn up under the direction of Mr. Meyers and was placed in the hands of Detroit legal representatives for formal filing in the United States District Court.

The investigation of the creditors, according to Mr. Meyers, disclosed the fact that the total claims against the company amount to about $304,000. Of this amount $100,000 is represented by the claim of Artemus Ward, of the advertising company Ward and Gow, and said to include loans of money as well as merchandise claims.

The assets of the company are rated as material of a book value of $150,000 and accounts receivable of $15,000. The material consists of parts of automobiles, but the stock on hand is not sufficient to make up complete cars unless certain deficiencies are supplied. The creditors estimated that it would be necessary to advance from $175,000 to $200,000 in order to make up 250 cars. This course was not favored and upon the recommendation of Mr. Meyers, steps were taken to institute bankruptcy proceedings.

In addition to the list of assets the company also has a lease upon the buildings which constitute its present plant.

DETROIT, MICH., Aug. 28—A petition in involuntary bankruptcy has been filed in the United States District Court, Eastern District of Michigan, against the King Motor Car Company. The petitioning creditor is the Harvey Manufacturing Company and the claim in suit amounts to about $1,100.

Rubber Easier in Lively Market

The bulge of crude rubber prices which carried the market up to a basis of $1.25 per pound for up-river fine was reduced after the commencement of the fortnightly auction in London. The prices obtained at the plantation sale were only slightly lower than those current 2 weeks ago but the total offerings were 725 tons, of which about 300 were sold on the block. A better local demand was apparent in the market with some buying that appeared to be for manufacturers.

Old Contracts Disturb Gasoline

Owing to the series of advances that have been noted in the market for gasoline during the past 8 months, prices have been badly demoralized in various sections of the country. Reports have been received that approximately the same grade of gasoline is available in Ohio and several adjacent states in the Middle West at 13 cents a gallon as can be obtained in New Jersey at 18 cents, New England in spots at 17 cents and New York City at 25 cents.

The Standard Oil Company of New York declares that it buys gasoline in Cleveland at the refinery at 17 cents a gallon and that the retail price of gasoline of the same grade in New York City is 19 3-4 cents a gallon f.o.b. New York in wooden barrels of 50 gallons capacity. Parenthetically, the Standard Oil Company explains that the grade of gasoline known as 68-70 degrees forms very little of the total amount sold and used for automobile fuel. The grade used for automobile fuel is known as motor or stove gasoline and the degree is not given.

The wholesale price of gasoline quoted by the Standard Oil and Texas companies in New York and f.o.b. New York for shipment elsewhere in steel barrels, the barrels to be returned immediately upon delivery is 16 cents a gallon.

The apparent paradox contained in the figures is explained as follows: Last year in July and before garagemen and big users and dealers in gasoline entered into contracts with the manufacturers of gasoline, the Standard Oil Company, Texas Company and others, at the level current at that time. Some of these contracts are still in effect with thousands of gallons of gasoline still to be received by the contracting purchasers at the same price that was in effect in July, 1911. In turn, some of these garagemen contracted with customers to supply them with gasoline at a certain figure and despite the repeated advances they have kept on selling at the original price not only to the customers with whom they have contracts, but also to their trade generally.

When their contracts expire, they will have to be renewed at the contract price that is current at the time of the renewal.

"Overlooking a chance to make hay while the sun shines," is the way headquarters of the big oil companies view the action of the garagemen.

When asked as to the significance of the epigram, an official of one of the companies said that in view of the big jump in the market price of gasoline, the customers who made contracts at low figures should have had a nice fat profit at the expense of the sellers instead of handing over the profit to their general trade, thus demoralizing prices and causing confidence to waver.

As to the permanence of the present level, or a gradual appreciation in prices, the opinion prevails that high prices have

Automobile Securities Quotations

Automobile securities had another quiet week in the markets. Goodrich issues have been listed on the New York Stock Exchange and the common has been strong for a week. General Motors continues to gain slowly but steadily. U. S. Motor has been active within a narrow range.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., common	..	..	145	165
Ajax-Grieb Rubber Co., pfd	..	..	95	100
Aluminum Castings, preferred	..	..	99	102
American Locomotive, common	38	38¼	45½	46
American Locomotive, preferred	106	107	109	110
Chalmers Motor Company	..	..	..	..
Consolidated R. T. Co., common	5	10	16	18
Consolidated R. T. Co., preferred	10	20	50	59
Firestone Tire & Rubber Co., common	179	181	284	288
Firestone Tire & Rubber Co., pfd	105	107	106	108
Garford Company, preferred	..	..	..	..
General Motors Company, common	42	43	38½	40
General Motors Company, preferred	80	82	79¼	81
B. F. Goodrich Company, common	243	245	76¾	77¼
B. F. Goodrich Company, pfd	118¾	119¾	107½	108
Goodyear Tire & Rubber Co., common	230	240	330	335
Goodyear Tire & Rubber Co., pfd	105	107	106	107½
Hayes Manufacturing Company	..	..	..	97
International Motor Co., common	..	..	27½	28½
International Motor Co., pfd	..	..	84	85
Lozier Motor Company	..	..	80	60
Miller Rubber Company	..	..	142	150
Packard Motor Co., preferred	..	..	105½	107
Peerless Motor Company	..	..	..	120
Pope Manufacturing Company, common	42	46	38	39
Pope Manufacturing Company, pfd	72	77	73	74
Reo Motor Truck Company	8½	10	9¾	10¾
Reo Motor Car Company	23	25	23	25
Studebaker Company, common	..	..	43	44
Studebaker Company, preferred	..	..	94	95½
Swinehart Tire Company	..	..	95	97
Rubber Goods Company, common	..	..	100	105
Rubber Goods Company, preferred	..	..	107	110
U. S. Motor Company, common	30	32	4½	4¾
U. S. Motor Company, preferred	70	71	17	17½
White Company, preferred	..	..	107½	..

come to stay and that the maximum price has not been reached.

"The facts in the case," said a Standard Oil official, "are that the emphatic demand of the hour is for gasoline. We can sell all we can get. The other petroleum products do not keep pace with gasoline as to demand. The solution of the problem lies in the discovery of some means by which the other petroleum products can be utilized as automobile fuel. The present investigation of the carbureter question is being followed by this company with much care and attention."

The situation in a nutshell is that the rate of 16 cents a gallon may be regarded as basic. The variations from that level are the results of local conditions, but as a general thing the rate in any given locality is about 12 1-2 cents plus the freight or transportation charge from the refinery to any given field. The price of 17 cents paid by the Standard Oil Company of New York at the Cleveland refinery includes the freight charges and contemplates 68-70 degree gasoline. This might account for the considerable difference in price noted.

Peil Is Mitchell Sales Manager

RACINE, WIS., Aug. 26—Leo A. Peil, president and general manager of the Mitchell Automobile Company, a large distributor for the Mitchell-Lewis Motor Car Company, of Racine, Wis., has been appointed general sales manager of the Mitchell-Lewis company to succeed William L. Day, who has resigned to accept the position of general manager of the General Motors Truck Company, Pontiac, Mich. Mr. Peil assumes his new duties on September 1.

Fiat Announces $500 Cut in List

Horizontal reductions of $500, applying to types 56, 55 and 54 which are the 50-horsepower six, the 55-horsepower four and the 35-horsepower, four-cylinder cars have been announced by the Fiat Automobile Company. The standard prices now established are $5,000, $4,500 and $4,000 for the three models respectively.

Market Changes for the Week

Small gains in tin and lead were the only developments in the metal market, these being strong. Copper was quiet. Steel continued at its old prices. Oils and lubricants also remained unchanged throughout the week, and the same applies to gasoline which still sells at 21 cents a gallon in 200-gallon lots in spite of promises for a small rise.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, lb.	.07½	.07½	.07½	.07½	.07½	.07½	....
Beams & Channels, 100 lbs.	....	....	....	....	....	....	....
Bessemer Steel, Pittsburgh, ton	22.50	22.50	22.50	22.50	22.50	22.50	....
Copper, Elec., lb.	.17⅜	.17⅜	.17⅜	.17⅜	.17⅜	.17⅜	....
Copper, Lake, lb.	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	....
Cottonseed Oil, August, bbl.	6.59	6.44	6.45	6.50	6.45	6.32	— .27
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	....
Fish Oil (Menhaden)	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime	.85	.85	.85	.85	.85	.85	....
Lead, 100 lbs.	4.55	4.55	4.55	4.50	4.55	4.70	+ .15
Linseed Oil	.68	.68	.68	.68	.68	.68	....
Open-Hearth Steel, ton	23.00	23.00	23.00	23.00	23.00	23.00	....
Petroleum, bbl., Kansas Crude	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa. Crude	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine Up-river Para	1.22	1.22	1.22	1.22	1.22	1.21	— .01
Silk, raw Ital.	....	4.15	....	....	4.15	....	....
Silk, raw Japan	....	3.72½	....	....	3.77½	....	+ .05
Sulphuric Acid, 60 Beaumé	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs.	46.10	46.00	46.00	46.00	46.25	46.25	+ .15
Tire Scrap	.09	.09	.09	.09	.09	.09	....

Aristos-Disco Suit Filed

Eastern Distributors for the Gas Starter Company Demand $325,000 Damages —Seven Causes of Action

Breach of Contract Alleged in Action Brought in Federal District Court at Detroit

WORD was received in New York Tuesday by E. B. McDuffee, president of the Aristos Company of New York, that suit has been filed in the United States District Court for the Eastern District of Michigan on behalf of the Aristos Company demanding damages of $325,000 from the Ignition Starter Company, alleging breach of contract.

According to a copy of the bill of complaint the suit is based upon seven causes of action. The bill alleges that the Aristos company has been the Eastern distributor for the Disco starter. That as such it purchased upwards of 4,000 starters for more than $50,000 and it complains that the contract conditions under which the starters were purchased were violated by the defendant company in numerous particulars for which damages of $100,000 is demanded. For violation of an alleged agreement not to advertise the Disco in the Eastern section of the country except with reference to the Aristos Company as Eastern distributors, $10,000. Lack of service, $75,000. Various elements of damage and loss caused by the alleged actions of the defendant company, $94,000, and for other reasons, $21,000.

The suit is a law action and the usual course of such proceedings is to reach an issue on the pleadings within 6 months and a hearing soon thereafter.

DETROIT, MICH., Aug. 28—Suit has been entered in the United States District Court by the Aristos Company, a Delaware corporation, against the Ignition Starter Company, makers of the Disco starter, asking $325,000 damages for breach of contract.

Esterline Company Forming Plans

INDIANAPOLIS, IND., Aug. 26—Announcement was made a few days ago of the purchase of one-half of the capital stock of the Esterline company, LaFayette, Ind., by Carl Fisher and J. G. Allison, owners of the Prest-O-Lite Company and the Indianapolis Motor Speedway. The capital stock of the company is $250,000. The plant at present located at LaFayette, will be moved to Indianapolis, and will locate at Speedway.

The Esterline company, it is announced, has already booked orders for the Berdon electric lighting equipment aggregating more than $1,000,000.

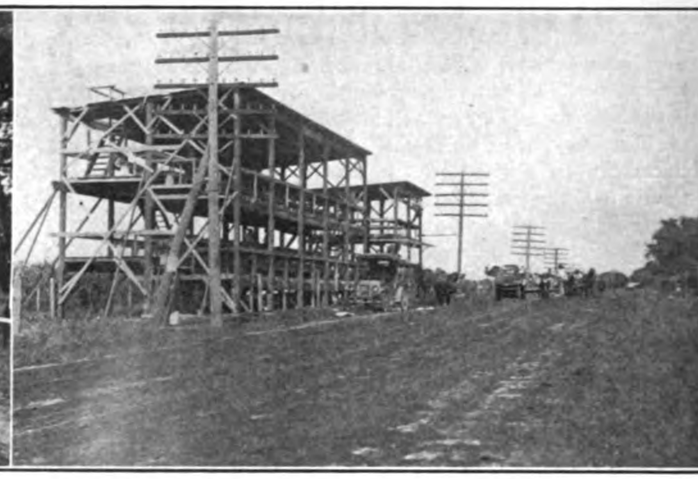
One of the most important lines to be manufactured is a new electric lamp for motor vehicles.

Swinehart to Issue Stock

AKRON, O., Aug. 28—Stockholders in the Swinehart Tire & Rubber Company have been offered a right to subscribe for 23 per cent. of their holdings in the new stock issue recently authorized by the company at par. The business of the company has outgrown its working capital and the increase in the issue of stock is to provide such. The subscription is subject to ratification at the annual meeting September 25.

Vinot Factory for Montreal

MONTREAL, Aug. 26—The Montreal Automobile Carriage Company has been formed for the purpose of building all sorts of cars. The Vinot Car Company, of Canada, has contracted for all the Vinot cars to be built by the Automobile Carriage Company and skilled mechanics are coming from the French factories.

View of the press stand now under construction alongside Elgin course. North stretch of the course undergoing repairs

Elgin Has 34 Entries

Great Road Races Promise to Surpass Record for Course—Many Celebrities Listed Among the Drivers

Well Balanced Fields Named to Go in Each of the Contests Scheduled for This Week

CHICAGO, Aug. 27—Meeting with far greater success than even its most enthusiastic supporters anticipated, the Chicago Automobile Club stands ready to run the third annual Elgin road races next Friday and Saturday and offers a program that is of greater brilliancy than anything of this kind ever developed in the Middle West. Whereas a couple of weeks back it looked as if the club would be lucky if it brought together twenty entries, today when the final count was made and the drawing for numbers took place, it developed that there were thirty-four entries on the books, not counting the four Peugeots which had been declared following the receipt of a telegram from Importer Lacroix to the effect that the French cars had been shipped for an American engagement. It now looks as if this was a false alarm, at least so far as Elgin is concerned. While the Peugeots remain on the list they will be booked only in case they get here in time to race.

The thirty-four entries in hand represent a larger field than started last year when stock car racing held the center of the stage. The thirty-four are divided so that three will start in the small car race for which F. W. Jencks, general manager of the Elgin Automobile Road Racing Association, is offering the trophy; six are booked for competition in the race for the Aurora trophy for cars of from 231-300 inches; while four are to start for the Illinois cup for 301-450 cars. This makes thirteen cars for the first day and inasmuch as all three races are run simultaneously it will make a big field. On the second day there will be fifteen cars running, twelve in the Elgin National Watch company trophy race for cars 600 inches and under and nine in the free-for-all. There are three of the free-for-all cars that are not in the Elgin.

Twelve different makes of cars are represented in the 2 days of racing, out of which number three—still not counting the four Peugeots—are of foreign extraction, the Fiat, of Italy, and Benz and Mercedes, of Germany. American makes represented include the Knox, Stutz, Mercer, National, Rayfield, Mason, Falcar, Ford and Herreshoff. This will be the first appearance in the racing field of the Rayfield, a six-cylinder car made in Springfield, Ill. New also is the Mason which is entered in the Aurora cup and the Elgin trophy races. This Mason is a slightly larger one than the Mason which Harry Endicott drove so successfully at the Galveston beach meet.

A list of drivers includes nearly all of the celebrities, those booked being Teddy Tetzlaff, Ralph Mulford, David Bruce-Brown, Ralph DePalma, Erwin Bergdoll, Spencer Wishart, Hughie Hughes, and Caleb Bragg. In the case of Bruce-Brown there still remains some doubt, for while the American Grand Prix winner was the first entrant, his plans have been somewhat upset by the non-arrival of his Fiat car from Italy. He is expected here not later than Wednesday, when an attempt will be made to have him drive one of the Fiats which Teddy Tetzlaff brought here from Los Angeles. Caleb Bragg has been nominated by E. C. Patterson, of Chicago, the sportsman who endeavored to import the French Peugeots. Failing to get a definite reply from the Frenchmen, Patterson, on Saturday, nominated Bragg, but as yet he does not know whether Bragg will drive a Fiat or a Belgium Metallurgique which he is reported to be preparing for Milwaukee.

With such a choice collection of cars and drivers, the Chicago Automobile Club has the stage all set for the big show. The course is in good shape and well oiled, soldiers have been secured to guard the course, a great interest aroused among the motorists of the Middle West and a prize list which includes $6,500 in cash has been offered. Threfore, the local promoters who have had only 7 weeks in which to handle the meet, feel confident that success awaits there efforts Friday and Saturday. The entry list is given on page 42.

Georgia Town Runs Trade Tour

ATLANTA, GA., Aug. 26—The possibilities of the automobile as a trade builder for the merchants of towns and small cities has been demonstrated by the little town of LaGrange, Ga. This city held the first of two boosting tours recently, covering three counties north of it. It will soon hold a second traveling southward.

The first trip covered 70 miles and more than forty business men of the little town made the circuit. Good crowds were present at all their stops. No attempt was made to do any business, but LaGrange was boosted as a trading point.

Other Georgia towns are planning to duplicate this experiment.

Club to Climb at Davenport

MOLINE, ILL., Aug. 26—The Davenport Automobile Club, which includes in its membership Moline and Rock Island automobilists, will hold a hill climb at Moline on Labor Day. Eight events have been carded, including a free-for-all for amateur drivers, the cars entered to carry full factory equipment. For this event the Josephson silver cup will be the first prize. Entries are

Left, Bergdoll in his big Benz. Center, left to right, Drivers Pullen, Hughes, Endicott and Tetzlaff, with Mechanician Hill in background. Right, Mulford in his Knox Six

limited strictly to members of the Davenport Automobile Club.

The events are for cars costing $1,000 and under; cars costing $1,000 to $1,800; cars costing $1,800 and up; cars costing $2,000 and under, carrying four passengers; cars costing $2,000 and over, carrying four passengers; age handicap; free-for-all; free-for-all for Josephson cup, amateur drivers, cars must carry full factory equipment.

Milwaukee Club Holds Evening Tour

MILWAUKEE, WIS., Aug. 25—The Milwaukee Automobile Club conducted its first annual Harvest Moon tour on Saturday evening, August 24, from its clubhouse at Milwaukee to Oconomowoc, the famous summer resort, and return. Sixty-seven cars participated. The start was at 5 o'clock and dinner was taken at Lalumier hotel on Oconomowoc lake at 7 o'clock. The return trip was begun at 8.30 o'clock, and the route was via Waukesha, where a party of twenty cars from the Waukesha Motor Club was picked up and taken to the Milwaukee clubhouse for a buffet luncheon and informal dance.

M. C. A. Revises Contest Rules

DETROIT, MICH., Aug. 24—Recommended changes in the rules to govern automobile contests for the coming year were formulated and presented to the General Rules Committee of the Manufacturers' Contest Association at its mid-summer meeting held recently. The proposed changes are few in number and not radical, but the exact significance of them cannot be established until the tentative list is acted upon by the Contest Board of the American Automobile Association.

A general poll of the situation was taken in advance of the meeting and queries as to changes in the code were presented to 130 manufacturers in and out of the organization. Sentiment was about evenly divided between the advisability of holding strict stock contests and non-stock contests.

CARS AND DRIVERS ENTERED IN THE ELGIN RACES, SHOWING THE BORE AND STROKE OF THE ENGINES

No.	Car	Entrant	Driver	Bore	Stroke
		Jencks Trophy: Friday, August 30, 11 a. m., 96 miles, or 12 laps			
41	Mason Special	F. S. Duesenberg	H. Endicott	3 13/16	5
42	Ford, 1911 T	Moe Brothers	F. W. Moe	3¾	4
43	Herreshoff, 20, 1909	Herreshoff Motor Company	W. G. Wordingham	3⅛	3 5/16
		Aurora Trophy: 152.5 miles, or 18 laps			
31	Mercer, 35-C	Mercer Auto Company	E. Pullen	4⅜	5
32	Falcar Special, 1912	Fal Auto Co	Hastings	4⅛	5¼
33	Falcar Special	Fal Auto Co	Wilbur	4⅛	5¼
34	Mason Special	F. S. Duesenberg	Roberts	3⅞	5
35	Mercer, 35 T	Mercer Auto Company	Wishart	4⅜	5¼
36	Mercer 35 T	Mercer Auto Company	Hughes	4⅜	5
		Illinois Trophy: 203 miles, or 24 laps			
21	Stutz, 1912	Stutz Motor Car Company	Anderson	4¾	5½
22	Rayfield Six, 1913	Rayfield Motor Company	Hobbs	4	5½
23	National 40, 1911	Fred Cummiskey	Whalen	5	5 11/16
24	Stutz, 1912	Ideal Motor Car Company	Merz	4¾	5½
		Elgin National Trophy: Saturday, August 31, 11 a. m., 254 miles, or 30 laps			
1	Knox Six	Ralph Mulford	Mulford	4¾	5½
2	Mercedes	W. H. Bertrand	Clark	5⅛	7⅛
3	Mason Special	F. S. Duesenberg	Roberts	3⅞	5
4	Mercedes	E. J. Schroeder	De Palma	5.2	7.06
5	Fiat Seventy	E. E. Hewlett	Tetzlaff	5¼	7½
6	Falcar Special	Fal Auto Company	—	4⅛	5¼
7	Stutz, 1912	Stutz Motor Car Company	Anderson	4¾	5½
10	Falcar Special	Fal Motor Company	—	4⅛	5¼
11	National 40, 1911	Fred Cummiskey	Whalen	5	5 11/16
12	Stutz, 1912	Ideal Motor Car Company	Merz	4¾	5½
14	Mercer 35 C	Mercer Auto Company	Wishart	4.39	5
15	Mercer 35 T	Mercer Auto Company	Hughes	4⅜	5
		Free-for-all, 306 miles, or 36 laps			
1	Knox Six	Ralph Mulford	Mulford	4¾	5½
2	Mercedes	W. H. Bertrand	Clark	5⅛	7⅛
4	Mercedes	E. J. Schroeder	De Palma	5.2	7.06
5	Fiat 70	E. E. Hewlett	Tetzlaff	5	7½
8	Benz, 1911, Racer	Bergdoll	Bergdoll	6.2	6.3
9		E. C. Patterson	Bragg		
11	National 40	Fred Cummiskey	Whalen	5	5 11/16
15	Mercer 35 T	Mercer Auto Company	Hughes	4.39	5
16	Fiat	Bruce-Brown	Bruce-Brown		

Wishart Breaks Records

Lowers Mark for 200 Miles and Several Intermediate Distances on Columbus 1-Mile Circular Dirt Track

Official Rules Covering Next Year's Grand Prize Race Published by the Automobile Club of France

COLUMBUS, O., Aug. 26—Records were shattered at the second annual 200-mile race given at the Columbus Driving Park August 25, under the auspices of the Columbus, Ohio, Automobile Club. The records for 75 miles, 100 miles, 150 miles and 200 miles on a circular dirt track were broken before a crowd estimated at about 35,000. The race was successful in every way and there were no accidents of any kind to mar the pleasure of the afternoon.

Spencer Wishart, in a Mercer, finished first in 3 hours, 28 minutes and 4 1-2 seconds, as against a previous record on the same kind of track of 3 hours and 45 minutes. The others finishing inside the money were Howard Wilcox, in a Cino, time 3:35:10; Johnny Jenkins in a Cino, time, 3:35:30 and Neil Whalen, in a National, time, 3:36:49. Ben Lawwell, in a Westcott, was also in at the finish but was not in the money.

Wishart drove steadily throughout and did not push his engine for the first 50 miles. After some jockeying, Wishart took the lead and held it with the exception of a few laps around the 50-mile period. At 65 miles, the Mercer led and was never retired from that position. It was after negotiating 103 miles that Wishart came into the pit for the first time and then three tires were changed. At that time he was four laps to the good and left the pit still in first place. At 129 miles Wishart again went to the pit for tires and water and at 180 miles the third stop was made, this time for oil. All told, he lost 10 1-2 minutes in the three stops.

The records broken were: 75 miles by Wishart, in his Mercer, 1 hour, 19 minutes and 38 seconds as against the record of Strang, at Columbus, O, July 3, 1909, in 1 hour 19 minutes and 39 seconds. 100 miles by Wishart, in his Mercer in 1 hour 40 minutes and 51 seconds as against Burman, at the Columbus, O., track, July 3, 1909, in 1:41:00 2-5. He made the 150 miles in 2:34:05, which won for him the Virginia Hotel cup.

The money and prizes distributed were: Wishart, in Mercer, $1,000 and Chamber of Commerce trophy. Wilcox, in Cino, $500 and Hartman Hotel trophy. Jenkins, in Cino, $300 and North Side Chamber of Commerce trophy. Whalen, in National, $200 and Williams & Schlereth trophy; 50-mile lead, Cino, Jenkins, Gordon Trophy, time, 1:02:41; 100-mile lead, Mercer, Wishart, Central Ohio Oil Company cup, time, 1:40:51; 150-mile lead, Mercer, Wishart, Hotel Virginia cup, time, 2:34:05. A summary of the prize winners and their respective times follows:

Car	Driver	Time
Mercer	Wishart	3:28:4½
Cino	Wilcox	3:35
Cino	Jenkins	3:35:30
National	Whalen	3:36:49

French Race Rules Published

PARIS, Aug. 16—In its official rules just published for next year's Grand Prix race, the Automobile Club of France has determined an allowance of 20 liters of gasoline per 100 kilometers (being at the rate of 14.1 miles to the gallon) and fixed a minimum weight limit of 1,763 pounds and a maximum of 2,425 pounds, without gasoline, oil, water, tools or spares. The total distance of the race, which will be a 1-day event, will be about 560 miles, the course to be about 30 miles round and as near as possible to the city of Paris.

Minute precautions have been taken in the drawing up of the rules to provide against cheating. In addition to a fine of $2,000 and disqualification of the driver, his team mates and the firm proved guilty of an attempt to dodge the rules, the committee has decided that it will supply the gasoline tank, the piping and all unions. The tank, which will be 39 inches in length and of a diameter to be determined when the total distance of the race has been decided on, must be placed across the frame to the rear of the two seats, it must not be encased or covered in any way, and the car must carry all spare tires and wheels across the frame to the rear of the tank. The whole of the fuel to be used in the race will be put into the tank before the start; thus if the distance is 560 miles, the amount of gasoline aboard will be about 40 gallons. The gasoline allowance will be made at a temperature of 15 degs. C., with rectification for any variation in temperature from this standard.

When the tanks have been filled on the day before the race, the filler cap will be sealed, all connections on the gas line will be sealed, and a control put on the carbureter, the car then being placed under military guard until the moment of the race.

Permission is given the competitors to indicate the brand of gasoline they desire to use in the race, a list of ten different makes being quoted from which a choice can be made. The particular brand selected will be bought from the retailers in the ordinary sealed cans and only opened in the presence of the competitors.

The construction of the tanks will be such that it will be impossible to put gasoline in without detection.

Under the rules any manufacturer can enter six cars at a fee of $800 per car, entries to be received by October 31 and to attain a minimum of forty for the race to be held. In view of the possibility of too large a number of starters, the right is retained to reduce the number per firm, starting with the firms having the maximum number of cars entered, by the drawing of lots, or by the running of an elimination race, as may be considered advisable. From October 31 to March 1, 1913, entries will be received at double fees.

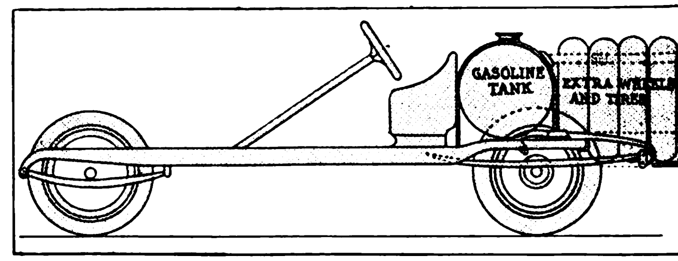
Alco Truck in Home Stretch

KELTON, UTAH, Aug. 26—The Transcontinental Alco truck has reached here, with a distance traveled of 3,150 miles and a record of thirteen state lines crossed. Less than 800 miles now remain of the journey from the factory of Charles W. Young & Company, Philadelphia, to the Carlson-Currier Company at Petaluma, Cal.

In contrast to the floods, washouts and other obstacles to travel that were met in Wyoming good road conditions have been experienced by the truck in Utah.

In reaching Kelton, the crew, on account of superior conditions for traveling, chose to make a wide detour to the north and drove across the Utah-Idaho state line just above Snowville.

MINNEAPOLIS, MINN., Aug. 27—The Contest Board of the Minnesota State Automobile Association announced today the disqualification of Studebaker No. 3, a contestant in the runabout class for the *Daily News* Cup in the recently run fourth annual reliability tour which finished at Winnipeg. The cause of the disqualification was that the car left the course, running around Foxholm, Minn., on the fourth day of the contest.



Position of fuel tank and spare wheels and tires prescribed by rules for 1913 French Grand Prix

Painting and Upholstering

High Grade of Workmanship Exacted By Automobile Owners and Users Elevates These Trades to Arts

Not Only Must General Effect Be Pleasing But Detail Must Be Carefully Executed Throughout

OF ALL the trades connected with the making of the automobile, none is more important and essential than those of painting and upholstering. Other trades are mechanical; these are charged with the elements of art.

The motor maker, the body fashioner, the designer, the worker in wood or metal, and the cunning artificers in various other lines create the car to do its appointed work, but without the creative, artistic and executive talent of the painter and upholsterer the prospective buyer would be as a stranger unto the salesman's inexhaustible vocabulary.

Neither the painter nor the upholsterer is a mechanical necessity. Both contribute to the comfort of the car owner; one to both the physical and mental, the other to the mental. Both, to accomplish the higher order of results now exacted by automobile owners and users, must be experienced and expert in all the intricacies of their crafts.

With the upholsterer, design, style, finish, material, color, form and finish, together with the luxurious effects which all these things are expected by the car owner to give to the vehicle, are chief items of his stock in trade. Not only must the general effect be all that anything in art can well be, but in detail also the work must, to meet modern requirements, be complete throughout.

Car Buyers Growing Critical

Within the past 2 years, car buyers have found it to their interest to be critically exacting in their choice of upholstering for their cars. Good upholstering or trimming serves no useful purpose, aside from a mere temporary effect, unless it is durable.

Durability of the upholstering depends perhaps about equally upon the workmanship and upon the quality of the goods used. The cushion and back springs, and the materials immediately connected with these in bringing up the form and foundation for the finer fabrics, are essentially important and the car owner may rightly insist upon these being of the best. Like the painter, the upholsterer or trimmer is concerned with the foundation building. With a defective under-structure the whole building, however fitly joined together upon its outer trappings, is in ever-present danger of going to pieces.

The maintenance of form, expansion, compression, with here a little and there a little of that deftness of touch which is at once the unmistakable mark of a superior workmanship, are necessary factors in the make-up of a good and durable job of car trimming.

Some of the foundation materials may be summarized as follows: Springs, sheeting, webbing, duck, buckram, thread, hair, etc.

For high-class work, which, after all, is ultimately the cheapest, the best curled hair, with sheet cover padding and springs of the finest elasticity, worked into an adjustment that means the most satisfying comfort, are indispensible.

With the outer adornments of the upholstery—the cloth, and silks, and satins, and lace, and cord, and leather, tufts, buttons, tassels, carpets—everybody having to do with the car is concerned. These things, of course, are variously priced, according to quality, but, as before stated, quality rather than the price should be the governing factor. Generally speaking, in the choice of cloth the car owner or buyer should select as the fabric most durable, goods of moderately long wool, soft and firm to the touch, not too compactly woven, clear in thread, and warp and woof, of cheap and shoddy filling, pliable, elastic and suggestive of luxury.

For automobiles of the best class, hand-woven laces continue to be in favor despite the expense attached to their use. Cushion fronts, doors and pillars display the wide laces, while the narrow fabrics are used, as required, principally in connection with the wide samples. In automobile upholstering, as in the painting, very much depends upon the choice of colors—their capacity to undergo service without fading. Naturally in the finest fabrics the color is fast and uniform.

For automobile work, the cloth should be dull finished—that is, without gloss. This is produced under the process of cold pressing, whereas hot pressing produces the gloss finish. Either finish may be made up from the same piece of goods.

The dyeing of the cloth has much to do, we are told by those in authority, with the quality, supposing the quality of the fabrics to be uniformly good previous to this treatment. There are at least two processes of dyeing, namely: Wool dye, which provides for the wool being dyed prior to being woven, and piece dye, which provides for dyeing the cloth in the piece as it comes from the loom.

In leathers, choice colors may be had for automobile work. Many rare and beautiful colors are wrought in leather, the split-hide leather, it is said, taken from the best hides, being most largely used for car upholstering. The finish, feel and appearance of fine leather, colored to harmonize and soften down the entire tone of the interior work, confers upon the upholstering a sense of comfort, of luxury, of indescribable restfulness quite unsurpassed by anything else that art or the ingenuity of man can put into the car.

Besides the cover fabrics, the cloth or leather, there are the interior furnishings, which belong to and are a part of the trimming of the car. You may choose to call them accessories, but they practically all belong to the trimmers' department of work for arrangement and display.

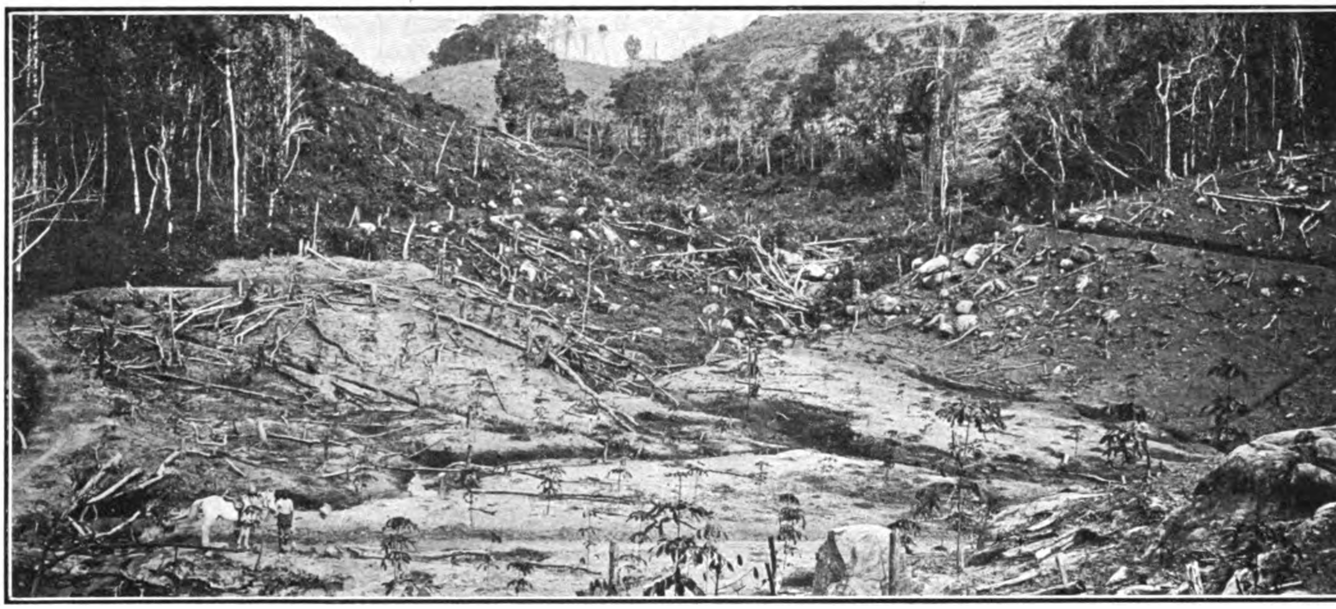
For the larger type of car, limousines, etc., there are hat-racks, parcel-nets, dome lights, corner lights, megaphones, coat-hooks, bouquet- and umbrella-holders, and a fairly wonderful list of other sundries which must enter into the completion of the car if it is to approach in detail work, and in the hundred and one little things making for the delight and convenience of the user, the beautifully finished and furnished cars from over the sea.

So, too, in the painting. While the American finisher gives to the car a quality of work unsurpassed, the American painter in his choice and combination of colors, and his manner of displaying them, fails somewhat by comparison with the work of the incomparable French colorists. However, we are this year being treated to a quality of color work which promises very soon to equal, or even surpass, anything accomplished by foreign touch artists.

Surface Work Highly Perfected

Surface work, rounding out and perfecting every detail of the under foundation is a department of work which in this country has been brought to a high state of perfection. If the French painter leads his American brother in color methods, the latter leads the world in surface creations and in the fine art of finishing.

While all these things are of immediate concern to the car owner the durability of the colors, the wearing properties of the varnish, and the results wrought out by a combination of the two are of still greater importance. The dark, fine blues and greens and maroons which seemingly harmonize with practically every popular upholstering and trimming material are, for the most part, durable colors requiring only the adequate protection of plenty of good varnish to maintain them in a high order of excellence through a long term of service.



How a newly-planted rubber orchard in Ceylon is laid out—Here the trees are only 12 feet apart, a mooted subject among the experts

Plantation Rubber a Factor in Industry

Production Increasing Rapidly, Thus Counteracting the Demand on Para Grades—Some Interesting Details Outlined by Experts with Regard to Advanced Methods in Use Among the Planters of Ceylon and the Far East

PLANTATION rubber in 1912 will reach a production 100 per cent. in excess of the production of cultivated rubber in 1911, according to the estimates of experts engaged in that branch of the industry and verified by the rubber auction reports from London and the other great marts where plantation rubber is handled. The amount of plantations offered in London is gaining with each fortnightly auction as compared with the offerings of last year.

As applied to the automobile industry, the production of plantation rubber is of prime importance and also has a secondary bearing that is an immense influence. There is a closely guarded question as to whether tire makers use any considerable amount of plantations in the manufacture of their wares. Some of them deny it; others will not make a definite statement with regard to the matter, while still others tacitly admit that plantation rubber has sufficient quality for their purposes without saying that their companies use it.

The general claim is made by tire makers that pure, hard-cure, up-river Para is used exclusively for tire making in their particular establishments. In proof of their claims it may be stated that the tire makers do buy and use vast quantities of Para and considerable supplies of that grade and variety of rubber may be seen in their storage warehouses in its original form.

To Equal Para in Quantity in 1915

But, whether or not plantation rubber is used to any material extent in tire making, the fact remains that every ton of merchantable plantation rubber manufactured and marketed has a distinct bearing upon the tire industry, inasmuch as it relieves the pressure of demand from the Para grades, because even if plantation rubber is not utilized for tires, it is usable for many other purposes that have always required Para in the past, and will be used for many other purposes in the future that would have accentuated the demand for Para when they became developed.

In the first 7 months of 1912 10,000 tons of plantations were auctioned in London, which is the principal trade point for that class of merchandise. In the corresponding period of 1911 the total was a round 6,000 tons. As the shipments are becoming larger each month, the rate of increase over last year steadily rising, makes it more than probable that the number of tons marketed in London will be at least double those of 1911. The total amount for the year is estimated in that market at approximately 20,000 tons.

Increase of 100 Per Cent. Expected

Next year with the new plantations coming into commercial productivity and with the increased production of the present plantations, a total yield of over 40,000 tons is predicted. As to figures further in the future, at best they are estimates, but the opinion of the experts is that the yield will increase to the total capacity of the available labor to handle.

It has been predicted that by 1915 the total yield of plantations will more than equal that of the Para districts and the rest depends upon the quality and quantity of available labor and the introduction of advanced economic methods in cultivating, collecting and manufacturing.

The plantation rubber industry is about 36 years old, having been born shortly after H. A. Wickham, a British scientist of high rank, had smuggled a boatload of seed of the Hevea Brasiliensis out of the Amazon country. The removal of Hevea seed proved a surprise to the Brazilian government. In fact, it was not within the legal contemplation of that state that such a situation should eventuate.

The cargo of seeds numbered many thousands, but after the delays that attended their transportation by devious routes to

Ceylon, only a few hundred of them were sufficiently preserved to germinate. There were some live germs in the seeds, however, and the result of Mr. Wickham's enterprise proved to be a nice little patch of infant rubber trees, numbering about 100 trees all told.

From that start the great plantation rubber industry of Ceylon, Malaysia, Oceania and the East Indies generally has developed. The initial plantation was so small that it required many years before it was possible to plant large areas on a commercial scale and still longer to bring the plantations to a point where the yield of rubber was large enough to be called a factor in the industry as a whole.

That day has now dawned and from this year plantation rubber must be reckoned as one of the chief elements in the industry.

The history of its development marks a tremendous step in the automobile industry. Ten years ago there was only a small fraction of the total production of rubber that was used by the automobile tire makers. Today it represents thousands of tons, more than half of the Para yield, and yet the price of crude rubber is not equivalently higher when the augmented demand is considered.

All the Ceylon plantations are from seedling Hevea Brasiliensis, which originated from the Wickham seed. Generally speaking, the yield per tree, 8 years old and 18 inches in circumference 3 feet above the ground and ranging from that size and age upward to the largest trees now in bearing, may be reckoned at about 6 pounds per season. The new plantations and those that have not had the most advanced type of care and administration will average less than that rate of yield and the older and better cared for plantations will yield more than that rate. Mr. Wickham takes the position that the trees should be planted not less than 33 feet apart and run not more than fifty trees to the acre. Kelway Bamber and other experts figure that 150 trees per acre is not excessive, and a few of the extremists on the other side place their figures as high as 500 or more.

According to Mr. Wickham's contention the trees require a large area of ground so that their roots may spread out in all directions, giving the tree a strong support and by reason of the lack of crowding below the surface to avoid the chance of having the tree become debilitated and liable to fungus infection on account of its lack of strength. He also demonstrated that tree for tree plantations conducted along the lines he indicated yielded a much larger amount of latex than those where close planting was the rule.

Wickham Points Out Essentials

Mr. Wickham divides the plantation rubber problem into three heads and places these heads as follows:

First.—That the Hevea tree has, and is still, being altogether too closely planted for a tree—a forest tree—of its natural order and habit.

Second.—The system designated generally as clean-weeding considers land from which the humus of the surface being burnt off, what remains of the surface soil is exposed to the bake of the sun and the beat of the rain and may be seen any day being carried bodily away in the drains of the nearest water-course—a loss never to be replaced.

Third.—Incision versus excision in the manner of tapping the trees for latex.

Under the first head he argues that the powers of growth must be arrested if insufficient room for the roots is allowed. He claims that the whole idea of the plantation is based upon some plan for avoiding that very difficulty by making adequate space provision for the rubber trees.

Under natural conditions in the jungle there is always a tense struggle for existence between the jungle and forest growths. This is somewhat compensated because the various elements in the competition are of different botanical orders and draw upon different food constituents. Much material also is returned to the ground in the form of humus for future food supply. But in the case of the plantation, the trees, all of one species, demand the same food elements and a fierce competition is concentrated on soil that is often denuded of humus. In tropical soil germs of morbid or fungoid growth are always present. These are usually innocuous unless the tree's power of resistance has been lowered. There is nothing that will lower the power of a tree or a man like starvation and make it or him liable to the germ of disease. If, however, the vitality of the subject be kept on a high plane by food and care, the chances for deterioration are minimized.

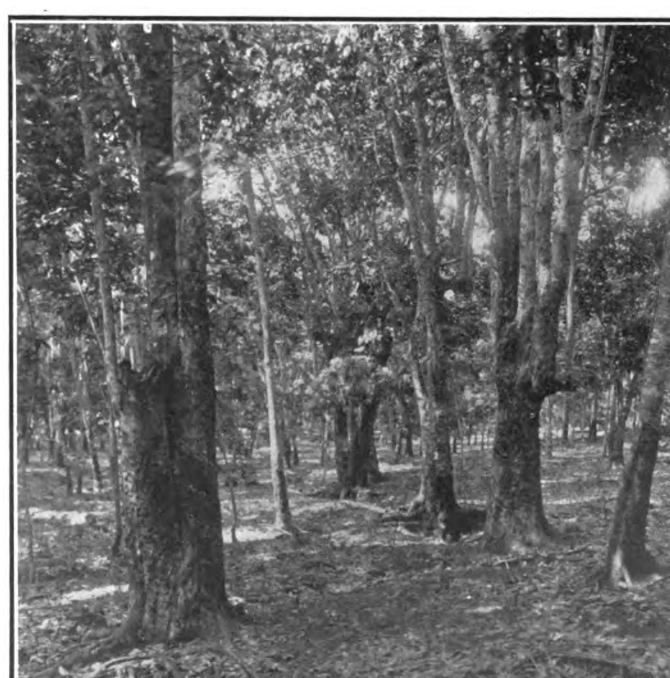
On the subject of clean-weeding Mr. Wickham says that if the surface is burned off and the soil washed away or baked around the roots, the tree must suffer at once. The Hevea loves to have its head in the sunlight and its roots in a cool, free, covered soil. Quoting from Dr. Ewart Mr. Wickham said:

"The use of fire to clear ground in preparation for cultivation is common among primitive races who practice a more or less rudimentary kind of agriculture, but with the advances of science fire plays less and less part in its doings. Even in a garden the less the amount of rubbish that is burned instead of being rotted in, the less amount of manure is needed to be carted in to keep up fertility. Eactly the same thing applies on a larger scale and even greater extent to agriculture."

Favors Incision Method of Tapping

With regard to the question of incision versus excision, Mr. Wickham holds that the former system will eventually be found to be the better method of tapping.

Kelway Bamber agreed with much that Mr. Wickham had presented. He stated that his experience in Ceylon pointed to 150 trees to the acre as being not too many, particularly in the early period of the plantation. He cites the fact that the rapid growth of the trees placed in such close proximity to one another gives rapid and adequate protection to the surface soil, shielding the earth from the rays of the sun and the force of the rain. Undoubtedly the wider planting, such as contemplates from forty to forty-eight trees to the acre, will give trees in time that will prove larger and more productive than those planted close together, but, he maintains that the plan of planting 150 trees or thereabouts has given better financial results than the other system so far in the industry.



Oldest rubber plantation in the world, which was started 36 years ago

Fish-bone method of tapping, showing feeder channels

Fish-bone method, showing vertical cutting and feeders

Speaking broadly of the plantation situation, Mr. Bamber said:

"Luckily for Ceylon the proportion of poor yielding trees is slight, but when found all such trees should be removed to prevent crossing with the better varieties. For the first 2 or 3 years, especially in soil requiring much drainage, the greater proportion of Hevea trees show a distinct gray bark, which darkens and becomes more corky from the base upwards after that period. After the third year the bark of the better types of trees increases in thickness considerably. When rubber first began to be planted on a large scale it was usually estimated that no returns would be obtained under 5 or 6 years, but it has been found in many instances that the trees were of sufficient girth to commence tapping in or after the fourth year and that with careful work no harm to the tree resulted, but should the trees at this early stage be over-tapped serious harm might follow.

"A favorite system, first tried on the Lanadron Estate, was to commence with a basal V tapping, embracing half the circumference of the tree and 15 inches from the ground and with another V, 12 to 15 inches above it, if the girth of the tree permitted. This is now frequently employed, with various modifications as to the proportion of the bark tapped, and while in many cases it gives satisfactory yields, it affords a means of gradually training the coolies to do good work before the bulk of the trees come into bearing.

Spiral Bleeding System Passing Away

"The spiral form of tapping has now almost gone out of practice, especially since Professor Fitting's able brochure was published. Latterly also the old system of pricking and paring is disappearing, as it has been found that better yields are obtained by paring only and with less injury to the trees. The evidence is, however, not conclusive and some of the finest work has been done by the combined tools followed by excellent healing of the bark.

"Professor Fitting demonstrated by his experiments that the supply of plant food for the stem, etc., was interfered with to a large extent by the spiral or half-spiral and similar methods of tapping and recommended that opposite quarters only should be tapped to minimize this effect, a suggestion that is being freely adopted."

Going into the details of advanced tapping methods, Mr. Bamber takes the position that with young trees it is better to tap only one-third of the circumference at a time. He states that if opposite quarters are used, the length of the cuts will not be sufficient to insure a good flow of latex. He cautions extreme care in tapping so that the bark of a certain section will last the required number of months. Twenty cuts to the inch is considered as a fair average. If one-third of the bark is tapped during the first year on an 18-inch tree, at 3 feet from the ground, at the end of the year the tree should measure from 23 to 24 inches in girth. The process of tapping is believed to be a fostering influence to promote the girth of the tree.

Tapping Increases Girth of Trees

When a tree has reached a girth of from 23 to 24 inches it is considered large enough to be subjected to tapping on opposite quarters if desired.

In tapping by the paring methods only, it must be remembered that the bulk of the latex tubes are situated close to the soft formative substance from which the growth of the tree is supplied, called cambium. Thus the blade of the tapping tool must go fairly deep if the latex is to be extracted. The slightest fraction too little in the incision will result in disproportionately small annual yields.

Formerly it was considered that no renewed bark should be touched under 4 years, but now it has been found that a good flow can be obtained after the second year from the bark that had been tapped previously. If the bark is not renewed within 2 years it may be taken as proof of the fact that tapping has been too rapid for the vigorous growth of the tree.

The new incision method of tapping is described by Mr. Bamber as follows: "It consists of cutting shallow vertical channels down the bark from 6 feet to the ground, incising these at 1 inch intervals. The latex is collected at the base of the tree in the usual way. Two channels are cut the first day on opposite sides of the tree and incised with a special blade from top to bottom at intervals of an inch. The second day after two more channels are cut 3-4 inch to the right of the two already made, and similar incisions are made as in the course of the others. On alternate days this process is continued until the whole circumference of the tree has been channeled and incised at 3-4-inch intervals. The tree is then rested for 6 weeks and the incision and channeling process is repeated on alternate days in the same channels but with the incisions 1-4 inch below the previous cuts. After each complete round the tree is rested for 6 weeks so that the trees are tapped an average of 72 days in a year, in six periods of 12 days each.

The yield from this process is about on a par with other systems, but it is open to certain objections as well as much support. The process increases the proportion of scrap rubber by reason of the difficulty in catching all the latex as it flows down the channels, but this loss may be prevented by care and promptness in collecting the scrap.

In favor of the system it is urged that the process of incision is more readily adaptable to bark growth than the other systems of tapping and that theoretically at least the system gives a longer yielding life to the tree.

The experiments were tried to learn whether bark renewed from below only gave as much latex as the bark after the total removal of the bark. It was known that where bark was cut away daily the renewed bark gives more latex than the original. The outcome of the experiments is still uncertain and will be for at least a year, but present appearances all point to an affirmative answer.

Manufacturers First Seek Uniformity

One of the drawbacks to plantation rubber so far as a material element in manufacturing is the fact that it is not uniform in quality. Even the product of the same plantation varies somewhat from the viewpoint of the manufacturer. The position of the manufacturer is that where he makes a certain line of goods requiring identical qualities in the material used throughout a manufacturing year, he can never be certain that a certain grade of plantation rubber will be absolutely uniform today and 6 months from now.

This is explained by the producers on the theory that they are not closely enough in touch with the manufacturers. They produce the rubber according to their best information as to the requirements of the market and the manufacturer purchasing in the market sometimes finds that the quality of the same grade of rubber varies sufficiently to force him to change his manufacturing processes or secure a supply of rubber that tallies with his original supply upon which the processes were based.

For instance, he may find traces of acetic acid or alum in one lot that were not present in the original or former shipments and the presence of such chemicals may render the rubber unfit for his particular purposes. Francis Martin, a manufacturing chemist, recommended that the producers eliminate all traces of coagulating mediums and water from their products before marketing. This would have the effect of making it unnecessary to wash and dry the product before use and would serve to enhance its value.

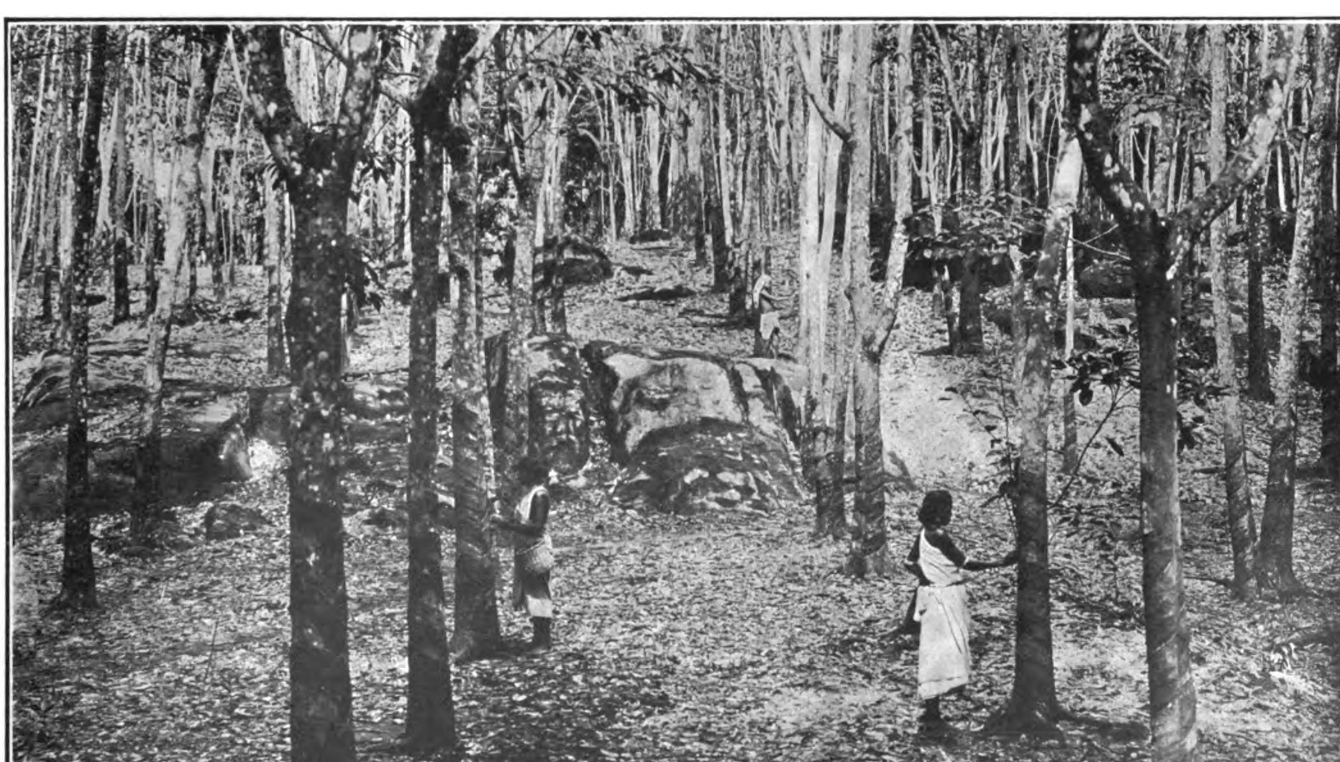
Would Pay More for Even Grades

Some of the makers who consume large amounts of plantation rubber feel very strongly on the subject of uniformity. Even quality is made a secondary consideration with them. Opinions have been expressed by men who are real factors in the trade that an advance of 15 cents a pound for certain grades would be gladly paid by the manufacturers if they could be assured that the rubber of a certain grade would be always of uniform characteristics.

The rubber producers are striving in every way to bring about this result and some of the leaders assert that they would willingly take 2 cents a pound less for their product if they could be assured that it was uniform.

Vulcanization is regarded as the supreme test and a movement is now under way to install small vulcanizing plants on several of the big Ceylon plantations so that actual working tests of the grades of rubber can be made right on the ground. The manufacturer has only a general idea of what is going to happen when he employs a new grade of rubber and he finds his proof of the pudding in the results attained. According to the scientists, vulcanization is the surest way of classifying rubber so that if the manufacturer knows that a certain grade will vulcanize according to certain methods and the product will serve to gain a certain result, he can purchase freely to the benefit of everybody concerned.

THE AUTOMOBILE is indebted for much of the information contained in the foregoing to A. Staines Manders, organizing manager of the International Rubber Exposition, which will be held at the Grand Central Palace September 23 to October 3.



View of plantation in full bearing, showing close-planting system which is not favored by all the pioneer leaders of the industry

Racing Speed Does No Harm to Perfect Road—French Demountable Wire Wheel—The Fiat Fire Pump—Load Suspension a Factor in Tire Wear—Cottin-Desgouttes Construction Features—Cheap Scavenger for Cast Steel

CAR Speed and Road Conservation—In its report on the recent *grand prix* race over the Dieppe course in France, the committee on sports of the Automobile Club of France takes note of the condition of the roads as observed before and after the racing cars had passed over them twenty times. This part of the report reads in substance as follows:

Despite the length of the contest and the number of vehicles engaged, the road in a general way suffered very little. On the straight stretches it was in perfect condition. In the places where the drivers could urge their motors, some detrition of the surface was observed, and it is possible to maintain that this result should not be ascribed to the speed but rather to sliding of the wheels on the ground, this sliding being due to misproportion between the relatively small weight of the cars and their excessive powers. The road in this case served as a brake band, absorbing the surplus power which was not utilized for propulsion.

The Dieppe race is a new demonstration of the fact that on a perfectly compacted road surface speed, weight or power, when held within the already widely extended limits characteristic of racing cars, are not factors in the destruction of roads; on the contrary, the weight, which causes adhesion to the road, should be in such a ratio to the power available at the motor shaft that the sliding of the driving wheels becomes impossible, and this for the protection of the tires as well as of the road. Anti-skid tires with suitable projections on their tread, in as much as they improve the adhesion certainly check the sliding of wheel and reduce the wear of the road. It is to be noted in this connection that the majority of the vehicles were equipped with anti-skid tires on the first day and that on the second day the few smooth tires which formed the exception from this rule were replaced with anti-skid tires.

It is known that accelerations and retardations are especially harmful to roads and tires. In this respect it was noticed that in front of the grand stand the road remained in perfect condition, although starting and braking were frequent at this point. The inference is that great progress must have been accomplished in the flexibility of motors as well as in clutches and brakes.

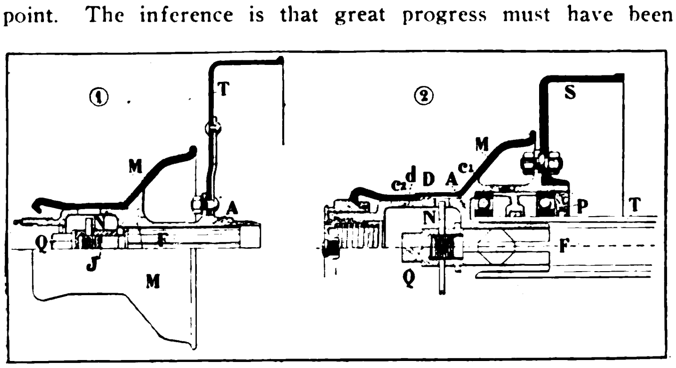


Fig. 1—Mounting of the fixed hubs in R.A.F. demountable wire wheels on different wheel-driving shafts—(1) on a non-floating type of shaft—(2) on a full-floating type of shaft

The vehicles in most cases hugged the road closely, and the well-studied load distribution methods, spring suspensions and spring moderators certainly contributed to this result, so favorable for roads and tires. It must be stated, however, that at the foot of hills, at the spots where gear was changed for the climb, considerable road detrition was observed. The speed change showed its effects; which argues in favor of progressive gear change.

At the turns the heaviest vehicles skid at the rear at the moment when the straight direction is resumed, and the lighter vehicles skid with all four wheels. This fact was verified at the hairpin turn (*la Fourche*) where the road was plowed up. The banking of the turn which is so valuable for the security of the vehicle, seems ineffective for conserving the road surface. It may be considered settled that the whole width of the road should be tarred at turns and also that repairs with crushed stone should be made over the whole width at these places and should be given time to settle. The fact that the stone replacements on the roads of the race were not recent combined with favorable showers to conserve their good condition.—From *Bulletin Officiel,* July.

Wire Wheel Construction—The demountable wire wheel, which is known as the R.A.F. and made in France embodies certain details of design and appearance which distinguish it from the well-known Rudge-Whitworth wheels made in England. The differences relate mostly to the method of mounting the wheels on the axles and are shown in the accompanying illustrations, Fig. 1 (1 and 2) and Fig. 2 (1, 2 and 3). The wheels themselves comprise the steel rim, the triple rows of spokes and the pressed steel hub, the latter, M in Fig. 1, being formed with two conical faces, $c1$ and $c2$, by pressure against which the wheels are held in their planes when mounted. The pressure is exerted by means of the mechanism of an auxiliary hub which is in all cases permanently—though removably—mounted upon the wheel spindle. It is the auxiliary hub which carries the ball-bearings and, in the case of the rear wheels, the brake drums. It rotates on the spindle in front wheels and with the spindle in driving wheels. Fig. 1 (1) shows the mounting of the auxiliary hub on the end of a wheel shaft which drives the wheel under load stress, while Fig. 1 (2) shows the mounting on a wheel shaft of the full-floating type, in which the load is supported on the tubular axle surrounding the wheel-driving shaft. Fig. 2 (1) shows the mounting of the auxiliary hub in a front wheel. Externally these hubs, Fig. 2 (2), all look alike, and the caps which lock them to the pressed-steel wheel-hubs by means of the internal locking barrels shown in Fig. 2 (3) are all of the same design, externally and internally. The auxiliary or, as it might be called, the fixed hub is formed with a conical surface E which serves as abutment for the conical part $c1$ of the wheel hub, and the latter is pressed up against this conical face by means of the screw cap L, Fig. 2 (1), which is threaded upon the outer end of the fixed hub, while the exact centering of the wheel is secured by the smooth cylindrical portion G of the fixed hub to which there corresponds a similar internal smooth cylindrical portion in the wheel hub. The toothed zone D on the fixed hub similarly corresponds to an internally toothed belt in the wheel hub and their engagement prevents rotation of the wheel on the fixed hub. In order to provide a secure lock for the screw cap, the fixed hub contains the barrel or plug D, Fig. 2 (3). This barrel which is pushed outwardly by a strong spring B, Fig. 2, (1) and (3), is provided with two toothed belts of which one goes into engagement with a corresponding toothed belt in the interior of the fixed hub, unifying these two parts, while the other engages an interior toothed belt cut in the interior of the screw cap L. This combination constitutes, then, a very secure lock with the assistance of the outward pressure of the spring B which amounts to about 50 kilograms. And to hold the barrel in place, preventing the spring from throwing it out, a groove K in the fixed hub receives a split ring C, Fig. 2 (3), which abuts against the toothed portion of the barrel.

A special tool has been devised for facilitating the mounting and dismounting of this wheel. It consists in a spanner fitting over the screw cap, with which is combined a yoke with prongs which may be adjusted to enter the groove in the cap, so as to fix the tool laterally, and with a screw device for pressing the barrel inward against the resistance of the spring while the screw cap is being released by the turning of the spanner. Another special tool serves for extracting the fixed hub whenever this operation may be desirable for examining ball-bearings or brakes.—From *La Vie Automobile*, July 27.

Fiat Fire Engine—The rear end of a fire engine chassis as built by the Fiat company of Italy is shown in Fig. 3. It is driven and operated for fire extinguishing purposes by a 45 horsepower gasoline motor, and the complete vehicle with 17 men on board and equipped with ladders and a reel can be driven on level ground at a speed of 25 kilometers per hour and is capable of climbing grades of up to 16 degrees. The chassis alone weighs about 2100 kilograms. According to a statement in *Zeitschrift des Vereines Deutscher Ingenieure*,

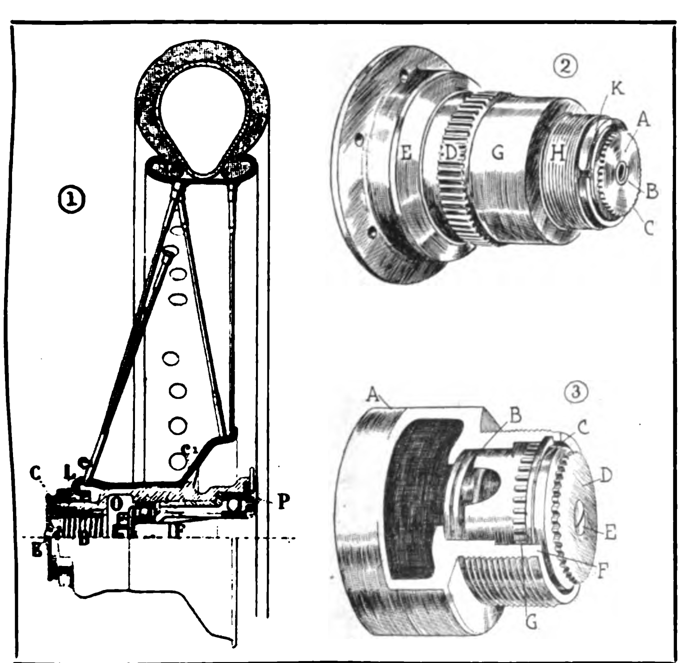


Fig. 2—(1) R.A.F. demountable wire wheel on a front-wheel spindle—(2) auxiliary hub upon which pressed-steel wheel hub is mounted—(3) the barrel or plug serving, together with the screw cap, to secure the wheel

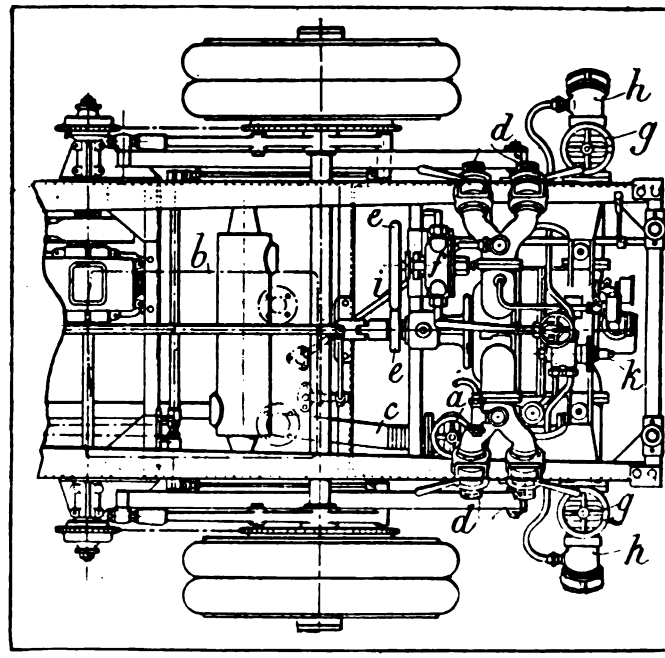


Fig. 3—Rear end of Fiat fire engine chassis with centrifugal pump

the three-cell centrifugal pump can draw water from a depth of 4 meters and discharge it at the rate of 1,200 liters per minute with the motor going at 2,000 revolutions per minute and the manometer pressure registering about 10 kilograms per square centimeter. At still higher motor speed and the pressure increased to 16 kilograms, the discharge can be raised to 1,600 liters. As will be noticed from the drawing, the vehicle is chain-driven, and the pump shaft is in continuation of the transmission shaft extending from the gear box and may be coupled to it.

The method adopted for starting the pump is somewhat different from any employed in German fire engines of the same general type. There is mounted upon the chassis a water tank *b* which normally is connected with the water jackets of the motor cylinders but whose content, when the valve *e* is opened, is also driven by the cooling-water pump into conduit *c* and thence into the four pipe joints *d* where fire hose are attached. As soon as the pump is to be started and its shaft has been coupled to the motor, a friction gear *ee* communicates the rotation of its shaft to an air pump *f* which evacuates the air from the suction conduits of the centrifugal pump which may be connected with the latter at any moment by means of the joint *h* and the valves *g*. Consequently, when this is done and as soon as the centrifugal pump has consumed the water in the tank *b*, these suction conduits are filled with water and the centrifugal pump continues its work through them, drawing from the local water supply. It also replenishes the tank *b* with water from this source through the pipe *i*. The connections between the air pump *f* and the suction conduits *h* are opened or closed by means of a six-way valve *k* placed at the rear of the vehicle.—From *Le Génie Civil*, August 3.

Metal Wheels, General Design and Tire Wear—A correspondent cites his experience with two fast cars, the motors and chassis of which were practically alike, excepting that the last one acquired by the experimenter had a wheelbase about 10 inches longer than the first one. In both cases Rudge-Whitworth wire wheels were used, but in the first vehicle the carriage body was built out over the wheels and also had a considerable rear overhang, extending several inches farther back than the frame reaches, while in the second vehicle the whole carriage body was kept entirely within the space between the axles and so narrow as to clear the planes of the wheels. Yet, the weight of the second car was 20 kilograms greater than that of the first one. With the first car, three tires had lasted only for 2,000 kilometers and two other ones for 5,000 kilometers, and this had been considered very unsatisfactory, although the average speed at which the car had been driven had been very high—tending up toward 60 miles per hour wherever the road would permit. With the second car, the tire results were much more satisfactory, none of the tires showing signs of giving out after a mileage of 5,600 kilometers attained at the time when the report was rendered. The upshot of the correspondent's reasoning is that while the wear of tires may be much affected by the nature of the wheels it is perhaps still more affected by other factors relating to the distribution and suspension of the weight of the chassis, the carriage body and the occupants, which are seldom considered as of great importance in this connection.—From *La Vie Automobile*, July 27.

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Details in a Well-Known Car—In a brief description of the latest Cottin-Desgouttes cars, which are among those most used in the hilly portions of France, some details are mentioned which seem worth noting. The carbureter takes its heated air from the space between the cylinder casting and the valve casing, thereby renewing the air in this space and contributing to keeping the valve springs and stems cool. The carbureter is heated by a piping, D in Fig. 4, which connects directly with the water jacket and also acts as a bracket assisting in supporting the carbureter. The pan marked E is cast in one with the upper portion of the crankcasing and takes the place of the mud pan with evident advantages. A wire screen B prevents the oil in the bottom part of the casing from swashing. A force pump with spring-pushed ball valves drives the oil through tube A to a horizontal distribution-tube running lengthwise of the casing at a level higher than that of the crankshaft, whence it drops through short leads to the three shaft bearings, and from these it is thrown by centrifugal action in the now usual manner through bores in the shaft, the crankpins and the crankpins to the connecting-rod bearings.

A special method has been adopted for obtaining a brake effect upon the transmission shaft when disengaging the clutch for the purpose of a gear change while avoiding this effect when the clutch is slipped for other reasons. The clutch is of the multiple plate variety, as indicated in Fig. 5 at B, and a conical brake band C is mounted upon the hollow member A upon which the clutch spring RR acts when compressing the clutch plates. This spring is made in two parts, however, of which the front one has more convolutions than the rear one, and between these two parts there is slidably mounted upon the squared shaft a female cone D which, when pressed into engagement with the brake band C, serves to retard the transmission shaft as desired. But when the clutch spring is drawn back only a little, the two brake elements do not come into contact. C moves back farther than D, as the part of the spring with which it moves is longer, but D also moves back somewhat. Only when the clutch spring is fully compressed, completely releasing the multiple plate clutch, is the condition brought about under which C overtakes D, retarding the rotation of the transmission shaft and facilitating the contemplated gear change.

In the front wire wheel construction used for Cottin-Desgouttes cars a notable feature is the end-thrust ball bearing which permits mounting the wheel on the spindle without undue tightness and yet with adequate provision against play. Of the two races of this bearing, one, B in Fig. 6, is secured upon the spindle and the other, C, is secured in the wheel hub, and the road shocks are thus absorbed in the bearing from whichever side they come.—From *Omnia*, August 3.

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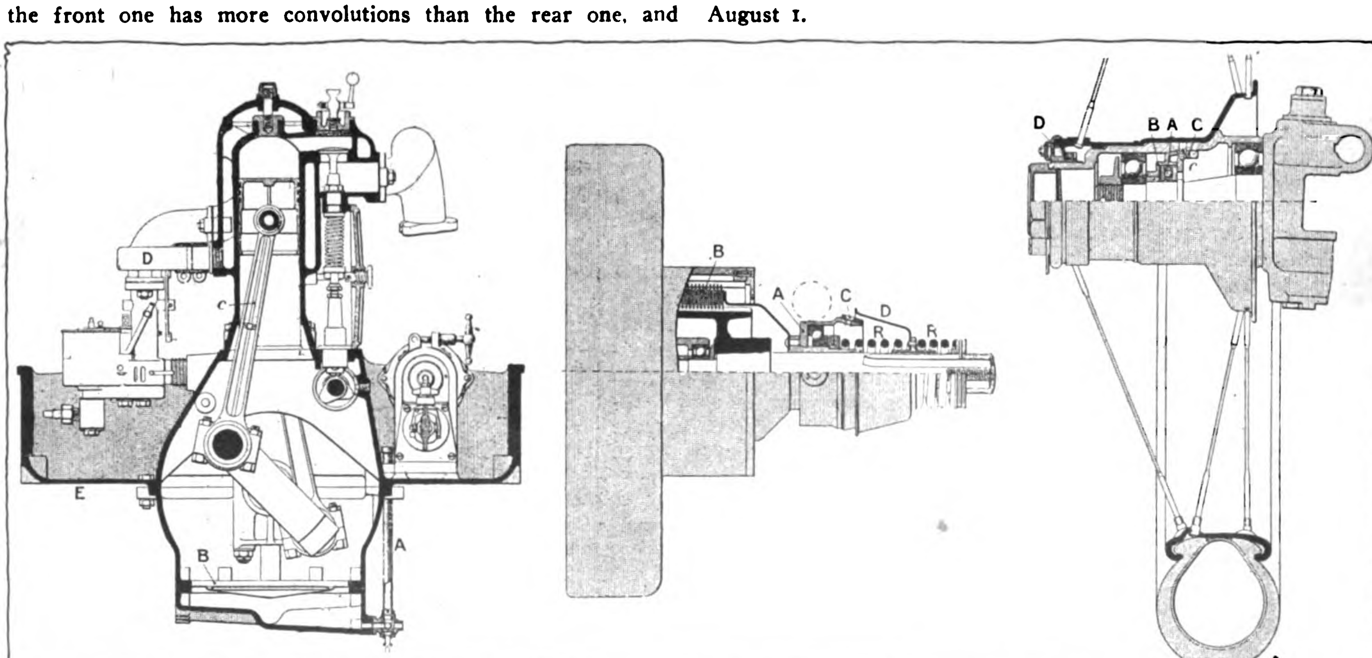
Improved Iron and Steel Castings—An advancement in the art of obtaining castings free from pipes and blowholes by the use of silico-calcium as a scavenging agent in the melt has been substantiated through experiments by Professors Donath and Luszner at the technical college of Brünn, Austria. It has a high affinity for sulphur, forming calcium sulphate, while the silica combines with the oxides and other impurities (nitrogen) and forms a slag which floats on top of the melt. With iron containing 26 points (a point being one hundredth of 1 per cent.) of phosphorus and nearly 10 points of sulphur, the silico-calcium treatment reduces these proportions to 20 points of phosphorus and 6 points of sulphur. In the case of an open-hearth steel, the treatment affected the contents as follows: 72 points of carbon was reduced to 70 points, 12 points of silicon was raised to 18 points, 92 points of manganese to 95 points (this gain apparently representing only the admissible error in the determination), 10 points of sulphur was reduced to 6 2-3 points and 7.4 points of phosphorus to 5.4 points. The sulphur and phosphorus taken out of the metal were found in the slag. The mechanical properties of the steel obtained in this manner are identical with those of steel treated with aluminum, with the additional advantage that the spots or grains of alumina often found in the latter are avoided.—From *La Technique Moderne*, August 1.



Figs. 4, 5 and 6—Construction features in Cottin-Desgouttes cars—Fig. 4 showing carbureter, mudpan and oiling system—Fig. 5 showing new combination of clutch and brake action—Fig. 6 showing wire wheel construction with internal end-thrust ball-bearing

New Gray & Davis Starter in Detail

Six - Volt Compound - Wound Motor Has Been Added to Lighting System Formerly on the Market

Pedal-Operated Device Will Spin Heaviest Motor for Sufficient Time to Start in Cold Weather

THE Gray & Davis self-starter, recently announced in THE AUTOMOBILE, is of interest to automobile engineers in that it is especially adapted to the use of a 6-volt current. This voltage has been selected by the Gray & Davis concern for two reasons: first, that it requires no special battery equipment, and, secondly, that it may be added to the Gray & Davis lighting system without adding any undue complexities to the wiring scheme of the car. The added complication of the electric motor is almost imperceptible, being merely the mounting of the motor itself below the floor boards of the car and the addition of a starting switch located near the battery that is generally placed on the rear right end of the car next to the side channel frame.

There are two sizes of the starter. The largest is the variety that will be seen in the 1913 Peerless cars. It is heavy enough and develops enough power to turn over the largest of the six-cylinder motors for a sufficient time to start it in the coldest weather. The motor on this large size starter weighs 70 pounds. Unlike most of the electric starters which have recently been put upon the market this is not a motor-generator. The generator is separate and independent, being mounted on the side of the motor. The starting motor is never in operation unless the foot is on the pedal that is used to start the car.

Motor Is Geared to Flywheel

The motor is of the compound wound type running on direct current and is geared to the flywheel. The reduction is about 20.8 to 1 from the motor to the flywheel. The heavier of the two motors is designed to turn over at 1,200 revolutions per minute on a current consumption of 200 amperes. The lighter motor, which is adapted for starting purposes on the smaller four-cylinder motors and weighs about one-half as much as the larger, will turn over at 1,500 revolutions at a current consumption of 100 amperes. The weight given by the manufacturers of the smaller starting motor is 38 pounds. The voltage of the smaller motor is the same as the larger motor, being normally rated at 6. Both the motors have been shown by the manufacturer's tests to be capable of operating under an overload of nominally 200 per cent. In case the gasoline motor should suddenly go dead on a railroad crossing the starting motor can be called into action and will carry the car across. The makers state that the storage battery they use in connection with the lighting and starting system will be sufficient to carry the car for 2 miles without the aid of the gasoline motor.

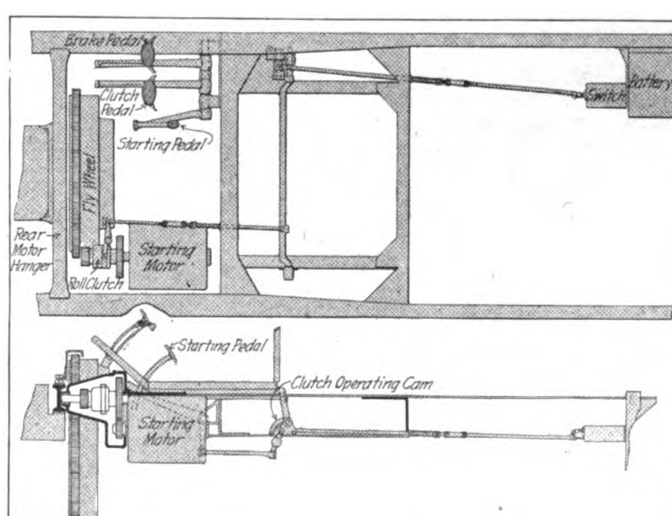
The installation of the starter is shown in elevation. The upper or plan view shows the starter's position relative to the control pedals and to the longitudinal frame members. With left control the starting motor would be located on the right side of the car so that there would be no complication in the brake and gear-shifter mechanism. The plan view also shows the relative positions of the starting pedal, switch, battery, etc., as well as the mechanism through which the apparatus is under control. When the pedal is depressed the switch is thrown in and the gears are put in mesh through which the starting motor drives the motor. After the motor is turned over and started the clutch is engaged in the usual manner, there being no change in any way in the clutch mechanism generally fitted to the car. When the clutch is let in and the motor speeded up the roll clutch indicated in the illustration comes into action and cuts out the motor so that it rests absolutely idle while the car is in motion. As shown in the plan view, both the rods which lead to the switch located in this case on the rear right of the chassis frame and the rod which controls the engagement of the starting motor gearwheel with the flywheel gear are adjustable for length. This is accomplished by a left and right screw device similar in action to a turnbuckle. The clutch which is used for the purpose of disengaging the electric starter may also be regulated to throw off the starting mechanism at any desired speed.

The dynamo, which is familiar to those who have used the Gray & Davis lighting system in the past, is what is known as the constant-speed type and can be driven from the motor or any other moving shaft by gear, belt or chain. The special centrifugal governor takes care of any of the varying speeds of the motor and keeps the armature revolving at a uniform rate by allowing the clutch to slip when the speed of the motor increases. When the motor is running so slowly that it is below the charging rate of the dynamo an electric cut-out comes into play and prevents the current from discharging back from the electric battery through the dynamo.

Centrifugal Clutch Important

The centrifugal clutch in the dynamo is the key to the system in that it not only is the part that keeps the current in the battery for use in starting the motor, but permits the battery to be charged at the normal rate. The centrifugal clutch combines a centrifugal governor with a friction clutch. The latter consists mainly of two disks, one of aluminum faced with asbestos fiber 1-8 inch thick running on three ball bearings. The other disk is of smooth cast iron. The aluminum disk is the variable speed disk, as it always runs at the same relative speed as the motor, being driven therefrom by a belt or by gearing. The cast-iron disk is pressed against the asbestos fiber facing by a strong vanadium spring, which is controlled by the centrifugal governor weights. When the speed of the dynamo mounts over 1,200 revolutions per minute or what would correspond to a car speed of about 12 miles an hour, the governor weights fly out to such a distance that the clutch releases its hold sufficiently to permit it to slip. This keeps the armature speed of the generator down to the required 1,200 revolutions per minute.

The cut-out which prevents the discharge of the battery through the dynamo at low speeds operates on the magnetic principle. When the generator speeds up the electric magnet attracts the magnet armature and closes the circuit between the dynamo and the accumulator battery.



Plan view and elevation of the installation of Gray and Davis electric starter

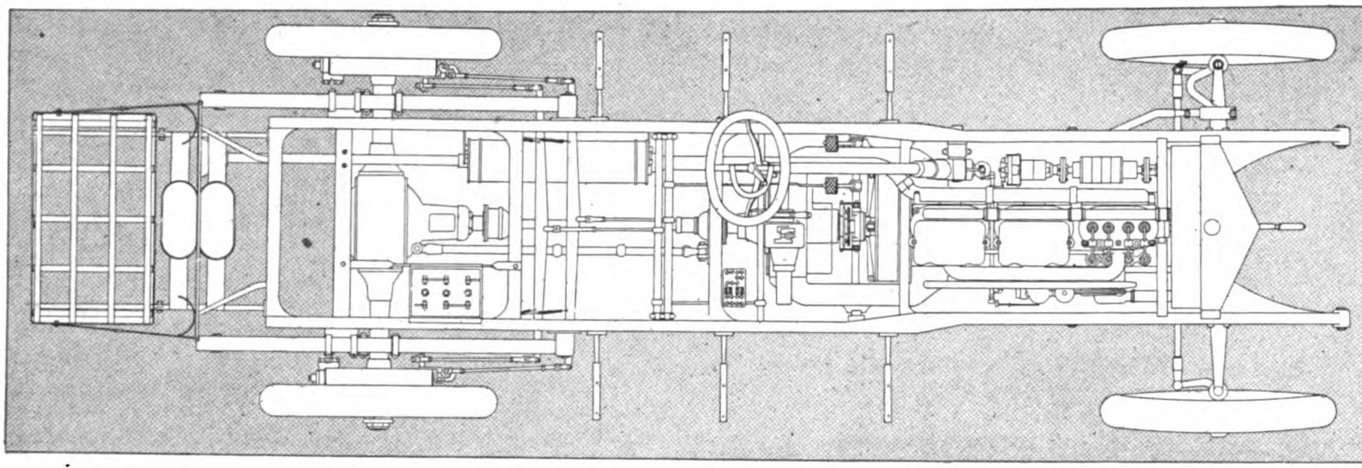


Fig. 1—Plan view of the new Knox little six chassis brought out for 1913 under the name of model 46

Knox Brings Out a New Six-Cylinder

Four Models on the Market for 1913—An Increase of Stroke Made on Four-Cylinder Motors

Important Body Refinements Adopted—Silence Made an Important Feature

FOUR models of cars will be produced by the Knox Automobile Company, of Springfield, Mass., for the season of 1913. Two of these, the models 44 and 45, are four-cylinder cars of identical specifications except for the wheelbases; while the remaining two comprise the big six car which was produced for 1912 by the Knox company and which is to be known next season as the model 66, and the little six or model 46. The little six is the only entirely new model added to the line and while the other three are put out under the 1913 date only minor changes have been found necessary.

The changes made in the models which have been continued for this year have been principally in the line of body refinements except one important change in the four-cylinder motor, that is, the increase of the stroke by 3-4 inch. The stroke of this motor was formerly less than the bore, the dimensions being 5 by 4 3-4 inches. In making the stroke 5 1-2 inches for the coming season the stroke bore ratio has been changed from .863 to 1.100. The other refinements incorporated in the 1913 models include a three, instead of a two-blade fan, oil-gauge on dash, clock speedometer, slides over pedals to prevent gases from entering passenger compartments, Perkins acetylene starting and lighting outfit, windshield base moved to top of cowl instead at begining of cowl, choice of horizontal or vertical tire carrier the horizontal tire carrier has a permanent trunk rack and the vertical tire carrier has a folding trunk rack, changed shape of mud guards, a graceful reverse curve being used this year instead of the straight type seen in the 1912 cars. The door, latches are now concealed whereas last year they showed above the body line.

New Radiator Is of V-Shape

Chief interest centers in the little six known as model 46. This is an entirely new car and involves features which are new to Knox design. The first point which strikes the eye is the V-shaped radiator. This radiator has been adopted by the Knox company on account of the splendid results obtained with it in racing. On opening the hood of the car it will be seen that in this model the engineers have cast the cylinders in pairs, not

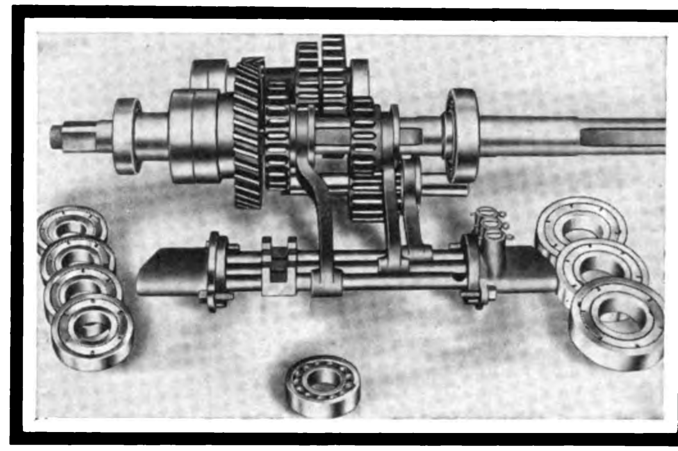


Fig. 2—Assembly of Knox gearset showing annular ball bearings

following the practice in vogue with the Knox four-cylinder cars where the cylinders are cast singly. Other departures from standard Knox practice: the placing of the intake and exhaust valves on opposite sides; the use of bolted-on instead of clamped-on manifolds; 45-degree conical valves are used instead of straight sided, although the other features of the cylinder head construction remain practically the same; cam rolls of large diameter are used with a spring inside the push-rod guide to hold the roll on the cam, thus making for silence; rounder cam contours are used; chain drive is used for the camshaft and magneto shaft; silence is sought in every direction, aluminum valve action covers being placed over the rocker arms on to that of the cylinder; bosses are cast in the cylinders to take the Perkins starting system and allow the acetylene to flow in such a way that a whirring action of the acetylene gas results, making starting more certain; nickel-plated wiring containers are mounted on the cylinders; a wood knob is fitted on the top of the gear shifter lever; torsion rod is placed on right instead of left of car; two separate entrances of water manifold to the radiator and extra large brakes are used. In all other essential points the construction of the little six-cylinder car is similar to that of the other models.

The bore of the little six car is 4 3-8 inches and the stroke 5 1-2 inches giving a bore-stroke ratio of 1.256. The cylinders as stated are cast in pairs and are of grey cylinder iron. The cylinder heads are all detachable and when so detached carry the valves directly with them as shown in Fig. 5. To remove the cylinder heads in order to reach the cylinder of the motor for cleaning out carbon or for any other reason, it is only necessary to unbolt the water manifold and take out the six bolts of the flange that holds the head to the body of the cylinder. The cylinder head can then be lifted off and the interior is exposed to view. The sections of water manifold above each pair of cylinders may be removed independently if desired and this will permit of the removal of each pair of cylinder heads singly. The main cylinder water-jacketing is connected to the water-jacket of the head by a small by-pass which is removable and which is rendered water-tight by a copper asbestos gasket. These small by-passes are seen in Fig. 4, where the left side of the motor is shown, they are located between the exhaust manifold and the metal pipe holding the ignition wires. As may be seen they are held in place on the cylinder by two bolts, one at the top and the other at the bottom of the by-pass.

The pistons are of grey iron and are fitted with four rings, three of which are above the wristpin and the other is below. The wristpin is fixed and is held secure against an oscillating movement by a stud bolt which passes directly through the bushing into the boss on the interior of the piston. This construction has been used in the four-cylinder Knox cars during the past and is illustrated in the part sectional view given at Fig. 3, where the four-cylinder Knox is shown. The connecting-rods are of I-beam section and are arranged to take a lead-pipe which is a factor in the oiling system as will be explained later. The crankshaft has a bearing between each of the separate cylinder castings making four main bearings on the little six cars and five on the four-cylinder model. The material from which the crankshafts are made is chrome-nickel steel, double heat treated. The connecting rods are 3 1-2 per cent. nickel steel. The camshaft which is driven by silent chain from crankshaft is also a heat treated steel and is mounted on the right side of the motor.

Valve Mechanism Slightly Changed

The valve mechanism is of the Knox type, but has been improved in some of the minor details. The points at which these improvements have been made are at the cam follower and over the cylinder heads where a unique adjustment device and aluminum cover plate have been fitted. The cam contours have been made more round also tending to give silence to the operation to this motor. This feature has not been carried far enough, however, to cause the motor to lose power, although a correspondingly slower opening and closing of the valve is a result of this change in design. As has been noted the employment of roller cam followers is used in conjunction with the changed cams. The aluminum cover plates as shown in Figs. 4 and 5 are held in place by two wing nuts, one at the forward end of the cover plate, and the other at the rear. The removal of these two nuts allows the cover to be taken off and exposes to view the compression cups and the valve rocker arms.

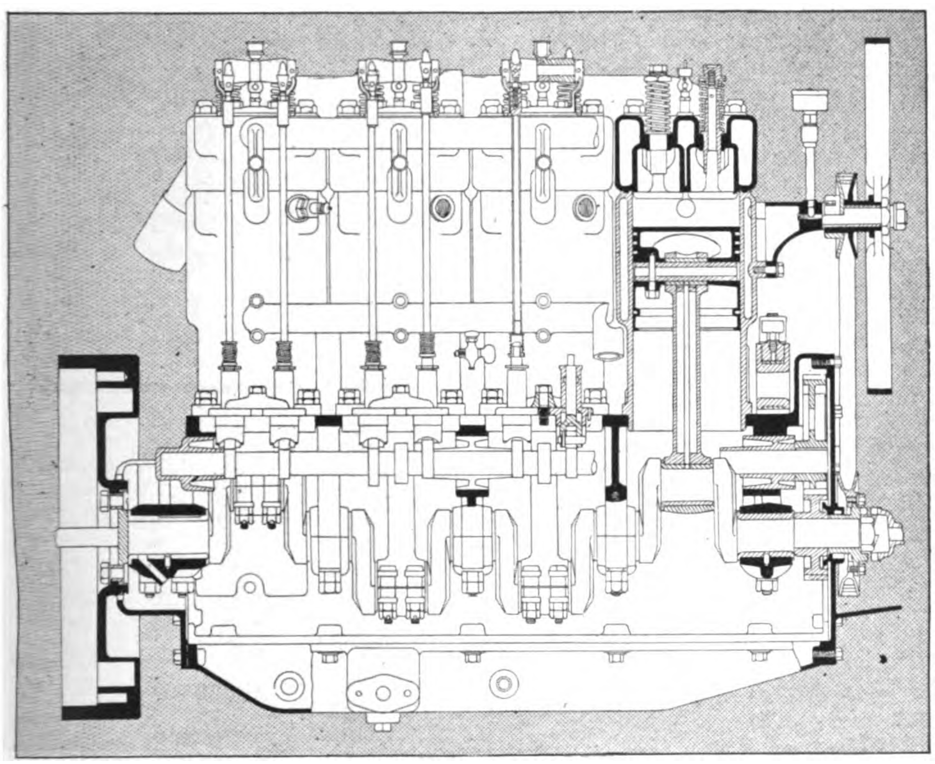


Fig. 3—Elevation and part sectional view of Knox four-cylinder motor

The lubricating scheme is what is known as the De Dion circulating system. There is no splash at the connecting-rods of any kind, the oil being delivered under pressure to all the important bearings throughout the motor. The oil pump is of the gear type and has an independent lead to each of the main bearings and to the cam shaft bearings. In the crankshaft at each main bearing there is an aperture which registers with the oil duct in the main bearing bushing. The crankshaft is hollow and the oil being under considerable pressure at the main bearing is forced against the slight centrifugal action in the crankshaft at this point and enters into the core of the crankshaft from where it finds its way through a drilled lead into the lower connecting-rod bearing. Between the two flanges of the connecting-rod there is a copper pipe which runs from the lower connecting rod-bearing to the wristpin. The upper end of this pipe terminates at the hollow wristpin bushing. The course of the oil is apparent. After entering the hollow crankshaft it

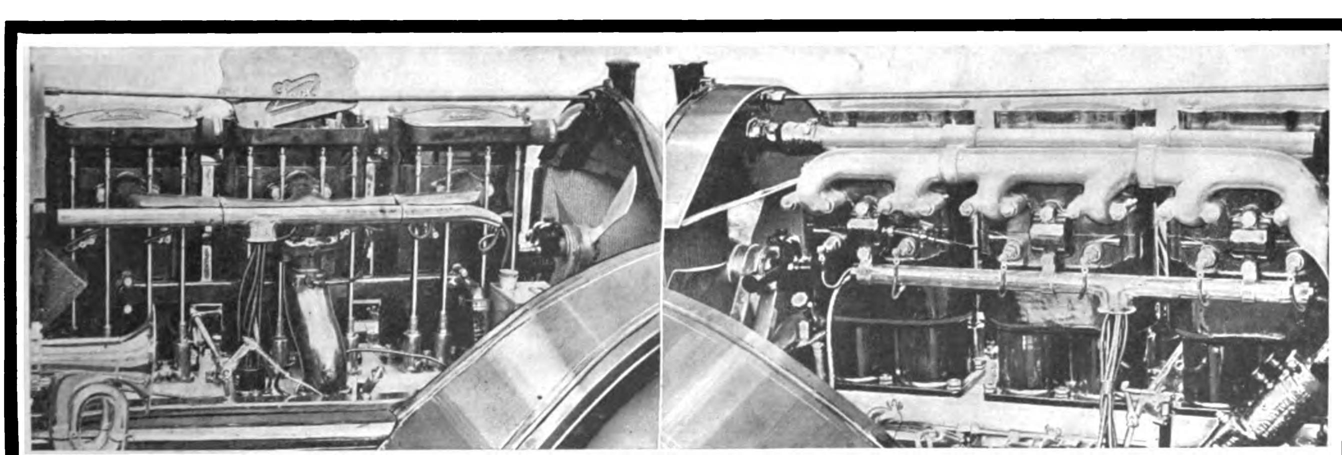


Fig. 4—Showing the right and left sides of the motor as exposed to view when the hood is lifted

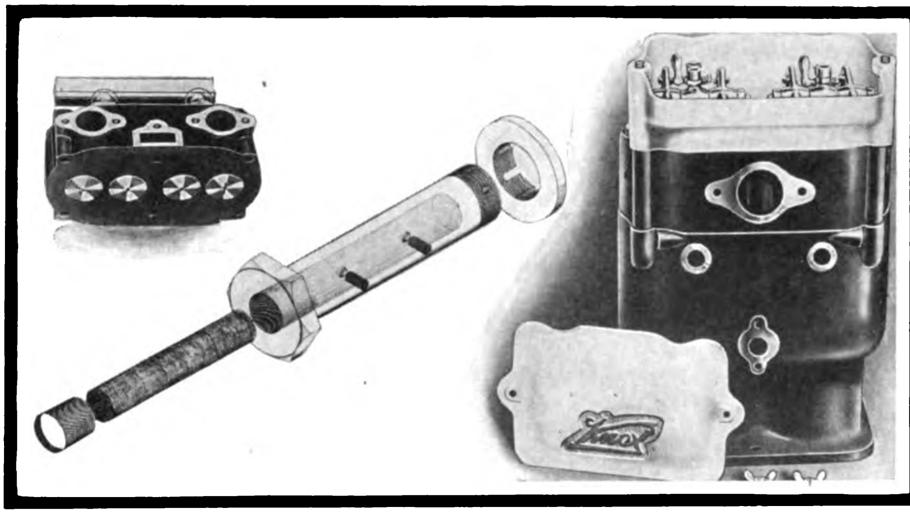


Fig. 5—Cylinders with valves, lubricated shackle bolt, assembled cylinder block

is forced up through the pipe along the connectings rods into the wristpin lubricating the bearing at this point and then passing out through the walls of the cylinder. After lubricating the different bearings the excess oil will drop back into the crankcase and will be re-circulated after having passed through a fine mesh screen.

Water Manifold Is Y-Shaped

The cooling system of the little six differs from the other model only in the shape of the radiator. This new type on the little six has a capacity of 3 1-2 gallons. The entire system including the jackets has a capacity of 28 quarts. Another distinguishing feature of the little six model is the fact that the water manifold is divided into two parts where it enters the radiator. The Y-shaped manifold is intended to subdivide the stream of cooling water as it leaves the cylinders so as to use every available part of the V-radiator. In order to get greater cooling efficiency the fan design has been changed also. A three-bladed fan is now used and tests show that a direct draw is secured through the entire front of the radiator and uniform cooling of the entire radiator surface is secured.

Two absolutely independent systems of ignition are employed on all Knox models. A Bosch magneto of the newest high-tension type is connected to one set of spark-plugs while the auxiliary system is furnished by batteries and a 4-unit Connecticut coil and timer in the case of the two 4-cylinder models, and a 6-cylinder Connecticut distributor with batteries and coil in the two 6-cylinder models. The spark-plugs are mounted on opposite sides of the cylinder walls and are placed below the removable cylinder heads. By this arrangement it is not necessary to disconnect any wiring when removing the cylinder heads for the purpose of cleaning the spark-plugs, piston heads and valve pockets. The wiring is contained in two independent nickel-plated tubes. This type of tube is deemed by the engineers of the Knox company, superior to insulated tube for the reason that should there be any tendency toward a short circuit from one of the high-tension wires the short circuit will be through the pipe containing the wires to the ground instead of from one wire to another. These nickel-plated tubes are clamped to the intake manifold on one side of the cylinders while on the other side a connection is made by a bracket held by the lower of the two bolts securing the waterjacket connection between the cylinder heads and the main part of the cylinder as may be seen in Fig. 4. The pipes give a neat appearance to the side of the motor and hold the wires securely against damage through vibration. At each spark-plug there is a hole drilled in the pipe through which the wire is lead to its respective plug.

To further carry out the ideas of the designers in having the appearance of the side of the motor as neat as possible all the manifolds this year are bolted to the side of the cylinders instead of being clamped thereto. Besides giving a neat appearance, a much better engineering job is made in that a tight connection is made between the manifold flange and the cylinder flange without as much stress being taken up on the bolts.

Necessary work, under the hood of the motor, is rendered very easy as far as accessibility goes because the engine is carried high for the low center of gravity of the car. It is not difficult to reach such parts as the fan-bearing adjustment, the carbureter adjustment screws, the oil cups of the steering mechanism or any of the other parts of the car that will require attention after a long run. Some of the adjustments are very readily effected. The fan belt may be tightened by merely pulling up on the fan after loosening the nut which holds it in place and then re-tightening the nut. The grease cups for the various exterior motor bearings are turned toward the operator so that they will be at hand when he lifts the hood. This is true of the cup on the fan bearing as well as those on the timing gear case and the steering gear.

The view of the right side of the motor in Fig. 4 shows the water-jacketing for the Stromberg carbureter although the carbureter itself is just out of view being concealed below the side frame of the car. The water is taken from the water-jacket, just below the exhaust pipe and is allowed to circulate around the carbureter, it is then lead into the suction side of the centrifugal water circulating pump. A drain plug is fitted in the lower part of the carbureter water-jacket which permits of the draining out of this jacket if it desired to run the motor without it in warm weather, according to the advice of the carbureter manufacturer. The rest of the gasoline system is of standard design. The feed to the carbureter is by gravity, the tank being contained under the front seat in the touring models while in the roadster types or raceabouts it is placed back of the front seats. The capacities of the gasoline tanks in use on the different models of cars are as follows:

Model	44	45	46	66
Touring	20 gallons	20 gallons	24 gallons	20 gallons
Raceabout	16 gallons	16 gallons	24 gallons	16 gallons

Figures on fuel economy are not now extant but the oil consumption of the Knox cars is stated to be 1 gallon to 800 miles on the six-cylinder cars and 1 gallon to 700 miles on the four-cylinder models.

Details of Clutch Construction

The clutches used with all the models remain unchanged from previous years. They are of the three-plate type with cork inserts in the center plate. The clutch is run dry, the cork having the quality of requiring no lubrication. The fly-wheel completely

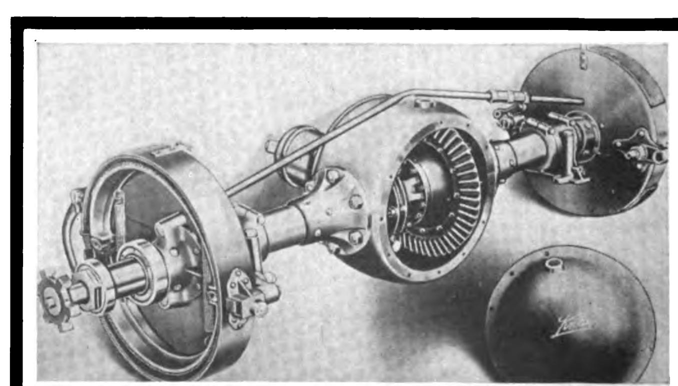


Fig. 6—Rear axle, showing brakes and differential plate removed

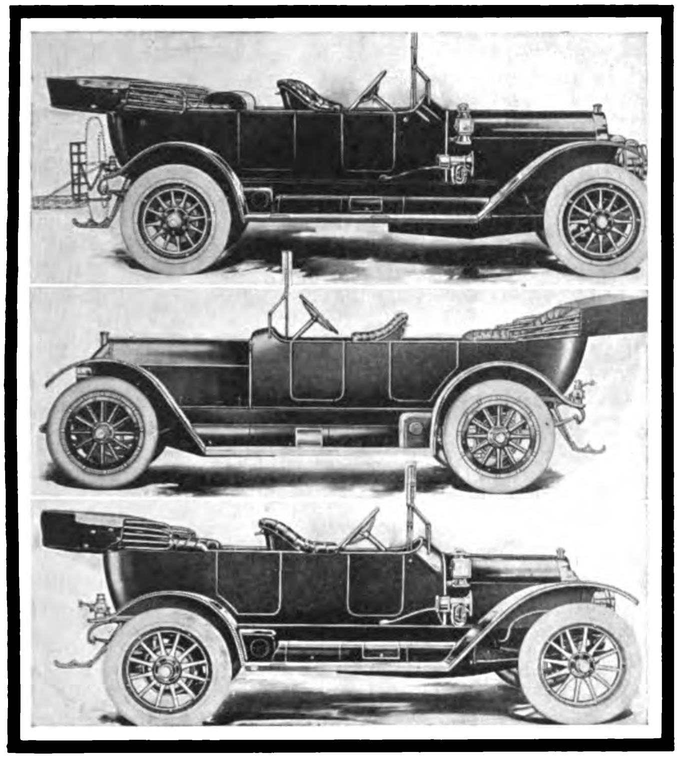


Fig. 7—Knox model 66, six-cylinder torpedo with folding baggage carrier. Model 46, little six torpedo, note the V-radiator. Model 44, the smallest chassis with a torpedo touring body.

incases the clutch and renders it dirt and waterproof. There are sixteen spiral clutch springs used with this clutch, they are arranged in a ring within the fly-wheel housing and put the desired pressure on the central driving plate which is provided with the cork inserts. Pressing down on the pedal relieves the pressure from the drive plate and allows the clutch brake to come into action thus stopping the spinning of the shaft and rendering it more simple to change gears. The clutch brake consists of two friction plates located between the clutch and the gearset which are brought into contact the instant the clutch is fully released. The friction plates are faced with Raybestos, which can be renewed if it becomes worn after long use.

Three-Speed Gearset Employed

The Knox company is among those who are believers in the three-speed gearset. The selective type is used, the shafts being of 3 1-2 per cent. nickel steel. The carrier shaft has four splines and is made of the same material as the other parts of the gearset. The entire gear-box assembly is illustrated in Fig. 2 where the four-spline shaft is shown together with the gears and the imported annular ball bearings upon which the shafts are carried. The length between bearings is short as may be seen from the compact arrangement of the gears. The gearshift quadrant is a modified H the reverse being one more notch to the left than the main body of the H. The center control now used on all models enables the lever to be near the gear-box itself and hence reduces the number of levers through which the control of the transmission is effected and allows of a somewhat easier shift.

A universal joint housed in a leather boot is placed just behind the gear-box and transmits the drive from the gearset to the propeller shaft. The drive through the nickel steel propeller shaft is a straight line when the designed load is carried. In the little six, contrary to usual practice, the torsion rod is mounted on the right side of the differential housing. At the rear end of the propeller shaft another encased universal joint is fitted through which the drive passes directly to the floating bevel gear rear axle. Some of the details of this axle may be seen in Fig. 6 which shows the axle with the differential cover plate removed. The axle bearings are Hess Bright ball and the pinion is integral with the shaft. The brakes are also shown in this illustration and as may be noted, they are of the expanding and contracting types acting directly on the rear wheel drums. The emergency brakes are the expanding while the regular set are the contracting.

The front axle is a nickel steel drop forging with the wheels and pivots mounted on Timken roller bearings. Nickel steel Elliott steering pivots are used, taper fits being utilized in conjunction with a nut and cotter pin fastening allowing the pivot levers to be taken up in case of wear. The steering gear itself is of the irreversible double thread and nut type fitted with adjustments which render it possible to take up lost motion throughout its mechanism.

Cold pressed nickel steel frames are used. The depths of these vary at different points through the length in order to meet the different requirements at different points of the chassis. Three cross frame members are used, one at the rear, another amidships and the third just in front of the flywheel. The springs are semi-elliptic in front and three-quarter elliptic rear on all models the lengths and the wheel sizes of the different models being as follows:

Model	44	45	46	66
Front	42 inches	42 inches	42 inches	42 inches
Rear	50 inches	50 inches	54 inches	50 inches
Wheels	36 x 4½	37 x 5	37 x 5	38 x 5½

The same size wheels are used all around on each car and they are all of the wood artillery type. The rims are all of the Fisk bolted-on type with Fisk demountable rims as standard equipment. Hand-buffed upholstery is used throughout and battleship grey, Brewster or Thistle green, blue royal purple and a number of other colors are optional with the purchaser of Knox cars.

The equipment consists of a full electric lighting system on the sixes and on all models a glass front, dash clock and speedometer, combination bulb and electric horn, motor-driven tire pump, gasoline gauge, shock absorbers, coat rail, robe rail, foot rail, floor mat, tire carrier, jack, baggage rack, tire pump (hand), tire repair kit, set of tools, complete set of lamps and headlights. The headlights are gas on the four-cylinder cars. On the limousine bodies or other styles of town car folding seats, speaking tubes and various other accessories are part of the regular equipment.

The enumeration of the principal innovations given above shows that in the execution of its latest model the Knox company's engineers have well followed the trend of European and American design, both inasmuch as efficiency of the mechanism and comfort of the passengers are concerned. At the same time, none of the well-approved principles of design or construction have been thrown overboard in the building of these latest models. In every respect, progress has been coupled with caution and all important changes were made only as a result of long-continued experimenting.

Painting radiators is a peculiar sort of work, remembering that whatever color one puts on the radiator frame and front will be continually exposed to a very high degree of heat. It is for this reason that all makers have practically agreed that black paint is one of the best and most durable colors for the radiator. The proper method of painting the radiator is to apply a very thin coat of lampblack in solution, and, after it has dried, to apply another equally thin coat. Lampblack has sufficient body and color depth to be effective even after only two applications, and, as it is composed of pure carbon, is not subject to decomposition as other colors which are made of chemical compounds and secured to the surface by means of organic binders. Lampblack will wear off under continued strain of service, but it will last long, as even together with the heat it suffers constantly the atmospheric elements have no effect on it. It is principally the mechanical hardships that radiator paint has to undergo in service that ends the life after a relatively short period.

Loose Clips Cause Broken Springs—Automobile and Motorcycle Records—Quick Crankshaft Changes—Winter Storage of Car—Repair on Leaky Manifold—Arguments for and Against Left Control—Motor Skips After Starting

Troubled by Breaking Springs

EDITOR THE AUTOMOBILE:—I have broken the left front spring on my car three times in close succession and am beginning to be disgusted with my misfortunes in this direction. I do not understand the car as well as I might and perhaps do not pay attention to details which I should not allow to pass unnoticed. As this is largely due to ignorance on my part I wish to correct it as much as possible. What I would specifically like to know is what to do with the springs to keep them from breaking as I am afraid to take my car over any of the roads around this vicinity. This morning I noticed that the bottom leaf of the forward right spring seems to be out of line with the others. As I noticed this same thing the day before the other spring broke the last time, I am afraid that this one is to go also at the first bad strain although it seemed tight enough when I hammered it back into line.

Port Jervis, N. Y. CHARLES FLAGG.

—The whole trouble is simply in the fact that you do not keep the spring clip bolts tight. This advice has been given scores of times through these columns and is also to be found in every instruction book brought out by car makers. With a hammer gently tap the spring leaves into line as shown in Fig. 5. When this is done tighten the spring clip bolts as tight as they can possibly be turned. When this is done nothing but an extraordinary stress will break the springs. If you are traveling in very rough country continually, it would be well to use shock absorbers or a rubber spring pad above the lower clip. This will deaden the effects of a blow and render the rebound less sharp. When springs are broken it is nearly always on the rebound.

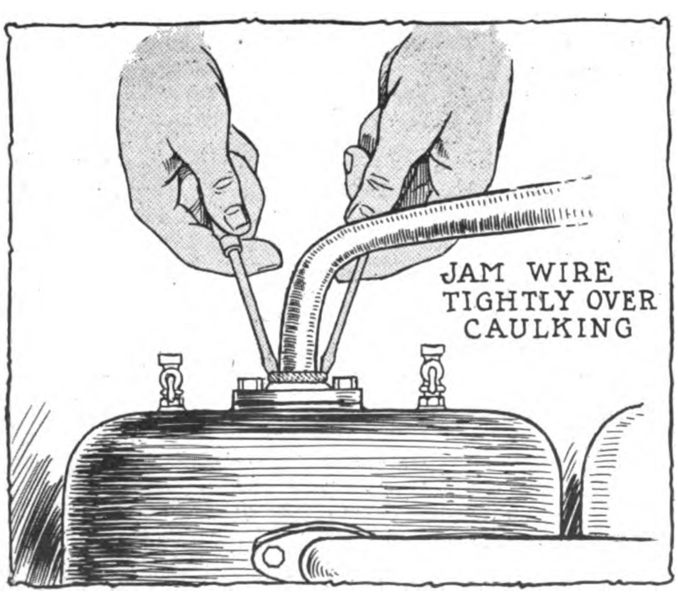


Fig. 1—A step in temporary water manifold repair on road

Automobile Faster than Cycle

Editor THE AUTOMOBILE:—Which has made the fastest mile up-to-date, an automobile or a motorcycle? Please give the names of the drivers and where the records were made.

New Haven, Conn. ANDREW McSWETE.

—The answer to this question was given in detail on page 1179 of the issue of May 23, for the current year. Briefly, the fastest time ever made by an automobile and incidentally by any human being who afterwards lived to tell of his experiences was made by Bob Burman in the Blitzen Benz car in 25.40 seconds at Daytona Beach, Florida, April 23, 1911. This is at the rate of over 141 miles an hour. The fastest motorcycle mile record was by Ray Seymour in 36 4-5 seconds at Los Angeles on May 17, 1912, this is at the rate of very close to 99 miles an hour.

Speed in Replacing Crankshaft

Editor THE AUTOMOBILE:—In the 4-inch race held at the Isle of Man some time ago, if I remember rightly, there was a record change of crankshaft made by the Metallurgique car representing Belgium. Recently I had a discussion about replacing a crankshaft with a gentleman who claimed that it could not be done under a day. I have done considerable contest work and have seen many quick shaft and bearing changes and believe I am right in saying that it can be done much more quickly than this. What is the quickest crankshaft change of which THE AUTOMOBILE has any record?

Norristown, Pa. HENRY L. BROWNBECK.

—According to the Metallurgique agency in New York the change to which you refer was made in 8 hours. Over the same course in 1908 one of the Deasy cars sustained a broken crankshaft. The break occurred at the forward end and owing to an exceptional form of the central main bearing, which was extra long, being designed to support other parts of the motor at this point, the car was enabled to make two or three circuits of the course on two of the cylinders after it was declared out of the race. THE AUTOMOBILE has no record of official times made in changing crankshafts, but for average touring car work it requires all of a day.

Proper Way to Store a Car

Editor THE AUTOMOBILE:—I own a Hudson 33 car and do not intend to run it after the cold weather sets in. What is the best and proper way to leave a car for the winter? What I particularly refer to is the oil, water, tires, etc.

Hartford, Conn. A SUBSCRIBER.

—THE AUTOMOBILE will shortly publish a detailed story on the overhauling of the car preparatory for storing it for the winter. As far as the mere storing of the car is concerned, however, the following directions apply as regards the oil, water, tires, and parts of the car which require special attention:

(1) Drain out all the water from the radiator and the jackets, letting the draincock stay open until the entire system has run

dry. The cock at the bottom of the radiator is always placed at the lowest part of the water system so there is no difficulty in allowing every bit of the water to run out.

(2) Let all the gasoline out of the tank and drain out the carbureter. If you wish to save the gasoline put it into an absolutely gas-tight vessel so that the volatile constituents will not evaporate during the winter. If this is done carefully the gasoline will be ready for use in trying out the engine in the spring; and will probably save you the trouble of lugging a supply from the nearest garage before the car is running. Close up the tank carefully by screwing the filler cap in place in the same way as would be done were the tank filled with gasoline. Do not give the cap a couple of turns and let it go at that because the cap is apt to be knocked off and should any flakes of rust or other foreign material get into the tank the trouble which could develop would be surprising.

(3) Remove the oil drainplugs in the bottom of the crankcase and let all the oil flow out. When it has all come out put the plugs back and pour about a gallon of kerosene into the crankcase. Next, make a piece of cardboard of sufficient size to make a conspicuous label and paint these words upon it:

KEROSENE IN CRANKCASE! DO NOT RUN!

Fasten the label to the motor where it can be seen and where it will not be detached. Then when you take the motor out of storage the crankcase will be clean when drained.

(4) In the storing of the tires for the winter great care must be taken or they will show a marked amount of deterioration at the beginning of the following season. Wash the casings thoroughly with soap and water after jacking up all four wheels. When every sign of dirt, oil and grease is removed take the tires off and remove the tubes from the shoes. Next paint the inside of the shoe with graphite which may be secured from any of the graphite concerns especially for the purpose. The same directions apply to the outside of the inner tube which should also receive a generous coat of the graphite. The tubes and casings should then be wrapped securely in brown paper and afterwards in cloth. When this is done store them in a cool dry place where the temperature will remain about the same all winter. Thirty degrees Fahr. is a very good temperature for rubber which is subject to deterioration when exposed to either heat or light.

(5) If you use the gas generator which was furnished with the Hudson 33 if desired, remove all the carbide from it and give it a thorough cleaning out immediately before the residue has time to harden to the point where it has to be chipped off. Whether using a Prest-O-Lite tank or a generator, remove all the rubber connections between the copper pipes and the tank and lamps and treat them the same way that the tires were treated. If left exposed to the atmosphere and light all winter, they will be worthless in the spring. Take the lamps off, cover them with polish but do not rub this off until the spring. It would be also advisable to take them off and wrap them up, leaving them in a safe place where the lenses will not be apt to be cracked. Excelsior is excellent, and if the car owner leaves his lamps packed in this he can be sure they will be safe in the spring.

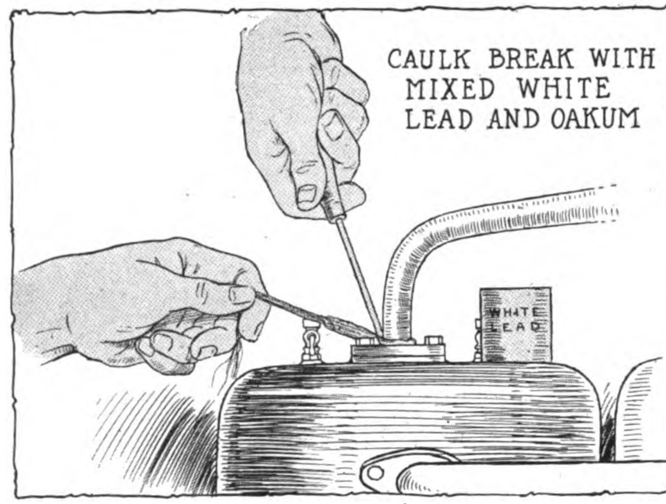


Fig. 2—Caulking the crack in the water manifold connection

Owner Makes Temporary Repair

Editor The Automobile:—Thinking that you may be interested in a temporary repair made while on the road the other day I am sending you a description of same, together with a few rough sketches (reproduced). After going over an unexpected obstacle in the road which gave the car a tremendous shock, I noticed that the water manifold was leaking badly just at the connection to the cylinder head. It was impractical to proceed with the water manifold in the condition in which I found it, and as the country is very hilly around this part of New Jersey I did not wish to attempt the run without any cooling water in the jackets.

Instead of taking the car to a country garage where, as I have learned by previous experience, incompetent workmen abound, I decided to make the repair as best I could myself. At the hardware store, which was also the grocery and post office, I purchased a small can of white lead and a little piece of hemp rope. The hemp rope was picked apart and made a very good form of oakum, which was very effectual for caulking purposes after it had been mixed with white lead. After first jamming a little white lead into the break, being very careful not to get too much into the interior of the manifold, Fig. 3, a small ring of the white lead and oakum was formed and pushed into the crack. This was jammed in as shown in Fig. 2, none of it being allowed to penetrate into the manifold and clog this. After being solidly kneaded down into place it formed a very tight ring which could not be depended upon, however, to hold itself in place. The last step of the repair was to form a strong supporting ring that would hold the packing in place and this was done by means of wire. A ring of wire, from which the insulation had been removed only at the ends, was twisted about the manifold just above the repair, as shown in Fig. 4. The pliers were twisted around several times in order to make this ring very tight. Then, with the aid of two screwdrivers, as shown

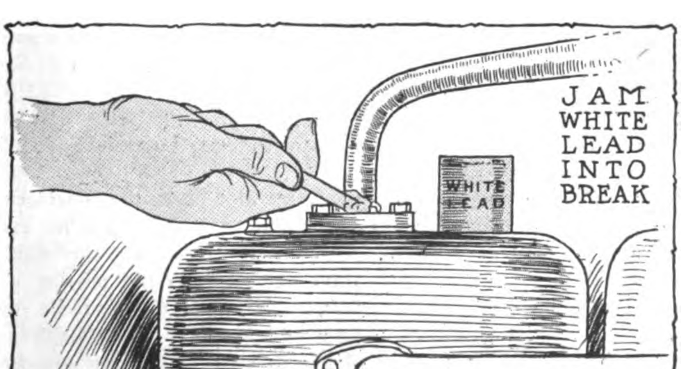


Fig. 3—White lead useful in manifold repair made on road

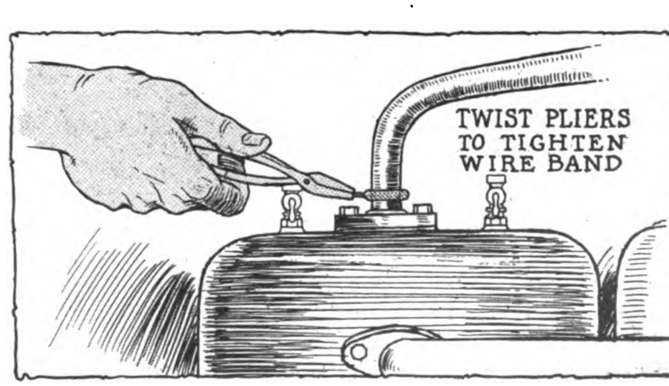


Fig. 4—Wires twisted to make a tight firm ring to bind caulking

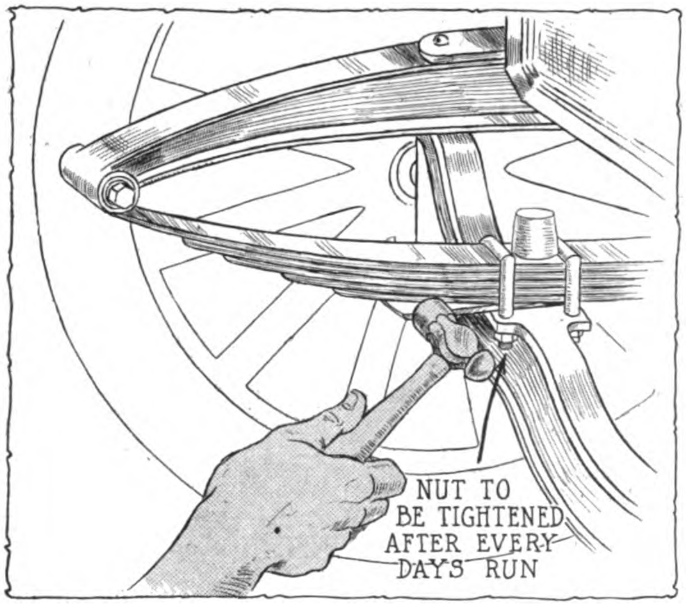


Fig. 5—Lining up the springs before tightening the slip bolts

in Fig. 1, the ring was jammed down hard over the caulking. This repair held so well that it was with difficulty removed when it became time to make a permanent repair, the latter being done by brazing a metal band around the weak point.

Hackettstown, N. J. JACK DRUMMOND.

Strong for Left Side Control

Editor THE AUTOMOBILE:—The editorial and also articles on the right or left side control question, recently published in THE AUTOMOBILE have been very interesting.

Having used both types of control for the last 2 or 3 years, under all conditions of driving in different parts of the country, I cannot see any fault worth considering with the left side control, but do think there are several bad ones with the right side. The left side control cars which I have been driving were among the very first of the high-grade cars using left side control in America, and are not and never have been experiments but the outcome of deep forethought on the part of their designers, whose aim was correct design and not selling arguments. Having just returned from a trip through some of the largest cities where traffic is dense and driving difficult, I am of the opinion that the user of a left side controlled car will never care to return to the once popular right side control. The advantages of the left side control are undoubtedly with both the passengers and the driver. Your August 1st editorial in THE AUTOMOBILE was very good and true up to the paragraph where you argue that right side control has at times in allowing the driver to "watch the ditch on the right" in passing oncoming vehicles. Right there is the weak point which kills the argument, because the basis of it is wrong, that is, "watching the ditch on the right."

Which would you prefer to take the chances with, a car coming toward you and passing you on the left at 25 to 45 miles an hour or a possible ditch on the right?

We can safely assume the ditch on the right to be 90 per cent. of the time possible to go into and come out of without serious damage, but hitting the passing car on the left will always mean more or less disaster.

Therefore you want to sit on the left so as to be sure to gauge your passing clearance with the oncoming car on the left, and when there is not enough clearance for both on the road the chances will have to be taken with the ditch on the right.

In my above spoken-of trip I drove sometimes a right and sometimes a left-control car, twice a day 15 miles from the lake shore hotel where I was stopping to the factory in the city, over a narrow brick road just wide enough to pass another car with about 12 inches clearance, the surface of the road on the right of the brick being very deep mud it was not advisable to run into it unless forced to do so by the oncoming driver on the left. The result of this driving situation was that I never felt safe unless I could watch the clearance between the oncoming car and mine, which with the left-side control was always possible to do.

Not all the drivers coming towards us were expert judges of space and twice I was forced into the mud with no further consequences than a slight delay in getting out.

"Watching the ditch" with a right-side control would have certainly meant new left side fenders, hub caps, etc., for our car, and possibly a wrecked car with some one hurt.

In driving the right-side control car over this road it was a matter of guesswork as to how much clearance I had over the other car; it was having to take the chances on both sides.

As to the left-side control in passing another car going in the same way it is not the car being passed that one wishes to watch, but the left side of the road in order to get the chance to cut over to the left when the road is clear of oncoming vehicles, and here the advantage of the left-side control shows up in the driver's ability to see around and to the left of the vehicle ahead which is to be passed.

Of course, if the road is wide enough for three or four cars abreast, the position of the driver is not so important, but it is the close places where fine steering has to be done and accurate driving is necessary that the left-side control shows to its best advantage.

Of course, the factory's side of the situation is mostly governed by the thousands of dollars it will cost them to change their right-hand existing designs to left-side control.

The problem that the foreign sales organization has to cope with in marketing left-side control cars abroad will probably never be solved until some day when international conferences decide on some uniform code of road usage which will result in one world-wide custom of driving.

Charleston, S. C. M. B. PAINE.

Is Disgusted with Left Drive

Editor THE AUTOMOBILE:—I notice the discussion of the left vs. right-hand drive in your columns, and as I am pretty thoroughly disgusted with the left drive (I am using left drive now) after using the right drive, I wish to show through your columns just why the left drive is wrong. It is so clearly wrong that I am at a loss to understand how any manufacturer of cars in America could ever be induced to build cars with driver's position on the left.

Taking up the various reasons advanced, point by point, let us first consider:

(1) Cars approaching from opposite directions. With left-hand drive, the driver has no view whatever of the right side of the road, the ditch, gutter or curb that may be there. The real danger, especially on narrow roads or streets, lurks at his right—never in the car approaching, for the driver of the approaching car is also on the lookout to avoid collision. Now, if each car is right-hand drive, the drivers can see the right-hand side of the road, and also can see each other, for they are on the same level approximately. The right drive is the only drive that will permit the drivers to see the sides of a narrow road and the approaching car. As for estimating the distance between the cars in passing, ask any driver accustomed to a right-hand car if he ever has any trouble in this respect. This estimation I find to be almost instinctive, as, I am sure, do all drivers.

(2) Cars passing in the same direction. There the consideration by the man passing another car must be for the other car. Ethics demand it, if nothing else, and here again the right-hand drive triumphs. You leave the car you are passing on the right, but as the driver of your car is also on the right you are sure never to scrape your neighbor's car, even though he is facing away from you and not in position to look out for himself as he is when meeting you. Some good friend may

come back and ask what about the curb in this instance so I give the answer now: It is a chance you must take. I said above that the consideration by the overtaking car must be for the overtaken car not for himself.

(3) Cars stopping at right side of street. Right-hand drive, with center control on the order of that in the Owen or Reo 5th, I think it is—anyway the cam handle shifting lever can be so designed, as can also the relation between the steering wheel and front seat, that entering the front seats from the right side is perfectly easy, and it should be done. And with the right-hand drive, the driver, who is often the host, takes his place after his guests are seated. The left-hand drive forces the host to take his seat first, which is a violation of hospitality.

(4) Right or left-hand operation of control lever. This makes no difference whatever, as I know from experience that the normal person is ambidextrous in this respect, and the left hand, after a little practice, is every whit as quick and as accurate as the right.

(5) As for all the other questions, such as torque reaction from the motor, etc., etc., in my opinion the car could better afford to be re-designed throughout, the motor made to reverse its direction if necessary and all other essential changes made to retain the right-hand drive.

Here is one man, and he has talked to many others like himself, who has registered his promise that, should he ever buy another car it will be a right-hand drive, even if it has to come from abroad, in the event all the American makers come to the left-hand drive.

Montgomery, Ala. C. L. Johnson.

Has Trouble Meshing Gears

Editor The Automobile:—I am having a little trouble in properly meshing the gears on my car. The trouble is really in two directions, first that while the car is stationary I sometimes can move the gear shifter lever into the required notch and at other times I cannot. I have four speeds and am often compelled to start on a second instead of first. My other trouble is in dropping back to a lower speed in climbing a hill. I cannot get the lower gear into mesh without making considerable noise. Could you help me out through the Letters Department of The Automobile?

Suffern, N. Y. Charles Peat.

—The difficulty you have in meshing the gears while the car is not in motion will be readily cured if you will let the clutch in with the gear lever in neutral for just an instant and then try to mesh the gears again. The reason that the gears do not mesh is that they are not properly aligned for the moment. If the gears do not mesh after the first attempt repeat the process until they do. In dropping from high to a lower speed on a hill you will find that your gears will mesh without much rattle if you will make the change by a quick firm motion the instant the clutch is disengaged.

Motor Skips When Starting

Editor The Automobile:—I have a 1911 model T Ford and have driven it barely 5,000 miles. Outside of the trouble i will mention the car has run to perfection al the time and I have never had a minute's trouble with it in any way. I think that I understand the car very well, as I have had one of the same make before, as well as four others of different makes.

For the last month or so nearly every time the machine is cranked it will run on one, two or three cylinders for from one to three or four minutes. It generally hits on one or two cylinders for that length of time and finally catches all four and runs perfectly. It will do this no matter whether the motor has been stopped two minutes or over night. When this missing occurs there are none of the vibrators working except on the cylinders that are working. This would seem to show that the trouble lies either in the magneto, vibrators or timers. I have cleaned out the times in good shape, but get no better results; also have taken off the magneto posts and found a little waste under the spring. I removed this, but it did not remedy the trouble. I adjusted and filed off the vibrators to no avail. The vibrators are kept as loose as possible as that is the way they have to be. The coil on this car is a Heintz. Could you tell how to find the source of the trouble?

Van Wert, O. A. Reader.

—The fact that the motor starts to fire on all cylinders as soon as it has been running for a few minutes precludes the idea that there is anything wrong with the magneto, vibrators or timers, as you suppose. There are four causes which may be responsible for this trouble; they are as follows: Dirty spark-plugs, electrodes too far apart, too rich a mixture at low speeds and too lean a mixture at low speeds.

In getting at the trouble first take out the spark-plugs and clean them well with gasoline. Be sure that the electrodes are bright and clean before putting the plugs back into the cylinder. After you have done this start the car and see if the trouble still continues; if it does, take the plugs out again and examine the gaps between the points. It is not true that the gap at the plugs should be the widest possible that the current can jump, for two reasons. The first is that the jump made by the current can not be as great in the cylinder where the gases are under pressure and the second is that the spark will not be as hot when the jump is extreme because it will be thinned out to a considerable extent. The gap should not be any greater than 1-32 inch at the most and a shade less than this will give even better results. After bending any points together that may be too far apart, again try the car and see if it works satisfactorily. If it does not it is then time to blame it on the carbureter and not before.

When changing the carbureter adjustment be very sure that you have carefully noted the adjustments as they stand before starting to make any changes or else you will be apt to find yourself in more trouble when you finish than at the start. If the carbureter you are using has two adjustment points for the gasoline, that is a low speed and a high speed screw, make the adjustments on the low speed point first by starting the motor and then turning the nut to produce a slightly leaner mixture. After you have made the mixture slightly leaner at low speeds, speed up the motor and see if it is necessary to change the high speed adjustment. If it is, make the required change to make the motor run as smoothly as it will possibly run. Now take the car out on the road and see if the trouble still occurs. If it does, the remedy will lie in making the adjustments necessary to produce a richer mixture at low speeds.

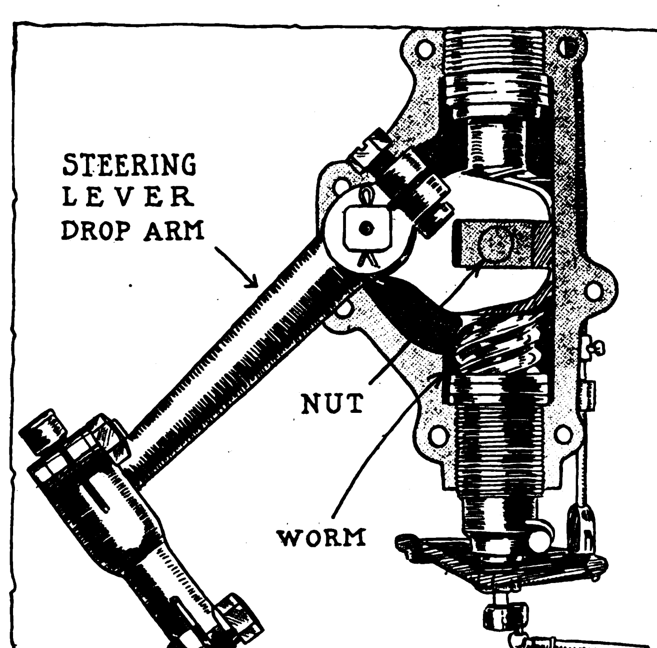


Fig. 6—Irreversible worm-and-nut type of steering mechanism

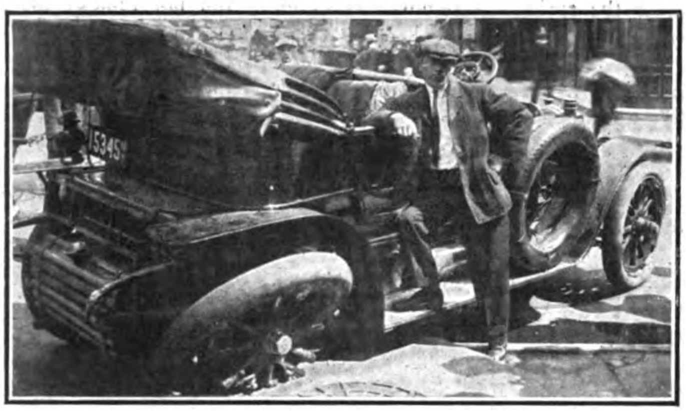


Fig. 1—A wheel that fell a victim to a slippery New York street

Accidents in the City

Careless Driving Not Responsible for All the Accidents Although a Large Number Are Due to This Cause

Neglect in Using Non-Skid Devices Places Many Cars at the Mercy of a Slippery Street

THE recent agitation among the insurance companies regarding the great increase in automobile accidents within the last few years and the marked intention of some of the accident insurance men to increase their rates has led the more careful owners and drivers to inquire what the causes of these accidents are. It is only natural to expect that the majority of these mishaps take place in the city where there are more cars and this is found to be actually the case. According to the insurance experts the greater part of the accidents are not due to carelessness, but nevertheless there are a great many which are directly traceable to this and no other cause.

One of the most prolific causes of accidents in city streets is skidding. Not less than 80 per cent. of the skids encountered are not at all due to negligence on the part of the driver. An accident which may happen to any one occurs when the car comes upon a freshly sprinkled stretch of asphalt and is compelled by traffic exigencies to make a quick stop. When the brakes are set hard on an occasion of this kind, the car is sure to start sliding because the back wheels are locked. If the frictional grip of the tires on the wet surface of the road is sufficient to check this slip before it becomes dangerous, there is no danger to be feared. Where the skid is not checked, however, the car is entirely out of the driver's control, unless by a mere chance he may again apply the power and secure sufficient traction to get the car again under command. Where the skid is not prevented, an accident is extremely probable if the traffic is dense. An accident of this kind is infrequent when the relative number of the cars in use in the streets of a city like New York is considered, still it is sufficiently frequent to make a considerable number when taken in the aggregate.

Accidents on Slippery Streets

An accident of this kind occurred recently to a large Fiat car passing through a prominent New York street. In this instance the street had been rendered wet by a short shower which only lasted for a few moments. The driver of the automobile did not deem the street slippery enough to take the precaution of placing chains upon the tires and shortly afterwards ended by finding his car in the unfortunate position depicted in Figs. 1 and 2. The car started to skid and being in a position near the curb the rear wheels brought up against the side of the gutter and the result was the bad break shown in the two illustrations just mentioned. A new wheel had to be bought for the car just because the trouble was not taken to apply the non-skids.

The chief objection to asphalt as a pavement is its slipperiness at the slightest moisture. The dust which settles on the surface of the asphalt combines with the water to make a thin layer of paste which acts in about the same manner as a slippery grade of axle grease would do should it be spread upon the surface of the road. It is a fact that a little moisture on the asphalt road will make it more slippery than would be the case with a heavy rain. This is due to the fact that when the rain becomes sufficiently heavy it washes the mud off the surface of the road and takes away the slippery mixture which is so apt to cause a skid at the slightest semblance of locking the wheels. The advice which is often handed out by people who are in a position of knowing to "put the chains on at once," is no airy persiflage. The uncomfortable feeling of sitting in a car that has passed beyond the driver's control and is swinging about end for end, has only to be felt once to convince any one of the advisability of taking the little extra trouble necessary in putting on the tire chains. If any definite proof of what experienced owners of large numbers of city-going vehicles think of the advisability of guarding against the fatal skid, it is only necessary to ask the managers of the large taxicab concerns. The positive instructions issued by these people to their drivers leave no room for further doubt.

Collision on account of the ignorance of traffic regulations also sends many cars to the repair shops and passengers to the hospital. There is only one piece of advice necessary in this connection and that is to secure a booklet from the municipality and study it. You will then know what you are expected to do and just what you can expect of the other driver. These booklets are gotten up by cities for the special purpose of instructing the driver of a car what to do in the crowded city streets. They are not only words of advice, they are words of law. Ignorance of the law is no defense of its infraction and will not keep an offender out of jail or free from the imposition of a fine. The traffic policeman is an excellent institution, but entire confidence cannot be placed in him unless every driver understands his signals and whistles.

Carelessness Causes Collisions

An Abbott car that only escaped many broken parts because of exceptionally strong construction at the strained point is shown in Fig. 3. This was the result of a city accident, in one of our Western towns. An attempt was made to cut

Fig. 2—Fiat skidded into gutter because of no non-skid device

across the rear of a car when the inevitable car going in the opposite direction caught the forward part of the automobile and reduced it to the state shown in the illustration. Accidents of this kind are frequent and are really caused by careless driving, for there is no excuse for a driver not exercising every possible care at a street-car crossing. Many drivers have the very pronounced fault of speeding through cross streets between avenues and then when they reach the avenue taking a chance without slowing down. As a rule, the driver on an avenue or a boulevard expects the driver on the side street to enter carefully and it is up to him to do so, for the driver going on the avenue has the right of way over the driver on a side street. This carelessness in entering the avenue causes so many accidents that it is not far behind skidding for effectiveness in this direction.

Caution Will Avert Trouble

When approaching an avenue slow down to almost a stop if the avenue is much traveled. If you intend to turn into the avenue the hand should be extended to signal a possible driver behind that a turn is to be made. This will prevent him from coming alongside unawares and cutting into your car by going straight ahead just as you are making the turn. If the turn is to be made to the left the car should be driven straight across the road past the central intersecting point of the street and the avenue and the turn made beyond this point. If the turn is to be made to the right it should be made close to the curb so as to allow a vehicle coming straight down the avenue to pass.

Another way to prevent accidents in crowded driving is to always sound the warning signal when passing a car. A driver will often make a sudden swerve to avoid the deep holes which are frequently found even in the most traveled of the city streets. Should another car be in the act of passing as this swerve is made by a driver who does not know that there is a car on his left, an accident having serious consequences to the running gear of either or both cars may ensue.

Accidents are even possible when the car is left standing. Should the car be left on a hill without the emergency-brake lever set as it ought to be, it is apt to gather momentum and become a source of danger to other cars as well as itself.

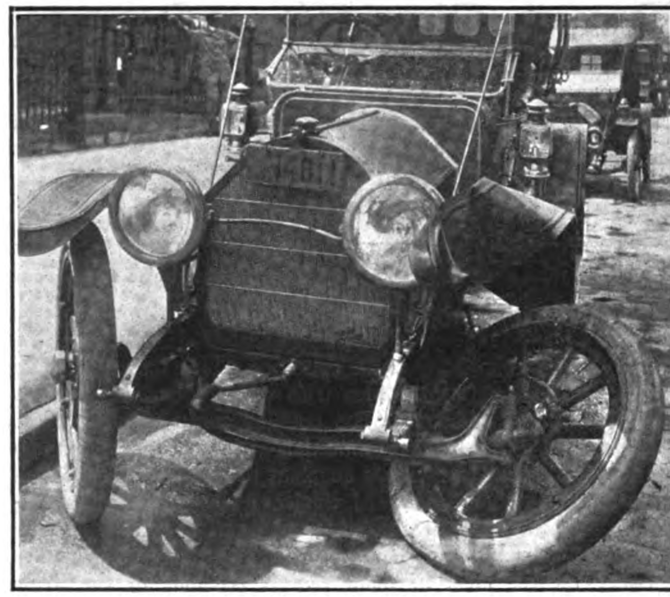


Fig. 3—The results of a collision due to careless city driving

The condition in which the brakes of a car are kept is a factor that must be considered. A car which cannot be stopped quickly is a menace to the public. Most states require that a car should have adequate braking facilities, but it is not a law that can be enforced, as it is impracticable to hold a brake test on every vehicle at short intervals. This should be a matter for the car owner to take care of, not for the sake of others alone, as his own safety depends on the care expended on this part of the car to a marked extent. Rear end collisions due to the fact that the car behind cannot be brought to a standstill quickly enough are the cause of many punctured radiators and broken gasoline tanks. Vigilance, regarding both vehicles and pedestrians, is a necessity in city work.

Harking Back a Decade in the Automobile World

Some of the Events and Activities Which Distinguished the Industry 10 Years Ago as Recorded By The Automobile and Motor Review

FROM *The Automobile and Motor Review*, August 30, 1902: The heavier class of commercial vehicles, comprehended under the general term lorry, a word comparatively unknown in this country, has already reached a high degree of perfection in Great Britain, particularly the steam lorry.

The Cannon steam racer; the 40-horsepower Mercedes-Simplex and the 35-horsepower Darracq were the features of the entry list at the Brighton Beach race meeting last week. The Cannon machine was barred at the last minute because the driver does not control the engine but it made a few exhibition miles. In one of these trials it cut the mile record for steamers to 1:07 3-5. The car uses 400 pounds of steam pressure. The Mercedes-Simplex carried off the gasoline honors winning the open 10-mile event in 11:54 4-5.

Rules for the Automobile Club of America reliability run to Boston and return have been published. These rules provide for gasoline, steam and electric entries and for three and four-wheeled vehicles. Every contesting car shall carry an official observer who shall be furnished by the club. While any necessary repairs may be made after reaching night controls, the practice of shipping skilled mechanics to control points by train so that new engines may be installed in contesting cars is forbidden.

The necessity of adapting the ratio of gear transmission to the resistance encountered, inherent in all vehicles with explosion motors, is usually met in practice by providing from two to four pairs of gears of graduated sizes, adjacent to each other on parallel shafts, by means of which the first shaft, when run at any given speed, may communicate from two to four different speeds to the second shaft. For the purpose of reversing, an intermediate pinion is arranged in one or another way to mesh between two gears on the first and second shafts, or sometimes a sprocket chain is employed instead.

The race meet last Saturday at Brighton Beach must be classed as a failure. The entry list included only a couple of foreign racers, a couple of American road cars and a few skeleton freaks. The attendance was moderate but the program was drawn out to an intolerable length and continued almost to dark.—Editorial.

W. H. Russell, a New York chemist, claims to have discovered a hydrocarbon gas that will prove a substitute for gasoline in automobile operation. Mr. Russell says that his gas is non-explosive except under compression through electric spark. The gas is generated while the automobile is in motion and is stored in an 8-pound tank.

Exports from New York covering automobiles and parts for the week ending last Saturday amounted to $16,300.

Repair Shop Time System

Two Types of Card Used to Control the Operative Efficiency of the Men During Working Hours

Checking Methods Are Open to Improvement and the Trend Is Toward Simplicity

UTMOST simplicity is the condition which makes a system a success. As the idea with which a business man introduces a more or less detailed control system in his establishment is to reach a condition where he may eliminate useless or harmful factors and supplant them by useful ones and raise things to a high plane of efficiency by a small number of essential operations, it is clear that an excess of details must be guarded against lest they counteract their purpose.

Labor records must be made out, if possible, by the workmen themselves, and it is a matter of course that this part of their occupation should take them as little as possible away from the work for which they are engaged. As much of the necessary writing as can be should be done at one time, to reduce the number and thereby the extent of interruptions of work. If a man records his time when starting and stopping his day's work, when going out at noon and returning to the shop, and when beginning and finishing overtime work; when he also records the time at which a certain repair is begun and ended, he furnishes the office with enough data upon which conclusions and improvements may be based. It is all very well to try and know everything about one's business, but after all that is not the final end of one's being there. An office and its work is always but an adjunct to a factory or shop.

The system for recording the time spent by the workmen in the shop and on individual jobs comprises two forms, one of which is a clock card and the other a so-called job-time card. Both of these cards are originally marked by the office with the names of the workmen using them and after the cards are filled out completely their records are checked by a foreman and a clerk before being sent to the bookkeeper's department for calculating the wages due to the men.

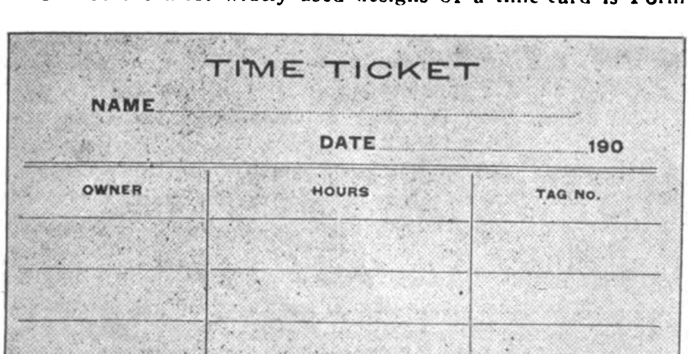
The starts and stops of work are recorded, in most shops, by means of the International type of time clock which stamps the time of ringing in or out on a card suitably lined and cut for this purpose. The time card has ordinarily six columns, of which only one may be stamped at a time. The proper column is brought to register with the stamp inside the clock by the movement of an indicator into one of six notches on the front of the clock, whereby the frame in which the time-card is placed is put into the correct position.

One of the most widely used designs of a time-card is Form 5, which is tan-colored and 5 1-2 by 3 1-2 inches. It is printed with the name of the White Company, 631 West Fifty-seventh street, New York City, and spaces are provided for filling in the name of the workman, whose time is recorded on this card and the week during which the latter is used. In addition thereto the shop number of the worker is entered on the card. There are six stamping spaces in each line and seven lines are provided, one for each day of the week. The spaces are designed to be filled when the workman arrives in the morning, goes out for and returns from lunch, and leaves in the evening; start and stop of overtime work are specifically entered on the card. Besides these six columns there is a blank space in every line, in which the total working time of the day is entered. At the close of the week these totals are footed and the sum recorded at the bottom of the car, and when the workman is paid he signs the card as a receipt for his wages which are based on the times given by his clock card. Slight variations in the design of the clock card are found with various companies. Some companies mark the six columns Morning in and out, Afternoon in and out, Overtime in and out; others provide a space for the rate at which the worker's time and overtime are paid; still others print rules or regulations on their cards, for instance: "Each man his own timekeeper. We pay by this record, your own recording," etc. However, the same principal features appear on almost all the cards, so that they are stamped in the same manner.

Several Types of Clock Cards

A special type of time-clock card used by the Peerless Company, of New York, is here shown as Form 10. This is a white card, 4 by 5 1-2 inches, printed on one side only, on which the name of the workman, the week during which the card is used, and his rate of payment are entered. The other records are "in and out" times printed by a time clock in the morning and evening, at lunch and when a man works overtime. There is a series of stamping spaces along every side of the card. Every morning the total number of working hours of the man during the previous day is calculated and the amount due to him for his work is entered on the card. When he receives his wages he is made to sign the card, which is preserved and filed for future reference.

Very much more variation is found in the forms, however, on which the distribution of the men's time is recorded. One blank, Form 6, is very similar to Form 5, it being also a clock card, and of the same size as Form 5. It is used by the Studebaker Brothers Company, of New York, 140 West Fifty-second street, to record the time spend by each man on every particular job on which he works. This card is made out in addition to the ordinary clock card. Form 6 is green where work is done on jobs which are paid in cash, while charge jobs are recorded on white blanks. The idea of morning, afternoon and overtime has been carried out also in the design of this blank although the spaces are marked differently. At the same time the design of Form 6 permits of repeated, though uneconomical,



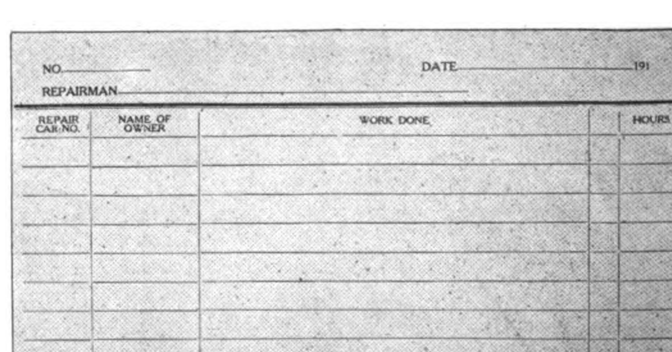
TIME TICKET

NAME

DATE 190

OWNER	HOURS	TAG NO.

Form 1—Haynes Company's job-time blank; thin white paper with black printing; comes in pads, 4 1-4 by 4 3-4 inches, which are kept on the foreman's desk



NO. DATE 191

REPAIRMAN

REPAIR CAR NO.	NAME OF OWNER	WORK DONE	HOURS

Form 2—Job-time card used in the White Company's service department; thin white cardboard printed in black; comes loose; size 6 1-4 by 4 inches

THIS SIDE OUT.

No.

Form 3—White company's time-clock card, reverse side; is of tan cardboard printed in black and marked with name and number of workman

JOB NO.................. EMPLOYEE NO..................

THIS SIDE OUT.

Description of work performed on this order:—

Form 4—Reverse side of time-clock card used by Studebaker service department; green with black printing; used for individual cash jobs

interruptions of one job without confusion of the records. As this card is used only for a specific job, the job or order number assigned to the work when the car is taken over by the superintendent of the Studebaker repair department is marked on this card when it is first started. After the repair, so far as one man is engaged in it, is completed, the card is filed away and the total times for each day are figured as in the case of Form 5.

Job Time-Cards in Many Designs

To avoid any trouble arising from mutual inspection of the workmen's time-cards, the men file their cards in a suitable frame when they go out, but turn the stamping side against the wall. The reverse of Form 5 is Form 3, and the reverse of Form 6 is Form 4. The green card being used in connection with but one job, it is filled out with every item of the repair work as the latter proceeds. On Form 3 as well as on Form 4 the name of the workman to whom the card is assigned is written, so that a glance over the rack in which the time-cards are kept shows the shop foreman or inspector which men are out and which are in.

Besides the job clock-card, other forms are in use on which the time taken by each job and by every step of the same is entered. If, for instance, a car is brought into the shop to have its valves ground, the carbureter adjusted, the brakes relined and lost motion taken up in the steering gear, these items are entered on the job time-card, as shown in Form 2, which is used by the White company. This form provides space for entering the number of the job which it is given when first taken over by the repair department, the date when this is done, the number of the car and the name of its owner, the progressive steps of the work and the time taken by each. As the work proceeds the time taken by every stage of the repair is entered and when the work is finished is checked by the head repairman, who is in a position to supervise the work and prevent excessive charges of the men.

Form 1 is a similar design and used by the service department of the Haynes Automobile Company, 250 West Fifty-fourth street, New York City. This Form 1 is marked with the name of the workman and the date of the week, as well as the name of the car owner, the number of the tag with which his car is sent into the shop and is filled with the hours spent on his car. The details of the work are given in the daily time distribution card of the man, Form 12, which is described below in detail.

Another system of recording time distribution in the shop is used by the American-Marion Sales Company, Broadway and Sixty-third street, New York City. This company uses a time sheet, Form 7, which is made out when a car is sent into the repair shop, and is then marked with the date on which this is done. The job number is also marked upon the form, but the name of the owner is omitted. On the other hand, this form provides a column for the names of one or more workmen who were engaged in the repair of the car and for elaboration of their labor thereon. The hours and minutes spent by each on each job are also entered on the form which, when the work is ready to be delivered to the customer, is checked over by the machinist for technical inspection and by the foreman for correctness of the men's time. Then the total time expended on the car is figured, and the sheet is forwarded to the bookkeeper's department.

An apparently similar card is used in the shop of the Peerless Motor Car Company, 1758 Broadway, New York City; this card, Form 12, is filled out by every workman in addition to his time-card. On Form 9 he enters whatever work he does during the day and on which order or job it should be charged; the time of starting and stopping every job is printed on the card by a special time stamp in the following manner: A number of widely spaced lines are used for entering the various jobs on them; these lines are intersected by downward lines marking the columns on the card, and in the last column a short line drawn from left to right is inserted between every two lines, giving two spaces for every job. In the upper space the starting time is stamped, while the lower space is reserved for the stopping time. The bookkeeper's department then calculates how much time of a man's work was spent during the regular working day and how much is to be figured as overtime. Ordinarily each man uses one card a day, but if he works on a large number of jobs, two or more cards are given to him, all of which are turned over to the foreman in the evening. The

THE WHITE GARAGE,
NEW YORK

WEEK ENDING..................

No.
NAME.

CHECKED BY..................

DAY	MORNING IN	LUNCH OUT	LUNCH IN	NIGHT OUT	OVERTIME IN	OVERTIME OUT
SUN						
MON.						
TUE.						
WED						
THU.						
FRI.						
SAT						

REGULAR TIME.................. HRS.
OVERTIME.................. HRS.
TOTAL TIME.................. HRS.

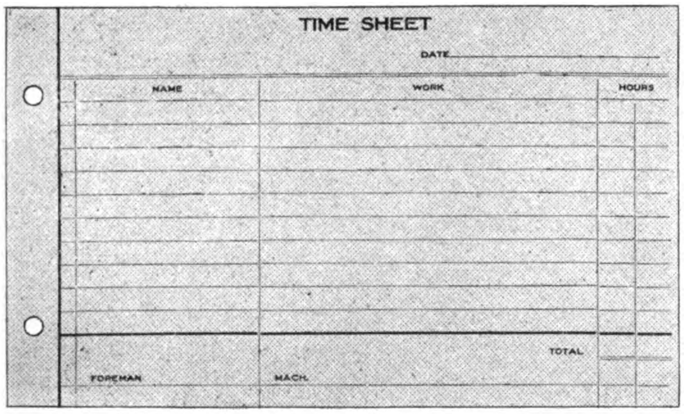
CASH JOB TIME CARD

Date ....
Job No. ....
Employee's No. ....
Name ....
Customer ....

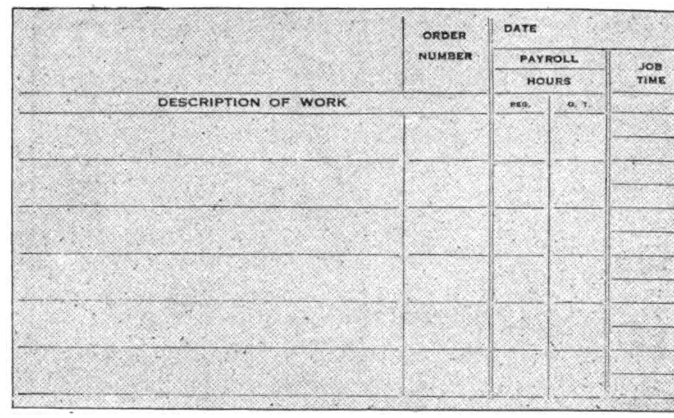
Day	Started	Stopped	Re-Started	Stopped	Re-Started	Stopped	Total

TOTAL HOURS..................
RATE..................
AMOUNT..................

Form 5—White company's clock time-card, 3 1-2 by 5 1-2 inches; tan with black printing. Form 6—Studebaker's cash job time-card, same size as Form 5; green



Form 7—Job-time blank of American-Marion Sales Company; white, thin paper, black printing; 8 by 4 3-4 inches; kept by foreman who gives it to workman



Form 9—Peerless company's job-time card; tan cardboard with black printing; 5 1-2 by 3 1-4 inches; start and finishing time of every operation are stamped on this card

total job times as accounted for by these cards must, of course, correspond to the main time record of a man's clock card.

The Haynes Company's time distribution card is Form 12. It is 4 by 8 inches in size and printed red on one side and black on the other. Both sides are marked with the date on which the card is used, the name of the workman using it and his shop number. The black side, which is used before noon, has twenty-five lines, one for every quarter-of-an-hour between 6 and 12 a. m.; the red reverse side has the same number of lines

SMITH MOTOR CAR CO.
NEW YORK

Week ending..

Employee............................ No........

DAY	Morning IN	Lunch OUT	Lunch IN	Night OUT	Overtime IN	Overtime OUT	Reg. Total	Over Total
S								
M								
T								
W								
T								
F								
S								

Clerk O. K. here..

Regular................hours; $..............

Overtime. ....hours; $..............

Received full payment..............................

Stamp Date of Payment Here

Form 8—Proposed time-clock card shown in full size; black printing on bluish-white paper, goes to office daily to have wages figured on it, being kept on rack during daytime

printed at intervals from 1 to 6 p. m., and a space for remarks is left on the bottom of this side of the card. Whenever a job is started it is written on the line corresponding most closely to the time of the start. The order number of the car, on which the repair work is done, is also recorded, as is the rate of payment of the workman. All time-cards are sent to the bookkeeper every night, who distributes the men's time on the customer's charge accounts.

As reference to the captions of the various blanks indicates, there are practically no two forms of the same size, except the clock cards, which are made for its customers by the leading time-clock manufacturer. The disadvantage of having half a dozen forms in a system and each of a different size must be obvious to every office worker, and it is the office workers who have to do principally with the handling of the shop records. Therefore, as many cards, sheets and other blanks as possible should be made in the same size.

Following this idea, a time-recording system is outlined below which like most of the others comprises two cards, in which all the features found in the various designs shown above are contained. The system uses two cards, one of which is the weekly time card, while the other is a daily workman's card, on which every job, or rather, operation he does is entered with a fair measure of detail. The clock card is of the standard size, while the job-time is of the same width, but twice as long as the clock card, and is folded around its middle line.

Improved Form for Clock-Card

The clock-card, which is based on the conventional type, but includes a few additional points of information, is illustrated as Form 8. On its head the name of the company appears, thereunder the date on which the week ends, during which the card is to be used. The name of the employee and his shop number follows, and a space is left under this line, in which a short rule or statement of the company may be printed. Besides the six stamping columns which are marked the same way as in Form 5 two columns are provided in which the totals of regular and overtime for each day are figured either at the end of the week or every morning, when the cards are turned over to the office of the company's bookkeeper. These totals in turn are footed, regular and overtime hours, the amount which is paid to the workman for them is calculated and then entered on the card. The sum of both amounts is paid to the workman at the end of the week, and he is made to receipt on the card, which is then filed by the bookkeeper's clerk. On the same day the card is stamped in the lower right-hand corner. All workmen's cards for one week are made into a package and stored away for future reference.

The second card, Form 11, as has been stated before, is 3 1-2 by 11 inches and folds around its middle line so that, when folded, it is as large as Form 8. The Men's Job Time Card, Form 11, like the clock card, gives the name of the employee and his number, the date on which the card is used and the number of regular and overtime hours which the man worked during the day. The caption of the card appears in large letters, so as to avoid confusion with the clock-card blanks, although this may be easily prevented by using different colors for the two forms. Under the caption it is a good thing to print a rule calling the workman's attention to the fact that his prompt and correct payment depends upon his truthful filling out of the blank, and the more personally the note is worded the more effective should it prove, as such a phrasing compensates for the severity of the order itself.

Proposed Blank for Job Time

Five columns ruled on the front side of the card below the caption of the card, and over the entire reverse side of the blank, offer the opportunity of recording every important detail of a repair, so far as the time consumed by it is concerned. Each of these columns is crowned by a head, which runs as follows: Stamp here, Job No., Description of Your Operations, Hours, and a check mark. For the stamping of this card the ordinary, large time-clock cannot be used, but a smaller type of time-stamp may be applied to advantage. This type of clock may be bought with a stamping mechanism giving the time as it changes from minute to minute; the stamping mechanism is ordinarily located just above the clock proper and is actuated by pressing down a handle. A clock which gives a one or two-line record like the following

Aug. 15-12
3:35 p. m.

is about the most suitable for the purpose wanted. Every time a man starts on a job or finishes it he stamps the card. After stamping for the start, he enters on the card the job number of the car on which he is put to work, and the specific work which he is made to do. When he finishes a job he stamps the time in the first column as closely to the descriptive text as possible, so that the card offers positively more space than will be required by any one worker in a day's time. This insures simplicity of the system and means that every man must provide a main clock card for the week and six daily cards, all of which make one compact little package.

On the following morning the foreman goes over the cards of the day, enters the time each operation took on the card and checks it if it is correct. Then the form is held on a rack on his desk and at the end of the week is sent to the office together with the main clock card.

The wages of each man are figured by the bookkeeper, after which both clock and job-time card are filed away in alphabetical order, each set of clock or job-time cards making a compact package which is always ready for future reference.

SMITH MOTOR CAR CO.
NEW YORK

Employee: Date:
No. Reg. ; Over

Men's Job-Time Card

You must enter every job, its starting and stopping time on this sheet, to be paid correctly.
J. B. Smith, Pres.

Stamp Here	Job No.	Description of Your Operations	Hrs.	✓

These times are correct .... Foreman

Form 11—Proposed design for job-time card; same material and print as Form 8; 3 1-2 by 11 inches and folds around line halfway its length; when finished are kept with clock cards

PEERLESS MOTOR CAR COMPANY of New York

IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
FRI.		SAT.		SUN.		MON.		TUES.		WED.		THUR.	

OVERTIME

123

IN	DAY	WEEK ENDING	TOTAL HOURS	DAY	OUT
	FRI.	Frank Snyder		FRI.	
	SAT.			SAT.	
	SUN.			SUN.	
	MON.	Total-Time Hrs.-Rate .50		MON.	
	TUES.	Amount Due		TUES	
	WED.	Rec'd Above		WED.	
	THUR.			THUR.	

NOON TIME

FRI.		SAT.		SUN.		MON.		TUES.		WED.		THUR.	
IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT

Form 10—Clock card used by Peerless company; medium-thick white cardboard with black printing; 5 1-4 by 4 inches; goes to office every morning for adding working times of past day

A. M.
DAILY TIME CARD

8/10 1912
Workman F. R. Willis No. 15

A. M	Operation	Order No.	Rate
6.00	Adjust carburcter	256	.50
6.15			
6.30			
6.45	Take up steering gear	256	
7.00			

6.00			

Remarks...

Form 12—Haynes company's job-time card, white thin cardboard with black printing on one side and red on the other; 4 by 8 inches; gives fairly exact time of every operation.

Labor-Day Tours to Nearby Beauty Spots

Suggestions for Spending the Coming Holidays Amid Nature's Wonders Adjacent to New York City

LABOR Day, which falls this year on September 2, following the week-end holidays, affords another excellent opportunity for automobile touring. For the benefit of automobilists of New York and vicinity and visitors in and about the metropolis, the following series of short tours has been prepared and is suggested to them as a fine way to spend the holiday.

Following is a summary of the various routes:

1. New York to Poughkeepsie—Pittsfield, Mass.—Waterbury, Conn.—New York. This will make a delightful run of 2, 3 or 4 days through the most beautiful sections of Westchester County, the lake district of Putnam County, the Berkshire hills of Massachusetts and Connecticut and the scenic route from Waterbury to New York. Following the usual route to Yonkers and Tarrytown, swing eastward to Briarcliff and Yorktown Heights to Lake Mahopac. From the lake the way is east to Carmel and thence to Luddington, Stormville, Hopewell Church and by a wide swing to Fishkill Plains and New Hackensack to Poughkeepsie. This is rather longer than by the direct route following the Albany Post Road from Yonkers, but the latter highway is undergoing repairs and to avoid detours that might lead the tourist into numerous difficulties, the longer and more picturesque route is recommended. The distance is 87.6 miles and may be easily done in 5 hours. From Poughkeepsie to Pittsfield, Mass., is 85 miles, and the route passes Rhinebeck, the Astor country place, Pine Plains, Ancram, Copake, Hillsdale. Shortly after leaving that place there is a stiff climb, but from the summit there is a mountain view that is ranked among the most wonderful in this section. The state road is followed through South Egremont, Great Barrington, Stockbridge, Lenox to Plainfield. Caution for stringent police regulations at Lenox and Stockbridge.

The tourist should be able to make Pittsfield from New York in 1 day's running, although the schedule calls for 172.6 miles. The roads are excellent and the country traversed is beautiful and interesting.

Many Fine Landscapes to Be Seen

The third section of the tour is to Waterbury, retracing the course to Great Barrington, where it turns east through Sheffield, Ashley Falls, Canaan, Norfolk, Torrington; there another series of wonderful landscapes will be unfolded. Thence through East Litchfield, Thomaston and Waterville to Waterbury, a total of 74.9 miles. The run to New York is 88.2 miles via Bridgeport and along the north shore of the sound and about the same through Danbury and south to the Westchester County line, meeting the Boston Post Road or going cross-country to White Plains. By making night stops of Poughkeepsie, Pittsfield and Waterbury, a leisurely 4-day trip is afforded with plenty of time to spare for detours and explorations. If Pittsfield and Waterbury are used as night stops there will be a 3-day tour of many attractions. Those who simply wish the tour for the sake of riding will find that the run to Pittsfield and return in 2 days will give them a satisfactory ride over the course outlined.

2. New York to Newburgh, Port Jervis and New Jersey Hills. Leaving New York, the most picturesque course will be found by following the route given above to Fishkill, crossing the Hudson via ferry to Newburgh, about 80 miles by this longer route. From Newburgh the course lies westwardly to Liberty, 57.7 miles, touching Coldenham, Walden, Pine Bush, Ulsterville, Ellenville and Woodburne. This section contains some good dirt roads, but is largely macadamized. From Liberty to Port Jervis the run is through the Mongaup Valley touching Stevenson and the village of Mongaup. From Port Jervis to New York the way passes through Milford, Pa., to Hainsville, N. J., from there through Culver Lake, Branchville, Newton, Sparta, passes down the Berkshire Valley to Dover and thence to Parsippany and Montclair. From Montclair to New York there are numerous good routes, but perhaps the best is through Rutherford to the Weehawken Ferry.

This tour may be done in 3 or 4 days according to inclination. It is about 250 miles long by the route suggested, but may be shortened 20 miles by following the direct route to Newburgh via the Fort Lee Ferry and the New Jersey and New York route on the west side of the Hudson. If that course is followed to Newburgh it is easily possible to reach Port Jervis in 1 day's run and return through the New Jersey hills the following day. However, the spur of the Blue Ridge which lies to the west of Newburgh may prove attractive for exploration if time is at hand for that purpose and it may be desirable to put in at least a day in covering the distance from Newburgh to Port Jervis. A detour on the return trip will probably attract some tourists. Instead of taking the road to the left at Branchville which leads around the south end of Lake Hopatcong, the right fork passes through Hackettstown and over Schooley Mountain and east through German Village to Morristown.

A Route for High-Powered Cars

Catskill detour from Newburgh, 3. Not recommended for any but high-powered cars. The route from Newburgh may be along the Hudson to Kingston, 34 miles, but it has some bad stretches and is not so agreeable for ordinary touring as if the party takes the route via New Paltz, which is longer. This passes through Plattekill, New Paltz, Eddyville and Wilbur and is about 36.2 miles over good roads. North from Kingston there is a fine macadam road to Saugerties. This is followed by good country road to Evesport, West Camp and Catskill. Leaving Catskill the next section of the run will be found to test even a car of 40 horsepower as it runs through the heart of the Catskill Mountains. This course lies almost due west to Palenville then up into the hills at Haines Falls and Tannersville to Phoenicia. The route traverses the territory where the adventures of Rip Van Winkle were staged. From Phoenicia the return course is via Beechford, just north of the Ashokan reservoir to Woodstock and Saugerties. The course toward Port Jervis is a return over the original road to Kingston and thence southwesterly to Ellenville, where the main route is picked up.

There is an easier route through the Catskills that may be followed by the average automobile without much difficulty. This is identical with the route given to Catskill and then west into the hills via Leeds, Cairo, East Windham, Windham, Prattsville to Grand Gorge, 41.8 miles from Catskill. At Grand Gorge the road turns south passing Roxbury, Arkville, Griffin's Corners, Pine Hill, Shandaken to Phoenicia, thence to Saugerties. From Catskill to Saugerties by this route is 106 miles and will be found to be about the mileage for a full day's running. The whole detour by the long route via Grand Gorge is 200 miles. Thus for a 3-day tour it will probably be well to make the first night stop at Catskill, spending the second day in the hills and the third in returning. If the short route via Palenville is used, the trip need cover only 2 days, although there will be some hard running on the second.

4. South New Jersey. Cross to Staten Island by the Municipal Ferry and run down the east side of the island to New Dorp, thence on the fine main road through Huguenot and Tottenville, crossing to the New Jersey side at Perth Amboy. Cross the Raritan River and continue south through South Amboy, Keyport, Matawan, Marlboro, Freehold, Adelphia to Lakewood.

From Lakewood to Atlantic City the course is via Toms River, Forked River, Waretown, Barnegat, Absecon to the resort city. This is a run of 115.8 miles, all of which is over fine roads. A variation of the above is to continue east from the route given above at Keyport to Long Branch and down the coast road to Point Pleasant, where a cross-road takes the party to Lakewood. This adds about 10 miles to the itinerary, but gives an opportunity to visit Asbury Park and a score of similar resorts.

Leaving Atlantic City for Cape May, the low country necessitates a swing west to Mays Landing and thence south following the coastline to Cape May passing through Tuckahoe, Seaville to Cape May Court House. The resort lies 13 miles to the south. The roads are not so good on this day's trip, but will be found passable at moderate speed. The distance is 63.3 miles. The return trip may be via Philadelphia, in which case the course will be to retrace the road to Cape May Court House, then taking the left branch road touch Goshen, Dennisville, Eldora, Leesburg, Dorchester, Port Elizabeth, Millville, Vineland, Newfield, Malaga, Franklinville, Clayton, Glassboro, Gloucester to Camden. This makes a total of 86.7 miles. Great caution should be used about Cape May Court House in crossing the railroad.

Roads From Camden to New York

From Camden to New York is an easy run over splendid roads via Trenton, and the choice of several routes is given, all of which are familiar to automobilists. The distance is 85 to 102.5 miles, depending upon which route is used. The Staten Island-New Brunswick route is interesting and that via Morristown and Montclair is fine. All told, this tour embraces 355 miles without detours. Including the Long Branch variant and the long way from Philadelphia to New York the total would come to 375 miles. The run from New York to Cape May though Lakewood and Atlantic City can be easily made in a long day's run and the return via Philadelphia affords a distinct change for the course back to the metropolis. If a day is spent in skirting the coast to Atlantic City the itinerary of the trip may be extended to cover 3 days or more.

5. Long Island. A complete circuit of Long Island contemplates starting from the Queensboro Bridge and following the north shore of the island, turning south at Greenport and skirting the south shore to the point of beginning. The course is from Long Island City to Winfield, Corona, Flushing, Bayside, Little Neck, Manhasset, Manhasset Hills, Roslyn, East Norwich to Huntington. In this part of the trip there may be several short detours along the shores of the numerous deep inlets that pierce the north line of Long Island. From Huntington east the main towns and villages are as follows: Centerport, Commack, Smithtown, St. James, Stony Brook, East Setauket, Port Jefferson, Miller's Place, Wading River, Riverhead, Aquebogue, Jamesport, Mattituck, Cutchogue, Southold and Greenport. This gives a distance of 103.9 miles, which undoubtedly will be much amplified and augmented when it comes to actual touring. The country from Huntington east is varied in scenery, but the roads are good on the general average and the temptation to try out a dozen or so of the bypaths north and south of the main route will probably account for a large addition to the contemplated mileage. There are numerous quiet little places where a night stop can be made and no trouble should be encountered in this respect even if no advance provisions are made to care for such a contingency. From Greenport the way lies across Shelter Island Ferry to Shelter Island, where another ferriage brings the party to Sag Harbor. This whole section is the vacation spot for tired dwellers in the metropolitan district and has a large summer population. Turning west after leaving Sag Harbor the route passes through Bridgehamptom, Southampton, East Quogue, Quogue, Westhampton Beach, Eastport, East Moriches, Center Moriches, Moriches, Brookhaven, Bellport, to Patchogue, traversing the lowlands along the shores of Shinnecock, Moriches and Great South Bays. The last leg of the round takes in Blue Point, Bayport, Sayville, West Sayville, East Islip, Islip, Bay Shore, Babylon, New Point, Amityville, Freeport, Baldwin, Rockville Center and Jamaica to Long Island City.

The total distance as outlined is 219 miles, but it may be extended indefinitely to any desired distance.

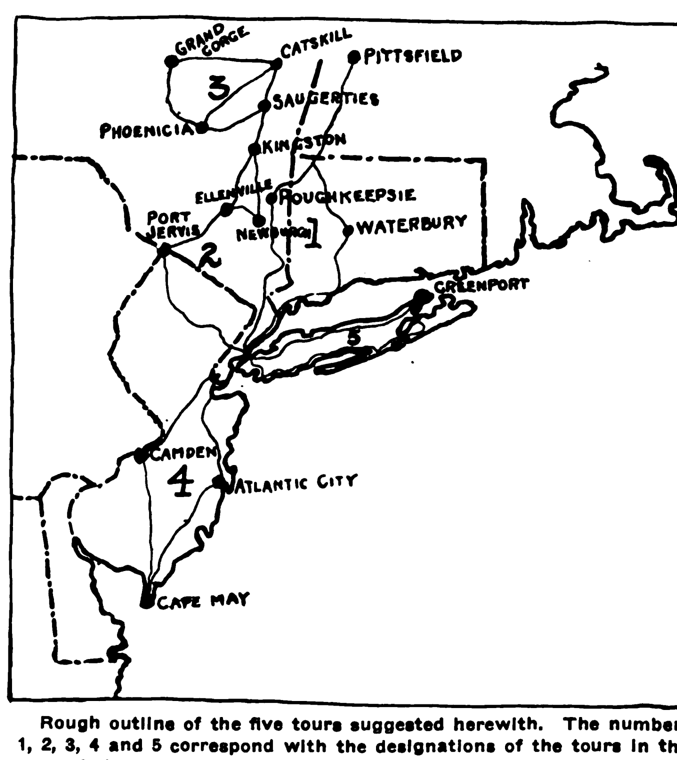
The five routes suggested are all delightful in different ways. The run into the Berkshires is the easiest as far as grades and general excellence of the roads are concerned. The section covered presents a continuous panorama of beautiful landscapes besides being interesting from the historical viewpoint.

Some Splendid River Views

The run through Newburgh to the Delaware Water Gap, while familiar to many of the automobile public in and about New York, is always a favorite. The big detour into the Catskills has some novel features. In the first place, the river road north of Newburgh, while poor in spots, is worth while covering on account of the gorgeous river views to be had from the car. If the automobile is a big, powerful machine and the tourists wish to enjoy something rather novel in the way of traveling, by all means let them make the trip through Palenville and up into the Catskills by the short route suggested. While not positively dangerous, much care should be used in driving along the mountain trails. The other, more circuitous route is not specially difficult, even for a car of moderate power.

The trip to Cape May is over magnificent roads and some that are not so magnificent. South Jersey is somewhat of a laggard in the matter of good roads, but within the last 2 years great improvements have been made in the main highways. The course through Lakewood to Atlantic City is like a boulevard, as is also the Philadelphia-New York run.

The Long Island tour will depend for its enjoyability upon the desires of the tourists. It can be made a hurried jumble of scenes, none of which will prove satisfactory, and it also may be made quite as delightful as any automobile trip in this part of the world. A prearranged plan of tour on Long Island will probably work more harm than good unless the party has some definite idea as to places for its regular stops. One-day trips can be made easily to and from each of the places named as the terminus of the first section of any of the trips except Long Island, and if a swift ride is what is desired, it is perfectly possible to go to Greenport and return in a day.



Rough outline of the five tours suggested herewith. The numbers 1, 2, 3, 4 and 5 correspond with the designations of the tours in the text of the article

Tours From St. Louis

Several Interesting Trips Offered to Automobile Enthusiasts Who Want to Go Touring Over Labor Day

The Territory Within Reach of St. Louisians Includes Chicago, Indianapolis, Springfield and Kansas City

ST. LOUIS, MO., Aug. 26—Automobilists of the Mound City who desire to take a 2 or 3-day trip over Sunday and Labor Day, have the choice of more than half a dozen routes on which they may spend the holiday to advantage, both enjoying fine scenery and making the acquaintance of some of the most interesting sections of the country.

Among the routes selected as ideal are the following: Tour No. 1, to Keokuk, Ia., 193.1 miles; No. 2, to Springfield, Mo., about 265 miles; No. 3, to Indianapolis, 243.6 miles; No. 4, to Chicago, about 350 miles; No. 5, to Kansas City, 310.5 miles. All the above are one-way mileages only.

Chief in popularity this year should be route No. 1, to Keokuk, Ia., the main attraction at the objective point of the tour being the huge new dam put in by the North American Securities Company, which will soon supply St. Louis with water. Either Hannibal, Mo., or Quincy, Ill., offers excellent attractions as an overnight stop, either going or returning, should it be deemed inadvisable to spend the night in Keokuk. Hannibal, 133.4 miles from St. Louis, will be remembered as the birthplace of Mark Twain. His old house has been transformed into a museum, and the Hannibalites are exceedingly proud of it and of the fact that the foremost humorist of modern times was a fellow townsman of theirs. At Bowling Green is the home of Champ Clark, Speaker of the national House of Representatives.

If there is plenty of time at the disposal of the party the return trip could be made by way of Springfield, Ill., or the trip could be further extended to take in Davenport, Rock Island and Moline. As regards the roads to be encountered on this tour, they range from fair to good, no great length of really bad roads being met with in the entire distance.

Through the Ozark Mountains

Another tour that will provide much in the way of beautiful scenery is that to Springfield, Mo., through the magnificent Ozark Mountains. While the roads traversed on this trip will not be of the best, the travelers will be amply repaid by the succession of charming prospects to be met with while journeying through the mountain country, some of them pronounced by seasoned travelers the equal of any to be found in the world. Interesting side journeys to inspect the Rolla caves, the wonders of Ha Ha Tonka and the Niangua River will add to the enjoyment of the tour, as will an examination of the world-famed lead and zinc mines of the Ozarks. The round trip may be made comfortably in 4 days, and the accommodations to be secured en route will be found adequate, especially at Rolla, which, in the matter of distance, would seem to be the natural stopping place in both directions.

While the roads of lower Illinois, by reason of the prolonged rains and floods of this year, are not at their best, a tour across that section to Indianapolis, *via* Vandalia and Terre Haute, will prove decidedly interesting to the automobilist. The old National Road, which will be followed the entire distance, is usually in very fair shape, and should it be decided to cover the distance in 3 days instead of 4, Terre Haute will prove to be an ideal overnight stop in both directions. It would be quite possible to vary the return trip by a detour through Champaign and Springfield, the distance from Indianapolis to St. Louis by this route being 333.3 miles.

The tour from St. Louis to Chicago, *via* Springfield, Peoria and Ottawa, is a favorite with the motorists of the Mound City. The roads are in such condition that it is quite possible to make the one-way trip in a single day; not a few St. Louisans have turned this trick within the past 2 years. On the route to Springfield the travelers will traverse the coal fields of southern Illinois, mining seemingly having crowded agriculture from the lead as the leading industry of the inhabitants. The entire distance from Springfield to Peoria is over dirt roads, which, except in rainy weather, will be found to furnish excellent going. Of the two main routes between Peoria and Ottawa that *via* Henry and La Salle is selected, the gravel roads which predominate in this section being especially good on this route. From Ottawa to the Windy City a practically level country is encountered the entire way, the entrance into Chicago being by way of Aurora and the West Side park system. The return route could be varied by taking in Bloomington, the road conditions on this route being good except in wet weather. If the trip is to consume 4 days, Peoria will be the natural overnight stop going and Springfield (or Bloomington, if the route variation is decided upon) returning.

This latter trip is a short cut, being 225.8 miles from Chicago, through Bloomington to Springfield. The start is made at Michigan and Jackon avenues, following the latter and passing through Garfield Park to Austin avenue to Forest Park. The route proceeds to Joliet, following the drainage canal. This town is the county seat of Will county and southwest of it there are still some old Indian mounds left. The Forest of Arden, a private park, is one of the most beautiful spots in the state.

Numerous Points of Interest

In Joliet there are also a number of enormous steel furnaces of the Illinois Steel Company, together with the plants of the American Steel & Wire Company and American Refractories Company. Northwest of the city the state penitentiary is located. From Joliet the route passes through Minoka and Morris to Dwight. After leaving Dwight, the tourists enter the richest farming region of Illinois and after a ride of about 20 miles reach Pontiac, whence the route is followed to Chenoa and Lexington, then to Towanda and Bloomington, 149.3 miles from Chicago. The remaining 76.5 miles lie in historical territory. Leaving Bloomington and passing Miller Park, the tracks of the Chicago & Alton Railroad are followed through a rich farming section. About 38.9 miles from Bloomington, tourists enter the town of Lincoln. This town was founded in 1853 and named for Abraham Lincoln and with his consent before he had achieved state or nation-wide fame. Lincoln, himself, drafted the town charter and practiced law there for a number of years. Beside the college and state school for feeble-minded children the town is noteworthy for the large coal mines situated in its neighborhood. Proceeding southward from Lincoln, Elkhart is reached, where the old homestead of Gov. Richard J. Oglesby is still standing. From Elkhart, the route leads to Williamsville and after a further 15 miles to Springfield.

While the country traversed by route No. 5, to Kansas City, is in some sections rather uninteresting, quite a number of St. Louisians are preparing to take the trip over Labor Day. To add interest to the tour the travelers could leave the route here mapped at Florence, rejoining it at Marshall, where another option is offered of going to Independence *via* the northern route, which hugs the Missouri River quite closely in some places, and stopping at Waverly and Lexington en route. For many miles these routes follow the new Missouri cross-state highway, which also constitutes a portion of the projected transcontinental road. Good stretches of macadam are to be found for a score of miles adjacent to St. Louis and Kansas City, but the remainder of the route is mostly over natural dirt roads, which, although generally excellent in dry weather, are almost impassable in some places after prolonged rain. The negotiation of the round trip in 4 days is well within the capabilities of the modern car. Marshall and Columbia would seem to offer the best attractions as overnight stopping places in either direction, assuming that the route variations as here outlined are decided upon.

Return Route From Chicago

Tourists who, after having gone to Chicago, wish to return by way of a detour, should find the trip through Champaign, Ill., and Indianapolis, Ind., very agreeable. The total mileage of this tour is 289.2 miles. The way leads through Washington Park, south on Cottage avenue, and to the right on Michigan avenue, passing through Roseland, Kensington, Riverdale and Dolton. There a poor road about 1 mile in length is encountered, which is followed by macadam road. The latter is followed past the Glenwood Industrial School for dependent boys, 26.1 miles from Chicago. This institution is remarkable and excels most other schools of its kind in the country. Passing through Chicago Heights, 29.8 miles from Jackson and Michigan Boulevards, the route leads through Steger, Beecher, Grant and Momence, along the Illinois Central tracks, to Kankakee. In this city the St. Viateurs College, a Catholic institution, as well as the state insane asylum, are worthy of inspection. Kankakee is equally important as an industrial and railroad center. From here the road leads directly to Champaign, through one of the richest farming sections of the United States and passing through Chebanse, Clifton and Askum. Champaign is 25.6 miles from Kankakee.

The distance from Champaign to Indianapolis is slightly longer, namely, 128.3 miles. The route leads through Urbana, Ill., and Homer over very good roads to Danville, where Lincoln spent many years of his life practicing law. The balcony of the Feldcamp home, whence he delivered a famous oration, is still in evidence, and, like the soldiers' monument, is a preferred point of interest to tourists. The road then proceeds to Covington, where the Wabash river is crossed, the tourists entering the state of Indiana. Here the tourists find materially better roads than on the preceding stretch of the route. About 30 miles farther Crawfordsville is entered, famous for Wabash college and known as the former home of Gen. Lew Wallace. About 8 miles south of Crawfordsville, Garland Dells, known as the Shades or the Yosemite of Indiana, offers a very attractive side trip, full of wild, romantic landscapes. From Crawfordsville a straight road leads through Jamestown, Pittsboro, Brownsburg and past the Motor Speedway into Indianapolis.

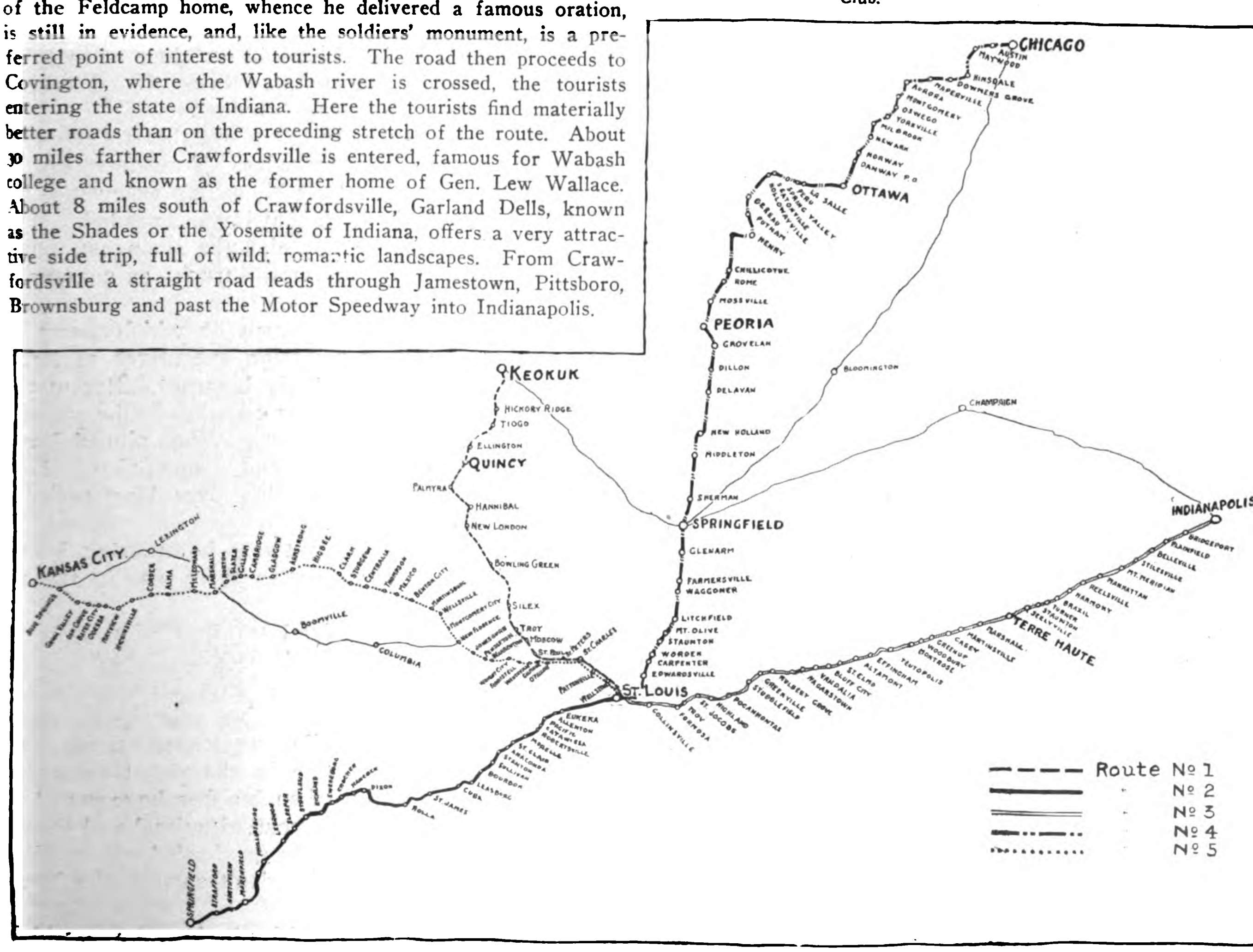
Calendar of Coming Events

Shows, Conventions, Etc.

Aug. 24-Sept. 9....Toronto, Can., Display of Automobiles, etc., at Canadian National Exhibition, Transportation Building.
Sept. 5-15.........San Jose, Cal., Automobile Show, San Jose Automobile Dealers' Association.
Sept. 14-21........Chicago, Ill., Annual Fall Festival and Show, Chicago Automobile Trade Association.
Sept. 17-20........Denver, Col., Convention International Association of Fire Engineers.
Sept. 23-Oct. 3.....New York City, Rubber Show, Grand Central Palace.
Dec. 7-22 ....Paris, France, Paris Automobile Show, Grand Palais.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 11-25, 1913...New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Feb. 1-8...........Chicago, Ill., Annual Automobile Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 24-March 1...St. Louis, Mo., Annual Automobile Show.
March 3-8.........Pittsburgh, Pa., Annual Automobile Show.
March 8-15........Boston, Mass., Annual Automobile Show.
March 17-22.......Buffalo, N. Y., Annual Automobile Show.
March 19-23.......Boston, Mass., Annual Truck Show.
March 24-29.......Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Aug. 30-31........Elgin, Ill., Road Races, Chicago Automobile Club and Elgin Automobile Road Racing Association.
Sept. 1-2..........St. Louis, Mo., Track Races, Universal Exposition Company.
Sept. 2............Indianapolis, Ind., Speedway Meet.
Sept. 2............Winnipeg, Man., Track Meet.
Sept. 3-6..........Chicago, Ill., Commercial Vehicle Reliability Run, Chicago Motor Club.
Sept. 11-14........Buffalo, N. Y., Third Annual Reliability Tour, Automobile Club of Buffalo.
Sept. 17...........Milwaukee, Wis., Grand Prize Race.
Sept. 20...........Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.
Sept. 21...........Milwaukee, Wis., Vanderbilt Cup Race.
Sept. ....Washington, D. C., Reliability Run, Automobile Club of Washington.
Oct. 7-11..........Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 12............Salem, N. H., Track Meet, Rockingham Park.
Nov. 6.............Shreveport, La., Track Meet, Shreveport Automobile Club.



Map showing the territory surrounding the city of St. Louis, outlining some of the principal routes for short tours

The AUTOMOBILE

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Truck Salesmanship

THE salesman capable of selling pleasure automobiles is not by virtue of his salesmanship qualifications in this field necessarily a post-graduate in the sale of motor trucks.

Selling pleasure cars calls for one fund of information; selling motor trucks presupposes an entirely different store of knowledge.

The motor-truck salesman meets the purchasing executive in his business atmosphere. When he discusses buying motor transportation he discusses a department of the business—a department which is to-day attaining greater and greater proportions in the perspective of the various departments of his business. This is so because of the greater despatch demanded by the consumer and because of the retrogression ot the horse in that his capacity for work is not so great to-day as it was 10 years ago, due to greater street congestion, greater radius of delivery and differences in street pavements.

A comprehensive knowledge of transportation is the prerequisite of the truck salesman.

To-day the neophytic salesman is often an infant groveling at the feet of the so-called transportation executive of the big business house which is in the market for motor power. True, he knows horsepower, wheelbase, load capacity, tire sizes, exaggerated speeds. estimated cost of upkeep, estimated annual capacity and a score of other estimated factors, but when it comes to talking power transportation he has often failed to lift the veil and survey the broad field of action in which the motor truck is establishing its position in to-day.

Too much effort is being expended by motor truck salesmen on truck mechanics and not enough on pure transportation. This is natural, it is the one subject the salesman would be conversant with and, since it is his rôle to lead the attack on the prospective buyer, it is his duty to select his own munitions of war and handle his campaign as he desires.

The buying executive for the large corporation is rarely a mechanical engineer, and while he may summon to conferences one or a corps of consulting engineers, these engineers are rarely qualified to adequately pass judgment on the truck design because of their general ignorance of this new field of power transportation and the many new factors it involves.

The events of the last 12 months record over a score of examples of where purchasing executives have held such conferences, in fact, series of them, and in the final act have selected the truck with the lowest price in preference to trucks that are to-day considered the best, mechanically considered, in the country. Other examples of this nature but prove conclusively that truck mechanics in a large percentage of the cases is not the keystone of the sale.

It is deplorable to record, yet it is an indisputable fact, that not a few of our biggest industrial concerns, whose judgment is impeachable in their own mercantile buying lines, have selected grossly inferior products in the truck field and have in fact done so in spite of the better judgment or the advice of consulting mechanical engineers in their employ.

Examples of this nature but prove that transportation is the subject to emphasize. Transportation is what the maker must school his selling executives in, it is the one form of attack that is most needed. It is most needed because it contains the strongest, most convincing arguments for motor trucks as compared with animal power.

Transportation is an argument on which many of the so-designated transportation executives of large business houses are amazingly ignorant. Recent researches have shown that few concerns know exactly what animal transportation costs. When pinned down in argument to actual facts and requested to show books revealing costs extending over long periods, they are unable to do so.

There has been more activity in securing horse costs within the last year than there was in the 10 previous years.

So deplorable have animal transportation systems been with many mercantile houses that they refused to have the transportation facilities incorporated in the business of the company, but organized a subsidiary company to handle the transportation and placed a shipping executive in charge. How could the purchasing executive of such a firm be expected to discuss sanely the relative cost of animal and motor power in trucks? And yet, the unschooled salesman is a mere puppet in the hands of such a transportation braggadoccio.

From over sixty leading cities in America, in which a canvass has been made, comes the almost universal response that mercantile houses have but the scantiest figures on the cost of horse transportation, and when these figures are analyzed it is generally proven that many items that should be in such calculations have been neglected. If the salesman is not master of the situation he will be forced to acknowledge figures of cost as correct which are far from being so, not due to wilful intent but to neglect and ignorance.

There must be determined standards of cost for transportation in different fields of business. A large electrical concern recently stated that it paid $42 a month for electric current to charge the battery of a small runabout used in one department of the business. A transportation expert called into conferences on the question of substituting electrics for horse vehicles immediately refuted such a claim without having once looked into the details. He was too familiar with costs to have such a statement thrust upon him for a single second. An investigation verified his judgment.

We have standards of money value, banks establish standard rates of interest. The merchant knows he has not to pay 20 per cent., as 6 per cent. may be the standard current rate, but in the transportation field these various necessary standards have not been determined and there are not a few shipping or transportation executives in business houses talking as absurdly on horse costs as the merchant who would claim to get all of the money he wanted at ½ per cent. per annum. This only accentuates the necessity for the establishment of proper standards.

Truck factories must do much to determine these standards; they must direct a country-wide campaign of collecting the necessary information needed to arrive at a determination of such standards. Each individual agent, no matter the state in which he is located, cannot do this, no more than the local bank in a Texas town can determine the money rates to the country. **Factors nation-wide enter into these problems of standards of transportation cost, and the only certain way the truck interests can insure themselves of ready response is by general co-operation through their large organizations as well as by continuous co-operation between makers and their many dealers.**

Wisconsin State Law Supreme

Attorney General Decrees That No Municipality or Community Can Make Automobile Regulations Conflicting Therewith

MILWAUKEE, WIS., Aug. 26—A decision by Attorney General Bancroft of Wisconsin that no city, village, county or other form of government lesser than the state can make any laws or ordinances fixing requirements with regard to the operation of motor vehicles which conflict with the state law, has brought dozens of cities and villages to their senses. The state law, which is declared supreme by the attorney general, fixes the speed of motor cars in cities at 15 miles per hour, and on country roads at 25 miles per hour. The object of the law is to make the speed limits uniform throughout the state. Some cities have made limits of 10 and 12 miles per hour, while Milwaukee county has passed a law making the limit on country roads 20 miles per hour. All of these ordinances are outlawed by the decision, although many city attorneys declare they will carry the cases to the highest court to determine if the state has the power to rule absolutely in such cases. La Crosse, Wis., has an ordinance fixing the speed at street intersections at 6 miles per hour. The attorney general says local requirements are taken care of the provision in the state law which requires every driver to proceed at a speed which is "reasonable and safe" at all times.

NEW ORLEANS, Aug. 24—European automobile manufacturers are securing an advantage in Latin America which is certain to cost American factories many sales. With the exception of Mexico City, Buenos Aires and Rio de Janeiro, makers of American cars have neglected active efforts in the cities which lie south of the Rio Grande. On learning that the streets of practically all of the places were paved with cobblestones for the most part, the tendency has been to postpone any idea of propagation that may have been entertained until better streets are constructed.

European manufacturers have adopted different tactics. They have secured high-class agents whose duty has been to stir up a desire for better streets rather than attempt to make immediate sales of cars.

Richmond to Have Annual Show

Automobile Association Seeks Charter With the Object of Holding Exhibitions—Atlanta's Show to Take Place Early in Fall

RICHMOND, VA., Aug. 26—The Richmond Automobile Association has petitioned the state corporation commission for a charter. The maximum capital of the new corporation will be $50,000 and will be limited to the ownership of 10 acres of land. The object of the association is to hold annual automobile shows, the first one being proposed for February of next year. There are now near on to 3,000 automobiles in use in Richmond and it is thought this number will be greatly exceeded by the time of the first show.

Officers of the Richmond Automobile Association are J. T. Anderson, president, and W. D. Wartton, secretary and treasurer. The board of directors will consist of the officers named and E. D. Hotchkiss, Jr., Barton H. Grundy and Leigh R. Page.

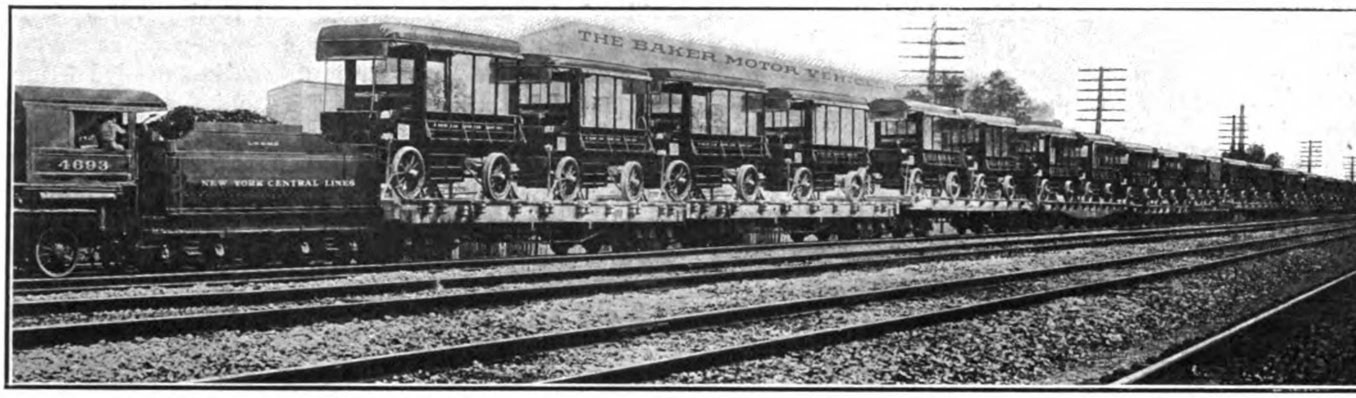
Atlanta Plans an Early Show

ATLANTA, GA., Aug. 26—Plans are going steadily forward for Atlanta's third automobile show, which is scheduled for the early fall.

Instead of having the show at the tag end of the Southern buying season, as was the case last year, this one will be given at a time when Southerners are beginning to buy cars, it will come at a time when money is easiest in Dixie and it will come before any other shows have taken the edge off the enthusiasm of prospects. The dealers in automobiles and accessories who constitute the Atlanta Automobile and Accessories, the promoter of the exhibition, are inclined to be sanguine as to the amount of business to be done as a result of the show.

Already arrangements have been made to combine with another exhibition which comes after the automobile show in the matter of decorations and in this way the automobile show will get the benefit of decorations that cost $16,000 at a price a great deal less than that.

Wylie West, acting as chairman of the show committee of the Atlanta Automobile and Accessory Association, is in general charge of the work.



Trainload of electric delivery wagons leaving the factory of the Baker Motor Vehicle Company, Cleveland, O.

TRAIN Load of Trucks—The accompanying photograph represents a recent partial shipment of Baker electric trucks to the American Express Company. When the cars now on order are shipped the American Express Company will have Baker electric trucks in service in eighteen cities as follows: New York, Chicago, Boston, Dallas, Portland, Springfield, Buffalo, Milwaukee, Lawrence, Mass., Kansas City, Memphis, Worcester, Syracuse, Rochester, St. Louis, Cleveland, Cincinnati, Los Angeles.

Hupmobile Honored at Turin—The Hupmobile was given first prize for cars of its class at the recent first International Motor Exposition held at Turin, Italy.

Trautman Is Manager—C. W. Trautman has been appointed manager of the Buffalo, N. Y., factory branch of the Detroit Electric Company.

Whitney Department Moved—W. N. Whitney & Co., Albany, N. Y., has moved its automobile department to 450 Central avenue, which salesroom and service station was formerly occupied by the United Motor Albany Company.

President MacAlman Back—President John H. MacAlman, of the Boston Automobile Dealers' Association, has just returned from a 2 months' tour of Europe, during which he visited all the large cities on the other side and inspected the various motor car factories.

Stuart Withdraws from Company—George C. Stuart, for a long time a member of the Mank-Stuart Motor Car Company, agents for the Cadillac at Portland, Me., has withdrawn from the firm and the company is now known as the Miles B. Mank Motor Car Company.

Bisons After Road Men—The Automobile Club of Buffalo, N. Y., has come out with vigorous arraignment of the New York State Highway Commission appointed by Governor Dix alleging that the abominable condition of the roads throughout the state, and particularly in Erie County, has been brought about by political favoritism and incompetency.

Motor Line in Franklin Park—James F. Shea, recently appointed superintendent of the Boston park system, started a motor bus line through Franklin Park, one of the biggest parks in the country, last Saturday, his aim being to make the place more popular. The cars start from Blue Hill avenue and over 2 miles at a leisurely gait, being driven by chauffeurs in the employ of the city.

Field Day for Chalmers Men—The first field day of the employees of the Whitten-Gilmore Company, of Boston, Mass., agents for the Chalmers line, took place last Saturday, when special cars conveyed the men and their friends to Glen Echo Park, Stoughton. A number of athletic events were run off and the day ended with a dinner at which E. A. Gilmore and Charles E. Whitten were the honored guests.

Large Registration in Minneapolis—The city assessor of Minneapolis has listed 4,724 automobiles in 1912, as compared with 3,044 in 1911. The valuations are $2,296,900 and $1,721,655. The value of the additional machines, 1,700 in all, is given at $571,000. This is on a 50 per cent. basis. The fourth ward, containing some of the best families, reports 1,848 machines, and the eighth, similarly blessed, reports 1,017 cars.

Burlington Wants More Time—The aldermen of Burlington, Vt., are considering a plan to put into force traffic regulations for the business section of the city to apply to all vehicles because of the increase in the motor traffic. Some of the regulations seemed to be too drastic, one in particular providing for a 4-mile limit while passing along by street cars. The matter has gone over for further investigation.

Danger in Mexico—Rebel activities close to towns in the Federal District and close to the limits of the City of Mexico are causing a falling off in motor car touring in this section. The dead bodies of a chauffeur and another occupant of an automobile were found lying upon the highway near a suburban town recently, and it is supposed they were killed by Zapatistas, as the rebels under Emiliano Zapata are called. It is even considered dangerous to make the trip to and from the Country Club at night.

Automobiles Excluded at Isleboro—As a result of Capt. F. C. Pendleton, of Brooklyn, N. Y., driving his automobile through the roads of Isleboro, Me., that had been shut to motor traffic on the grounds of an unwritten law the residents of that town called a special town meeting and by a vote of 58 to 7 directed the selectmen to take steps to exclude automobiles from the island kingdom. The selectmen are in a quandary for they do not know whether or not they have the authority to exclude motor vehicles from the town limits. If they find they cannot do so a bill will be sent to the next legislature asking for such authority.

New Agencies Established During the Week

Place	Car	Agent
Aberdeen, S. D.	R-C-H	Worthington Auto Co.
Alliance, O.	R-C-H	C. O. Scranton
Battle Creek, Mich	KisselKar	B. C. Kirkland
Buffalo, N. Y	Henderson	Zimmer Motor Vehicle Co.
Buffalo, N. Y	Hupp-Yeats	L. G. Schoepflin Co.
Buffalo, N. Y	Ideal Car	E. E. Grimmel
Buffalo, N. Y	R-C-H	L. G. Schoepflin Co.
Burlington, Vt	R-C-H	A. F. Lauzon & Co.
Chatsworth, Ill	R-C-H	J. C. Gelmers
Columbus, O.	Everitt	Everitt Auto. Co.
Columbus, O.	Garford	O. G. Roberts & Co.
Columbus, O.	Richmond	J. Renner
Dubuque, Ia	KisselKar	Lupper-Bishop Auto. Co.
Easton, Pa	Franklin	Shannahan & Wrightson Co.
Indianapolis, Ind.	Marathon	Finch & Freeman Auto. Co.
Indianapolis, Ind.	Nyberg	Finch & Freeman Auto. Co.
Indianapolis, Ind.	Regal	Finch & Freeman Auto. Co.
Jacksonville, Fla	R-C-H	R. Kloeppel
Kalamazoo, Mich	KisselKar	W. C. Grace
Kaufman, Tex	KisselKar	J. C. Bryant
La Crosse, Wis	KisselKar	Fox Brothers
Lone Tree, Ia	KisselKar	Zimmerman Steel Co.
Longview, Tex	KisselKar	W. D. Sessum
Manitoba, Can	Marmon	Lion Auto Garage
Marshall, Mo	Kissel-Kar	H. Lowenstein & Co.
Milwaukee, Wis	Velie	Blenheim Garage
Minneapolis, Minn	Little	Minnesota Motor Car Co.
Minneapolis, Minn	Mercer	Mercer Motor Sales Co.
Minneapolis, Minn	Staver	Eng Olsen
Nashville, Tenn	KisselKar	Howard Douglas
Omaha, Neb	Little	Doty & Hathaway
Omaha, Neb	Paige-Detroit	Mitchell Motor Car Co.
Omaha, Neb	Reo	Doty & Hathaway
Portland, Maine	Franklin	W. M. Chellis
Portsmouth, O.	Abbott-Detroit	Portsmouth Auto & Machine Co.
Portsmouth, O.	Paige-Detroit	Portsmouth Auto & Machine Co.
Regina, Can	KisselKar	D. L. Boureau
Rochester, N. Y	KisselKar	Ball-Washburne Motor Co.
Rochester, N. Y	Mitchell	E. W. Fisher
Salisbury, Md	KisselKar	L. D. Collier
Sedalia, Mo	KisselKar	W. C. Evans
South Bend, Ind	Haynes	S. & C. Auto Co.
Spokane, Wash	Buick	E. G. Finlay
Spokane, Wash	National	E. G. Finlay
Washington, D. C.	KisselKar	E. H. Bauer
Welland, Ont	Ford	A. N. B. Nepp
West Point, Neb	KisselKar	Brown Brothers
Wheeling, W. Va	Marmon	R. C. Bowman
Whitestown, Ind	R-C-H	Clark & Smith

COMMERCIAL VEHICLES

Place	Car	Agent
Rochester, N. Y	Dart	John Grape
Washington, D. C	Atterbury	Motor Truck Co.
Washington, D. C	Hatfield	Motor Truck Co.

Studebaker's Atlanta Building—The Studebaker Corporation, Atlanta, Ga., has arranged for a four-story fireproof building at Peachtree and Harris streets for its store in that city.

Toledo to Frisco in 19 Days—Richard Sheldon, a Toledo, O., automobile enthusiast, drove his new Chalmers Six into San Francisco, Cal., recently, after 19 days of actual running time.

Licenses Fatten Ohio Treasury—State Treasurer Creamer, of Ohio, credits the automobile department of the state with having brought into the state treasury $33,874.59 during the months of June and July.

Two Trucks for Toledo—Service Director Cowell has been authorized by Council to expend $9,000 for two 5-ton trucks to be used by the street department in hauling garbage from the collecting stations to the reduction plant.

Horses Scarce in Manitowoc—The assessment list of Manitowoc, Wis., gives but 549 horses for 1912, as compared with 721 in 1911. The number of motor cars owned in the city in 1912 is 152, as compared with 75 a year ago.

Williams With Locomobile—L. W. Williams, for some time connected with the advertising department of the Locomobile Company, Bridgeport, Conn., has recently entered the truck sales department of the same company.

Wilson Eastern Sales Manager—George D. Wilson, sales manager of the Warren Motor Car Company, has resigned to take charge of the sales of the Warren car for several eastern states with headquarters in New York City.

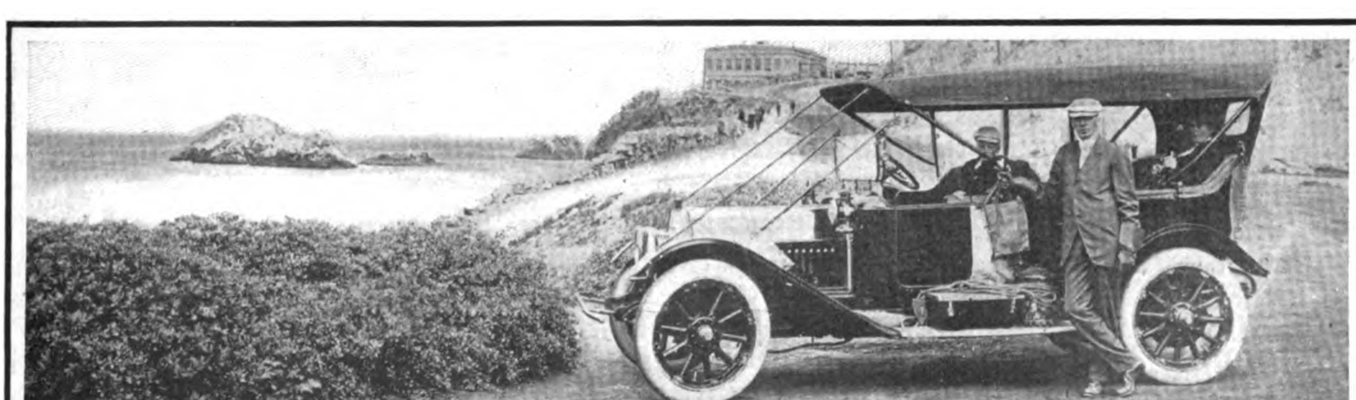
White Truck Takes Prize—A White 3-ton truck took the silver loving cup at the Long Branch Business Men's parade, Long Branch, N. J. The prize was offered on the basis of appearance, quietness of engine and lowest cost of upkeep.

Dennis Company's Toledo Quarters—The Dennis Motor Company, Toledo, O., agents in Ohio and southeastern Michigan for the Alco, Cino, Rambler and Detroit electric cars, have moved into their new quarters at Madison avenue and Fifteenth street.

Abolishing Water Bars—D. T. Bates, supervisor of highways for Bennington County, Vt., has declared war on the old-fashioned water bars and he has already wiped out more than sixty on the road between Pownal and the Rutland county line. There are 103 others remaining and these will be removed speedily.

Weeks' Permit for Canada—The custom service in Canada has inaugurated a new system of permits which adds greatly to the pleasure in taking Canadian tours in automobiles. With the present arrangement it is possible to get a 7-day permit to drive a car, licensed in the United States, through Canada. This permit is secured from the custom official at the point of entry.

Motorists' Mecca, Atlantic City—Motorists' Mecca is what Atlantic City, N. J., may be called during the week of September 30 to October 5. In the holding of the American Road Congress, the American Automobile Association is co-operating with the American Association for Highway Improvement, while the National Association of Road Material and Machinery Manufacturers will conduct a most comprehensive exhibit on the big pier.



The new Chalmers Six in which Richard Sheldon and family, of Toledo, O., crossed the continent. Seal Rocks in the background

New salesroom and garage of the Chicago Lozier branch

New Road for State Fair—Owners of automobiles will find a new road and free parking space at the state fair, Detroit, Mich., September 16 to 21.

Seely School's New Quarters—The Seely Automobile Sales and Training School has moved into its new quarters in the Ireland Building, South Bend, Ind.

Jiffy Company's Detroit Office—The Jiffy Automobile Curtain Company has opened a general sales office in Detroit with headquarters at 527-528 Ford Building.

Angier Joins Pope Forces—Irving O. Angier has joined the sales forces of the Pope Manufacturing Company, Hartford, Conn., as traveling salesman and will cover the Southern States.

Davidson Goes to Detroit—M. D. Davidson, formerly with the Boston branch of the Oldsmobile and also the R-C.H salesforce in the Hub, has gone to Detroit to accept a position as district sales manager with the R-C-H company.

Keyless Lock Company's Factory—A two-story, fireproof factory building, in which will be manufactured brass and aluminum motor car castings, is being erected in Indianapolis, Ind., by the Keyless Lock Company. It will cost about $75,000.

Pennsylvania Issues 55,000—The Automobile License Bureau of the State Highway Department, Pennsylvania, has issued 55,000 licenses to date, and applications are coming in every day.

Brevard Joins Zenith Company—Proctor Brevard, experimental engineer of the Hudson Motor Car Company, has resigned and joined forces with the Zenith Carburetor Company, Detroit, Mich.

Milwaukee's Orphans' Day Outing—The sixth annual orphans' outing of the Milwaukee Automobile Club, Milwaukee, Wis., was held on August 28. William H. Pipkorn, manager of the first five outings, was again in charge.

New Kalamazoo Company Formed—A new company has been formed in Kalamazoo, Mich., under the name of the National Compression Mixer and Primer Company, to manufacture a device which will eliminate the waste gasoline in automobile engines.

Wolverine Club's Elections—Bert Miller has been elected to the board of directors of the Wolverine Automobile Club, Detroit, Mich., in place of Charles Gilmour, who recently resigned. W. G. Bryant, the club's attorney, has been elected vice-president.

Ware Company Building Factory—The Ware Motor Vehicle Company, St. Paul, Minn., is building a concrete factory at Raymond and University avenues in that city. The company is building a four-wheel drive car in four models: 1,500 to 2,000 pounds, 1 1-2-ton, 2-ton and 3-ton types. The Model gas engine is incorporated in the machine and Wilcox-Bennett carbureter.

Oldsmobile Has Moved—The Boston, Mass., branch of the Oldsmobile Company has moved into the new building erected for it on Commonwealth avenue and now just as soon as renovations can be made in the old quarters on Massachusetts avenue and Newbury street the Boston branch of the Buick will be moved there from the Motor Mart.

Changes in Packard Staff—Russell Huff has been made consulting engineer; J. G. Vincent, chief engineer; G. R. Bury, manager motor carriage sales department; G. S. Loomis, manager specifications department; C. R. Norton, manager of truck sales, and C. E. Morton, assistant in the truck sales department of the Packard Motor Car Company, Detroit, Mich.

Campbell Continues Good Work—Secretary Chester I. Campbell, of the Boston, Mass., Automobile Dealers' Association, who recently took 3,000 orphan, blind and crippled children on an outing, gave another outing to the inmates of the almshouse and home for aged couples of Wollaston and Quincy, taking about 50 on a trip to Sharon, where they all had a delightful day.

Reorganize Berkshire Motors Company—A meeting of the stockholders of the Berkshire Motor Company was held in Boston a few days ago for the purpose of reorganizing the concern. The Pittsfield Electric Company recently placed an attachment for $2,500 upon the stock of the company and this brought about the plan to reorganize because of the effect upon the company's credit.

Dallas Joins Anti-Noise Cities—The decision of the Dallas city government to permit the use of all adequate automobile warning signals and to restrict the use of all signals to an abrupt short sound means that Dallas will hereafter take rank with Chicago, St. Louis and all other cities in that regard. The City Commission merely passed an ordinance making it a violation of the law to make unnecessary noises.

Automobile Incorporations

AUTOMOBILES AND PARTS

BRANTFORD, ONT.—Keeton Motors, Ltd.; capital, 200,000; to manufacture automobiles. Incorporators: Forrest M. Keeton, William G. Houck, William J. Verity.

CAMBRIDGE, MASS.—Blake Automobile Company; capital, $100,000; to deal in automobile business. Incorporators: E. C. Blake, L. E. Gibson.

COLUMBIA, S. C.—Lyon Motor Car Company; capital, $50,000; to manufacture automobiles. Incorporators: E. B. Lyon, J. M. Black, J. E. Johnson.

CORTLAND, N. Y.—Brockway Motor Truck Company; capital, $100,000; to manufacture motor trucks. Incorporators: George A. Brockway, Charles S. Pomeroy and Frederick R. Thompson.

DETROIT, MICH.—Standard Motor Truck Company; capital, $50,000; to manufacture motor trucks. Incorporators: Howard Wilcox, W. K. Ackerman.

INDIANAPOLIS, IND.—Mais Motor Truck Company; capital, $1,000,000; to manufacture motor trucks. Incorporators: Frank H. Wheeler, Walter M. Pearce, S. Lockard, William H. Brown, Jacob V. Stimson, Henry G. Francis.

JAMESBURG, N. J.—Ex-Cel Motor Trust Company; capital, $250,000; to manufacture automobiles. Incorporators: T. C. Corwin, A. Englehardt, A. A. Kelley.

LA CROSSE, WIS.—General Motor Car Company; capital, $10,000; to deal in motor cars and commercial cars. Incorporators: Joseph P. Krett, Louis L. Fox, Henry F. Fox.

LAWRENCE, PA.—Lawrence Automobile Company; capital, $40,000; to deal in automobiles. Incorporators: L. C. John, Earl M. Kyle, J. P. Gill, J. P. Cope, C. A. Brookover, George Greer, R. M. Jamison, T. F. Moorehead.

MANSFIELD, O.—Eagle & Vincent Automobile Company; capital, $15,000; to manufacture automobiles. Incorporator: C. H. Engle.

NEW YORK CITY, N. Y.—Curran Patent Company, Manhattan; capital, $10,000; to manufacture motors. Incorporators: Harry L. Curran, Charles H. Wilson.

NEW YORK CITY, N. Y.—Harman-Yount Company; capital, $10,500; automobiles, etc. Incorporators: Daniel H. Hanckel, Frederick B. Hunt, Helen M. Kelly.

NEW YORK CITY, N. Y.—Henderson Eastern Motors Company; capital, $20,000; to manufacture automobiles. Incorporators: Harry Harris, E. Knight Harris, Leopold Friedman.

NEW YORK CITY, N. Y.—George Leveene Company; capital, $5,000; to deal in automobiles, etc. Incorporators: George Leveene, John L. Meyer, Charles E. Lauten.

OWENSBORO, KY.—Ames Motor Company; capital, $100,000; to manufacture automobiles.

New Lee Tire Agency—The Kelly-Field Company, Philadelphia, Pa., are sales agents for Lee tires.

Start-Lite Jackson Equipment—The Jackson Automobile Company, Jackson, Mich., has adopted the Start-Lite Junior lighters for 1913 standard equipment.

Barnard's Grand Rapids Branch—Augustus H. Barnard, sales manager for the Grand Rapids Motor Truck Company, has established a branch in Minneapolis.

La Vigne in Detroit—The La Vigne Gear Company, originally of Detroit, Mich., is about to leave Milwaukee, Mich., its present quarters, to return again to Detroit.

Ford Shipment Largest Made—The largest shipment of automobiles ever made has just left Detroit, Mich., for Kansas City, Mo. In the shipment were 630 complete Ford cars.

Roberts Is Transferred—C. L. Roberts, of the New York City branch of the Marquette Company, has been transferred to the Oakland division of the General Motors Company.

Dutch Rubber Company Incorporated—The Dutch Rubber Company, Akron, O., was recently incorporated with a capitalization of $1,250,000 to manufacture and sell rubber articles.

Oakland's 1913 Plans—The Oakland Motor Car Company of Pontiac, Mich., will turn out 11,500 cars for 1913. For the coming year a six-cylinder model and also a car at $1,075 have been added.

Denver-Salt Lake Record—Frank Botterill, of Salt Lake City, Utah, and E. M. Grady, of Denver, Col., made the trip from Denver to Salt Lake City in two days, excelling any attempt heretofore by at least 2 miles to one.

Moore with Gramm-Bernstein—W. H. Moore has resigned from the Gramm Company, Lima, O., to take a position as manager of the sales department of the Gramm-Bernstein Company, truck manufacturers, Lima, O.

Overland's Buffalo Building—The Willys-Overland Companl, Toledo, O., has purchased land at Main and St. Paul streets for the construction of a three-story building to be used as a salesroom for the Buffalo branch of that company.

Automobile Incorporations

San Antonio, Tex.—Guarantee Motor Car Company; capital, $10,000; to engage in the automobile business. Incorporators: J. F. Hagan, H. J. Smith, C. W. Voss.

GARAGES AND ACCESSORIES

Baldwin, L. I., N. Y.—Acme Automobile Rental Company; capital, $5,000; to carry on a renting business. Incorporators: George Wintjen, Adam Meiselbach, Allen C. Ewing.

Buffalo, N. Y.—Buffalo-Akron Transit Company; capital, $2,000; to engage in automobile bus line, etc. Incorporators: William H. Pensyres, Gilbert Kunz, Fred Christiansen.

Cleveland, O.—Mutual Oil & Automobile Supply Company; capital, $10,000; to deal in supplies. Incorporators: M. L. Steuer and others.

Columbus, O.—Southern Taxicab Company; capital, $10,000; to engage in the taxicab business. Incorporators: James J. Keating and others.

Hempstead, N. Y.—Smith's Garage; capital, $2,000. Incorporators: Lawrence Schultz. Joseph Pensock, Ray McCombs.

Indianapolis, Ind.—Koogle Automobile Company; capital, $10,000; to conduct a repair business and also to sell tires and tops. Incorporators: I. G. Koogle, O. P. Kline, L. D. Buenting.

Macon, Ga.—Wade Garage Company; capital, $12,000; to carry on a garage business. Incorporators: Phelps Wade, Edward T. Wadley, M. E. Richardson.

New York City, N. Y.—Reliance Taxicab Company; capital, $500,000; to conduct a taxicab business. Incorporators: Nicholas F. Yeagle, Elizabeth Yeagle, Katherine Lally.

New York City, N. Y.—Fox-Hegyi Company; capital, $6,000; to paint and repair automobiles. Incorporators: Otto Hegyi, Ida Hegyi.

Toledo, O.—Walker Tire Chain Company; capital, $150,000; to manufacture a patented anti-skid automobile and truck chain. Incotporators: H. F. Rohrman, Hugh Williams, Maurice A. Carter, Charles E. Newman.

Youngstown, O.—Folberth Carbureter Company; capital, $70,000; to manufacture a carbureter. Incorporators: E. A. Hegg, J. F. Williams, Thomas L. Morgan.

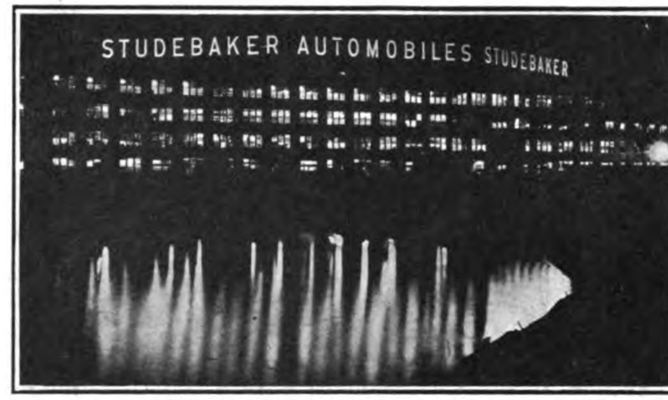
CHANGES OF CAPITAL

Dayton, O.—Nation Automobile Company changed its name to Majestic Motor Car Company.

Detroit, Mich.—Ignition Starter Company; increase of capital to $500,000.

Cleveland, O.—South End Garage Company; increase from $500,000 to $1,000,000.

Pittsburgh, Pa.—Penn Motor Car Company; increase from $5,000 to $141,950.



Detroit plant of Studebaker Company and electric sign

Stowe Elected Vice-President—George H. Stowe became a stockholder and was elected vice-president in charge of the sales at the annual meeting of the stockholders of Carl H. Page Company, New York City dealers in Chalmers cars.

Auction Sale Accessory Company—On Wednesday, September 4, 1912, at 2 o'clock p. m., at 1516 Grand avenue, Kansas City, Mo., there will be a bankrupt auction sale of the entire stock of automobile accessories of the Auto Specialty Company.

Automobile Displaces Horse—An old horse drawn stage that has been in service for nearly 50 years between New Albany and Corydon, Ind., has been displaced by an eight passenger motor car bus. The motor car is making two round trips daily.

Encouraging Michigan Writers—Michigan is laying plans to have her boys wrest literary honors from Indiana, the State Fair Association having set a premium on literary effort in the awarding of an R-C-H car to the boy who shows best in essay writing.

Charges Against Gasoline Dealers—Attorney G. A. Will, of the Automobile Club of Minneapolis, Minn., has complained to the state oil inspection department that some dealers are delivering a lower test gasoline than automobilists are paying for. Samples have been taken from supply houses to investigate the charge.

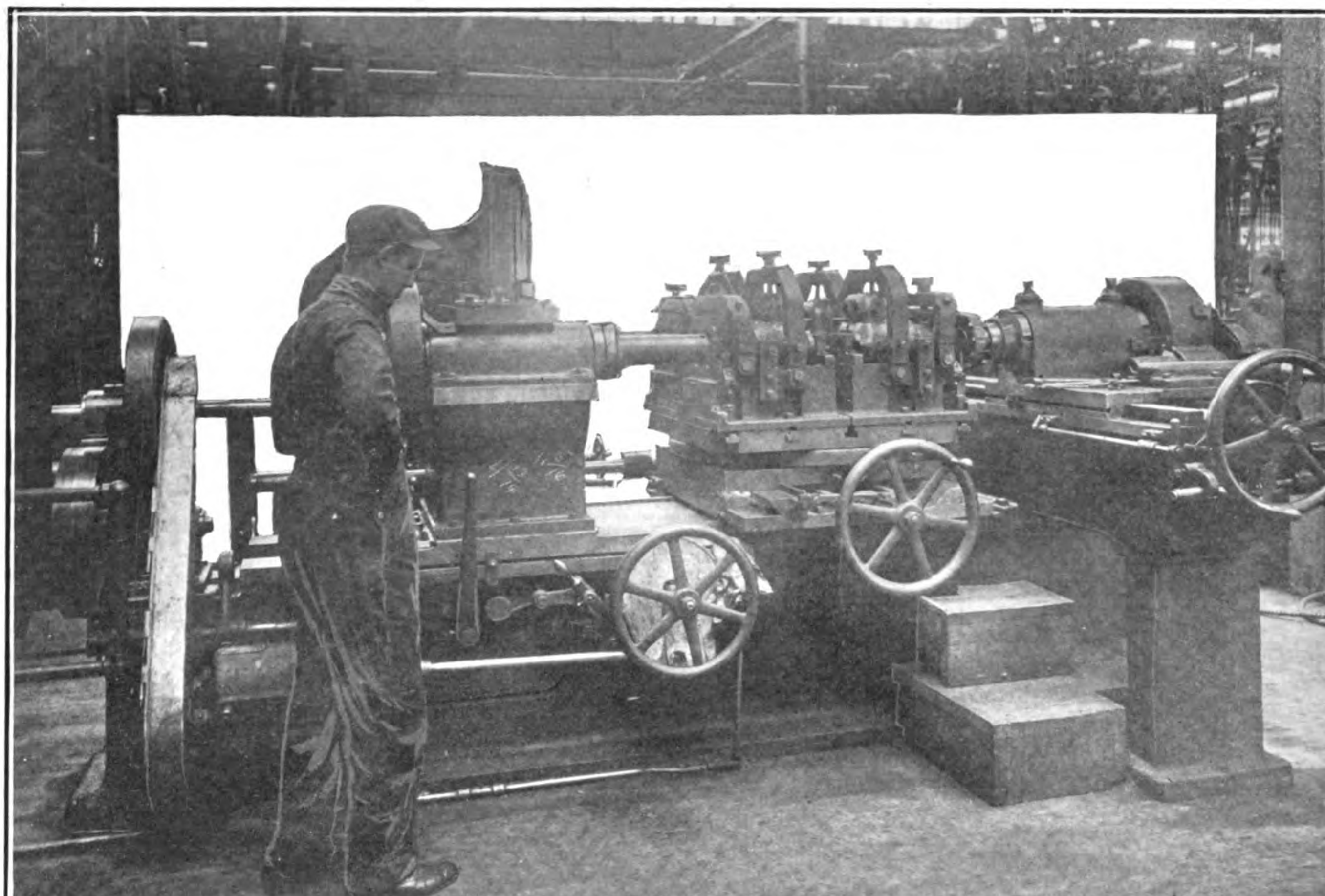
Book on Record Run—A booklet on the record run of the Wolverine-Detroit commercial car in the Wolverine Automobile Club run from Detroit, Mich., to Indianapolis, Ind., and back has just been issued. A brief account of the run is given, together with interesting illustrations depicting the rough roads encountered.

Studebaker Has Immense Sign—What is claimed to be the largest electric sign in the world has been installed by the Studebaker Corporation on its Detroit factory, which is plant No. 5 of the company's chain of works. The sign, which is illustrated herewith, contains, according to the Studebaker company, more than 2,000 electric bulbs which make it visible for a very considerable distance.

State Road Contractors Warned—C. Gordon Reel, State Superintendent of Highways of New York, has notified the Touring Club of America that state road contractors have been instructed not to leave tarred stone roadbeds unprotected by a top dressing between the close of work on Saturdays and the beginning of work on Mondays, a period during which motor traffic is generally the heaviest.

Starter Company Adds Plant—To manufacture the Disco electric lighting, starting and ignition equipment, the Ignition Starter Company, Detroit, Mich., has taken over the plant of the Gray Motor Company, giving the Ignition Starter Company 20,000 square feet of additional floorspace. The increase in the capital stock to $500,000 has been based on the increased value of assets of the company and for putting new capital into the business for further developments.

Factory Miscellany



Showing the machine used for boring out cylinders in the factory of the Lozier Motor Company, Detroit, Mich.

This is a view of the big Beaman & Smith milling and boring machine used in the factory of the Lozier Motor Company, Detroit, Mich. The complete machine which is shown in operation is capable of simultaneously finishing eight cylinders which are cast in pairs. While four of the cylinders are being bored out the other four are in the milling part of the machine. The milling part of the device is shown in the foreground, while the boring cutter is located in the rear of the machine away from the operator. As the machine is shown it is working to its capacity, that is to say, there are four of the cylinders in the miller and four in the boring part of the instrument. By mounting the cylinders on the turntable in the manner indicated they can be readily swung from the boring cutter to the miller. It requires 30 minutes to mill and bore a set of cylinders while the size to which they are bored is regulated entirely by the diameter of the cutter which can be changed at will.

TIMKEN'S Factory Nearly Completed—The new four story addition to the Timken-Detroit axle plant is rapidly approaching completion. It is 150 feet long and 75 feet wide. The shipping department will occupy the ground floor, while the other three will be devoted to manufacturing purposes.

Luverne's Six-Cylinder Car—The Luverne Automobile Company, Luverne, Minn., announces the addition to its line of a 50-horsepower, 6-cylinder Luverne touring car.

Moves to New Bedford—The William A. Carroll Company, of Merrimac, Mass., which manufactures carriages, automobile bodies and other vehicles, is to move shortly to New Bedford, Mass., where a new factory has been built for the company.

Timken Adds Modern Shop—The Timken Roller Bearing Company is adding to its Canton, O., plant the most modern grinding shop in the world. Dimensions of the newcomer to the factory group are 64 by 240 feet. The building will be ready for occupancy November 1.

Mutilate California Road Signs—The Automobile Club of Southern California is giving serious attention to discouraging the practice of shooting up or otherwise multilating the road signs which have been found so convenient to tourists and which have been erected at much expense.

Put on Night-Shifts—The American-La France Fire Engine Company, Elmira, N. Y., has been forced to put on night-shifts to care for the business that is being received from every section of the United States. Since July 1 four complete motor-propelled fire-fighting trucks have been shipped from the local factory every week and at least one new order for a fire truck is being received daily.

Kalamazoo's Axle Company Remains—The automobile axle department of the Lee & Porter Manufacturing Company will remain in Buchanan, Mich. The deal by which this department was to have been taken over by a Kalamazoo company and removed to Kalamazoo has fallen through. The Lee & Porter company is considering the manufacture of automobile bodies as an addition to its present product.

Firestone's Office Building—The contract for the erection of a one-story office building for the Firestone Tire & Rubber Company, Akron, Ohio, has been awarded to Morrison & Errickson, of Akron.

Jones Speedometer Adds Factory—The Jones Speedometer, New Rochelle, N. Y., has facilitated its shipments by adding a factory, much larger than its plant at New Rochelle, at Bush Terminal, Brooklyn, N. Y.

Takes Big Contract—The Columbus Buggy Company, of Columbus, Ohio, has entered into a contract with Tyler Bros., of Boston, Mass., to furnish that concern with 100 Columbus-electric cars for distribution in New England.

Hess-Bright Moves Office—The Hess-Bright Manufacturing Company, Philadelphia, Pa., moved its office July 5 from Twenty-first street and Fairmount avenue, Philadelphia, to its new factory at Front street and Erie avenue, of that city.

Newspaper Men Visit Factories—Newspaper men have been flocking to Detroit, Mich., during the past few weeks on a tour of inspection of her automobile factories. Up to the middle of August scores of reporters, automobile department editors, advertising representatives and even newspaper proprietors had called at the several factories.

Michigan Buggy Enlarges Factory.—The Michigan Buggy Company, Kalamazoo, Mich., has found it necessary to enlarge its factory and ground has been broken for a 50,000-foot addition. This annex will directly adjoin the main factory building on the north side. The basement of the new building will be an addition to the service department of the company, which is said to be conducted on a modern and efficiency basis.

Ford's Walkerville Factory Addition—The Ford Motor Company, of Canada, has let contracts for an addition to the plant at Walkerville, the new addition being 75 by 505 feet. It will be four stories high, of concrete, and will be an extension of the present building. The total floor area will be about 300,000 square feet. It is the intention of the company, next year, to build all its parts in Canada. In subsequent seasons, however, they will have a strictly made-in-Canada car.

Tent Used by Henderson—Having started shipments for 1913 cars, and being crowded for room to manufacture its cars, the Henderson Motor Car Company, Indianapolis, Ind., has erected a huge tent in the factory yard to facilitate matters. The big white top has a diameter of 80 feet. Until the new addition to the factory is ready for occupancy, September 15, the overflow from the first assembly will be housed under the canvas. The tent, which was raised recently, has a capacity of over 30 cars. and will relieve much of the congestion in the factory.

Haynes Installs Fire Protection—A complete fire-protection system has been installed in the Kokomo, Ind., factory of the Haynes Automobile Company. It consists of an extensive sprinkler net extending throughout the plant, the water being supplied from a 75-foot water tower which contains at all times 50,000 gallons of water which is fed to the sprinklers by gravity. In addition to this a large electric pump is being installed which will be capable of supplying water to a number of points in the plant. Furthermore, hydrants communicating with the municipal fire department are scattered throughout the building.

Berlin's New Rubber Factory—The property owners of Berlin, Ont., carried a by-law granting a bonus of $25,000 to the Canadian Consolidated Rubber Company, for the purchase of 15 acres on which to erect an automobile tire factory. The company, which has already extensive interests in Berlin, receives the $25,000 and a fixed assessment for ten years for that amount, after it has expended a quarter of a million dollars in buildings and equipment. The company agrees to employ 100 skilled workmen the first year, 200 the second and 500 in five years. The building operations are to commence immediately.

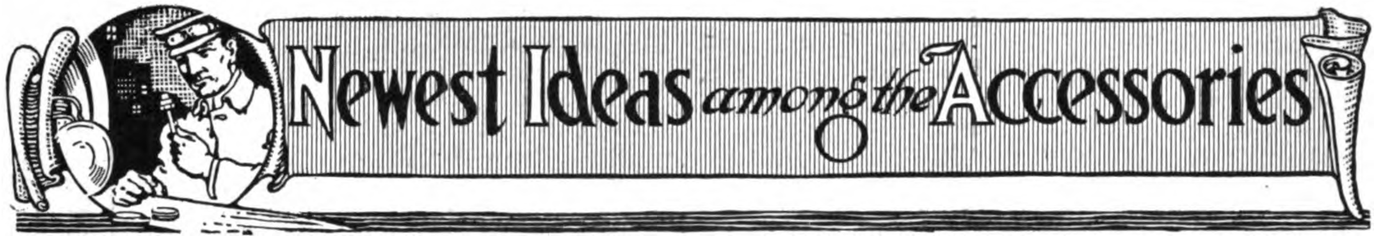
To Double Its Facilities—The Milwaukee Auto Specialty Company, Milwaukee, Wis., manufacturing Radium batteries, ignition devices, tire irons, bumpers and other motor car accessories and specialties, has started work on the erection of a new building, to occupy the entire corner of Seventh and Chestnut streets, adjoining its present works. The building will cost $25,000 equipped. The company recently purchased the former Zwietusch soda fountain factory at Seventh and Chestnut streets, including adjoining acreage, and the growth of the business has made necessary the doubling of its manufacturing facilities.

Krit Constructs Testing Track—The Krit Motor Car Company, Detroit, Mich., has installed a novel test track on a piece of vacant property adjacent to its factory on Grand Boulevard. The company believes that by constructing this track it has eliminated the chances for accident, which are not small when testers drive their cars through the streets of the city. The track has been constructed to give the cars all road conditions in their try-outs. There is a smooth, level stretch for speeding, a rough place and a section of sand, so that the tester can determine the performance of the car on each of these types of road.

Newmastic Man to Make Rims—The Newmastic Tire Company, of New York City, has increased its working capital from $150,000 to $250,000, and besides enlarging its business in the line of tire filling, it will soon take up the manufacture of an entirely novel type of demountable rim, invented by O. A. Parker, a member of the company. This new rim will supplement the virtues of the filled casing and permit of adjusting the pressure in the tire filler in proportion to the load placed thereon. The method by means of which this end will be accomplished is the use of a locking ring which compresses the bead of the casing; this locking ring engages the rim in the manner of a nut wedging on to a bolt, so that the operative width of the rim may be decreased at will of the driver.

Hyatt Jersey Plant Busy—The Newark, N. J., plant of the Hyatt Roller Bearing Company is working to its full manufacturing capacity. Bearings and all their parts, as well as a large number of the machine tools required for their making, are produced and thoroughly tested at this factory. The Jersey plant of the company comprises half a dozen buildings, in which all equipment is directly driven by electric motors having a total of 1,000 horsepower, 500 of which are made in a gas producer, while six 200-horsepower steam boilers provide the remainder of the power which is generated in steam engines which drive electric dynamos. While the executive departments of the company are located at Detroit, Mich., the Newark plant has also a complete engineering staff which attends to all requirements and needs brought up by the production and sales departments.

Timken-Detroit Axle Company's new plant, now under construction



Pitless Turntable—Rattleproof License Plate Holder—Complete Tourists' Luggage—Roller Bearing Interchangeable With Ball Types—New Tire Tool—Remy Distributer of Bakelite—Portable Steel Garage

Pitless Automobile Turntable

THE Pitless Autó Turntable Company, 1316 West Ninth street, Kansas City, Mo., manufactures a turntable, Figs. 1 and 6, which may be installed in any garage or salesroom, as it requires no pit. The turntable consists of a circular frame which is braced by six diametrical stayrods; the frame has a smoothly ground surface and serves as a running track for eight casters on which the automobile to be turned is supported. This rests directly upon two parallel runways of a strong steel, which are 15 feet wide and 3 inches above the floor, being directly carried by four ball-bearing casters or rollers each. These rollers are connected by hangers to the runways and one of the rollers is equipped with a foot-brake shoe which, when applied to the periphery of the roller, holds it securely in position on the circular track. Another ball bearing, which is of the thrust type, supports the central portion of the turntable, where the stayrods intersect and are strengthened by a king bolt. Thus the track is the only portion resting directly upon the floor. The manufacturer supplies the turntable in any one of four sizes, which are designed for the operation of automobiles having wheelbases up to 90, 116, 124 and 145 inches. The tread range of the first type is from 46 to 56 inches and of the others from 50 to 60 inches, the runways being sufficiently wide to permit of tire changes being made on them. The turntable ranges in weight, for the various sizes, from 1000 to 1500 pounds and is shipped by the factory crated so that it may be readily installed at its destination by the owner.

Michigan Number Plate Holder

The latest type of license plate holder, made by the Michigan Sign Holder Company, 231 North Ionia avenue, Grand Rapids, Mich., is shown in Fig. 2. This license plate holder is made of strong sheet steel, 6 by 4 inches and may be attached to any portion of the radiator, bottom, top or face, by means of nuts and bolts inserted through the holes in the holder. The mechanism by means of which the license plate is held in place consists of three prongs the ends of which are bent over toward the front in U-style. Two of these prongs overlap the bottom edge of the plate, while one is in position near the middle of its top portion; the two prongs are slidable in tracks extending from bottom to top of the plate, and each may be locked in any position, independently of the other, by means of a screw. The upper, central prong is attached by a spring to the bottom portion of the holder and is also slidable in a track. In installing the plate in the holder, the two bottom prongs are positioned flush with the lower edge of the holder, the lower edge of the number plate is placed in their U-ends and the upper prong is drawn up until it snaps over the upper edge of the license plate and holds it securely in place. It is evident that the use of this holder obviates all rattling of the plate; another advantage is that the number plate may be easily and quickly exchanged without necessitating a change of the position of the plate holder or the removal of the same.

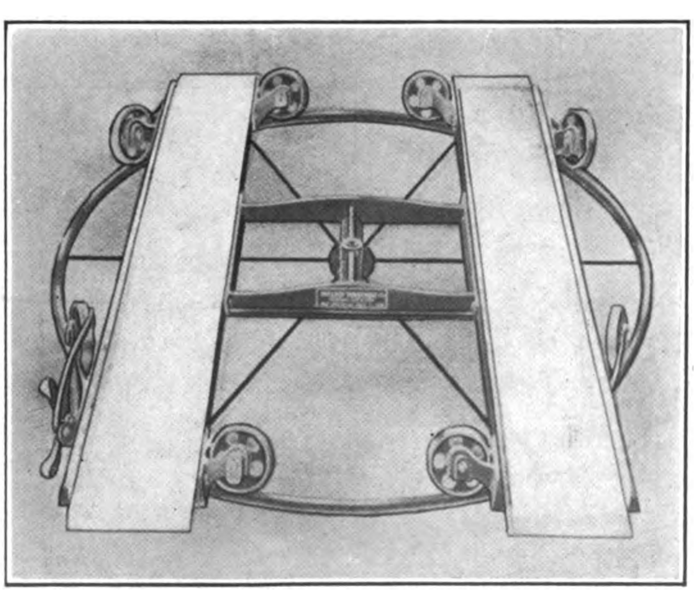


Fig. 1—Pitless automobile turntable for garages

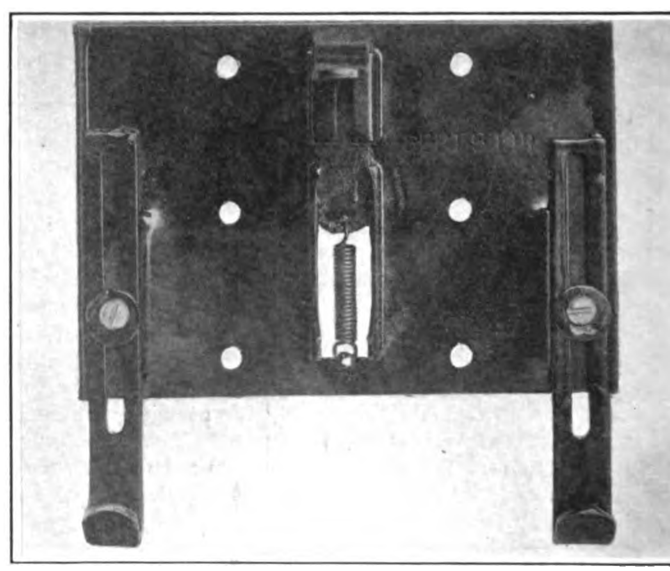


Fig. 2—Michigan automobile license plate holder

Moore-Packard Luggage Outfit

A touring luggage equipment comprising twelve pieces has been designed by C. J. Moore, of the Packard Motor Car Company, Detroit, Mich., which is specially adapted for the requirements of automobilists traveling in Packard cars. The equipment, Fig. 3, is very complete and designed to take care of whatever raiment and commodities are carried by such tourists, every piece being waterproof and having a special place on the automobile. It comprises two trunks which are carried on the trunk rack, together with a suitcase attached directly below them, two suitcases carried on the left running board, a tire trunk on the right running board, a lunch kit on the left front fender and two suitcases above it, an ice box on the right front fender and a hat box above it and two suitcases which are carried inside the tonneau and directly under the robe rail.

The trunks are fitted with trays, the suitcases with dividing boards, and the ice box with two trays, one being intended for ice and the other for eatables. Sufficient ice may be carried to last for ten hours, even in summer. Complete lunch equipment for seven persons is contained in the lunch box.

Standard Interchangeable Bearing

Interchangeability with ball bearings of the same size is the feature of the latest type of annular roller bearing made by the Standard Roller Bearing Company, Fiftieth street and Lancaster avenue, Philadelphia, Pa. The same system of numbering as in ball bearings is used in this roller type which is claimed to have twice the carrying capacity and life of a ball design of the same size. The rollers are spaced in a retainer and have grooves which are engaged by annular projections on the races, whereby side movement of the former is prevented.

Nelson Never-Sware Tire Tool

The Miller Brothers Auto Supply House, 1105 Fourteenth street N. W., Washington, D. C., sells a small and handy tire tool, the Nelson, Fig. 5. It consists of a bar of iron bent at an obtuse angle to give two levers of different lengths, the shorter one of which is again bent in a right angle. Near the obtuse angle a ratchet lever is attached to the short arm along which it may be moved and be locked in any relative position thereto. Between this ratchet lever and the right-angled end of the short lever a hook is slidably arranged on the lever. If the hook whose end is designed to rest on a spoke is in this position near the felloe, it provides a pivot around which the right-angled end of the tool may be forced against the tire bead, holding it away from the rim and permitting of removing the locking rings, while the tool may be held in position by the proper adjustment of the ratchet lever.

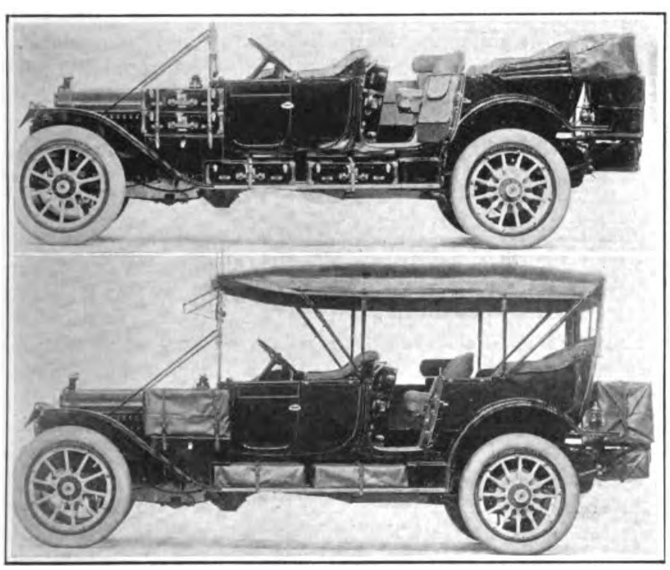


Fig. 3—Moore luggage equipment on Packard touring car

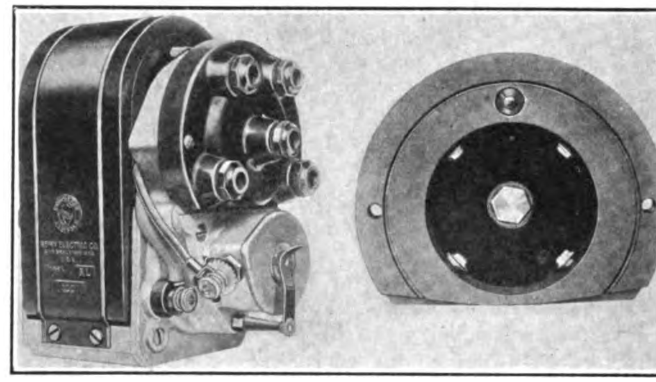


Fig. 4—Remy magneto with latest type of distributer

Remy Bakelite Distributer

Bakelite, an insulator material of recent origin, is used in the latest design of Remy magneto distributer, Fig. 4, constituting the main new feature thereof. The design of the distributer is not unlike former types but its size is larger than before, as may be seen in the view showing the distributer in place on the magneto. The principal new feature of design is the shape and location of the binding posts of the distributer. While the distributer formerly used on Remy magnetos had long posts which were vertically positioned on the top portion of the device, the latest type has short, converging addenda protruding from the front of the distributer casing.

Garry Portable Fireproof Garage

The portable fireproof garage made by the Garry Iron & Steel Company, Niles, O., may be furnished in any of three sizes, 12 by 16 feet, 14 by 18 feet or 16 by 20 feet, which weigh 1400, 1570 and 1825 pounds, respectively. The frame is of pressed-steel beams which are easily assembled and between which the wall sections of corrugated galvanized steel are installed. A gable roof covers the structure which has two double entrance doors, each of which is 4 feet wide and 8 feet high, and is provided with a padlock hasp. Each building has three fireproof windows.

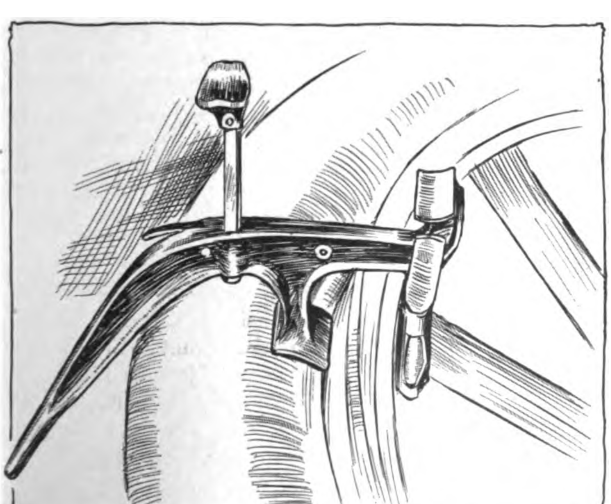


Fig. 5—Nelson Never-Sware tire tool

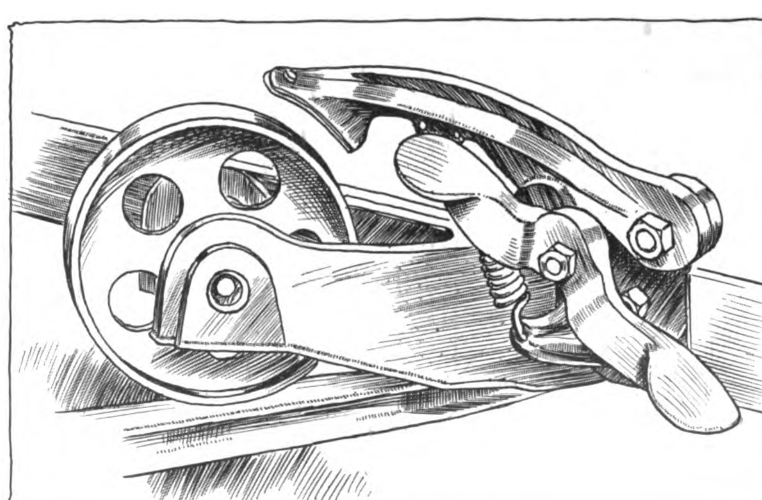


Fig. 6—Ball-bearing roller and brake shoe of Pitless turntable

AUTOMOBILE Lamp and Dimmer—Comprising two semicircular plates attached to the burner for dimming the light.

This patent refers to the construction shown in Fig. 1 in which a dimmer is illustrated, comprising two substantially semicircular plates which overlap each other. These plates are supported by vertical shafts held in bearings of clamps which are secured to the burner. The clamping members carry means for rocking the shafts and thereby altering the relation of the dimming plates to the burner.

No. 1,034,536—to Francis H. Tobias, New York City. Granted August 6, 1912; filed October 23, 1911.

Spark-Plug Construction—Containing two electrodes in an insulator core, which are both connected to the original source of current.

This patent relates to a spark-plug as the one in Fig. 2, which consists of a core C of insulating material which in one place is shaped with an annular-expanding flange F. Above this flange a metal ring R and a bushing B surround the casing, the bushing being threaded externally. These threads engage the internal ones on the shell ring Q, which also has an external thread to fit into the motor cylinder head. Two electrodes E and E1 pass through the insulator core and their lower ends are bent to form a spark-gap, while their upper ends are equipped as terminals adapted for connection with current sources. A V-shaped recess S is formed above the spark-gap.

No. 1,034,835—to Lewis T. Rhoades, Mont Clare, Pa. Granted August 6, 1912; filed March 15, 1911.

Internal-Combustion Motor Starter—In which fuel is injected into the cylinder whose piston is arrested at a point of the power stroke.

The subject matter of this patent is a starter having a fuel supply receptacle and a communicating passageway leading to the cylinders of the explosive engine. Means are provided for arresting each of the engine pistons at a certain point of its power stroke. These means consist of a movable member connected with the engine crankshaft, which is in engagement with a stationary member yieldingly supported. By throwing movable and stationary members out of engagement and simultaneously injecting a portion of the fuel from the receptacle into the cylinder in which the piston is arrested, the engine is started.

No. 1,031,908—to James A. Brown and Carl G. Bosch, Cedar Rapids, Ia. Granted July 9, 1912; filed May 18, 1911.

Spring Shock-Absorber—Consisting of two curved springs, which are designed to check the recoil of the elliptical ones.

In Fig. 3 the subject matter of this patent is illustrated. The shock-absorber, which acts in conjunction with a semi-elliptic spring S and a C-shaped spring member S1 connected by a swing link L, consists of a spring S2 which has a compound curve and is attached at its middle portion to the spring S, and with its end portions to those of the latter. Another curved spring S3 has one end secured to the body of the car.

No. 1,034,231—to Philip Edward Haugh, Millvale, Pa. Granted July 30, 1912; filed February 16, 1912.

Spring Wheel for Automobiles—Consisting of spring-pressed plungers serving as spokes and a spring rim.

The idea of this patent is seen in Fig. 4. The wheel consists of an outer, or felloe, portion F and an inner portion I which are spaced from each other. In the felloe portion there are longitudinal tubes T, the side walls of which are partly cut away so as to form guideways in which a pivot pin P is adapted to travel. The tube contains springs S tending to hold the pivot pin in a central position by bearing against blocks which in turn bear against the pin P. Each pivot pin is in engagement with a driving plunger or spoke P1 which is slidably disposed in a guideway in the inner portion I of the wheel and is pressed outwardly by the spring S1.

No. 1,034,475—to Marius Mathiesen, San Antonio, Tex. Granted August 6, 1912; filed March 19, 1912.

Engine Primer—Consisting of a pump and suitable pipes and nozzles for injecting gasoline in spray form into the cylinders.

The priming attachment described in this patent consists of an elongated equalizing chamber which is adapted to contain gasoline under pressure and communicates with a distributer pipe. In communication with the distributing pipe are tubular members each of which contains a check valve and ends in a spray nozzle, one of them being arranged in the head of each cylinder and one in the intake manifold. The gasoline is drawn from the lead connecting the fuel tank and carbureter by means of a pump.

No. 1,030,931—to Eugene Silver, Omaha, Neb. Granted July 2, 1912; filed January 27, 1912.

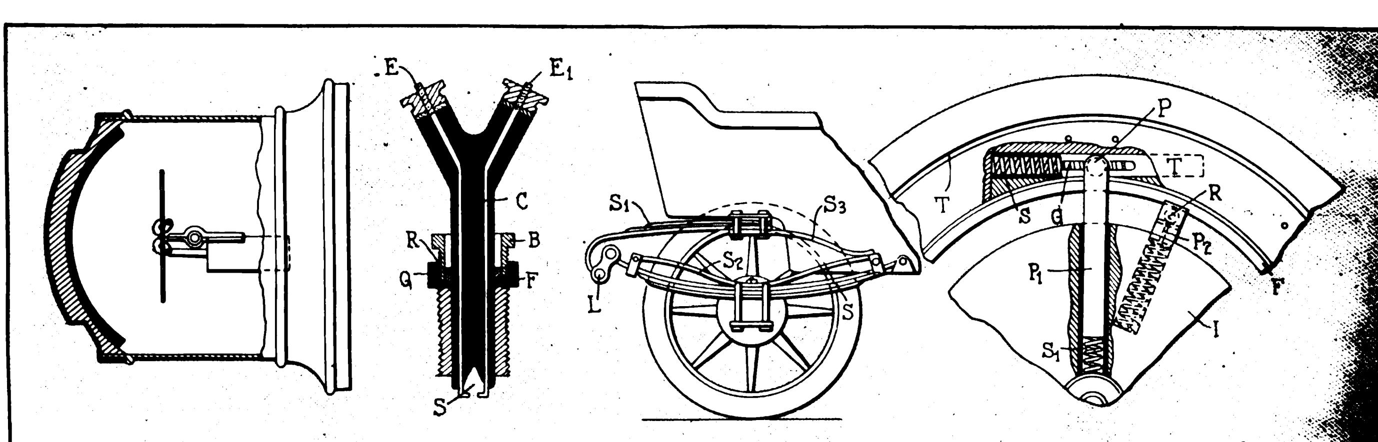


Fig. 1—Tobias lamp dimmer. Fig. 2—Rhoades Spark-plug. Fig. 3—Haugh shock-absorber. Fig. 4—Mathiesen spring wheel

VOL. XXVII NEW YORK—THURSDAY, SEPTEMBER 5, 1912—CHICAGO No. 10

The AUTOMOBILE

Mercedes Lowers Records at Elgin

De Palma Wins Elgin and Free-For-All Races — Stutz, Mercer and Mason Winners of Their Respective Events

Mercedes, No. 4, driven by Ralph De Palma, winning Elgin and free-for-all race, August 31, on Elgin course; races run simultaneously. His average for the Elgin race was 68.4 miles an hour and in the free-for-all 76 miles an hour, distances 254 and 305 miles

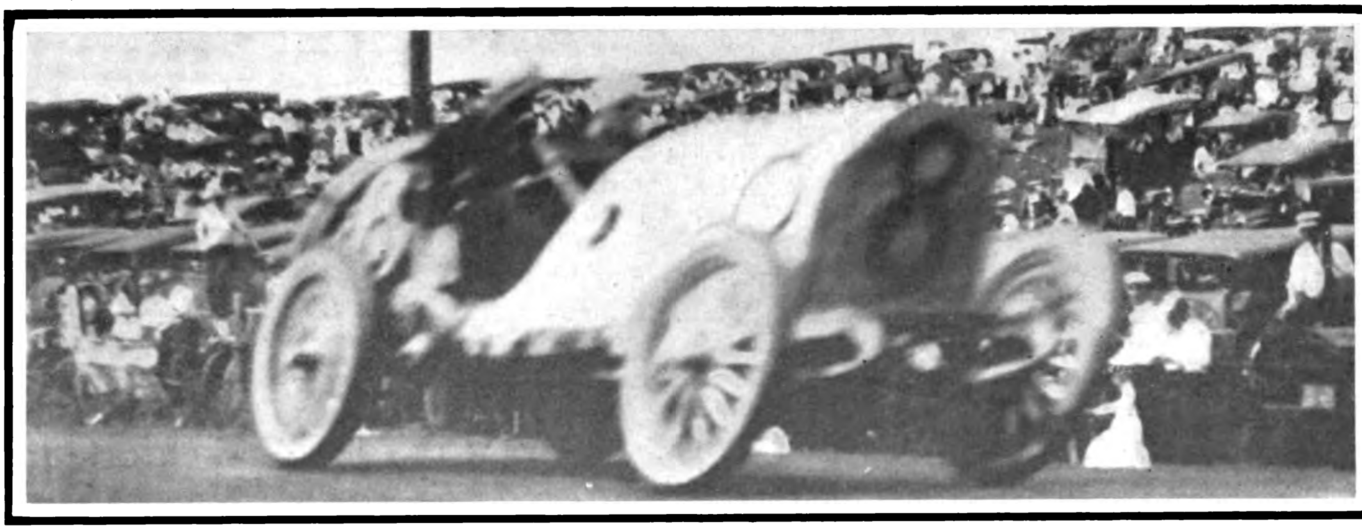
ELGIN, ILL., Sept. 3—Ralph De Palma won the Elgin National trophy race and the free-for-all race at Elgin, on Saturday, August 31. Ralph Mulford was second in the former event and Erwin Bergdoll was second in the free-for-all. On Friday Hugh Hughes was an easy victor in the Aurora trophy race, with Pullen second. The Jencks trophy race went to Endicott, while Charles Merz won the Illinois trophy event, with Anderson second.

De Palma, driving a Mercedes, for the first time in his racing career won, overcoming the ill-luck which has overtaken him on all previous occasions. His speed for the 254 miles and 1,050 feet of the Elgin National race was 68.4 miles an hour, while for the free-for-all race, which was run simultaneously with it, he averaged 68.9 an hour for 305 miles and 204 feet. His fastest lap, the last lap of the longer race,

Bergdoll, prominent driver in the Elgin free-for-all contest

SUMMARIES OF THE ELGIN RACES

FREE-FOR-ALL		
Distance, 305 miles and 204 feet		
1—De Palma	Mercedes	68.9 m.p.h.
2—Bergdoll	Benz	67.5 m.p.h.
3—Mulford	Knox	66.6 m.p.h.
ELGIN RACE		
1—De Palma	Mercedes	68.4 m.p.h.
2—Mulford	Knox	67.3 m.p.h.
3—Merz	Stutz	64.2 m.p.h.
4—Roberts	Mason	63.8 m.p.h.
5—Anderson	Stutz	63.3 m.p.h.
ILLINOIS TROPHY		
1—Merz	Stutz	66.11 m.p.h.
2—Anderson	Stutz	65.6 m.p.h.
AURORA TROPHY RACE		
1—Hughes	Mercer	65.0 m.p.h.
2—Pullen	Mercer	62.3 m.p.h.
3—Trussell	Falcar	54.0 m.p.h.
JENCKS TROPHY RACE		
1—Endicott	Mason	60.57 m.p.h.



Bergdoll's big Benz traveling at over 67 miles an hour in the free-for-all. He led throughout the greater part of this race

was made at a speed of 74.6 miles an hour. The lap distance is 8 miles, 2,499 feet, and his time for the lap was 6:49. Bergdoll, in a Benz, was entered only in the free-for-all race, and in coming in second averaged 67.5 miles an hour for the thirty-six laps. Mulford, in a Knox, averaged 66.6 miles an hour.

Saturday's races were easily the most sensational yet seen at Elgin, and the winners were always in doubt up to the last minute. Tire trouble deprived Bergdoll of the longer race when it seemed as though he would be the sure winner. No serious accidents took place, although Mulford was overcome by the heat and Clark, driving a Mercedes, and his mechanician, were pitched over a fence, while several others ran into the straw-banked turns.

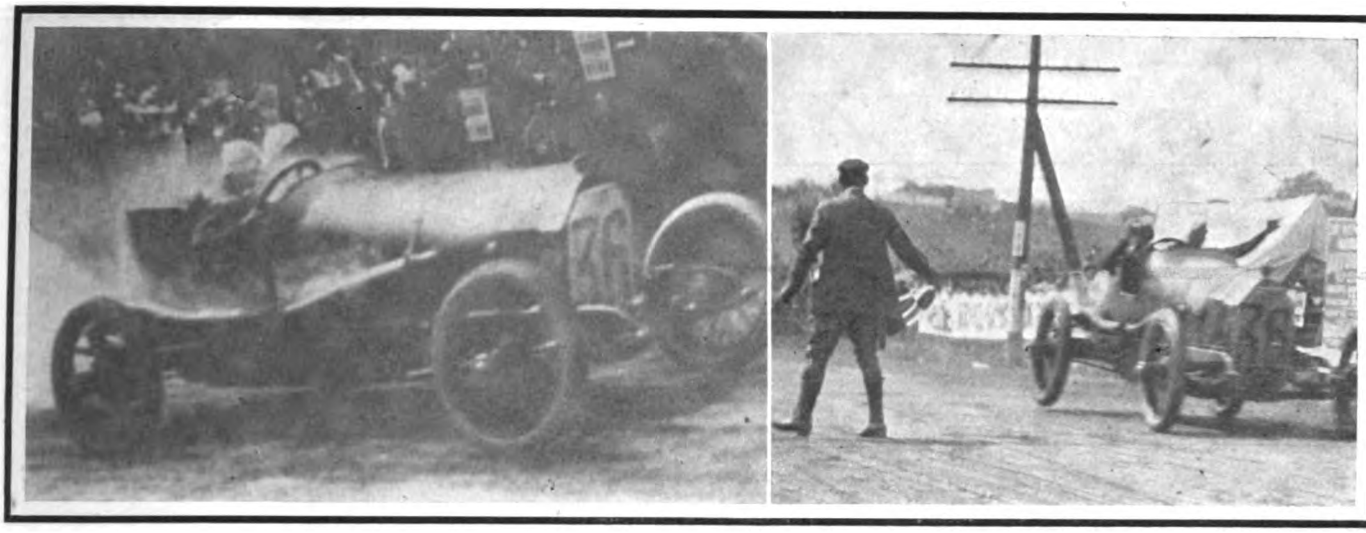
The crowd was a record one, and completely filled all available space. Officials of the meet estimated the attendance at 60,000. Weather conditions were ideal for both days, and perhaps had something to do with the time made by the leaders. On Friday the time was slow in the various events, but Saturday's figures made up for this. De Palma succeeded in his last lap in making the remarkable speed of 74.6 miles an hour, establishing a new record for the Elgin course.

Friday's races were less exciting than those of the following day. Hughes, driving a Mercer, in winning the Aurora trophy race, had things all his own way, and was never headed during the entire run. The Mason Special, driven by Endicott, was also an easy winner, the only other two contendants for this event being a Ford, driven by Henning, and a Herreshoff, driven by Wordingham, both of which cars were out of the race long before the finish, due to accidents. The Illinois trophy race, won by Merz in a Stutz, had four contenders at the start, while

FREE-FOR-ALL RACE RUN AT ELGIN ON

No.	Car—Driver	Lap Miles	1 8	2 16	3 25	4 33	5 42	6 50	7 59	8 67	9 76	10 84	11 93	12 101	13 110	14 118	15 127	16 135
4	**MERCEDES**	Elapsed Time		14:17	21:35	28:45	36:01	43:23	50:41	59:14	66:21	73:32	80:39	87:47	94:55	102:17	110:12	117:33
	DePalma	Lap Time	7:08	7:09	7:18	7:10	7:14	7:22	7:18	8:33	7:07	7:11	7:07	7:08	7:08	7:22	7:55	7:21
8	**BENZ**	Elapsed Time		14:04	20:55	27:59	34:57	41:58	49:00	55:58	63:00	70:10	77:11	84:13	91:06	98:11	105:22	112:28
	E. Bergdoll	Lap Time	7:09	6:55	6:51	7:04	6:58	7:01	7:02	6:58	7:32	7:10	7:01	7:02	6:53	7:05	7:11	7:02
1	**KNOX SIX**	Elapsed Time		14:21	21:28	28:53	36:08	43:22	50:41	59:43	66:55	73:55	80:58	87:56	95:00	102:08	112:59	120:14
	Mulford & Chandler	Lap Time	7:15	7:06	7:07	7:25	7:15	7:14	7:19	9:02	7:12	7:00	7:03	6:58	7:04	7:08	10:51	7:15
5	**FIAT 70**	Elapsed Time		15:38	23:41	31:32	39:07	46:45	54:11	61:27	68:39	75:50	83:07	90:28	97:37	116:36	124:05	131:32
	E. Hearne & G. Hill	Lap Time	7:52	7:46	8:03	7:51	7:35	7:38	7:26	7:16	7:12	7:11	7:17	7:27	7:09	18:59	7:29	7:27
15	**MERCER 35**	Elapsed Time		14:55	22:13	29:29	39:38	47:13	54:32	61:52	69:19	76:41	84:06	91:27	98:47	107:55	115:23	122:48
	H. Hughes	Lap Time	7:36	7:19	7:18	7:16	10:09	7:35	7:19	7:20	7:27	7:22	7:25	7:21	7:20	9:08	7:28	7:25
2	**MERCEDES**	Elapsed Time		16:48	24:16	31:37	38:59											
	C. Clark	Lap Time	9:25	7:23	7:38	7:21	7:22	Out—Ran into fence—smashed both rear wheels.										
9	**FIAT**	Elapsed Time																
	Bruce-Brown	Lap Time	Car did not arrive in time for race.															
11	**NATIONAL 40**	Elapsed Time																
	N. Whalen	Lap Time	Magneto coupling damaged day previous.															

Ralph Mulford letting up on his Knox Six for a few seconds in the free-for-all. Later in this race he was overcome by the heat



Winning Mercer with Hughes at the wheel swinging around a turn and car being flagged at the finish of the Aurora Trophy

only one other car, another Stutz, with Anderson at the wheel, finished. Damage to their machines prevented the other two entrants from becoming serious rivals of the Stutz cars, and the race developed into merely a Stutz family quarrel.

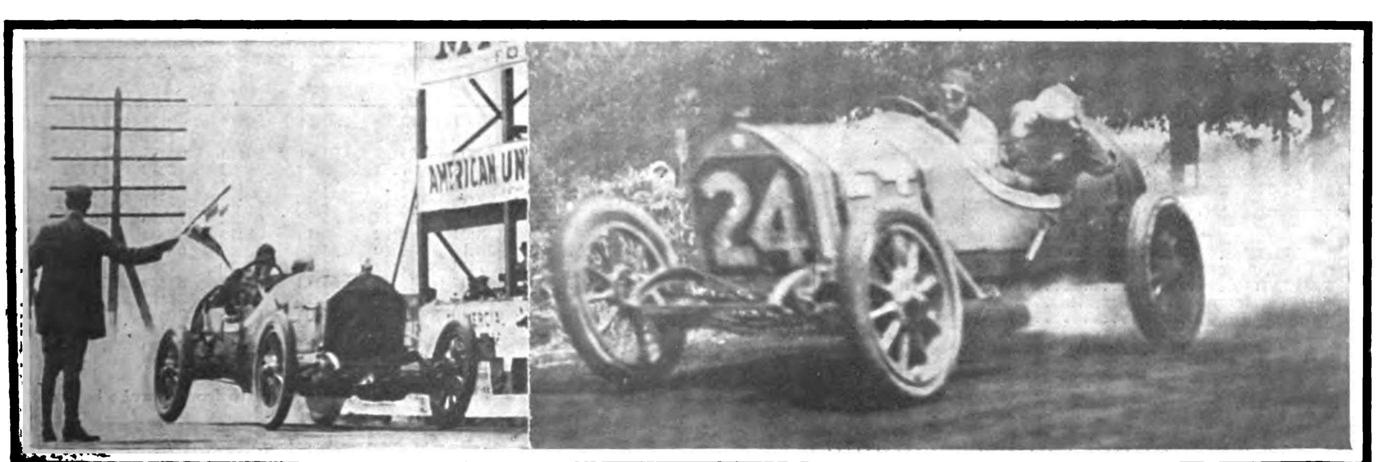
One feature of the Elgin races this year was the remarkable freedom from accidents and the entire absence of fatalities to either contestants or spectators. Each driver and mechanician was examined by the surgeons of the Elgin National road races, who reported that all were physically fit to take part in the races. These physicians stated they were unable to find any of the contestants suffering from diseases which would in any way tend to cause sudden illness during any race, and a carefully made table showing the age and rate and character of pulse of each man was submitted to the referee. This is practically the only racing association which adheres strictly to such a rule.

Saturday's Features

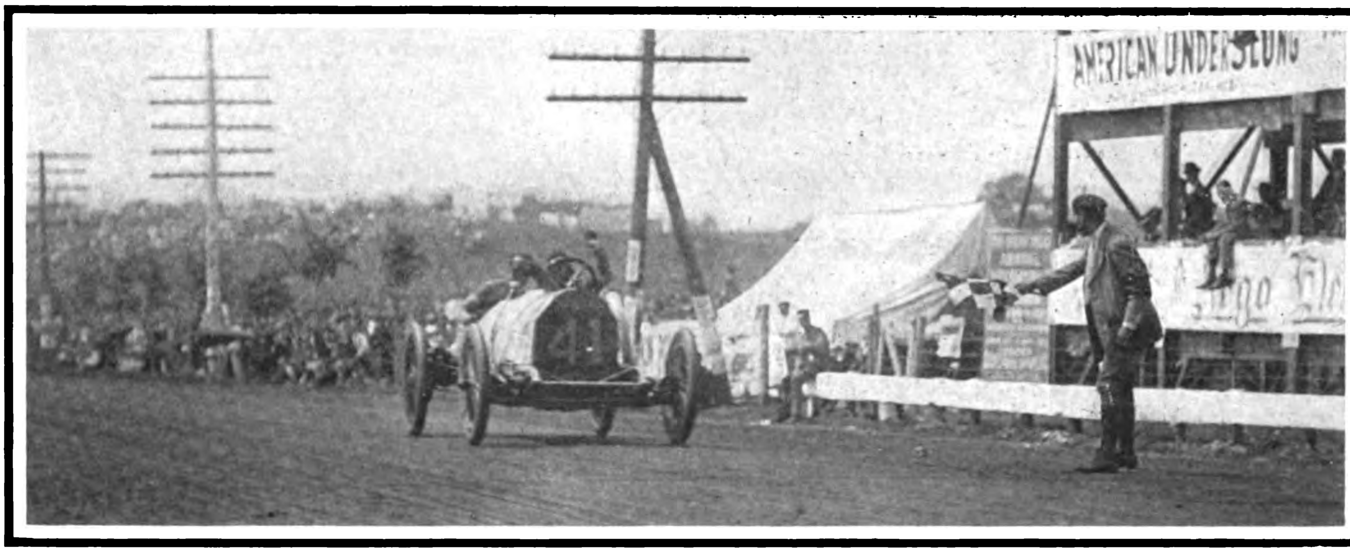
THE feature races of the Elgin meet were those run on Saturday, which were for the Elgin National Watch Company trophy and the free-for-all. They were the most sensational ever seen by the Elgin racegoers. While there were fifteen entries, only ten cars lined up for the long grind of 254 miles in the Elgin National race, and 305 miles in the free-for-all, which event was only added this year. The two races were run simultaneously, several of the cars competing in both, the Benz entry, which was driven by Bergdoll, Philadelphia's millionaire racing driver, not being eligible in the Elgin National race for the reason that its piston displacement was over 600 cubic inches

SATURDAY, AUGUST 31; 305 MILE

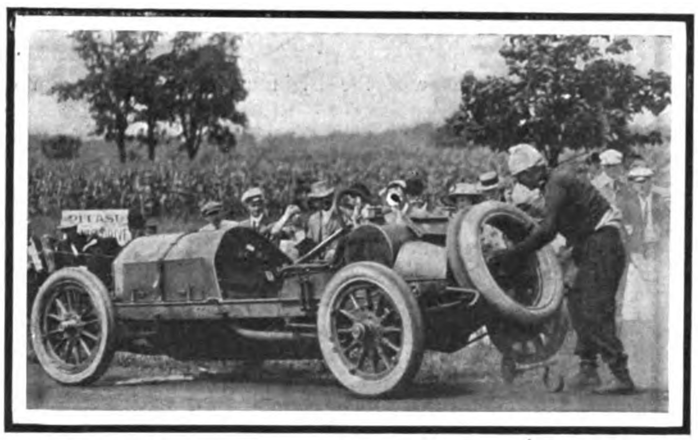
17 144	18 152	19 160	20 169	21 177	22 186	23 194	24 203	25 211	26 220	27 228	28 237	29 245	30 254	31 262	32 271	33 279	34 288	35 296	36 305	Miles per Hr.
124:37	131:34	138:31	145:32	152:36	159:37	166:43	174:01	183:46	190:59	198:38	207:33	214:57	223:20	230:23	237:39	244:53	251:51	258:47	265:36.25	68.9
7:04	6:57	6:57	7:01	7:04	7:01	7:06	7:18	9:45	7:13	7:39	8:55	7:24	8:23	7:03	7:16	7:14	6:58	6:56	6:49	
119:36	126:49	133:54	144:14	151:19	158:45	168:40	176:00	183:14	190:22	197:32	204:44	211:52	219:04	226:25	233:45	243:19	250:57	259:26	270:28.28	67.5
7:08	7:13	7:05	10:20	7:05	7:26	9:55	7:20	7:14	7:08	7:10	7:12	7:08	7:12	7:21	7:20	9:34	7:38	8:29	11:02	
127:19	134:28	143:32	150:32	157:29	164:28	171:31	178:39	185:46	192:56	200:03	206:57	217:30	226:09	233:28	241:01	249:29	258:22	266:14	274:08.72	66.6
7:05	7:09	9:04	7:00	6:57	6:59	7:03	7:08	7:07	7:10	7:07	6:54	10:33	8:39	7:19	7:33	8:28	8:53	7:52	7:54	
139:10	146:49	154:36	162:23	169:59	177:47	185:24	193:08	200:48	212:27											
7:38	7:39	7:47	7:47	7:36	7:48	7:37	7:44	7:40	7:39	Out—Transmission trouble										
131:39																				
8:51	Out—Burned out crankshaft bearing.																			



Stutz 24 with Merz driving, receiving the winning flag and at the right making its victorious dash in one of the late laps



Mason Special, H. Endicott driving, as it came up to the line all alone at the finish of the Jencks Trophy race, its competitors having withdrawn



Mercer 35, Wishart driver, repairing two blown-out tires

which was the maximum permitted entrants in that contest.

It was a representative gathering of famous racing drivers that lined up before the immense crowd in the grand stand, awaiting Starter Wagner's tap on the shoulder, which was the signal to begin the long run. Ralph De Palma, who has had perhaps the greatest amount of ill-luck during his career in the speed game, was at the wheel of the big Mercedes, entry No. 4. Ralph Mulford, last year's Vanderbilt cup winner, was in control of the Knox Six and was given a rousing cheer when his car was pushed into position at the tape. Eddie Hearne, in the 70-horsepower Fiat, lined up in the fifth position, and looked rather diminutive behind the immense red hood of entry No. 5. Erwin Bergdoll, in the big Benz, was the eighth to line up. Behind him was Charlie Merz, in his Stutz winner of the day before. Hughie Hughes, winner of last year's Elgin Kane Count event. and Friday's Aurora trophy race, was the last to get into position.

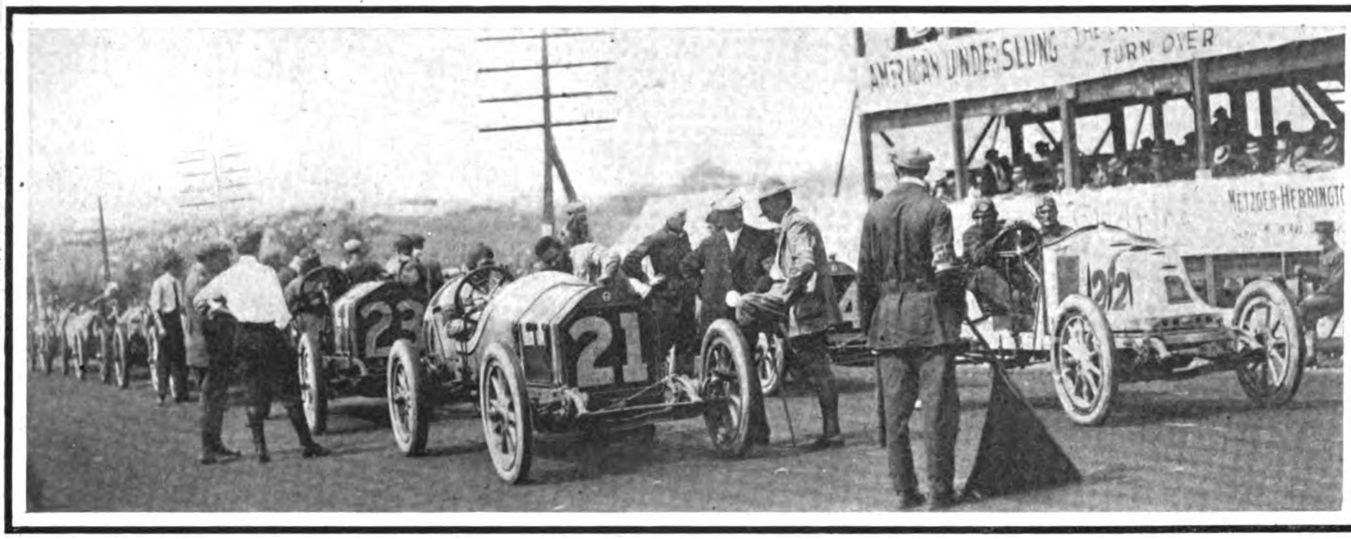
It was easily seen that the crowd liked Mulford. After a delay of 15 minutes, while the pit men tinkered with De Palma's Mercedes' stubborn clutch, Mulford was sent off at 11:15 amid a cloud of smoke. The familiar sight to old followers of the races of two men cranking the big Knox was repeated before the enthusiastic crowd. Mulford's mechanician was at the crank, while he was aided in his efforts by a pit man, who pulled on a long leather strap. The big motor took up its work and Mulford was away down the stretch.

AURORA TROPHY RACE OF 152 MILES,

No.	Car—Driver	Miles / Feet	1 / 8 / 2499	2 / 16 / 4998	3 / 25 / 2217	4 / 33 / 4716	5 / 42 / 1935	6 / 50 / 4434	7 / 59 / 1653	8 / 67 / 4152
36	**MERCER**	E.Time.	7:52	15:26	22:53	30:32	38:33	46:20	54:22	62:17
	H. Hughes	L.Time.	7:52	7:34	7:27	7:39	8:01	7:47	8:02	7:55
31	**MERCER**	E.Time.	8:21	16:15	24:11	32:07	40:05	48:01	56:06	64:30
	N. Pullen	L.Time.	8:21	7:54	7:56	7:56	7:58	7:56	8:05	8:24
33	**FALCAR**	E.Time.	9:28	22:57	32:05	41:13	50:44	60:04	69:07	78:17
	H. Trussel	L.Time.	9:28	13:29	9:08	9:08	9:31	9:20	9:03	9:10
34	**MASON**	E.Time.	8:36	23:10	31:18	39:26	47:41	55:56	64:41	72:40
	M. Roberts	L.Time.	8:36	14:34	8:08	8:08	8:15	8:15	8:45	7:59
32	**FALCAR**	E.Time.	10:15	20:30	30:48	40:36	50:47	60:57	70:55	83:16
	H. Hastings	L.Time.	10:15	10:15	10:18	9:48	10:11	10:10	9:58	12:21
35	**MERCER**	E.Time.	8:04	15:45	23:30	42:01	49:40	57:23	65:07	76:46
	S. Wishart	L.Time.	8:04	7:41	7:45	18:31	7:39	7:43	7:44	7:39

RACE OF 254 MILES (30 LAPS OF THE COURSE) FOR THE ELGIN

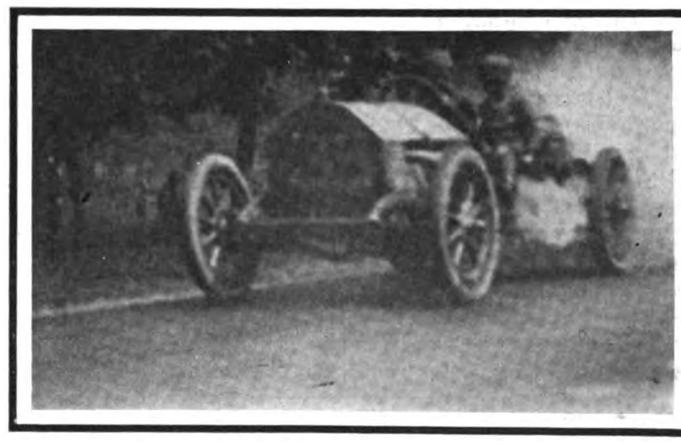
No.	Car—Driver	Lap / Miles	1 / 8	2 / 16	3 / 25	4 / 33	5 / 42	6 / 50	7 / 59	8 / 67	9 / 76	10 / 84	11 / 93	12 / 101
4	**MERCEDES**	Elapsed Time		14:17	21:35	28:45	36:01	43:23	50:41	59:14	60:21	73:32	80:39	87:47
	De Palma	Lap Time	7:08	7:09	7:18	7:15	7:16	7:22	7:18	8:33	7:17	7:11	7:07	7:08
1	**KNOX SIX**	Elapsed Time		14:21	21:28	28:53	36:08	43:22	50:41	59:43	66:55	73:55	80:58	87:56
	R. Mulford	Lap Time	7:15	7:06	7:07	7:25	7:15	7:14	7:19	9:02	7:12	7:00	7:03	6:58
12	**STUTZ**	Elapsed Time		15:29	23:03	30:38	38:12	45:50	53:29	61:11	68:48	76:27	84:05	91:42
	C. Merz	Lap Time	7:51	7:38	7:34	7:35	7:34	7:38	7:39	7:42	7:37	7:39	7:38	7:37
3	**MASON SPL**	Elapsed Time		15:52	23:45	31:41	39:42	47:54	56:09	64:22	72:26	80:28	88:21	96:18
	M. Roberts	Lap Time	8:03	7:49	7:53	7:56	8:01	8:12	8:15	8:13	8:04	8:02	7:53	7:57
7	**STUTZ**	Elapsed Time		15:29	23:01	30:43	38:16	45:50	53:19	60:49	68:23	75:54	83:26	90:56
	G. Anderson	Lap Time	7:51	7:38	7:32	7:42	7:33	7:34	7:29	7:30	7:34	7:31	7:32	7:31
5	**FIAT 70**	Elapsed Time		15:38	23:41	31:32	39:07	46:47	54:14	61:27	63:39	75:50	83:07	90:28
	E. Hearne and G. Dix	Lap Time	7:52	7:46	8:03	7:51	7:35	7:38	7:26	7:16	7:12	7:11	7:17	7:21
14	**MERCER 35**	Elapsed Time		16:05	24:03	31:54	39:40	47:25	55:03	62:35	70:10	77:43	85:19	92:59
	S. Wishart	Lap Time	8:07	7:58	7:58	7:51	7:46	7:45	7:38	7:32	7:35	7:33	7:36	7:40
15	**MERCER 35**	Elapsed Time		14:55	22:13	29:29	39:38	7:10	54:32	61:52	69:19	76:41	84:06	91:27
	H. Hughes	Lap Time	7:30	7:19	7:18	7:16	10:09	7:05	7:19	7:20	7:27	7:22	7:25	7:21
2	**MERCEDES**	Elapsed Time		16:48	24:16	31:37	38:59							
	G. Clark	Lap Time	9:25	7:23	7:28	7:21	6:52	Car skidded—ran into fence—broke both rear wheels.						
6	**FALCAR**	Elapsed Time												
	H. Hastings	Lap Time	Car not in racing condition.											
10	**FALCAR**	Elapsed Time												
	G. Trussel	Lap Time	Car not in racing condition.											
11	**NATIONAL 40**	Elapsed Time												
	N. Whalen	Lap Time	Magneto drive damaged on Friday, putting car out of race.											



Line-up of the contestants in the Illinois and Jencks Trophy races—the eventual winner of the longer race—Stutz 24 is in the middle ground

Next came Clark in Mercedes No. 2. The powerful car jumped into motion at a word from the starter and was off after Mulford. Then came the little Mason, winner of the day before in the Jencks trophy event. Following it, De Palma, in Mercedes No. 4, came to the tape. The onlookers were in sympathy with him, and more than one hoped his ill-luck of the past would not deprive him of honors this time. The little Italian determinedly shot his car down the course. Then Eddie Hearne, driving the Fiat which, according to the program, Teddy Tetzlaff was to drive, was sent off. It was doubtful if he would be able to finish the race because of his weak wrist. Following Anderson's Stutz, Bergdoll, in the Benz, received the word from Starter Wagner. After what seemed an interminable wait, Charlie Merz, in the other Stutz, was away. This left only the two yellow Mercers at the tape. Wishart was next to go, Hughie Hughes alone remaining. It was not until nearly time for Hughes to come to the line that his attendants cranked his motor, and with the good wishes of the crowd he was off after the others.

Hardly was Hughes out of sight around the Hornbeek turn when Mulford, running well, hove into sight, and had soon completed his first lap. Then came De Palma, in his Mercedes, driving like a demon, having passed Clark in the other Mercedes and Roberts in the Mason in the first lap. He was soon out of sight after Mulford. He had made the circuit in 7:08, 7 seconds faster than Mulford, putting him in first place immediately. This gave Mulford second position, while Hughie



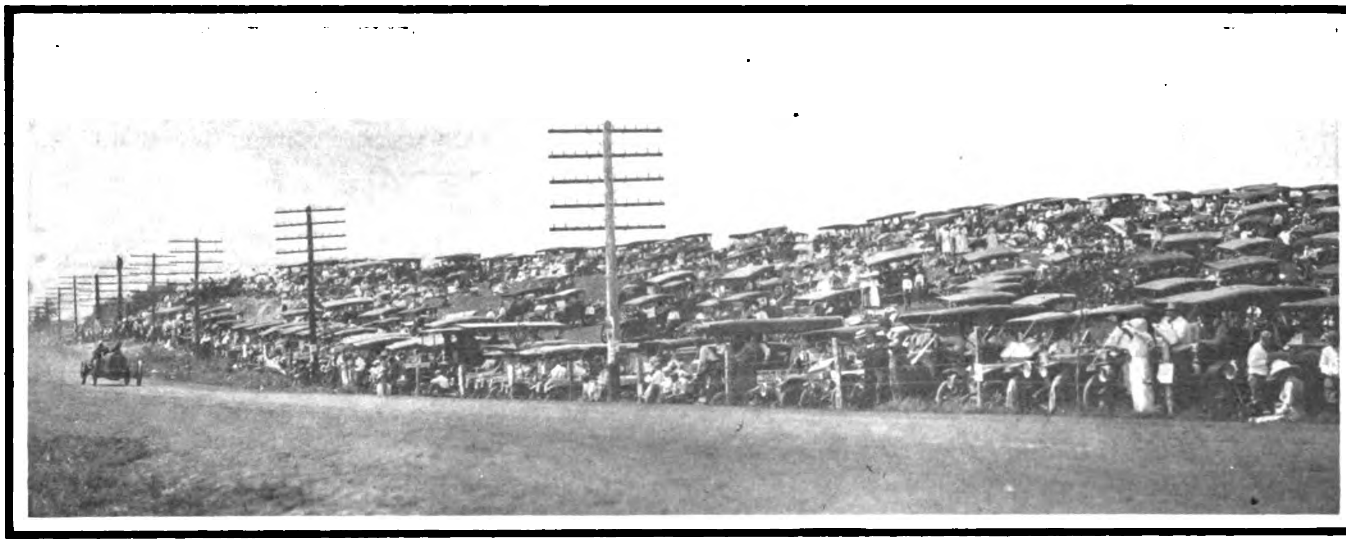
Trussel's Falcar which finished third in the Aurora Trophy

RUN AT ELGIN ON FRIDAY, AUGUST 30

9 76 1371	10 84 3870	11 93 1089	12 101 3588	13 110 807	14 118 3306	15 127 525	16 135 3024	17 144 243	18 152 2742	Miles per Hour
70:09	77:58	86:24	94:31	102:28	110:10	117:57	125:42	133:01	140:40	65.0
7:52	7:49	8:26	8:07	7:57	7:42	7:41	7:45	7:23	7:35	
72:58	80:28	90:28	98:25	106:21	114:21	122:09	130:15	138:26	146:31:45	62.3
8:08	7:50	7:57	7:57	7:56	8:00	7:48	8:06	8:11	8:05	
87:28	96:44	105:55	115:05	124:09	133:15	142:18	151:16	160:14	169:19	54.0
9:11	9:16	9:11	9:10	9:04	9:06	9:03	8:58	8:58	9:05	
80:41	88:47	96:45	104:45	113:58	128:53	141:12	153:50	167:23	178:11	51.7
8:01	8:06	7:58	8:00	9:13	14:55	12:19	12:38	13:33	10:48	
90:38	105:19	115:13	125:04	134:57	144:51	154:33	164:34	174:20	183:57:53	49.7
7:22	14:41	9:54	9:51	9:53	9:54	9:52	9:51	9:54	9:37	
80:25	96:00	106:37	114:26	122:17						
7:39	15:35	10:37	7:49	7:51	Out—Sprung rear axle.					

NATIONAL WATCH COMPANY TROPHY, RUN AT ELGIN ON SATURDAY, AUGUST 31

13 110	14 118	15 127	16 135	17 144	18 152	19 160	20 169	21 177	22 186	23 194	24 203	25 211	26 220	27 228	28 237	29 245	30 254	Miles per Hr.
94:55	102:17	110:12	117:33	124:37	131:34	138:31	145:32	152:36	159:37	166:43	174:01	183:46	190:59	198:38	207:33	214:57	223:06	68.4
7:08	7:22	7:55	7:21	7:04	6:57	6:57	7:01	7:04	7:01	7:06	7:18	9:45	7:13	7:39	8:55	7:24	8:23	
95:00	102:08	112:59	120:14	127:19	134:28	143:32	150:32	157:29	164:28	171:31	178:39	185:46	192:56	200:03	206:57	217:30	226:09.26	67.3
7:04	7:08	10:51	7:15	7:05	7:09	9:04	7:00	6:57	6:59	7:03	7:07	7:07	7:10	7:07	6:54	10:33	8:39	
102:50	113:36	121:30	129:18	137:04	144:47	152:29	160:08	167:49	175:36	183:17	190:58	198:30	206:15	214:00	221:34	229:16	236:43.50	64.2
11:08	10:46	7:54	7:48	7:46	7:43	7:42	7:79	7:41	7:47	7:41	7:41	7:32	7:45	7:45	7:34	7:42	7:27	
104:02	111:53	119:39	127:26	135:21	144:33	152:26	160:08	167:58	175:42	183:30	191:16	199:07	206:58	214:50	222:40	230:30	238:17	63.8
7:44	7:51	7:46	7:47	7:00	9:12	7:47	7:48	7:50	7:44	7:48	7:46	7:48	7:51	7:52	7:50	7:50	7:47	
98:27	105:59	113:24	120:55	129:18	136:57	144:36	153:29	160:08	169:32	178:26	186:55	199:24	209:46	217:14	224:48	232:24	239:57.60	63.3
7:29	7:32	7:25	7:31	8:23	9:39	7:39	8:43	7:39	8:24	8:54	8:29	12:29	10:22	7:28	7:34	7:36	7:33	
97:37	116:36	124:05	131:32	139:10	146:49	154:36	162:23	169:59	177:47	185:24	193:08	200:48						
7:09	18:59	7:29	7:27	7:38	7:39	7:47	7:47	7:79	7:48	7:37	7:44	7:40	Out—Transmission trouble.					
100:44	108:24	116:02	123:35	131:12	140:01	147:38	155:10	170:49	187:55	195:43	226:59							
7:45	7:40	7:38	7:35	7:37	8:49	7:37	7:32	10:19	17:06	7:48	31:16	Out—Broken oil lead and water pump.						
98:47	107:55	115:23	122:48	131:31														
7:20	9:08	9:28	9:25	8:51	Out—Burned out crankshaft bearing.													



Hundreds of cars were massed about the course at various points of vantage from which the automobilists might obtain a clear view of the course

Hughes was third, Metz fourth, Hearne fifth in the Elgin National race. Considering all the cars, the Benz, which was not entered in the Elgin National, was second, with Mulford in the Knox third, and Hughes fourth.

Bergdoll was driving at terrific speed, and succeeded in coming to first place in the second lap, while De Palma, also getting all the power out of his Mercedes, had to be contented with second position. Mulford was now in third place. In the third lap Mulford changed positions with De Palma, Bergdoll in the Benz still retaining the lead. This he held from lap No. 2 on through the twenty-second lap, or 186 1-3 miles of his long grind of 305 miles. In this lap he was obliged to stop on the back stretch on account of tire trouble. This delay gave De Palma the lead, which he maintained in the twenty-third and twenty-fourth laps. He would, no doubt, have led Bergdoll longer had he not been obliged to stop at the pit at the end of the twenty-fourth lap to take on gasoline and oil and to replace his left rear tire. This wait put Bergdoll again in the lead, which he retained for ten of the remaining twelve laps of the free-for-all race. De Palma was now in second place, while in the same lap Mulford was a close third, which position he had held since the fifteenth lap, or 127 miles had been passed. He was pressing De Palma closely, and in the twenty-sixth lap succeeded in regaining second position, about 2 minutes behind Bergdoll, in the Benz, while De Palma was less than a minute slower than he.

The twenty-ninth lap saw tire trouble for both Mulford and De Palma. The latter stopped at the pit after completing this lap and to him the short wait seemed endless. He was all eagerness to be away. But before he was off again Mulford also stopped at his pit for identically the same reason. Immediately De Palma saw his chance. He pressed his attendants to their utmost and was away again, fairly lifting his machine from the ground in getting off. There was only a single lap remaining to the Elgin National race, and De Palma realized it fully. It was the fastest lap of his race, and he made it in 6:49, for the first time in his career crossing the tape the winner of a race. But he did not slacken his speed, for he had still six laps to go in the free-for-all race in which he was also entered.

The course from the main stand before post call

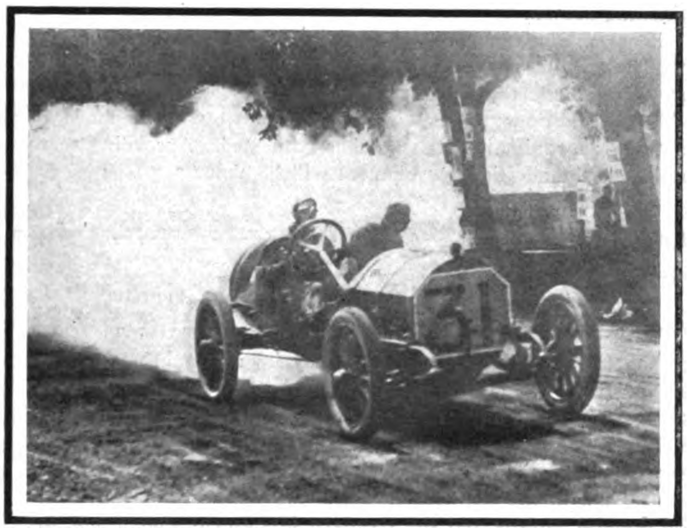
Mulford was next to finish, and while De Palma's average speed for the Elgin National race was 68.4 miles an hour, that of Mulford was slightly less, as the tables show.

Meanwhile, the other cars were changing their positions somewhat. After completing three laps, Hearne was obliged to quit Fiat No. 5 because of his wrist becoming too weak to properly control the car. George Hill, mechanician for Tetzlaff, took his place in the big red machine. He lost no time in getting the Fiat under way again, and drove daringly and with the nerve of a veteran for twenty-three laps. When Hill took the wheel he was in sixth place, but in the sixth lap Clark's Mercedes, which had been in fifth position, was put out of the race by accident, giving this position to Hill in the Fiat. In the eighth lap Hill took the fourth position in the Elgin National, which had been held by Merz in the Stutz. Two laps later he took third position from Anderson in the other Stutz, and retained it through the thirteenth, when he dropped to seventh place, Merz regaining his former place in the van. Trouble with the transmission was rapidly taking on serious proportions, judging by the

RESULTS OF THE ILLINOIS TROPHY RACE, 3

No.	Car—Driver		1 Miles 8 Feet 2499	2 16 4998	3 25 2217	4 33 4716	5 42 1935	6 50 4434	7 59 1653	8 67 4152	9 76 1371	10 84 3870
24	STUTZ	Elapsed Time	7:44	15:16	22:46	30:20	37:48	45:18	52:51	60:27	68:02	75:38
	C. Merz	Lap Time	7:44	7:32	7:30	7:34	7:28	7:30	7:33	7:36	7:35	7:36
21	STUTZ	Elapsed Time	8:00	15:49	23:30	31:15	38:54	46:34	54:12	61:49	69:25	76:56
	G. Anderson	Lap Time	8:00	7:49	7:41	7:45	7:39	7:40	7:38	7:37	7:36	7:31
23	NATIONAL	Elapsed Time	7:46	15:28	23:09	30:44	38:21	46:02	53:45	61:56	72:06	Out—Brok
	N. Whalen	Lap Time	7:46	7:42	7:41	7:35	7:37	7:41	7:43	8:11	10:10	mag. dri
22	RAYFIELD	Elapsed Time	8:35	34:32								
	W. Hobbs	Lap Time	8:35	25:57	Pit—Out—Burned out main bearing.							

Anderson's Stutz, which finished second to its team mate in the Illinois Trophy race, in a lively brush takes the pace midway of contest



Pullen's Mercer, place winner in the Aurora Trophy

noise emanating from Hill's machine, and after completing twenty-six laps he was obliged to quit the race on this account. He was then in sixth place.

The first car to drop out was the Mercedes, driven by Clark, which, after staying in fifth place on the fifth lap, was preparing to negotiate the Hornbeek turn, the first after passing the pits, and was driven into the straw banking of the turn and damaged sufficiently to put it out of the race. Clark miscalculated the turn, ran into a small concrete culvert located at this point, with sufficient force to blow up one of his tires. This sent his car swerving to the right and into the fence, breaking both rear wheels and pitching himself and his mechanician over the fence. Neither man was seriously hurt, each being only slightly bruised. Had it not been for the straw bales banking the turn, the accident would undoubtedly have been serious. Curiously enough, Clark had objected previously to the use of the straw for this purpose.

As a safety element these straw bales at the four turns demonstrated their worth. Not only did they save Clark and his mechanician, but they prevented injury to Wishart, whose Mercer got off the course at one turn, and to Wordingham, who also ran into them, ditching his Herreshoff car and breaking one of its wheels, without injury to himself or his companion.

Following Mulford, Merz, in Stutz No. 12, was next to finish in the Elgin National race. He came into this position, due to the accident to Wishart's car in the twenty-fifth lap, when the latter's oil lead and water pump broke, and to Hughes' Mercer, which was running well up to the eighteenth lap, when it burned out a crankshaft bearing, rendering it useless as a contender for honors.

These various accidents left only three cars to contend in the free-for-all. These were Bergdoll's Benz, De Palma's Mercedes and Mulford's Knox. The final performance of these three cars was the most sensational of the 2 days' meet. Bergdoll was in the lead at the beginning of the thirty-first lap, with

(*Continued on page 496.*)

JENCKS TROPHY RACE

No.	Car—Driver	Lap Miles	1 8	2 16	3 25	4 33	5 42	6 50	7 59	8 67	9 76	10 84	11 93	12 101	Miles per Hr.
41	**MASON SPL**	Elapsed Time	8:05	16:07	23:58	32:13	40:42	49:18	57:59	66:28	79:51	83:24	92:11	100:42.9	60.57
	H. Endicott	Lap Time	8:05	8:02	7:51	8:15	8:29	8:29	8:41	8:29	8:23	8:33	8:47	8:31	
42	**FORD**	Elapsed Time	12:15	29:46	41:40	54:21	66:13	87:28							
	Henning	Lap Time	12:15	17:31	11:54	12:41	11:52	21:15	Out—Car ditched.						
43	**HERRESHOFF**	Elapsed Time	10:49												
	Wordingham	Lap Time	10:49	Out—Broken wheel.											

MILES, RUN AT ELGIN, ILL., ON FRIDAY AUGUST 30

11 93 1089	12 101 3588	13 110 807	14 118 3306	15 127 525	16 135 3024	17 144 243	18 152 2742	19 160 5241	20 169 2460	21 177 4959	22 186 2178	23 194 4677	24 203 1896	Miles per Hour
85:13	92:00	99:46	107:22	114:59	122:38	130:23	138:11	146:00	153:40	161:22	169:12	176:49	184:32:25	66.11
7:35	8:47	7:46	7:36	7:37	7:39	7:45	7:48	7:46	7:40	7:42	7:50	7:37	7:43	
84:33	92:08	99:48	108:27	116:26	124:22	132:11	140:02	147:47	155:36	163:12	170:56	178:37	186:14:15	65.6
7:37	7:35	7:40	8:39	7:59	7:56	7:49	7:51	7:45	7:49	7:36	7:44	7:41	7:37	

Pierce and Case Are Sued

Stephenson, Manufacturer of Utility Car, Charges That Milwaukee Companies Violated Agreement to Buy Plant

Packard Dealers, 150 Strong, Formulate Plans to Tour United States and Canada

MILWAUKEE, WIS., Sept. 3—The Stephenson Motor Truck Company, of Milwaukee, Wis., manufacturing "Utility" commercial cars at South Milwaukee, on Saturday, August 31, filed a suit in the Circuit court at Milwaukee against the Pierce Motor Company and the J. I. Case Threshing Machine Company, of Racine, Wis., charging them with violating an agreement whereby the Pierce and Case owners agreed to purchase the plant of the Stephenson company for $100,000 worth of the capital stock of the Pierce company. The trial will be transferred to Racine county by mutual agreement and promises to be most interesting. The official complainants are George L. Stephenson, Charles Matthews, A. E. Halderman, Fred M. Stephenson, Paul Durant and Frederick Gettelman, and the official defendants are Frank K. Bull, Richard T. Robinson and F. Lee Norton.

The complaint charges that from the time of the alleged agreement, in January, 1912, the Case company agreed to act as sales agent for the Stephenson company until the Stephenson works were taken over on August 1, 1912. It is charged that the defendants have refused to comply and that the Stephenson company, by reason of discontinuing all of its own sales agencies, and announcing to its patrons that it was no longer selling its product directly, suffered a great decrease in sales and now has on hand a large number of motor vehicles which it cannot sell because of the termination of its own selling outlets.

It was stipulated, the complaint says, that if at the time of the purchase of the Stephenson company's plant, scheduled for August 1, 1912, the assets amounted to less than $40,000, the difference was to be subtracted from the amount of the capital stock to be paid to the directors of the Stephenson company, and that if the assets exceeded $40,000 in value, an additional amount of stock was to be added to the consideration.

It is stated that the Stephenson company became affiliated with the Pierce and Case companies because of the desire to add commercial vehicles to the Case line of products, which includes Case cars, manufactured by the Pierce Motor Company, which is owned by the directors of the Case company.

Insurance Probe Meets Snag

The problem of automobile insurance, particularly as it applies to commercial vehicles, is still some distance from a solution. The matter was referred to James S. Marvin, assistant general manager of the N. A. A. M., for investigation and report and Mr. Marvin ran into an obstacle early in the proceedings. After conference with the insurance men Mr. Marvin found that the first element of information required from him by the insurance men was as to how long trucks are kept in garages and how long they are in service each average day.

As such figures must be gained by a detailed canvass and as no such general detailed canvass has been made, the pursuit of that special line had to be postponed until such time as the figures should be available. Such a canvass will be undertaken in the near future.

Packard Dealers to Cruise

DETROIT, MICH., Sept. 2—About 150 dealers and salesmen from the principal cities of the United States and Canada, will be guests of the Packard Motor Car Company on a 3-day lake cruise, which will constitute the annual convention of the Packard sales corps.

The steamer City of St. Ignace has been chartered. The route extends through Lake St. Clair and Lake Huron, then down into Lake Erie to Buffalo and return. The boat leaves Detroit Tuesday, September 3, and will stop in Cleveland for a theater party the evening of September 4.

The dealers will be accompanied by a number of Packard officials, including H. B. Joy, president; S. D. Waldon, vice-president; Alvan Macauley, general manager, and H. H. Hills, sales manager.

In addition to business discussions there will be various forms of entertainment, including concerts by the Packard brass band.

More Cars, or More Service?

With upwards of 40,000 actual automobile freight cars in service upon the various railroad lines of the United States and with the prospective shipment of 100,000 carloads of automobiles from the factories to market, the supply of freight cars for this service would appear to be sufficient if each car suitable for automobile shipment could be made to make 2 1-2 trips each during the shipping season.

Reports from Detroit that an effort was being made to persuade the railroads to furnish 50,000 more freight cars for automobile traffic have been circulated recently.

Some additions to the present equipment will be made but nothing approximating the number requested. According to the railroads the additional equipment will be about 5,000.

Automobile Securities Quotations

With the approach of the time limit of the extension granted to the United States Motor Company by its creditors, a period of inactivity has settled upon the market for automobile securities. Sellers and buyers appear to be about evenly balanced with volume of trading rather on the small side. There is a distinctly strong undertone in the market for shares generally which finds expression in the stiffness of American Locomotive, both issues of General Motors and the standard investment shares, but with the exception of General Motors the upward movement has been fractional. Goodrich, which was listed on the New York Stock Exchange last week, has maintained its advance and the other rubber shares partake of its strength. The table showing the current level compared with the market last year is as follows:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., common	..	..	145	165
Ajax-Grieb Rubber Co., pfd	..	..	95	100
Aluminum Castings, preferred	..	..	99	102
American Locomotive, common	38	38¼	45¼	46
American Locomotive, preferred	106	107	109	110
Chalmers Motor Company	..	..	145	150
Consolidated R. T. Co., common	5	10	14	17
Consolidated R. T. Co., preferred	10	20	50	60
Firestone Tire & Rubber Co., common	179	181	285	290
Firestone Tire & Rubber Co., pfd	105	107	106	108
Garford Company, preferred	..	..	99	101
General Motors Company, common	42	43	42	43
General Motors Company, preferred	80	82	82	83
B. F. Goodrich Company, common	243	245	77½	79
B. F. Goodrich Company, pfd	118¼	119¼	107½	108½
Goodyear Tire & Rubber Co., common	230	240	330	334
Goodyear Tire & Rubber Co., pfd	105	107	105	106½
Hayes Manufacturing Company	..	..	..	97
International Motor Co., common	..	..	27½	28½
International Motor Co., pfd	..	..	84	88
Lozier Motor Company	..	..	50	60
Miller Rubber Company	..	..	142	150
Packard Motor Co., preferred	..	..	105½	107
Peerless Motor Company	..	..	115	120
Pope Manufacturing Company, common	42	46	38½	40
Pope Manufacturing Company, pfd	72	77	73½	74½
Reo Motor Truck Company	8½	10	9¾	10¾
Reo Motor Car Company	23	25	22½	24½
Studebaker Company, common	..	..	42½	43½
Studebaker Company, preferred	..	..	94	95½
Swinehart Tire Company	..	..	95	97
Rubber Goods Company, common	..	..	100	105
Rubber Goods Company, preferred	..	..	107	110
U. S. Motor Company, common	30	32	3¾	4
U. S. Motor Company, preferred	70	71	11	12
White Company, preferred	..	..	107	109

According to traffic managers of several of the big automobile companies the requirement is not so much for more cars as it is for more service from present equipment.

The average time for a trip from Detroit to New York is about 60 hours and from any factory with first-rate handling facilities to any point of consignment 1,000 miles away is not more than 5 days. The return trip should take no longer and the various delays, loading and reconsignment ought not to occupy more than 1 month.

On this basis, figuring the shipping season at 120 days and the number of automobile cars available at 50,000 and the average time of the round trip at 40 days, the cars should be able to transport 150,000 carloads. At an average of 2 1-2 automobiles to the carload, they would account for the shipment of 375,000 automobiles, or considerably more than the probable output.

The difficulty that lies in the way of such a solution of the trouble is that automobile cars are used for other purposes during the rush season.

Imports Large—Rubber Steady

Imports of crude rubber for the week ending August 24 amounted to 14,272 packages to which must be added 1,673 packages of waste, the whole valued at $1,768,000. The waste was valued at $59,000. Local trade has been quiet and while the actual sales are said to be small, the volume of imports in connection with the steady market means that the demand is sufficient to maintain prices. This would argue in favor of a large general business. Prices remained about stationary throughout the past week, the level being at $1.20 1-2 per pound for up-river fine.

Market Changes for the Week

The holidays stifled activity in the materials market to some extent this week, and as a result there are few changes to note as compared with last Wednesday. The metal market was rather steady all through the week, with no special activity except in the cases of lead and tin, both of which gained materially during the week. Both Lake Superior and electrolytic copper remained at their nominal quotations throughout the week, and the same holds for the prices of steel products, among which beams and channel products continue to be sold at the ask price.

Fine up-river para rubber declined 1 cent a pound on the first day of the week in response to the London trend, and has since remained at the same price. Gasoline, oils and lubricants also underwent no changes. Linseed oil formed an exception in this respect, rising from 68 to 69 cents on the last day of the week, thereby recovering from its decline about 2 weeks ago. Cotton oil was also strong and closed 19 cents higher than the market opened.

Material	Wed.	Thurs.	Fri.	Sat.	Tues.	Week's Change
Antimony, lb.	.07½	.07½	.07½	.07½	.07½	....
Beams & Channels, 100 lbs.	1.51½	1.51½	1.51½	1.51½	1.51½	....
Bessemer Steel, Pittsburgh, ton	22.50	22.50	22.50	22.50	22.50	....
Copper, Elec., lb.	.17⅜	.17⅜	.17⅜	.17⅜	.17⅜	....
Copper, Lake, lb.	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	....
Cottonseed Oil, September, bbl	6.29	6.27	6.31	6.40	6.40	+ .19
Cyanide Potash, lb.	.19	.19	.19	.19	.19	....
Fish Oil (Menhaden)	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @	.21	.21	.21	.21	.21	....
Lard Oil, prime	.85	.85	.85	.85	.85	....
Lead, 100 lbs.	4.67½	4.65	4.85	4.85	4.85	+ .17½
Linseed Oil	.68	.68	.68	.69	.69	+ .01
Open-Hearth Steel, ton	23.00	23.00	23.00	23.00	23.00	....
Petroleum, bbl., Kansas Crude	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa. Crude.	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	....
Rubber, Fine Up-river Para	1.20	1.20	1.20	1.20	1.20	....
Silk, raw Ital	....	4.15	....	....	....	....
Silk, raw Japan	....	3.82½	....	....	....	....
Sulphuric Acid, 60 Beaumé	.99	.99	.99	.99	.99	....
Tin, 100 lbs.	46.50	46.80	47.70	47.70	47.50	1.00
Tire Scrap	.09	.09	.09	.09	.09	....

Receiver For Thomas

Judge Hazel Directs G. C. Finley to Take Charge of the Affairs of Defunct Company—Receiver Silent as to Future

Assets of Thomas Company $740,000 in Excess of Liabilities and Reorganization Is Not Improbable

BUFFALO, N. Y., Sept. 3—Judge John R. Hazel, in United States District Court here last Thursday granted an order appointing George C. Finley, secretary of the M. D. Taylor company, and Adolph Rebadow, attorney of the law firm of Rebadow & Ladd, receivers for the E. R. Thomas Motor Car Company. The order provides that the receivers for the automobile company are to continue the business of that concern and bond for the receivers was fixed at $50,000. Application for the appointment of receivers for the Thomas company was made by Charles B. Sears, of the law firm of Rogers, Locke & Babcock. The E. R. Thomas Motor Car Company was represented at the hearing by William L. Marcy, of Moot, Sprague, Brownell & Marcy.

The receivership of the Thomas plant resulted from action in equity brought by creditors on the grounds that the E. R. Thomas Motor Car Company, while entirely solvent, was temporarily unable to meet its obligations. Extension notes given at the time of the reorganization of the Thomas company a year ago could not be met at maturity. The notes, which totalled $250,000, fell due this year on August 1. The holders of $210,000 worth of these notes agreed to grant a 3-month extension but holders of the remaining $40,000 declined.

The E. R. Thomas Motor Car Company succeeded about a year ago to the business of the E. R. Thomas Motor Company when that concern was reorganized. The liabilities of the Thomas company today are said to be $960,000 while assets total $1,700,000. Merchandise creditors of the Thomas company are to hold a meeting in the near future and it is anticipated that a reorganization of the company will be the result. At the meeting which will probably be held this week the receivers of the Thomas company undoubtedly will act on the resignations of Frederick R. Humpage, president of the Thomas plant; William L. Gleason, vice-president and general manager, and John J. Ramsey, treasurer. The resignations of these prominent automobile officials was received with the greatest of surprise. The resignations are said to have been tendered together, but authorities in the Thomas plant decline to give further statements on the matter until action has been taken by the company's receivers. President Humpage declines to state why he resigns from the concern but probably will discuss the matter after the receivers' action.

Concerning the matter of the continuation of the business of the Thomas company, George C. Finley, receiver for the concern, has this to say:

"I am unable to say at this time just how long the business will be continued. The receivers have taken hold of it, and intend to put the business on its feet if that is possible. Of course, we do not know just at present what the exact conditions are in the plant. The permanent continuation of the business will depend greatly upon what we find." The forces of the plant were reduced about 200 in number on Saturday but the business will be continued if possible.

Chicago Show Blanks Issued

Application blanks for space at the thirteenth annual automobile show at Chicago have been issued. The pleasure car section will be held February 1-8 and the commercial vehicle section February 10-15. The rental rate is fixed at 90 cents a square foot for each show.

U. S. Motors Plan Due

Committee Working on Reorganization Scheme to Be Announced Before Friday of Next Week

Important Meetings of National Organizations Scheduled To Take Place Early in October

FRIDAY, September 13 is the date upon which the 90-day extension granted by the creditors of the United States Motor Company will expire and before that date a plan of reorganization will be presented to the creditors and owners of the company. In fact, three different plans have been suggested to the creditors' committee and while official confirmation is lacking, it is quite certain that one of these plans, modified by suggestions of the merchandise creditors will be favorably reported.

The first draft of this plan has been prepared but pending official action those interested decline to say anything about it. Meetings of the committee have been held three different times within the past week and the announcement of the main facts contained in the plan may be expected at any time.

It is understood that some additional capital is necessary and that it will have to be secured; that one or more of the companies connected with the organization will have to curtail its production and that the 1913 manufacturing campaign, already well under way, will be conducted on conservative lines so as to avoid extraordinary calls upon the company's resources prior to the season when adequate returns are available to meet such calls.

At the headquarters of the company it was learned that shipment of the 1913 product is continuing satisfactorily and while all the officers are guarded in their statements, there is a feeling of growing optimism as to ultimate results.

On the New York curb a sharp break was scored in both common and preferred issues, but later there was a good recovery, the net loss being only fractional. It was reported after the break that the selling pressure was by speculators who had loaded up at recent lower levels and took profits on the subsequent rise.

Big Meetings for October

Meetings of the Automobile Board of Trade and the National Association of Automobile Manufacturers, scheduled for the first week in October promise to be among the most interesting gatherings ever held by those organizations. There will be the regular monthly meetings of the associations; the twice postponed convention of salesmanagers; the allotments of space at the national shows and probably a gathering of automobile makers, the like of which has never been witnessed so far in the industry.

There are a number of live topics to be considered by the members, including the tentative merger and the scope and extent of the big organization that will result.

The probable date of the sales managers convention is October 1.

Exported Cars Less in Price

WASHINGTON, D. C., Aug. 31—According to figures compiled by the federal bureau of statistics, $30,000,000 worth of American automobiles and parts found markets abroad during the fiscal year 1912, as against less than $1,000,000 worth 10 years ago. The figures show that the exports of motor cars to foreign countries in the fiscal year were valued at $21,500,000; of parts thereof, including tires, $6,750,000. If to this were added the shipments to Hawaii and Porto Rico, we get for the year's sales of American cars outside of continental United States a round $30,000,000, since the value of motor cars and parts thereof sent to Porto Rico was nearly $1,000,000 and to the Hawaiian Islands a little over $1,000,000. The total number of cars exported to foreign countries was 21,757, valued at $21,550,139, averaging slightly less than $1,000 each, while those to the non-contiguous territory were higher, averaging $1,600 each.

The export price of American cars in 1912 averaged less than in any earlier year in the history of the export trade. The average for 1912, dividing the total number of cars exported into stated value, was $990 each, against $1,100 in 1911, $1,380 in 1910, $1,700 in 1909, and $1,880 in 1908.

On the import side the motor cars imported last year amounted to but about $2,000,000 in value, against more than $4,000,000 in 1907. The average import value of the cars brought into the country last year was $2,216 each, against $2,138 in 1911, $1,936 in 1910, $1,788 in 1909 and $2,392 in 1908. Thus the export price of American cars has fallen from $1,880 in 1908 to $990 in 1912, while the import price of foreign cars entering the country has only fallen from $2,392 in 1908 to $2,216 in 1912, the reduction in price on the export side being 47 per cent. and on the import side but 8 per cent.

Marion Names District Managers

INDIANAPOLIS, IND., Aug. 31—In connection with the active sales department which the Marion Motor Car Company is now organizing, there have been appointed four district sales managers who are men of wide experience and acquaintanceship.

These men are C. H. Tyler, who has just resigned as manager of the United States Motor Company's Cleveland branch; C. B. Riggs, who gives up the management of the Oldsmobile branch in Kansas City; W. W. McClure, who has been associated with the Marion interests in Texas, and Howard W. Harrington, who has been in charge of the Marion on the Pacific Slope.

To Build Argyll Engine in Canada

OSHAWA, ONT., Sept. 3—The Hackett Motor Car Company, Ltd., of this city have secured the patent rights to manufacture the Argyll engine in Canada. Hitherto the Argyll car has been made in Scotland only but an enterprising group of Canadian capitalists have purchased the manufacturing rights for the Dominion. This concern will be known as the Hackett Motor Car Company. Last spring they bought out the plant of the Matthew Guy Automobile Works, Oshawa, and the equipment there will be enlarged to enable the company to turn out a very largely increased output. It is the intention of the Hackett company to build high-class automobiles equipped with the Argyll valveless engine. It is announced there will be a four and a six-cylinder model. They will also build a cheaper car with a different engine. The latter will be a thoroughly reliable and up-to-date car, and it is the intention to place it on the market at a price below $1,000.

Alco Truck at Wells, Nevada

WELLS, NEV., Sept. 3—The Alco transcontinental truck reached this place today after passing through a series of tropical floods. Much work had to be done in road construction as the poor existing roads had been washed out in many places. The total distance to date is 3,323 miles and there still remains about 650 miles to travel before reaching the destination. Progress has been slow for 2 weeks on account of the extraordinary difficulties that had to be surmounted.

Bumper Crops in North Dakota

FARGO, N. D., Sept. 3—Bumper crop conditions in North Dakota this fall are attracting the attention of automobile manufacturers and dealers everywhere with the result that a number of new agencies have already been established or announced for

Fargo and many other cities. Old agencies already in the territory are increasing their sales forces to handle the increased amount of business which the dealers believe is assured.

Crops in the state are now beyond the prospect stage and it is certain that the farmers will harvest the biggest yields of the past 15 years. While harvest and threshing have been delayed by the heavy and frequent rains during August the work is now far enough along to forestall further weather damage and to give reliable indications of what the yields will be.

Wheat, the leading crop of the state, will give a yield several bushels above the average for the last ten years and almost double the yields reported for the two previous years, both of which were attended with crop failures. Reports that the heavy rains had started the grain sprouting in the shock are denied by farming experts who have traveled through the state. In certain sections of the state grades have been lowered but the damage is not sufficient to affect the state as a whole.

Flax, barley, rye and oats are all yielding crops far above the average. Corn is ripening rapidly now and experts believe that for the first time in the history of the state the farmers will raise their own seed corn for 1913 planting. Potatoes have been attacked by a form of stem rot. In spite of what damage this may do the yield is likely to be so large that the price will go very low.

Automobile salesmen are already busy among the farmers of the state and the number of orders received at the branch houses is increasing rapidly.

Receiver for King Company

It was reported in New York, on Tuesday, that the Union Trust Company, of Detroit, had been named receiver for the King Motor Car Company, by the United States District Court under bond of $5,000. An order granting an extension of time for the making up of certain stock on hand has been allowed. The company has been in existence since the spring of 1911. Charles B. King, the designer of the product, was backed in the venture by H. Kirke White.

The stockholders of the company are, generally speaking, rated as wealthy men and three plans for continuance of the business on a permanent basis are under consideration.

These plans are as follows: First, one of the stockholders is ready to take over the business. Second, a reorganization of the corporation with the present stockholders, starting all over again and third, it is reported that an outsider stands ready to take over the corporate interests.

The car was widely advertised in New York and had secured quite a material business in the metropolitan district.

J. R. Ballinger Killed in Accident

CHICAGO, ILL., Sept. 3—J. R. Ballinger for 4 1-2 years connected with the Stromberg Motor Devices Company, Chicago, Ill., was accidentally killed on August 30 when the car which he was driving from Chicago to Elgin for the races overturned in passing another machine. At the time of his death Mr. Ballinger was assistant to the sales manager of the Stromberg company. When he first took a position with the concern he was employed as stenographer and had risen rapidly to his present position. He was 27 years of age. No successor has as yet been appointed.

Exporters to Meet and Dine

The American Manufacturer's Export Association has announced its third annual meeting and banquet which will be held at the Hotel Astor, September 20-21. The association's members now transact an export business of $160,000,000 and an effort is being made to secure additions to the membership before the opening of the Panama canal so that the total business represented shall be above $500,000,000 a year.

W. B. Campbell is president of the association and Henry T. Wills, secretary.

Testing Convention Meets

International Association Comes Together and Begins Considering of Long and Interesting Program

Opening Session Is Attended by Delegations From Every Progressive Nation

WITH an attendance estimated at 600, including representatives of every advanced nation on the globe, the sixth congress of the International Association for Testing Materials came together Monday morning in New York. The convention will remain in session until September 7 and on the following day the official tour as outlined in previous issues of THE AUTOMOBILE is scheduled to commence. This will take up all the time until Sunday, September 15.

President Taft is the patron of the congress although not present personally. The opening day was devoted to organization and a formal reception to the members and ladies under the joint auspices of the American Society for Testing Materials and allied societies.

The real business of the congress commenced on Tuesday when the army, State of New York and the city welcomed the delegates and the professional sessions commenced.

In the metals division the speakers were: E. H. Saniter and twelve others who treated hardness and wear tests, impact tests and slag inclusions. Mr. Saniter used as an illustration in the testing of hardness and resistance the dry abrasion process on lubricated material and his conclusions were that hardness tests are unreliable as indicators of wearing properties.

F. Robin spoke on wear tests, showing results were not uniform under varying conditions and that each specific form should have its special test.

R. Guillery on tests for hardness, elastic limit and resilience under impact described three machines for making tests. The first was a ball-hardness machine with micrometer to measure the indentation caused by spring pressure upon the specimen. The second was an elastic limit device equipped to compress a truncated cone specimen while an autographic record is made to locate the point where set begins. C. Grard on studies of hardness of steels said that he believed it practicable to specify hardness and impact test requirements in steel specifications.

G. Charpy on impact tests recommended the study of the different testing machines and apparatus and reported for the committee the recommendation that a system of calibration and checking should be established as a prime requisite. He said that the relation between impact-test results and service value not having been fully established, the collection of statistics on the subject is recommended.

A. Schmid treating on the influence of shape of testpiece and treatment on notched-bar impact tests said that the previous size of testpiece was too large and that 10 mm., 60 mm. in span, with notch 2.5 mm. deep of radius 1 mm. gave satisfactory results.

The other speakers took up various phases of steel tests, treating of tough steels, brittleness, resilience, tensile-impact, slag inclusions and non-metallic impurities.

The Society of Automobile Engineers through the Iron and Steel Division of the Standards Committee adopted a set of strict steel specifications which has been augmented and modified from time to time and the international society with which the test congress is affiliated accepted the standards as applied to automobile making. The specifications, however, were not applied generally on account of the small limits of tolerance allowed. Some sort of action relative to the S. A. E. specifications will probably be taken before the close of the sessions.

Segregating Truck and Car Marketing

Pro and Con of Problem as Shown by Tendencies and Experience of the New York Selling Establishments—Drift Is Now Toward Separation

WHEN the automobile industry was young, it was considered quite the thing to have its advertisements read about like this: "The Bildad Motor Car Company has secured the agency for the Splitquick Truck, one of the most prominent among the commercial vehicles. This completes the Bildad line, which now contains in addition to the Splitquick truck, the Lemon gasoline, Pulmonary Electric and the reliable Asthma steam cars."

Mr. Bildad's sales force handled three lines of pleasure cars and the business wagons with admirable impartiality even if the salesmen lacked much detailed and definite information about any of the stock.

There were several New York agencies which sold, or attempted to sell, as many as six different makes of automobiles at once. Gradually the conviction came to the proprietors of the agencies that two lines of different makes represented about the limit for a single store and while there are a number of agencies along Gasoline Row that handle two lines, those that split up their energy by attempting to market three or more, except in such houses as group several varieties of foreign makes or allied types of commercials, are unimportant in number.

The reason for this conclusion is that when the industry developed beyond the experimental stage it tended to become highly specialized not only in manufacture, but also in marketing practice.

There are two factory branches which handle both the pleasure and commercial lines with the same sales force from the same salesroom and seven branch houses and agencies which have both lines but which conduct them separately as to showrooms and salesmen. The remainder center attention on a single line, except as has been noted with reference to the foreigners and the allied lines of commercials, such as the LaCroix agency for foreign cars and the International Motor Company and General Motor Company.

Tendency Is Toward Segregation

Such makes as Packard, Pierce and Peerless handle both lines from their local establishments, but the departments are kept separate with scrupulous care. The White Company is an example of the other phase of the situation where the two types of the automobile art are handled indiscriminately.

The tendency is toward separation and centralization of effort upon a single objective point. The arguments of those who follow such procedure as the White Company are that the fact of handling trucks and pleasure automobiles of one make does not constitute the scattering of energy to any material extent while it does embrace certain special advantages. The main elements of these are that where a business man has purchased an automobile for his personal use and is satisfied with its performance, he is likely to be prejudiced favorably toward the line of trucks manufactured by the same company as turned out his pleasure car. Numerous instances are cited by companies that conduct their business in this way to show that the identical salesman who conducted the sale of the pleasure car in the first instance is the best man to handle the commercial negotiations and in some cases the only man who can do so under the circumstances.

The concerns which separate the two departments argue that bankers, brokers, lawyers and other professional classes which constitute a very large proportion of their total customers, are not interested in trucks. That any energy diverted from the selling of pleasure cars is not counterbalanced by an equal or greater gain in efficiency in selling trucks. That the business men who are interested in trucks may have no interest in pleasure cars, and that while there is a certain advantage in having the successful salesman of a pleasure car conduct the negotiations for truck sales to his own customers, in other respects the idea is not economical.

Among the companies that handle a single variety of automobiles or trucks the idea of centralizing effort is more pronounced than it is in any other type of automobile selling. While there are dozens of such establishments in New York, such as the Abbott, Oakland, Pullman, Moon and Cadillac, the experience of the latter concern is a strong illustration. The Cadillac salesmen are massed to sell one car. They are carefully schooled in the features of their wares, as, in fact, are all the more efficient salesmen of the present. But, in addition to knowing their own car, they are cautioned that the less they know about competitive lines the better will be the results attained.

Their motto is that comparisons are odious; let the other fellow do the comparing.

Both Ideas Have Their Advocates

Within the past year several companies that have had the selling agencies for trucks of different makes than the pleasure cars handled by them have abandoned them because of the radical difference found in the clientèle of the two branches of the automobile business and the amount of specialization required by the salesmen.

They learned that the truck salesman must be a scientist, diplomat and business man rolled into one individual and that when such a combination exists it would be a shame to require him to follow the routine of the average salesman of pleasure cars. On the other hand, they found that the average run of pleasure car salesman is about as far from availability as a truck salesman as it is possible to be.

Maintenance guarantees are not the rule in selling pleasure automobiles, but at the present stage of the industry, operative and maintenance costs as estimated and stated by truck salesmen before sales are a distinct factor. Such procedure may be poor business, but in viewing things as they are, it can not be avoided.

The regular manufacturers' guarantee as to material and workmanship is all that is required of the concern selling pleasure cars. This varies to some extent, running from 90 days to life, and with it the salesman has but little to do. While the usual truck guarantee is couched in somewhat similar general terms as covering these points, the salesman is obliged to show operative and maintenance costs down to the mill per wagon mile and in many instances must guarantee such costs as well as the working of the truck in service.

Unjust as such practice may seem, it is a fact, and dealing with the fact guesswork on the part of the salesman might prove disastrous to the company. Therefore, a much more extended knowledge of all those factors is required of the truck salesman than of his brother in the pleasure car end of the business, just as the pleasure car salesman must possess certain other qualities applicable to his line which would be wasted in the truck trade.

Summed up, the reason for segregating the branches of the automobile industry is based upon the diametrically opposed character of the trade and the reasons for conducting the sales of trucks and cars with the same force and from the same salesroom in the particular instances where that plan has been used with success, is that there is a material relation between the buyers of pleasure cars and trucks. Both views are perfectly tenable from the standpoints of each class of sellers and the reasoning of both is identical up to the final conclusion.

Communications from the Manufacturer

G. W. Dunham, of the Chalmers Company, Claims That S. A. E. Formula for Rating Horsepower Does Not Do the Modern Motor Justice

WHEN a mathematical formula will not give the right answer, it is time that formula was abandoned. When the A. L. A. M. or S. A. E. formula for rating horsepower will not give the horsepower which an engine will actually develop, it is time another method of figuring was adopted.

There is but one kind of horsepower, and that is work accomplished. There is but one way definitely to measure one horsepower—that is by lifting 33,000 pounds 1 foot per minute. One horsepower in an engine is the capability of doing work equal to lifting 33,000 pounds 1 foot per minute.

For instance, a man lifting 33,000 bricks, each weighing a pound and setting them on a platform 1 foot high in 1 minute, would be doing one horsepower of work. If, by means of a hoisting device, he could raise a block weighing 33,000 pounds, 1 foot a minute, he would be doing work equal to one horsepower. Whether it is a man, a steam engine, an electric motor, or some other means of power, one horsepower represents exactly the same amount of work.

In a high-speed gas engine, such as is used in an automobile, the horsepower varies. In the case of the man-lifting bricks, the faster he works, the higher will be his horsepower rating. The same is true of engine work. Thus, an engine developing a certain horsepower at 300 revolutions per minute will develop very much more at 1,000 revolutions per minute and still more at 1,500 revolutions per minute. If properly designed, its horsepower development will be still greater at higher speeds.

It is therefore obvious that, in rating an engine of a certain size, the speed of the engine has a direct bearing on the horsepower rating. An engine with four cylinders, each of which is 4 inches in diameter, with a stroke of 4 1-2 inches, could be given any number of different ratings. Each might be accurate for the speed at which the engine was running when the horsepower was rated. It could be truthfully stated that such a motor was a 12-horsepower motor, if rated at 600 revolutions per minute; or you might say that it was a 20-horsepower motor, if it was rated at 1,000 revolutions per minute; and if it was rated at 1,200 revolutions per minute it could accurately be called a 25-horsepower motor.

Theoretical vs. Practical Rating

It is necessary for comparative purposes to set some speed at which a motor should be rated. Again, there are two ways of rating a motor at a given speed—one is theoretical and the other practical. A theoretical rating may be obtained by figuration, by using a certain formula to arrive at the horsepower.

In some instances, the use of such a formula is the only possible means, as in deciding what size of motor would be required to do certain work. Yet, at best, the formula method is rather misleading.

Where the motor is already in existence, there is a second means—that of testing the motor for horsepower. This means is positive and practical. The motor is connected with a testing apparatus, run at a certain speed, and the horsepower is actually measured.

The Royal Automobile Club of Great Britain some years ago decided upon a formula for computing horsepower which was later adopted by the engineers of the mechanical branch of the A. L. A. M. This formula, rating the motor at 1,000 feet piston speed, was decided upon, in this country at least, by a comparison of results of horsepowers obtained in actual test from numerous motors of various sizes and compressions.

By 1,000 feet piston speed is meant a motor running at such a number of revolutions per minute that the piston will move up and down in the cylinder at the rate of 1,000 feet per minute. For instance, if the stroke were 6 inches, the piston would travel down 6 inches and up 6 inches with each revolution of the motor, i.e., it would travel 1 foot with each revolution. Thus, in that motor, at 1,000 revolutions per minute, the piston would travel 1,000 feet. If the stroke were less than 6 inches, the motor would have to run faster than 1,000 revolutions per minute, and *vice versa*.

This formula was adopted several years ago, and great strides have been made toward motor efficiency since that time. There is something wrong with a motor today that will not develop 50 per cent. more horsepower than its rating by the A. L. A. M. formula. Such a rating is neither doing the motor justice, nor giving the parties interested an accurate idea of the power developed. There is, therefore, a necessity felt for a new rating by which motors of different sizes may be compared. At the present time there is no such formula and there is no standard speed. Various makers are rating motors of the same size at different horsepower, according to the speed upon which they base their calculations.

Explanation of Chalmers Method

In the case of the Chalmers motors, although the old A. L. A. M. rating would not be reasonable, it was thought desirable to stick as close to the once-accepted formula as possible. The most reasonable workout seemed to be according to the old motor speed of the A. L. A. M. formula, and actually test the motors at 1,000 feet piston speed.

Therefore, Chalmers motors are tested at 1,000 feet piston speed per minute, and the horsepower is determined by actual measurement.

The Chalmers 36 develops, as an average, 36 horsepower at 1,000 feet piston speed, or at 1,143 revolutions per minute. Yet, by the A. L. A. M. rating, its horsepower is only 29. The Chalmers Six develops 54 horsepower under the same conditions, but by the A. L. A. M. rating its horsepower is only 43 1-2. Thus, the inconsistency of the old A. L. A. M. formula is apparent.

On the other hand, it would be possible for us to test our motors, as some do, at 1,500 revolutions per minute and claim over 40 horsepower. I know of one instance where a motor of less bore and stroke than the Chalmers 36 is given a higher rating. This is obviously unfair both to the manufacturer who rates his motors at the accepted 1,000 feet piston speed, and to the purchaser who accepts as truthful a manufacturer's rating of his motor. Personally, I consider all ratings made at other than 1,000 feet piston speed distinctly misleading unless the revolutions per minute is given.

Rating the motor in the actual test at 1,000 feet piston speed seems advisable, as this is about the speed of the motor in ordinary actual use. This is obvious, upon consideration, inasmuch as the large motors, with longer strokes, will allow the car to be geared higher so as to let the motor run slower for a given speed of the car than would be possible with a small motor.

GEORGE W. DUNHAM, *Chalmers Motor Company.*

THE OTHO Motor Company, of Boston, Mass., has just reported that any type of storage battery may be used in connection with their starter, which was described in THE AUTOMOBILE for August 22. It was stated in the description that Exide batteries alone were of service with this starter. The demands of the starter are a relatively high amperage sustained for a short length of time as distinguished from a lighting current where a continuous flow at low amperage is a necessity.

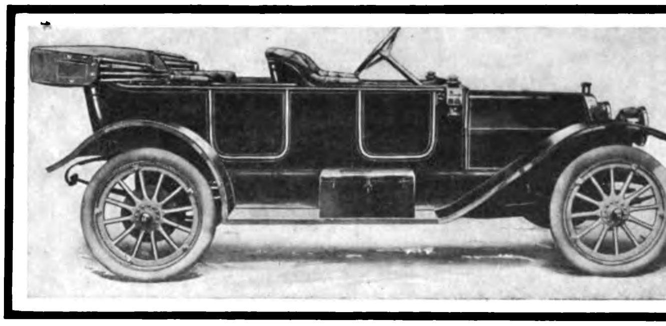


Fig. 1—Halladay model 32 touring car for 1913

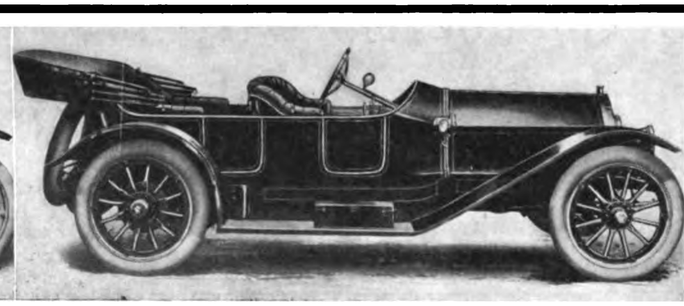


Fig. 2—Six-cylinder model 50 with toy tonneau

Halladay Model 50 Is Now Six-Cylinder

Four-Cylinder Model 40 Is Continued with Minor Changes While the 1912 Model 30 Becomes 32

Long-Stroke, L-Head Motor, Developing Over 40 Horsepower, S. A. E., Is Used in Model 50

THE announcement of the Streator Motor Car Company shows that another American maker has joined the ranks of those who are making six-cylinder cars for the season of 1913. One of the models of this concern has been changed in bore and stroke as well as in number of cylinders and makes the sole six-cylinder car that will be produced for 1913. Other than the necessary changes incorporated in this car which has grown from a four to a six there are no mechanical changes of importance noted in the Halladay line for 1913. This year the three chassis were named the 50, 40 and 30; next season there will be the 50, 40 and 32. Model 50 has now six cylinders; model 40 is continued with minor refinements and model 32, the outgrowth of model 30, remains unchanged except for small body alterations.

The model 50, around which chief interest settles owing to the remarkable trend towards little sixes for the coming season, is equipped with the latest Rutenber six-cylinder motor. It has a bore of 4 1-8 inches and a stroke of 5 1-4 inches. The cylinders are of the L-head type and are cast separately, as may be seen in Fig. 5, where the left or valve side of the motor is shown. The cylinder castings are of soft grey iron and have the valve cages cast integral with the water jackets. The pistons are of the same material as the cylinders and are fitted with four rings. The latter have square-lapped joints and are distributed near the top of the piston, three of them being above the piston pin, while the other is in the same plane as the pin, serving both as a piston ring and as a guard against the possibility of the wrist-pin working its way longitudinally through the piston and bearing against the interior of the cylinder. The piston pins are made from hardened and ground steel tubing with phosphor-bronze bushings.

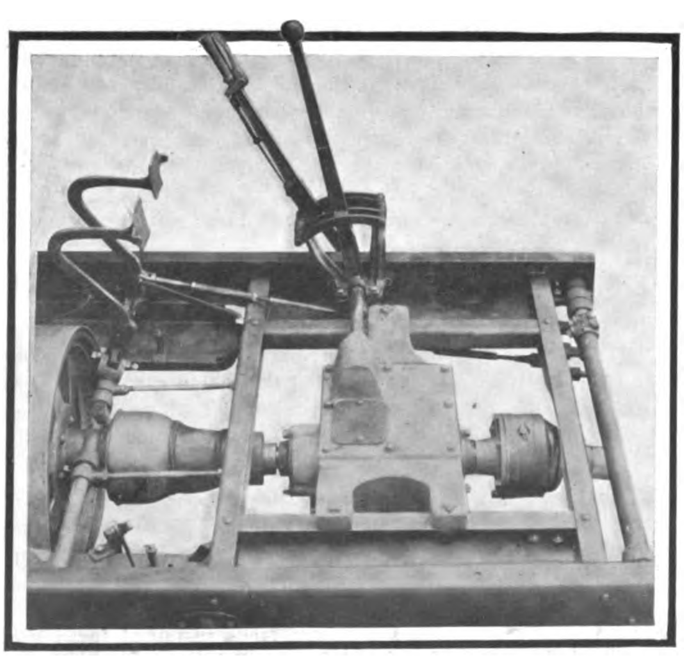


Fig. 3—Control mechanism on the model 32, showing the suspension of the gearbox

The entire valve action in this motor has been given special attention and is worthy of study as it has been made thoroughly up to date and typical of modern valve practice. The camshaft is placed in the same horizontal level as the crankshaft and by this arrangement there is no idler wheel between the camshaft drive wheel and the wheel on the end of the crankshaft. The teeth on these wheels are helical in form and carefully made to insure silence. The camshaft is a drop forging with integral cams.

Camshaft Has Large Bearings

The shaft is mounted on four large bearings lined with die-cast bronze bushings in two parts, which may at all times be taken up should wear occur. The valve tappets are actuated by a specially designed system which has been followed out with the idea of securing the utmost silence at this point. The actual valve follower is a roller which is carried in the center of a short lever pivoted at one end to a special boss which is a part of the crankcase. The bottom of the valve push-rod rests upon the other end of the short lever. Since the cam is applied between the fulcrum and the push-rod the lift on the latter is twice that of the cam follower, which gives a relatively quick opening and closing of the valve as well as a maximum total lift.

As far as adjustments go on the valve action it is only necessary to drop the bottom of the crankcase to expose the whole mechanism to view and enable any one making repairs or adjustments on this part of the motor to reach any desired part. The valve lifter fingers may be removed in pairs from beneath the crankcase and the lower halves of the camshaft bearings may also be taken out singly if desired.

The connecting-rods are long drop forgings with bearings of ample dimensions at each end. The bearings are lined with a special die-cast babbitt material and are split horizontally. Seven main crankshaft bearings are used. They are carried on bridges supported by the upper half of the crankcase. Adjustments on these bearings are made by removing the bottom of the crankcase in the same manner as for the adjustments on the camshaft bearings.

The oiling scheme is a combination of the force-feed and splash systems. The oil is contained in the base of the crankshaft, which is divided into two parts. These two parts are separated by a horizontal partition which forms a cover to the oil reservoir located in the bottom and also a foundation upon which rest the oil troughs necessary in the oiling arrangement. The capacity of the oil reservoir is in the neighborhood of 2 gallons. The oil is drawn from the reservoir by means of a gear pump driven off the camshaft and housed within the crankcase. This pump takes the oil through seven independent leads to the bearings of the crankshaft and sends the lubricant into these bearings under pressure and in great quantities. The oil flows out of both ends of the main bearings, which are the only ones taken care of by the forced feed. The lubricant flowing from the main bearings furnishes the source of supply for the splash, as it runs into the splash troughs which are located below the throw of each crank. As the cranks sweep around a sufficient quantity of oil is scooped up by the bottom of the connecting-rods to lubricate the interior of the cylinder, the camshaft bearings, connecting-rod bearings and timing gears. The entire crankcase is filled with an oil mist which is sufficient to take care of all the bearings in the interior of the crankcase.

Provision for Overflow of Oil

As the oil is supplied to the crankcase more rapidly than the main bearings and the splash systems take care of it, there must be some means of overflow. Standpipes are provided which permit of a flow of the lubricant back to the crankcase whenever it tends to rise above the level of the splash troughs. The oil re-enters the reservoir and is then ready to be used over again. Before again passing to the suction side of the pump, however, the oil is passed through a strainer of fine-meshed screening which will take out the impurities to a great extent. In addition to this the oil supply should be thoroughly renewed every month. An oil indicator shows the level in the reservoir.

The cooling system is taken care of by a large centrifugal pump mounted on the same shaft as the magneto on the right side of the motor. The pump and magneto shaft is driven by a separate gear and carries at the end a pulley wheel from which the fan is driven by a belt. The fan is made of aluminum in one piece and has six blades. A cellular radiator is the remaining factor in the cooling system.

Two entirely independent systems of ignition are used on the model 50, there being no connection at all between the two systems. One system is through a Bosch high-tension magneto, while the other system consists of a set of batteries, coil and distributer. As has been indicated, the Bosch magneto is carried on the same shaft as the water pump. A special connection between the water pump and the magneto sides of the shaft allows either of these two instruments to be removed separately and independently from the other. This shaft is lubricated by grease cups on the ends of long stems which render them particularly accessible when the hood is raised.

A cone clutch is used on the model 32. It is shown taken down in Fig. 8. Leather facing is used on the driven member, which is shown along with the universal joint on the rear

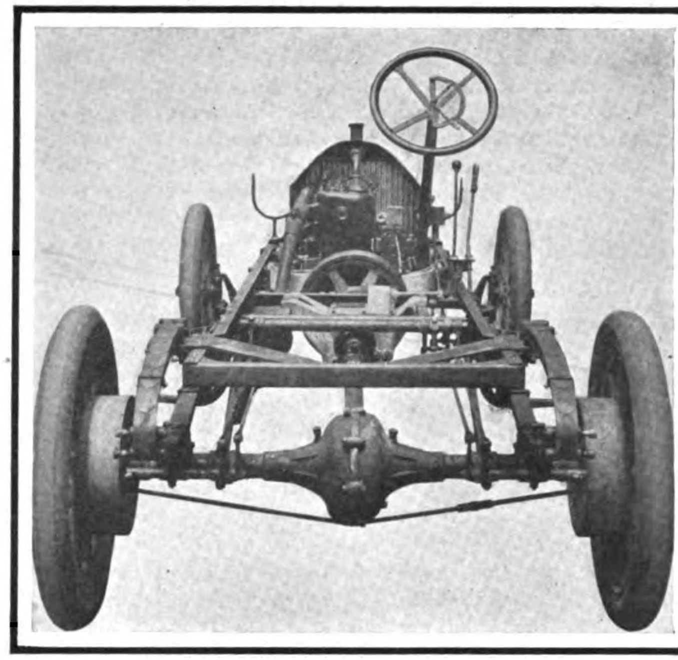
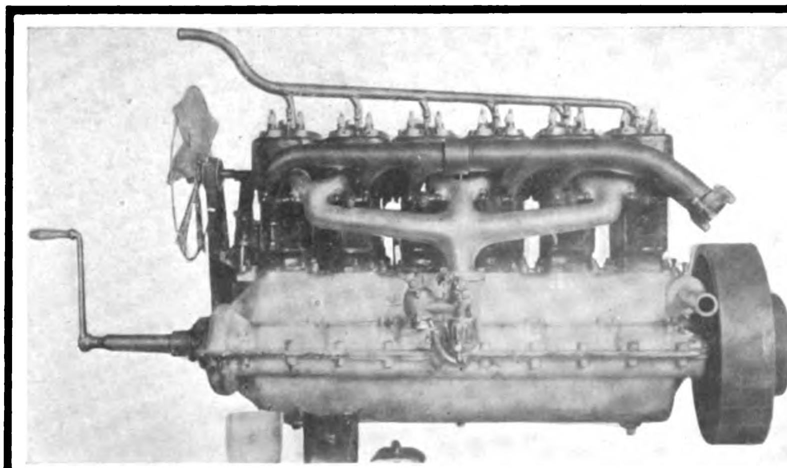


Fig. 4—Rear view of the model 32, showing suspension and details of chassis construction

of the short driven shaft in the illustration just referred to. From the clutch the drive is transmitted to the gearset, which is located amidships. The suspension of the gearset is particularly rigid as two independent transverse members are made use of to carry the weight of this part of the transmission. This system of supporting the gearset is shown in the chassis view, Fig. 4. As may be noted, they are of deep channel section and have the advantage of not only supporting the weight of the gearset, but of also protecting the entire framework against racking strains. Four forward speeds and one reverse speed is given by the gearset used on the six-cylinder car. The highest speed is geared higher than direct drive having a final ratio of 2 3-4 to 1, while the direct drive has a final ratio of 3 1-2 to 1. According to the usual usage the direct drive will be the more often used in this case, while the higher speed will become handy for work through open country on very good roads where the high gear ratio may be conveniently used.

Annular ball bearings are used throughout the gearset, while the gears themselves are of chrome vanadium steel. The shafts are of the same material as the gears and are carried on closely spaced bearings. The universal joint between the gearset and the propeller shaft is of extra large size and will permit of considerable disalignment between the shaft and the axis of the



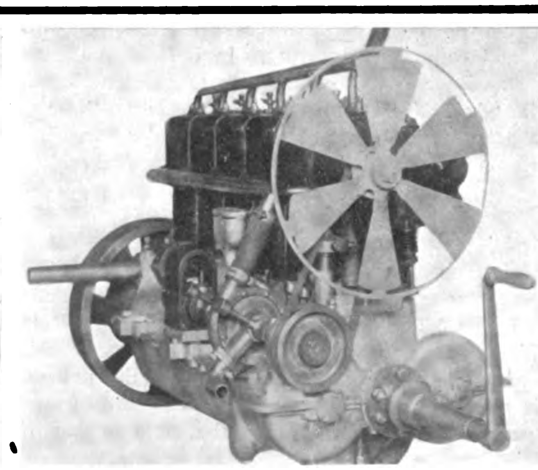


Fig. 5—View of the left side of the motor used on the Halladay model 50, showing the manner in which both intake and exhaust valves are inclosed. Fig. 6—Quarter front view of model 50 motor

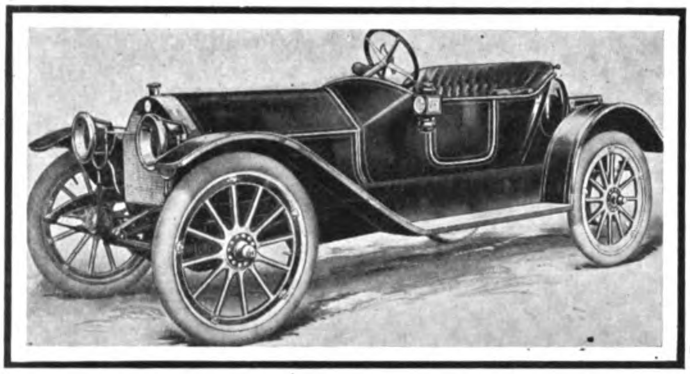


Fig. 7—Halladay 1913 model 40 equipped with roadster body

gearset shaft. In order to take care of the large bearing surface in this universal joint a grease cup is mounted upon it. The cup can be reached by lifting the floor boards just below the driver's seat. The propeller shaft is inclosed in a torque tube of generous size. One end of the torque tube terminates at the forward universal joint, while the rear is fastened to the differential casing on the rear axle.

A floating rear axle supported by a pair of radius rods, also visible in Fig. 4, transmits the power to the road wheels. The axle is carried entirely upon annular ball bearings. The housing of the rear axle which under the floating construction carries the weight of the car is of pressed steel joined in the center. This connection is shown in Fig. 4. In order to reach the differential wheels for the purpose of making adjustments or repairs it is only necessary to remove the eight bolts from the housing, when the entire rear system may be disassembled. Two grease cups are mounted on the differential housing to take care of the annular ball bearings. A strut rod, which is adjustable for tension by means of a turnbuckle, relieves the axle to a large extent of sagging strains and makes the structure in the rear more rigid.

There are two sets of brakes. They are both of the internal expanding type acting on the same band. The springs are three-quarter elliptic in the rear and semi-elliptic in front. All the spring shackle bolts are fitted with integral grease cups. In fact, as may be noted in the chassis view, special attention has been paid to the placing of grease cups through the wearing part of the chassis. The frame members are of straight channel without a drop or toe-in throughout their entire length. The side members are amply supported with deep transverse pieces connected gusseted joints. An irreversible steering gear is used on this car. There are two wheelbases for this model, 134 inches on the seven-passenger type and 128 inches on the four-passenger cars. The tires are 36 by 4 1-2 inches all around.

Model 40 of the Halladay line begins its third season without constructive change but with several refinements in details of body and equipment for 1913. In it is used the same size of motor as in the 50 except that there are four cylinders instead of six. Aside from dimensions of the parts, the construction is almost the same as that of the six-cylinder car. The wheelbase is 118 1-2 inches and the tires are 36 by 4 inches.

Model 32 Has Long Stroke Motor

Model 32 is almost the same as the 1912 model 30. Either a Rutenber or Continental motor is supplied. This is of the long-stroke type with a bore of 3 3-4 inches and a stroke of 5 1-4 inches. The details of construction of the Rutenber motor of this size are the same as those of the larger model already described, while the construction of the Continental motor is similar in many respects. Except for dual instead of double ignition, the general design of the car is the same as that of the larger model.

There is one point about the construction of the 32 motor that is worth emphasizing and that is the size of the camshaft bearings. These are so large that the entire camshaft, cams and all, can be withdrawn through the bearings without removing the latter. The cylinders are offset 1-2 inch from the crankshaft to give maximum torque with minimum friction. The Briggs dual magneto is used. The wheelbase is 112 inches and tires are 34 by 3 1-2 inches front and rear.

Two types of bodies are supplied on the model 32, a five-passenger touring and two-passenger roadster with trunk and gasoline tank on the rear deck. A neat arrangement is used for carrying a spare demountable rim and tire at the rear of the car. Three rigidly supported brackets from the body and frame grip the rim so that no straps are necessary, and the rim and tire are held rigid with no chance for the tire to chafe, as there is nothing with which it can come in contact except the rim on which it is inflated. The cars are all equipped with a provision for adjusting the carbureter from the seat and with ventilators in the dash.

Three bodies are fitted to the Halladay 40, a five-passenger touring, a four-passenger toy tonneau and 2-horsepower roadster. In its external appearance the 40 has been modified somewhat for greater refinement and comfort. The fender lines have been greatly improved. The running boards are made wider and thicker and covered with a very heavy cork carpet and nickel binding. Black and nickel finish has been made the standard. The upholstering has been increased in thickness and 8-inch cushions are used. Foredoor ventilators, demountable rims, dash control on carbureter and the special spare rim holders are furnished as standard equipment. The car also is electrically lighted throughout, the current being supplied by silent chain-driven generator when the car is in motion, and by storage battery when the car is standing still.

The two bodies fitted on the model 50 include a seven-passenger touring car and four-passenger toy tonneau; the equipment is the same as that on the 40.

Credit to Reference Works

In the two articles entitled Metric or English Measurements? which appeared in the issues of August 22 and 29 of The Automobile, credit should have been given to the following publications: W. Hallock and H. T. Wade, Outlines of the Evolution of Weights and Measures and the Metric System; F. A. Halsey, The Metric Fallacy. The parts and figures regarding the two systems of measurement as given in these works proved of great assistance to the author of the articles mentioned.

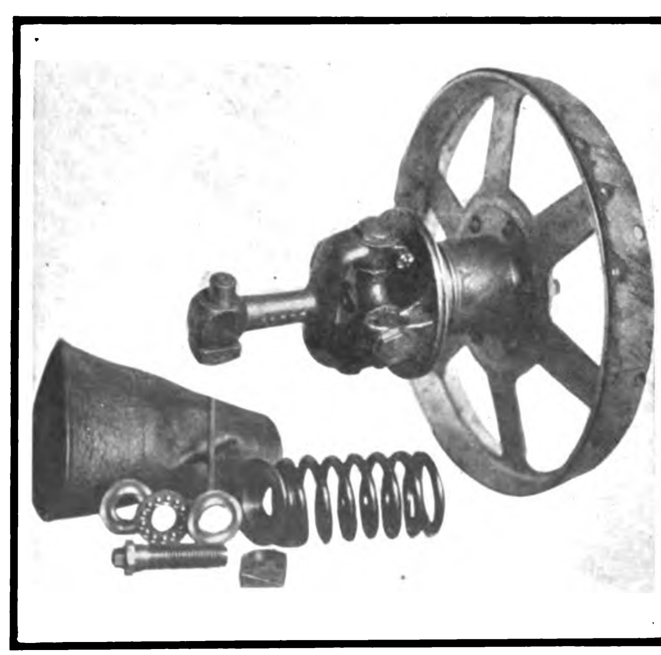


Fig. 8—Cone clutch on model 32, showing leather facing and liberal size of universal joints

Disco Starter Improved

Model 16 Possesses Several Refinements Designed to Make It More Certain in Action and Easier to Operate

Distributor Valve Altered to Produce a Better Mixture Ratio—Engine Valve Self-Cleaning

THE Disco starter which will be seen on several prominent cars bearing the 1913 date will have several changes for the coming season. There is no difference in the principle involved in this starter which is of the acetylene type, but the distributing valve by means of which the gas is directed to the motor cylinders has been changed to a considerable extent. The engine valve is now a combination check valve and priming cock which involves a self-cleaning feature. These two new parts with the refinements involved in each represent the changes which have been made over the starter of last year. The model is to be called the Disco 16.

The new distributing valve is similar in principle to the one used on the original Disco starter but the operation is different. With the new distributer needle valve the distributing operation is performed by opening and closing the valve apperture by turning the handle to the right and then back to the closed position. The valve handle as it appears on the dash and also with the dash plate removed is shown in the accompanying illustration. When the starter is not in use the handle must be left in the off, or closed position, which is perpendicularly downward. As the valve is closed when the handle is down it will not be possible for the vibrations and jars to which the car is subject to shake the valve open. The handle is weighted sufficiently to hold it safely in the closed position.

New Valve Gives Two Charges

The valve employed in the past was of the same type but had to be given a continuous turn for one rotation. The new valve gives two distributing charges instead of one on opening and closing the valve handle and a mixture of the correct proportions, it is claimed, will surely be forced into the cylinder by this method. Last year, if it was desired to start the motor while cold it was necessary to turn the handle of the valve two or three times and it was found that there was a tendency among users to give the cylinders more gas than was needed even when cold. With the double charge distribution used on the model 16, it is thought that there will seldom be occasion to turn the handle more than once to the right and back.

The engine valve which involves the priming cup and self-cleaning feature is shown to the extreme right of the illustration. In the past models the priming cup was used in conjunction with the engine valve but the self-cleaning feature has been added for the model 16. When the lever is in an upright position as it is in the illustration, the engine check valve is in operation and is so placed as to admit gas from the distributer into the motor cylinders. The check valve will not, however, permit any of the gases from the engine to back through the tubing to the distributer as it automatically closes against pressure which would tend to return the gases in that direction. When the handle is turned to the left it opens a passage from the priming cup direct into the cylinders so that gasoline may be injected into the cylinders if desired, or the cup may be left open to blow out the cylinders by turning the handle to the right. When the handle is in the latter position the passage is past the ball check and is not closed to any degree by the check.

The weight of the Disco starter complete, exclusive of the acetylene tank, is approximately 4 pounds. It consists of the distributer valve, the engine valve, both of which have just been described, and the necessary copper tubing that connects the acetylene tank with the distributer and the distributer with the different motor cylinders. When the distributer handle is turned to the right and then back to its original position a current of gas has been allowed to flow into each cylinder. This acetylene mixes with the air that is in the cylinder and forms an explosive mixture. The range of explosion of acetylene is very large as it will explode when in the proportion of 63 parts of acetylene to a hundred parts of air all the way to three parts of acetylene with 100 parts of air.

When the acetylene has been introduced into the cylinder it is necessary to fire it in the same manner that would be used in starting on the spark. The switch is turned on and the charge ignited. After the first explosion or two, the engine should pick up its own cycle and continue on the fuel supplied by the carbureter. As there is a charge of acetylene in each cylinder after the distributing valve has been opened, there will at least be four explosions from the acetylene alone, this should be sufficient to turn the engine over at least seven times.

Under Cold Weather Conditions

In cold weather conditions or after the car has been left standing for a long time in cool weather it will sometimes be necessary to put a heavier charge of acetylene in the cylinders or even to run the car on acetylene until it becomes sufficintly warm to run on the carbureter. To run the motor on the acetylene it is only necessary to keep the foot against the handle of the distributer valve, keeping it in an open position so that the gas has access to the cylinders.

In order that the starter will work satisfactorily it is necessary that the engine should balance, that is, at least one of the cylinders must be in a firing position so that when the ignition is switched on there will be a spark in one of the cylinders.

The installation of the Disco starter requires the replacement of the ordinary compression cock by the priming cock and valve previously described and shown in the illustration. The distributer valve is attached to the dash in some convenient location for starting and the copper tubes are run from the distributing valves down the engine valves. The standard valve attached to the acetylene tank is then removed and replaced by a special two-way valve, the larger tube of which is connected to the lamps while the smaller takes care of the starter. The copper pipes are then connected so as to give a flow from the tank directly to the distributing valve. After the lamps have been connected up and all the joints in the tubing made tight the starter is ready for use.

New Disco distributer valve, with and without dash plate; improved model 16 engine valve with self-cleaning feature

Movement for Domestic Motor Fuel Started in Germany to Oust Gasoline—What Mufflers Should Do and How—A Proposed Piston Improvement—Ten Years of Progress in French Automobile Construction Outlined By Expert

ROYALTY Urges Benzol for Fuel—Under date of July 25 Prince Henry of Prussia issued a call to German owners of automobiles exhorting them to turn to benzol as a motor fuel, mostly for patriotic reasons, and it is predicted that this call from the brother of the Emperor and the most influential patron of automobilism in the German-speaking countries will not pass unheeded. In the United States the benzol produced at gas and steel works from bituminous coal is used largely for enriching illuminating gas or is turned back into the heating processes incidental to steel production, while that contained in coal tar is largely wasted at present, but the question of a much-increased production of this fluid is also here entering upon the order of the day, since the price of gasoline has been increased about 33 per cent. during the past six months, and because the demand for benzol for the chemical industries is growing with the advancement of the latter, while coal tar is now required in large quantities for road improvements and for this purpose is more valuable the less benzol it contains. Under these circumstances the German attitude to the subject, as voiced by Prince Henry, becomes a matter of interest, even apart from its probable influence on the design of carbureters for automobiles intended for export to the German market. Prince Henry covers the subject as follows:

"Lately new tests have been made with benzol with a view to the displacement of the foreign product benzine (gasoline) by German-made benzol. A 40-horsepower Benz car was driven, for example, 669 kilometers from Hemmelmark near Kiel to Friedberg near Frankfurt am Main at an average speed of 40 kilometers per hour, and the fuel consumption was only 109 liters of benzol. A 100-horsepower Opel car was driven 680 kilometers, from Frankfurt am Main over Bochum, Dusseldorf, Cologne and back to Frankfurt, at 60 kilometers per hour, using 138 liters of benzol. The fuel efficiency was thus found to be at least equal to that of benzine. And as benzol costs only 24 pfenning per liter as compared with the present price for benzine of 45 pfennig per liter, a saving of nearly 50 per cent. is established.

"Several technical objections were formerly raised against benzol, such as soot formation and overheating of the cylinders. But these troubles can be obviated by suitable modifications of the carbureter, giving an increased air supply. The above mentioned tests, in which the heat generation and soot formation were normal, were made with a "Favorit" carbureter, which is designed especially for benzol. The high freezing point of benzol can be materially lowered by a small admixture of benzine and therefore constitutes no drawback. Of interest, and at the same time an argument for the suitability of this fuel, is the fact that so far more than 20 per cent. of the German benzol output has been exported for use in French automobiles.

"The national interest constitutes however the center of gravity in this matter. The prices of benzine are dictated to us from abroad, especially from America. German automobilism is at present completely dependent upon importations, and this means a great national danger in case of war. Every automobile owner should—entirely apart from the pecuniary saving involved—contribute his share toward a more general employment of benzol which is produced from German coal by German workmen and German engineers, so that in an emergency the benzol industry may be enabled to take care of Germany's needs. Through private negotiations, the German Benzol Society at Bochum, representing the united benzol industry, has with laudable patriotism declared itself prepared to guarantee that the price of benzol will not be raised within a measurable future, even though a strongly increased demand should raise its cost of production by making it impossible to turn out a sufficient supply as a byproduct.

"Therefore, German automobile owners, drive with benzol!" (Signature of Prince Henry).—From *Automobil-Betrieb*, middle of August.

Mufflers Which Increase the Power—In the agitation against the wanton use of muffler cut-outs on automobiles and motorcycles and the total absence of mufflers in aeroplanes and motor boats, the argument offered by those whose earsplitting practice gives offense is mainly based on the assertion that the muffler consumes power and tends to overheat the motor by retarding the escapement of the exhaust gases. L. Ventou Duclaux, one of the engineers connected with the testing laboratory of the Automobile Club of France, writes interestingly on this subject, in part as follows:

When the cylinders of a motor are fitted with exhaust pipes of a few centimeters in length, the burned gases which are expelled under pressure at the moment when the exhaust valve is raised from its seat strike the atmosphere at once. A clash is thereby produced to the right of the exhaust orifice, and it is this clash of gases which makes the noise. There is also established a counterpressure which has the effect of hindering the evacuation of the cylinders. Any expedient which serves to reduce this counterpressure results in reducing the noise of the exhaust.

On the other hand, if the escape of the burned gases is assisted in any manner it is possible to avoid losing power at the same time as the noise is reduced, and in certain cases power may even be gained through the suppression of the noise Already several years ago Mr. Lumet proved by tests made in the laboratory of the Automobile Club that for any given speed of a motor it was possible to add a little to its power by fitting it with exhaust pipes of a certain length. The muffler contest of 1905 had previously demonstrated that a certain muffler pattern dampened the noise without absorbing power but also that the majority of mufflers consumed a notable percentage of the motor power.

The muffler problem comprises two elements: (1) so far as the noise is concerned, to devise an apparatus which will make the burned gases empty into the atmosphere at a minimum speed and (2) so far as power is concerned, to promote the flow of the gases.

These two problems are usually solved simultaneously. It is sufficient to produce in an enclosed space of suitable capacity a decided cooling of the burned gases immediately at their exit from the motor. The cooling reduces their volume and consequently their speed. This cooling process must however not go beyond certain limits, as otherwise more power will be spent in producing it than can be gained from its effects. It can be brought about either by expanding the gases suddenly in a considerable space or by making them pass through tubes surrounded with circulating water. The same result can be obtained by circulating the hot gases in contact with baffle plates which absorb some of their heat, and leaving it to the apparatus to get rid of the heat by radiation. But in apparatus of this class power is necessarily consumed, since they block the exhaust more or less. Some constructors have also tried to reduce the speed of the hot gases by directing them into jets with opposed nozzles and playing one stream against another, creating eddies, but this method has not given good results.

In order to obtain the best results it seems necessary to cool the gas as much as possible while leading it out with a minimum of friction against the walls of the apparatus. It is consequently useless to aim for a radical cooling of the gases, for this cooling takes place so much more slowly as the difference is less pronounced between the temperature of the gases inside of the piping and that of the atmosphere, and experience shows that the resistance caused by passing the gas through the long piping, which may be necessary to effect such complete cooling, means a power loss. In fact, mufflers have now been designed which choke the noise very well and at the same time add slightly to the power. Tests made recently by the Automobile Club of America on 4-cylinder motors showed that a muffler, the origin of which is left unmentioned, produced the following results:

At 300 revolutions 13.5 horsepowers, as against 13 horsepowers with open exhaust.

At 1000 revolutions 43 horsepowers, as against 41.5 horsepowers with open exhaust.

At 1800 revolutions 47 horsepowers, as against 46 horsepowers with open exhaust.

Still more recently tests have been made at the laboratory of the Automobile Club of France with a Galaine muffler which is composed of three concentric tubings. The tube of smallest diameter is open at both ends and forms the part which is fitted to the exhaust conduits of the motor. It is cut with slits at right angles with its axis. The second tube is pierced with holes. The third is external and has no apertures. The burned gases are divided in two portions. One follows a straight line and empties directly into the atmosphere. The other passes through the slits of the inner tube and the holes of the second one and mixes in the final discharge with those which have followed the straight course. Toward the end of the apparatus an ejector permits the escape of the deflected gases. The passage of the gases in the central tube creates suction, drawing gas back through the slits and holes and further facilitates the expansion and discharge of the deflected gases.

A Renault 4-cylinder motor, 75 by 120 millimeters bore and stroke, fitted with this apparatus developed 7.08 horsepowers, while with free exhaust it gave only 6.72 horsepowers, which represents a gain in power of 5.35 per cent, all the while the noise of the exhaust was very satisfactorily obviated.—From *La Vie Automobile*, August 17.

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Trémolières Piston—Representing one of the first rational attempts at the improvement of piston design, with a view to the reduction of friction and safeguarding of the compression, the Tremolières piston was recently mentioned in these columns (THE AUTOMOBILE, July 18), the description being taken from one of the French automobile publications, but it would appear from the illustrations reproduced herewith, which are of a more definite character, that the description first offered was incomplete or misleading in some details. The objects aimed at in the Trémolières design are the retention and equable distribution of lubricating oil over the whole rubbing surface of the piston, and the means adopted for this end are oil-retaining grooves, connected by cross-channels and a considerable reduction of the actual rubbing surface below the piston rings. Fig. 1 (1) gives a view of the complete piston (with the piston rings A released from the confining pressure of the cylinders, so that the ends of the rings do not meet). Fig. 1 (2) shows the relations between the cylinder wall G and the piston surface below the piston rings, and Fig. 1 (3) shows details of the piston rings and the oil channels *a*, *c* and *d*. Those marked *a* are circumferential grooves upon the rubbing surface of the rings, while grooves *c* connect one ring's oil supply with that of the next one and grooves *d* carry oil behind the rings. BB are oil retaining zones turned in the piston surface, so formed that the lower portion *b1* of each zone acts as an oil retainer during the upstroke and the upper portion *b* likewise during the downstroke of the piston. CC are grooves connecting these zones. Only the lowest zone B1 is isolated. DD are the zones which remain in rubbing contact with the cylinder wall save for the oil films which the gas pressure and the resistance to the piston movements carry unto them from the adjacent oil-retaining zones. It is said to have been demonstrated that this construction—the weight of which, as compared with that of ordinary pisons, is not mentioned—has produced an increase of power and a velvety piston action in a number of French motors in which it has been tried.—From *Omnia*, August 17.

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Progress of Ten Years—An analysis of the changes which automobile design has undergone since it was first thought to be approaching finality is presented by the well-known engineer and editor, Charles E. Faroux, and is reproduced in the following with abbreviations.

It was during the first two years of this century that the operation of automobiles became sufficiently safe and regular to assure them their place among the standard means of transportation. Before that time all had been groping, and many automobiles of strange appearance were seen, but, as many will remember, from the year 1902 people began to recognize the different manufactures by the shape of the motor hood, which is equivalent to saying that other differences in the chassis became too inconspicuous to attract the notice of the general public. The age of refinements had begun. In looking backward over the period of ten years which has elapsed since, we shall see that certain organs of the automobile have been the object of a rapid evolution, that others have remained almost what they were, and that some, after undergoing various changes, have returned to the forms first given them.

The motor ten years ago was heavy and had small power,

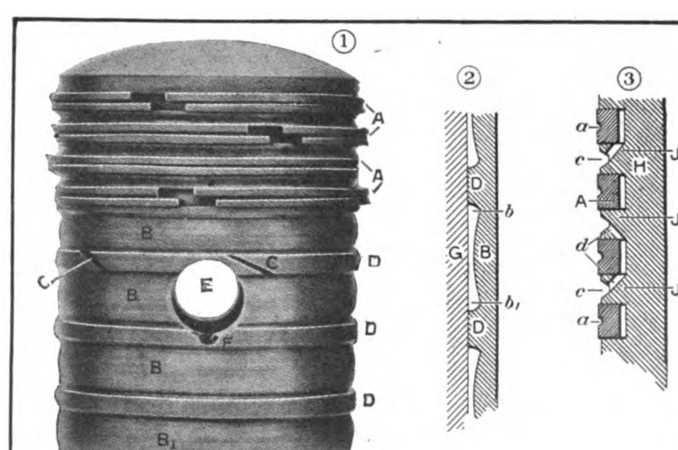


Fig. 1—The Trémolières oil-distributing anti-friction piston

low compression and small speed. It turned at from 750 to 900 revolutions per minute. Only a few single cylinder motors reached 1200 or 1400 revolutions and gave rise to technical arguments from which in course of time they have emerged victorious. Piston speeds and mean pressures were very low and the weights of reciprocating masses were considerable. The two-cylinder casting was the rule, the monobloc unknown. Admission valves were actuated by suction and the cam shaft gears were often exposed. The motor was regulated by blocking the exhaust on the hit and miss plan. Throttling was unknown. The unclutched motor turned in a series of spurts and checks, with the governor spasmodically tending to maintain a constant speed by the inadequate means just mentioned. Variations of the vehicle speed were obtained by maneuvering with the gear speed levers. The small 4-cylinder motor did not exist, and the number of cylinders was in practice determined by the power it was desired to obtain. Up to 8 horsepowers the motor had one cylinder, from 8 to 12 or 15 it had 2 and only above that 4. Six and 8-cylinder motors were in the state of samples or projects only.

Lubrication was effected by splash only. Variations related to the means for getting the oil into the crankcase—by hand pump, by gravity or by exhaust gas pressure. While valves were automatic, carbureters were not so. Their biblical simplicity included merely a float chamber and a jet. It was not till 1903 that Col. Krebs introduced automatic regulation of the gas mixture acting on the air supply, and later came the modern apparatus acting on the fuel, by which perfection is almost realized.

Ignition at that time was the nightmare of the chauffeur. Electricity by degrees triumphed over hot tubes but had for its source only dry or storage batteries. An ignition system for four cylinders involved a network of wires and of organs for the distribution and transformation of current which gave the driver many a sweet pause of perplexity. Low tension magnetos with wipe spark were placed in the market, but it was a long time before apparatus became known which would function for hundreds of thousands of kilometers without a murmur of trouble.

Vehicle frames existed in all possible variations excepting the one which is now standard; that of pressed steel. Panhard used armored wood. Charron forced wood into a steel tube which was afterwards rolled flat. Some used the rolled structural steels of commerce, but a large majority used the drawn tube borrowed from the bicycle industry, only larger. While strong and light, the latter did not lend itself well to convenient and sightly methods for mounting the various organs of the vehicle or the carriage body. The pressed steel frame first appeared in 1903 and gradually displaced all other forms. For axles, tubes were used and also solid oval or rectangular sections of forged iron or soft steel. The I-section came only with the Mercedes school of design which brought us annular ball-bearings, push-pedals, honeycomb radiators and multiple sliding gears with lateral displacement; also the modern form of the front wheel spindle and its mounting. Some firms continued to use adjustable ball-bearings, of the bicycle pattern, in the wheels up to 1906.

The rivalry between wood and wire wheels was sharp at this period, and the victory of the wood wheel seemed definite in 1903. Yet, the wire wheel returns now to give it battle again, but in demountable form and with many improvements. Vehicle springs were nearly what they are now, only shorter, more arched and less flexible. Often the rear springs were placed directly under the chassis, but on the whole the progress in spring suspension has been slight except in the matter of shock absorbers and elastic shackles which were unknown in 1902. [Shock absorbers were used on motor cycles and some racing *voiturettes* in France at that time, however, and auxiliary springs mounted as elastic shackles were known in the United States. The improvement in alloy steel spring materials which has taken place after 1902 would also seem to be so important a factor that the progress in spring suspension must be said to have been anything but slight or insignificant.—Ed.]

The cone clutch with leather facing was generaly adopted but was far from possesing the qualities which it has acquired since. It wavered between slipping and seizing. It was often mounted upon the transmission shaft and the cone easily came out of alignment with the flywheel. The clutch spring was usually supported on the motor shaft. The mounting of the cone on the flywheel axis, the equalization of the engagement and the interpositon of universal joints between the clutch and the gearbox were important improvements. The multiple disk clutches and the plate clutches were at the beginning of this period only projected.

Gear changes were in most cases made by the sliding gear system, though some belt transmissions still survived as well as some epicyclic gears actuated by expansion rings or brake bands. But the gearboxes gave three or four speeds by means of a single shifter, which made them very noisy by reason of the length of the shafts and the resulting vibrations. Peugeot, however, had multiple shifters controlled by cam grooves in cars with horizontal motors, which arrangement has been readopted in another form more recently. [The author refers perhaps to the cam-controlled gears in one of the Panhard motor trucks.—Ed.] But the lever with lateral displacement and its simple and direct control of the shifter forks was not known in France. Only the Mercedes cars were equipped with it. Direct drive on the high speed existed in Renault cars but was not general.

Bearings were usually of the parallel type and if ball bearings were used they were of the adjustable cone and cup pattern. The steels used in gears and for cutting gears were not those to which we owe the silence and strength of modern cars. The battle between chain and shaft drive had just begun, and the Paris-Vienna race, in which the light shaft-drive cars won, became the signal for the commercial victory of shaft-drive construction. It is notable that its first form was the same in the large features as that which won out recently at Dieppe: Two universal joints; the springs clipped to the axle; no push struts or torsion tube; all stresses transmitted through the springs.

As for worm drive it may be supposed that none had been thought of, but as a matter of fact a Dietrich car with horizontal motor was equipped with worm drive to each of the rear wheels, and Louet constructed a rear axle worm drive which he brought out in 1903. While the wheels and the cardan shaft drive seem to be returning to the forms in which they first appeared, other organs have remained practically unimproved; especially the brakes. Little has been done since 1902 to improve their efficiency. About 1904 the external camel's hair brake bands gave way to internal metallic brake shoes. That is about all. We still absorb the momentum stored in the fast-moving car by first transforming it into heat by means of friction. Braking by the motor has not yet become general, perhaps by reason of the cost of the required construction. The steering system was established so well in 1898 that the improvements effected since that date relate only to those refinements which make the guiding of a modern vehicle so easy. The steering post has been given more slant, the tie-rod has found shelter behind the axle, lubrication and facilities for taking up play have been provided where needed, but the general design remains unchanged.

From this brief synopsis of the changes which have come over the automobile during the past ten years it will be seen that, although the chassis in its external aspect differs but little from its progenitor of 1902, the sum total of improvements in the design of details coupled with the gains accomplished through the use of better materials and a complete revolution in production methods make the vehicle of 1912 stand apart from the earlier type as sharply as modern man is distinguished from the cave-dweller. And in this résumé no account is taken of the advances in the forms and conveniences of the carriage work.—From *La Vie Automobile*, July 27, August 10 and 17.

American Cars in England

Change of Opinion Regarding Our Product and Increased Sales Command Formulation of British Defense

Organ of English Industry Voices Sentiments and Ideas of United Kingdom's Manufacture and Trade

FOR the past few years, during which the average price of the American automobile has been lowered continually, the manufacturers of this country have made determined and concentrated efforts to break into foreign markets, especially those of Europe, Great Britain and Australia. They have been singularly successful in the case of the last-named continent, while their success in continental Europe has so far been rather limited. But in England, the number of American cars has been increased constantly of late, and this development has given rise to a serious agitation of the British industry and trade.

While, in the beginning, the Britons rested on the hope that the inferiority of the American product would soon stop and nullify the influx of such cars, as the British imports of American bicycles had lasted only a short time, the trade of the United Kingdom soon proved to be mistaken. As *The Motor* (London) recently remarked, the Americans had learned their lessons in the bicycle days and now profited thereby. The quality of cheap American automobiles is never out of proportion to the price paid for them, and, as a result, their market among the middle class is constantly increasing.

Our above-mentioned contemporary has analyzed the situation and has arrived at the conclusion that the American success in Great Britain is due to five reasons: (1) To the low cost of production and low price of the cars, which is made possible by the standardized production methods applied in their manufacture; (2) special inducement to the purchasers of the cars in offering them completely equipped machines, which gives the car the appearance of a bargain in another way; (3) the ample reserve power afforded by the use of relatively large power plants; (4) simplification of the mechanism, that is, power plant and driving units; (5) energetic business methods.

Merit of Our Product Recognized

The fact is, that, though for years American cars were called nasty and cheap, the British public has come to recognize that the Western product is not only a mechanism by the use of which one may gain automobile experience for little money before investing in a larger and more costly car of European or British make. The people have come to see that the American automobile is a low-priced but meritorious product, the cheapness of which is due to the great production of American plants and the standardized basis on which this production is attained. True, the low-priced American car is not on a par with the refined machines turned out by several high-class European factories; but, as the former gives satisfactory service and has a fair length of life, it appears to be worth the money which the British pay for it.

A connoisseur or expert will, in most cases, buy an automobile at any price, provided the quality of its material and workmanship warrant longevity. But even they do not buy with a view of keeping a car forever, and this would be the only condition under which the average purchaser could afford to invest in a high-priced car; so that every reasoning induces him to choose a low-priced machine. For him the American automobile is the solution of the problem, and the satisfaction which the buyers of these cars get out of their machines serves to constantly increase the sales of the latter.

The great engine power and simplicity of mechanism in American cars are bound to impress the purchasers favorably. In addition to the relative cheapness of American machines, these factors complete the democratic appearance which always attracts the average buyer. One more factor tending to strengthen this impression lies in the American business, that is selling methods which are named as the fifth large cause of the progress of American automobiles in Great Britain. The American salesman, shrewd and direct at the same time, and to whom salesmanship has become a science, is entirely different from his European confrere who always stands on a different plane than his prospective, either above or below him. The congeniality of the American salesman toward his customers is one of the largest factors in the introduction of United States products in foreign countries and is one of his greatest assets, which has proved valuable all over the world. His competitors may despise his methods, but they are all beginning to recognize their effectiveness, and ultimately will come to adopt them at least in some measure unless they desire to sacrifice their trade.

The English are beginning to see that nothing except concerted effort of all their automobile industry and trade could stop the American tide or turn it to advantage. As *The Motor* (London) says, the battle will have to be waged in every department from the designer to the advertising man and salesman. Americanization, vaccination of British effort with American ideas, is the only way of balancing the invasion of mass-produced automobiles. It will not do to merely build small and cheap machines which are miniature copies of the large, expensive ones; the lesson to be learned cannot be learned from any but Western teachers.

Automobile Business a Pioneer

It may be said that the coming of such a transformation as is foreshadowed by the British article cited several times, marks the beginning of an era of general introduction of American industrial and business methods throughout Great Britain and Europe. It is the era of scientific management, of maximum efficiency, of the most practical application of science which has been conceived by American business engineers under the pressure of American conditions. The foreign industries may not see the advantages of scientific management as yet, but they are bound to awake to them sooner or later and to avail themselves of this new key to the still unclosed gates of success. The start which we have, on this side, in this new line of effort, is sufficient to keep America ahead in the race, provided she keeps pace with foreign engineers and the work evolved by them.

And how is supremacy to be preserved by us? The first steps have been made; engineers are constantly traveling to Europe and Great Britain to study the developments of quality made by the engineers who are active there. This work must be continued and increased by established and developing engineers who not only visit the factories to study the results of foreign work, but also the mental methods by which transatlantic engineers develop their new ideas, by which they work out the improvements of present designs and constructions. If there is one field in which we have much to learn from foreign engineers, it is their methodical thinking methods, for it is only on the strength of this that European automobile engineers have been developing, during the last few years, mechanisms which have entirely changed the appearance and the construction of automobiles. Of course, it was not all their work, but their work, done in proportion to their number, was very remarkable.

What Will Be Required of Us

In competing with the British we have to proceed from quantity to quality, while they must go the opposite and more difficult way. It is for us to take prompt advantage of this fact. In doing so, we have a wide basis to build upon and whatever materials and tools and, last but not least, money, there is required in the developments we have to undergo, is at hand. But the well-determined effort to overcome our shortcomings and attain whatever necessary qualities we do not possess now, is all that is necessary for our success.

Checking Cars in Garages

There Are Two Ways of Keeping a Record of the Time When Cars Enter and Leave the Building

Checking Sheets and Time-Clocks Have Advantages if Utilized in the Right Way

MR. AUTOMOBILE OWNER: If you were to be summoned to court today and another car owner claimed that his machine was damaged in a collision with your machine last night; if you knew you had been at home last night and that proving an alibi for your car could save you the expenditure of a large sum of money for damages; would you be in a position to conclusively establish such an alibi? This case may not happen frequently, but such an incident may occur at any time. Is not the logical conclusion that an owner should know the whereabouts of his car during every hour of the day or night?

Mr. Garage Man: You are in a position to keep for the automobile owner entrusting you with the care of his car a full record of the time when his car enters and leaves your garage. He wants such a record, he needs such a record; and it is you, and only you who can provide it. It is your business to watch over his car while he is not using it. You may not be legally obliged to keep such a record for him, but knowing that service, complete and efficient, is the one basis on which you may build up a large and profitable business, you will not refuse his just demand. There is a choice of means and ways by which you may keep such records for your patrons, and the more elaborate and reliable they are, the more valuable will be the result of your effort to yourself and to your patrons.

There are two principal systems of recording the time at which cars leave their garage and return to the same. They differ as to the degree to which the personal equation is involved in their execution and to which the possibility of a mistake enters into them. The first system consists in the use of large sheets which are suspended on boards near the garage entrance and on which the number of every car and the name of its owner, together with the time, are entered every time the car passes through the door. The second system consists in the use of a daily clock card for every car in the garage. The time clock and card rack are in the charge of a special boy or clerk.

It stands to reason that both of these systems, if carried out with an efficiency of 100 per cent., work equally well. But in this case the second system has a considerable advantage over the first, mainly because once the cards are filled out with the name and number of every car, the clerk has nothing to do except to stamp them from time to time. In the first system, on the other hand, the name and number of the car, perhaps even the name of the driver, must be written on the sheet by hand, in addition to the time of the car passing through the door. This shows that in case of a large garage, where a car passes through the door every minute, the sheet method of recording cannot be kept up save at the expense of correctness, as the man entering the times on the sheet is bound to get very tired in a short time.

In selecting a time system several things have to be taken in consideration. These are:

1—The number of cars kept at a garage.

2—The average frequency with which the cars housed at the garage leave and enter the same, giving an idea of the average number of times a car passes out of and into the garage in a day.

3—The resulting average number of cars passing through the door during an hour of the average week day with average weather.

4—The class of patrons the garage caters to and their expectations of service; that is, the extent to which they expect the garage to keep tab on their chauffeurs.

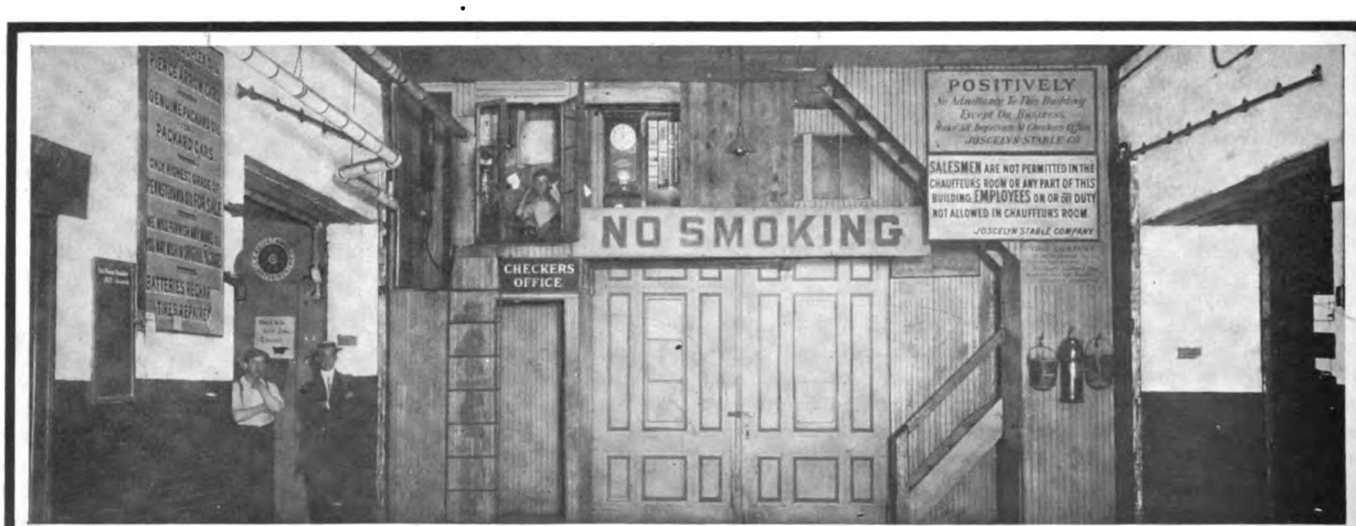
The sheets used by various companies for recording cars entering differ greatly in the way the details of information are arranged on them, and we therefore refrain from illustrating a large number of them, giving only a few representative designs which contain practically every point brought up in connection with this class of records.

Number of Cars Served a Factor

It is a matter of course that the number of cars served by a garage has a large bearing on the design of a checking sheet. If there is a large number, say more than a score, of cars kept at the garage, there should be not more than one line a day devoted to each car.

There are patrons who are less particular about the whereabouts of their cars during the day than others. As a rule, however, an automobile owner prefers to know his car is in the garage when he is not using it; for, while there are some chauffeurs to whom one may safely entrust the car, these can hardly be said to be in the majority. Most owners are very positive about their desire to have no one except themselves use their cars. The more strict the patrons of a garage, the more positive and unfailing must be its records.

One form of recording sheet which is very elaborate and gives an opportunity to enter a car on four trips a day, that is, leaving the garage four times and returning, is used by the White



Entering the Joscelyn Garage, New York City, every car passes the checker's office where its time is recorded by a stamping clock

WHITE GARAGE
DAILY REPORT
DATE ....

NUMBER	OWNER	A. M. OUT	A. M. IN	A. M. OUT	A. M. IN	TAKEN BY	BROUGHT IN BY	P. M. OUT	P. M. IN	P. M. OUT	P. M. IN	TAKEN BY	BROUGHT IN BY

Form Y R 31 500 4-12

RECORD OF CARS

NAME OF OWNER	NAME OF DRIVER	TIME OUT	TIME IN	REMARKS

Form 1—Checking sheet used for its own cars by the White Company. Form 2—Checking sheet used for infrequent callers in the Packard establishment

company, 631 West Fifty-seventh street, New York City. This blank, Form 1, is 1 by 2 feet, is of white paper, ruled with red and blue lines. It provides a space for entering the name of the car owner, that of the chauffeur if he drives the car, and the license number of the car.

Form 2, which is shown under Form 1, is used by the Packard Motor Car Company, of New York, for cars coming in for repairs. The names of the owner and driver of each car are entered on this sheet, together with the time of arrival and the time of departure. The Packard company does not conduct a public garage and therefore this system covers comparatively few cars per hour. Moreover, the case of cars coming in once and then not for another month or so, makes it impossible to use a system other than a sheet on which the cars are entered by hand.

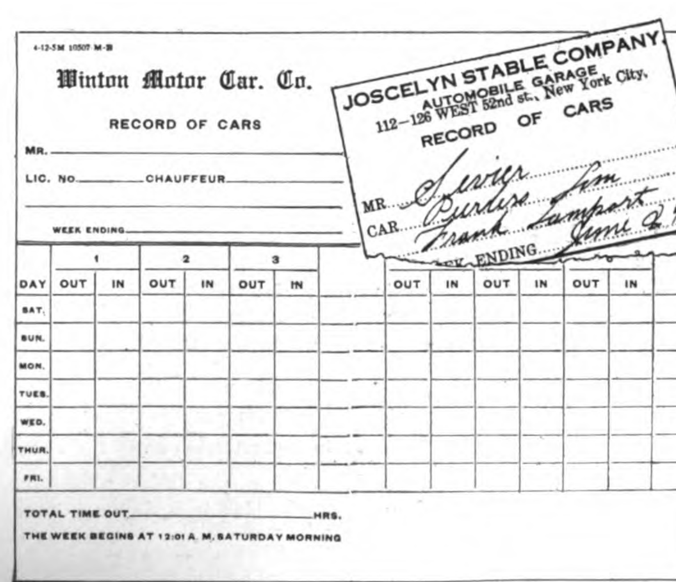
Packard Has Time-Clock System

For its own cars, demonstrating machines and those owned by members of its organization, the Packard company uses a time-clock recording system, in which the International type of recorder is used, together with recording cards of the ordinary design. As Form 3 shows, this type of clock card differs very little from the sort used in keeping time of shop workers. The design is practically the same, only the six columns are named differently and allowance is made for the names of car owner and driver on the card, as well as for the number of the car. Another difference between this card and the shop time card is that the design here shown is twice as wide, but folds to the ordinary size, so that it may be kept on the common type of card rack. The double card, however, gives an opportunity for making twelve records on it, six each for entering and leaving the garage. The cards are kept on the rack in the alphabetical order of the respective owners' names.

Form 3 is used by the Winton Motor Carriage Company, Broadway and Seventieth street, New York City, and is made in duplicate, one copy being on a tan pasteboard card and the other on thin white paper, which is sent to the car owner at the end of the month. If the owner also keeps track of the times when he uses his car, it is easy enough to see whether his driver takes the car out without his knowledge. The Joscelyn garage uses another type of clock card, which differs but slightly from Form 2 and is shown as Form 4.

The latter company handles 300 automobiles daily in the busy season and the cars pass by the recorder at a rate of one a minute. To insure the recording of every car and give the recorder a wide range of vision, he is located in a balcony about 15 feet above the ground, whence he can see part of the interior of the garage as well as the door which is opposite his post.

Opinions on the value of checking systems for cars are naturally divided, and, while the advantage of having a record is not to be underestimated in certain cases, there are also arguments being raised against conducting a recording system. One of the greatest advantages became obvious in the case of a New York automobilist several months ago. His car was said to have been seen at a certain time and place and to have figured in a collision. The records, however, showed that the car was in the garage at the time and the owner of the car thus had an excellent alibi. On the other hand, some garage men hold that most recording boys or clerks are other than absolutely reliable and therefore subject to being bribed by chauffeurs who want to go out on a joy-ride without having any record made of their departure. One garage man put the situation in this drastic way: "If your chauffeur goes joy-riding, fire him and get one who does not." He was very positive in contesting the value of a system in which the personal equation left any opportunity for error and fraud and stated that few owners demand that the garage keep tab on their chauffeurs. There is little opportunity for such abuses, however, if records are made with a carbon copy which is mailed to the owner.



Form 3—Winton's time-clock card, which is made in duplicate
Form 4— Joscelyn Garage uses similar clock card

Cure for Troublesome Gearset; Dimensions of the Jay Eye See; Splash System Criticized; In Favor of Metric System; Believes Radiator Useless; Care of Inner Tubes; Tire Chain As a Mud Hook

Has Trouble with Gear Shift

EDITOR THE AUTOMOBILE:—I have noticed the discussion in the issues of THE AUTOMOBILE for August 1 and 8 on gear shifting and would like to state my case.

The machine is a 1912 Maxwell Special and shifting from low gear to intermediate makes a grinding noise. The heavier the car is loaded the louder the noise. From intermediate to high it is all right. After shifting gear, on any speed, the clutch makes a rumbling noise along with jerking of the machine.

This machine has metal multiple-disk clutch and progressive type transmission.

I have taken all the grease out of the gearbox, but can find nothing wrong except that the end of the square shaft that carries the sliding gears toward the clutch has about 1-8 inch play. Should the bronze bushing that it runs in be loose in this bearing? I also notice that the countershaft runs at the same speed when shifting from low gear to intermediate as when the gears are engaged. It also runs at a high speed when the gears are standing in neutral position. This shaft will stop running only if the clutch pedal is pressed clear down to the floor board, but this cannot be done when the car is in motion as the brakes, being connected with the same pedal, will stop the car.

The clutch has been washed out with gasoline and new oil put in the clutch box. Any information you can give will be greatly appreciated.

New Albany, Ind. F. KAHLER.

—You are evidently troubled more by a dragging clutch than anything else, although there might be a small amount of trouble in the clearance you mention. You have probably noticed that you are compelled to move the clutch pedal through considerable distance before the clutch begins to disengage. This should not be the case, for, in this car, the brake is interconnected with the clutch and should you be compelled to press down too far the forward progress of the car is checked on account of the application of the brakes. The clutch should be adjusted so that the pedal will act more quickly in disengaging it. The linkage of the clutch is shown in Fig. 7, as is the point for making the desired adjustment, the latter being marked A. The length of this lever can be changed to bring the pedal to the desired position.

The play which you mention in the bronze bushing should not prove serious other than having a tendency to make the car noisy on low gear. It would be well to give the clutch another thorough cleaning with kerosene or gasoline in order to be sure that it will be in its best condition.

Jay Eye See Dimensions Given

Editor THE AUTOMOBILE:—Will you please tell me the bore and stroke of the Jay Eye See car? Has it a six or a four-cylinder engine?

Alton, N. H. H. B. TIBBETTS.

—The Jay Eye See car is a four-cylinder Fiat machine. The motor has a bore of 9 1-3 inches and a stroke of 8 5-8 inches.

Does Not Like Splash System

Editor THE AUTOMOBILE:—I have been very much interested in the discussions that are being carried on through the pages of THE AUROMOBILE and believe that there is room for one very valuable one along the lines of whether or not the splash system of lubrication has really justified itself. I am a firm believer in the force-feed system, because it puts the oil in the spot where it is needed, and, what is more, puts the very quantity that experience shows is required into each particular bearing. I believe that when the motor speeds up to a considerable extent the splash system does not adequately take care of the lubrication, unless there is some auxiliary means of adding to the supply in the crankcase by the use of a small hand pump or some other such device. Besides the drawback at high speeds, it has another at low. That is when the car starts off there will generally be a large cloud of blue smoke emitted which alone shows that much unnecessary oil is being burned. When the motor is running idle at the curb with a splash system of lubrication it does not take the spark-plugs very long before they become choked to such an extent that the motor dies. I am at a loss to know what the defense of the splash system can really be when it would not be very much more expensive to install a good non-splash system.

Newark, N. J. LOUIS BOURGEOTTE.

Likes the Metric System

Editor THE AUTOMOBILE:—I have read with much interest the first part of your article on Metric or English Measurements, and wish to be allowed to make a few remarks on just one point.

You say that "workmen are all educated to the foot, inch and yard system and it would take considerable time to get them accustomed to any other method of determining the size of any piece."

I take exception to that statement, as my experience is to the contrary.

When we established our American factory a year ago we decided to keep the metric system so that our parts could be interchangeable with the parts made by our European factories. I wish to say that we have never found one workman who had any trouble on account of figuring in millimeters. Our operators throughout use metric scales and metric micrometers, and I wish to say that the use of this latter is somewhat easier than that of the English one, as the pitch of the micrometer screw is exactly ½ millimeter, whereas the pitch of the English micrometer is 1/40 inch.

I agree with you that changing from one system to the other would be rather expensive, as it would involve a change in the machinery and a change in the measuring devices.

The automobile industry in France, with which I am familiar, uses a great deal of American machinery, which is proof that the builders are able to supply machinery built for the user of the metric system. In fact, I have catalogues of American tool makers which offer the choice of either English or metric adjustments, according to the desires (and wishes) of the purchaser of the machinery.

I believe that the changes made would affect only such parts as lead screws or nuts in lathes or milling machines, and, of course, in some cases, changing these parts would involve considerable expense and delay.

Changing of measuring devices would, in most shops, be still more expensive, but, once this change is made, would not the saving in time in the drafting room alone pay for it in a very short time?

Detroit, Mich. G. R. HEFFLY, Zenith Carburetor Company.

Considers Radiator Useless

Editor THE AUTOMOBILE:—For one interested in the internal combustion motor the unraveling of its mysteries is an absorbing study. The individual views and ideas are so varied concerning it that the beginner in search of information thinks that a book telling all that is known and unknown about it would be a big volume, especially the unknown part. Speaking of two-cycle or four-cycle it seems to me that the four-cycle can be so improved as to enable it to easily surpass the two-cycle. A lively discussion in a journal is an interesting and useful source of information, and Mr. Tismer, in his Communication, states he is looking for a fight and moves to abolish the radiator. As to that, I can heartily second the motion, for, to me, the almost general use of this device is no positive proof of its necessity; but his statement, "one but has to look over the efforts to improve engines by more perfect scavenging and the failure of those efforts to look askance at an attempt towards improvement in that direction," seems to lack the pioneer-like traits of character that he deplores in "present practice." This has induced me to send in a description of not only an air cooling arrangement, but also a scavenging arrangement that is, I believe, about as nearly perfect as anything that can be secured. I invite free criticism. Referring to the sketch, Fig. 1 represents the completion of the explosion stroke. As the crank reaches the outer, or lower, dead center the slide valve begins to open and is wide open by the time the piston begins its return stroke. The burnt gases, if under any pressure, go out under their own volition and are further expelled by the returning stroke of the piston until it has almost reached the port, when the cam on the half-time shaft begins to open the poppet exhaust valve at the top of the cylinder. The piston, passing the slide valve port, continues the expulsion of dead gases from the upper end of the cylinder through this poppet valve unto the end of its stroke. Meanwhile, the shaft, operating the slide valve, running at crankshaft speed, but about 90 degrees late, has closed the outer end of the port, this port being situated about the middle of the piston stroke. The piston then begins its return or suction stroke. The poppet valve, remaining open, draws in the cool air from the atmosphere (the burned gases being sent out with such force as to be beyond the recovery of intake) until it reaches about half its downward stroke, the cam having then moved far enough to allow the spring to close the poppet valve. The suction opens the inlet valve from the carbureter, admitting the explosive mixture until the end of the suction stroke, when the inlet valve closes, the crank again passing the lower dead center. The slide valve again opens and the piston on its return stroke drives out through the slide valve port the air that has come through the upper end of the cylinder, cooling it and driving downward ahead of it the remaining foul gases that were in the compression space, perfectly scavenging it. Both the air and remnant foul gases are driven out. The piston passing the port, the mixture is compressed in the upper end, the spark made and the cycle repeated. If efficiency means the utilization of all the heat units in available power, can an engine that expands only to the point it compressed from be efficient? In Fig. 6 a charge of 4 inches is compressed, while in Fig. 1 it is represented in an explosive stroke of 8 inches. Note the simplicity of accomplishment; no transfer ports, nor passages, all inside the working cylinder, on one side of the piston and with no loss of time. The advantage is that, while using the same quantity of fuel as other engines, we get twice their crank leverage. The further expansion utilizing the heat in power development instead of wasting it in a muffler with its back pressure losses, doubling the time for the complete combustion of the fuel. Is not this absorption by expansion in longer power stroke utilizing the heat that is otherwise thrown away through the radiator greater efficiency through this same effort of better scavenging? Further, consider low speed efficiency, the loss by throttling. In this design, for a less power stroke, having no throttle valve, the lower end of the push-rod is moved in toward the cylinder, the angular end of the rod coming in contact with the nose of the cam delays the closing of the poppet

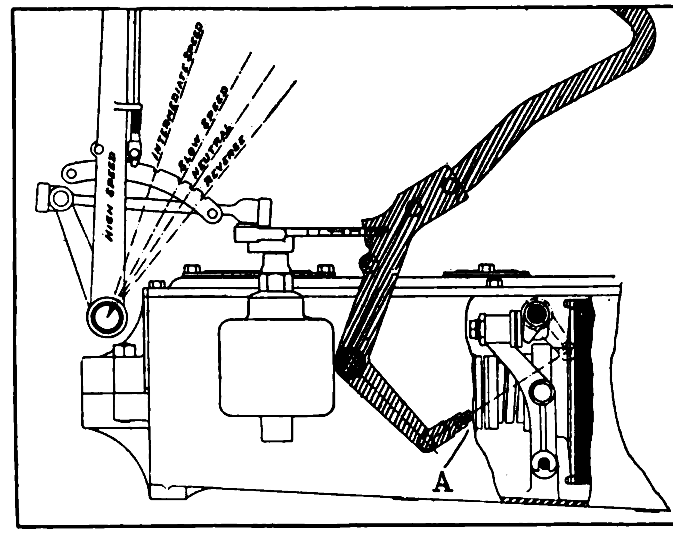


Fig. 7—Showing the arrangement of the clutch on the Maxwell Special

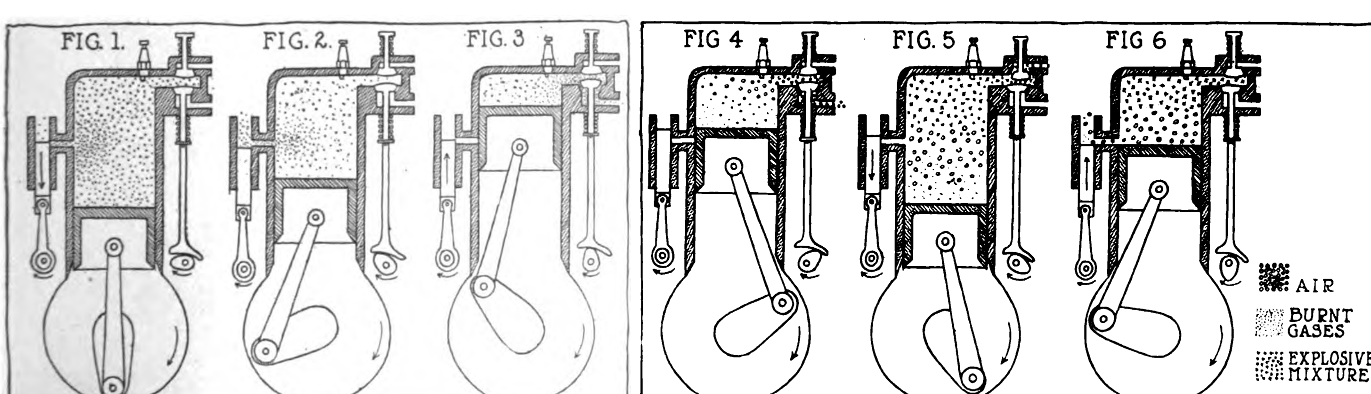


Fig. 1—End of explosion stroke. Fig. 2—Beginning of the scavenging stroke. Fig. 3—End of the scavenging stroke. Fig. 4—Start of suction stroke, only air admitted. Fig. 5—Inlet of explosive mixture. Fig. 6—End of stroke with cylinder scavenged

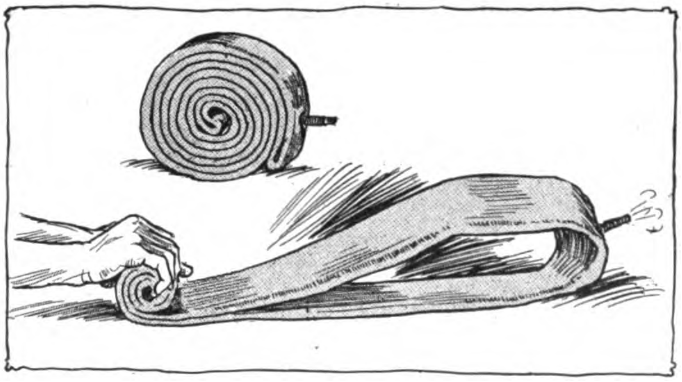


Fig. 8—Proper way to roll an inner tube to make it lie flat

valve, which delays the opening of the inlet valve admitting less explosive mixture, air taking its place. The compression pressure is always constant. The charge is ignited always under the same pressure, less fuel to be burned, less heat units liberated, less power but proportionally as the air acts as an absorber of the heat giving it out as power by expansion, giving a very economical and flexible effect. A six-cylinder engine of this design would take a car as far on a gallon of gasoline as any single-cylinder, not excepting the Only car which, it is claimed, went 40 miles on a gallon. As the perfect scavenging prevents carbon deposit, with a suitable carbureter this design will burn kerosene week in and week out. A gallon of kerosene being equal to about 1 1-2 gallons of gasoline, the kerosene having a little gasoline in it to facilitate starting. I will state that a carbureter, to burn kerosene, can be so small that, with the exception of the air valve, it can be put in one's vest pocket (my engine being 3 by 8). Kerosene can be bought wholesale for 7 or 8 cents per gallon, while the average man who buys his gasoline in small lots pays 22 to 25 cents per gallon. Consider the economy of this engine. What would be the increased efficiency to the average man's pocketbook? Now I would like to know the superior advantages of Mr. Tismer's high temperature; would the wearing parts last as long or longer? Would working under a hood on a hot summer day make it more pleasant for a driver? Would it improve the quality of any woodwork that happens to be near it, eh? He says he can "burn any old thing." Now, I thought it was the function of the carbureter to prepare the mixture for burning. Why make the cylinder do its own work and the carbureter's also unless he dispenses with the carbureter. A gun is an internal combustion engine, yet you do not hear of a sportsman heating his gun to make a long shot. A means of proper mixture may produce a great efficiency with very cool cylinder walls. He uses a compression pressure of about 80 pounds. Of what advantage would this be on a four-cylinder car when a very low speed is desired or climbing a steep hill. It would require a large and heavy flywheel, would it not? Is high compression absolutely necessary to rapid ignition and burning? I have burned kerosene when the compression was so low that turning the crank at twenty-five or thirty revolutions per minute there was not enough pressure to move the crank 1 inch from top dead center, owing to a leaky piston. Yet the engine ran as fast as the unbalanced conditions would allow, between 800 and 900 revolutions per minute. The cylinder was cool enough to permit putting a hand on it. Would not a longer power stroke than compression stroke be a better power, for hill-climbing, etc., would not require a high compression.

Bradenville, Pa. JOSEPH MUNDEN.

Take Good Care of Inner Tubes

Editor THE AUTOMOBILE:—I am driving a Hupmobile runabout and using 30 by 3-inch tires. Of late I seem to have run into a streak of bad luck, as every time I go out I am forced to make at least one tire change. In a short run the other evening down to Seaford, L. I., I had a puncture and am still at loss how to explain it except that there was a deep cut in the casing that possibly allowed a sharp stone to enter and cut the tube. I replaced that tube and was soon on my way. After going some distance we were compelled to stop, owing to the fact that the bars on a railroad crossing were down. After we had stopped I could hear the hissing sound of escaping air and soon saw that the same tire was again troubling me. I took out the tube which I had just put in and saw that there was a small cut in that also. I thoroughly examined the casing, but could find no nail or other sharp object. Is it possible that a cut in the casing would allow a sharp stone to penetrate and cut the tube?

2—I find also that very often the inner tube is stuck to the shoe when I remove the tire. What is it that causes this? It sticks so fast that at times I am afraid to pull it off for fear of tearing the tube. What can be done to prevent it from sticking?

3—One more tire point I should like to know is the best way to carry inner tubes. I use the clincher type of tire and when I make changes it takes me about 20 minutes from the time I first notice the puncture before I get started again. Anything that can shorten this time would be very welcome to me as I detest the work of dealing with articles that possess the usual obstinacy of the inanimate when a man is in a hurry.

Freeport, L. I., N. Y. OWNER.

—It is very possible and often happens that stones cut inner tubes by penetrating an opening formed by a cut in the shoe. The cure is to go over the cuts in your shoe before every trip and, wherever you find a cut, seal it with one of the plastic compounds which are for sale by all the large tire manufacturers. A more permanent job can be made with a vulcanizer and it would repay the trouble that it gives by increasing to a remarkable extent the tire mileage which you will be able to secure.

2—The inner tube will not stick to the shoe if you will powder it thickly with tire talc before putting it into the shoe. When there is no talc, the heat generated by running will be sufficient to vulcanize the tubes and shoe together to a sufficient degree to cause considerable adhesion.

3—You will have no difficulty in carrying the inner tubes flat, as they should be kept, if you are careful to exhaust all the air that is in them. To get all the air out, first remove the entire valve by turning the cap upside-down and using it for a screw-driver, as shown in Fig. 8. This will take the entire valve out and allow the air to escape readily. Pick the tube up and allow the part with the valve to hang down so that it will be possible to start rolling from the other extremity, Fig. 7. By the time the tire is rolled up all the air will be out and the tube

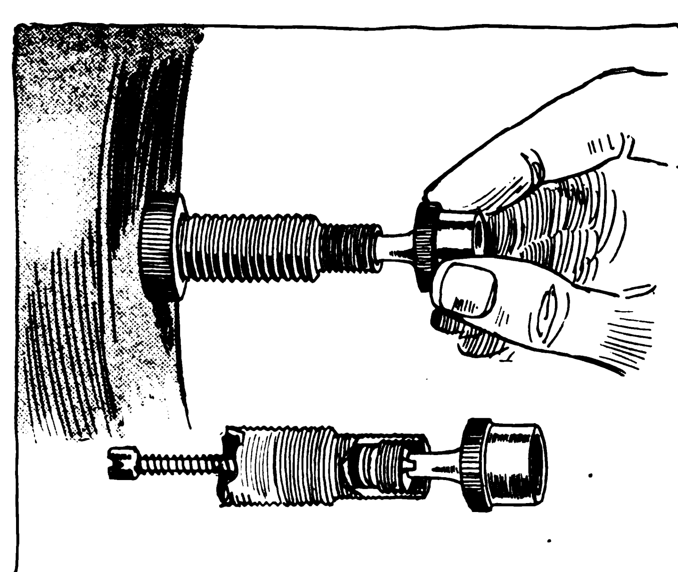


Fig. 9—How to remove the valve to allow all the air to escape

TABLE SHOWING THE RECOMMENDED TIRE DIMENSIONS AND PRESSURES FOR ANY GIVEN WEIGHT AS COMPILED BY SOME OF THE LEADING MANUFACTURERS

MICHELIN

Tire size	Maximum axle load	Pounds inflation
3 inch	600-1000 pounds	50-60
3½ inch	800-1600 "	50-70
4 inch	1300-2200 "	60-75
4½ inch	1400-2600 "	60-80
5 inch	2200-3200 "	70-80

UNITED STATES

Tire size	Weight per front wheel	Weight per rear wheel	Tire size	Weight per front wheel	Weight per rear wheel
28x2½	275	225	36x4	900	750
28x3	425	350	40x4	1000	850
30x3	450	375	42x4	1050	900
32x3	450	375	32x4½	950	750
28x3½	500	425	34x4½	1125	900
30x3½	550	450	35x4½	1175	935
31x3½	575	475	36x4½	1225	975
32x3½	600	500	37x4½	1260	1010
33x3½	625	525	38x4½	1300	1050
34x3½	650	550	42x4½	1450	1200
36x3½	700	600	34x5	1200	950
30x4	750	625	35x5	1250	1000
31x4	775	635	36x5	1300	1050
32x4	800	650	37x5	1350	1100
33x4	850	675	39x5	1450	1201
34x4	875	700	43x5	1550	1400
35x4	885	735	37x5½	1400	1150
			38x5½	1450	1200

Inflation 20 pounds for each inch of tire diameter, i.e., 3-inch diameter tires have 60 pounds; 4½-inch, 90 pounds, etc.

GOODRICH

Tire size	Weight per front wheel	Weight per rear wheel	Inflation pounds	Tire size	Weight per front wheel	Weight per rear wheel	Inflation pounds
28x2½	275	225	55	38x4	950	800	75
30x2½	275	225	55	40x4	1000	850	75
28x3	425	350	65	42x4	1050	900	75
30x3	450	375	65	32x4½	950	750	80
32x3	450	375	65	34x4½	1125	900	80
34x3	475	400	65	36x4½	1225	975	80
28x3½	500	425	70	38x4½	1300	1050	80
30x3½	550	450	70	40x4½	1375	1125	80
32x3½	600	500	70	42x4½	1450	1200	80
34x3½	650	550	70	35x5	1250	1000	85
36x3½	700	600	70	37x5	1350	1100	85
30x4	750	625	75	39x5	1450	1200	85
32x4	800	650	75	41x5	1500	1300	85
34x4	875	700	75	38x5½	1450	1200	90
36x4	900	750	75	40x5½	1600	1350	90

FIRESTONE

Tire size	Weight per wheel	Inflation	Tire size	Weight per wheel	Inflation
28 to 36x3	350	50	34x4	700	75
30x3½	450	60	36x4	750	75
32x3½	550	60	32x4½	700	85
34 and 36x3½	600	60	34x4½	900	85
30x4	550	75	36x4½	1000	85
32x4	650	75	36x5	1000	90

will be found in such a condition that it will be comparatively easy to put it in a very small box. When the tube is in the box it should be thickly dusted over with the tire talc, as this serves to keep the rubber from becoming sticky, especially in hot weather, when the folds are likely to adhere to each other.

Never carry envelopes or shoes uncovered so that they are exposed to light, to temperature variations and to oils and grease. Very strong light, such as sunlight, has a tendency to make tires brittle so that they will crack in places. This at the same time takes away their elasticity. Tires, when stored by the man who knows, are placed in dark rooms where the temperature is kept as nearly constant at 50 degrees as possible, for temperature variations age them prematurely.

Interested in Over-Tiring

Editor THE AUTOMOBILE:—I have a 1911 Cadillac which has rims that take 34 by 4-inch tires. Would it be advisable to use larger shoes than these? If so, what size could be procured that would fit these same rims? The rims are of the Q. D. type. Would larger shoes affect the running of the car in any way? A discussion on this topic would greatly interest me and I should imagine many other car owners would find it of great value.

New York City. F. D. MARTIN.

—Regardless of the make of your car it has been proven before now that it is most economical in the end to slightly over-tire your car. The size of the tire is determined by the weight it has to carry and the experts in the employ of the different tire companies have figured out very closely just what tires should be used with a given weight. The car should be first carefully weighed when fully loaded for touring. That is, the passengers should be placed along with all the baggage that would be carried on a tour. If it is not feasible to get the weight of the car in that condition, it should be loaded up to the extent that it would be on a long tour and the weight on each axle taken in that condition.

The weight on each axle should be taken separately, as the loads will be different in front and rear. By running the car up on the scales which will be found at any railroad station the whole weight may be found as well as the weight on the rear axle. When weighing one axle at a time it would be well to get the car level by means of a spirit level before the weight is taken. If this is not done there will be a slight inaccuracy. The tires that the car makers recommend for each weight can be seen by the accompanying table, which expresses the ideas of the leading tire men. Should it be desired to over-tire the car, the next largest size tire having the same diameter is used.

As far as affecting the running of the car goes there will hardly be a noticeable difference when a slightly larger tire is used. If there is any tendency at all it will be toward making the car run easier over slight irregularities in the road. It is safe to state that in every instance where the heavier tire is used the increased first cost will be balanced by the decreased cost of upkeep.

Tire Chain As a Mud Hook

Editor THE AUTOMOBILE:—It often happens that one delays in putting on the tire chains until the rear wheels are actually stuck in the mud. When this occurs, it is often difficult to jack up the wheels, as the soft mud sinks under the weight of the car and the jack. An expedient which will pull the wheel out of almost any mud if the motor has power enough is to wrap the chain about the tire and rim in the manner shown in the sketch, Fig. 9. Fasten the ends of the chain around a spoke. Care should be observed in starting the car or the spokes are likely to be damaged.

Allegheny, Pa. MURRY FAHNESTOCK.

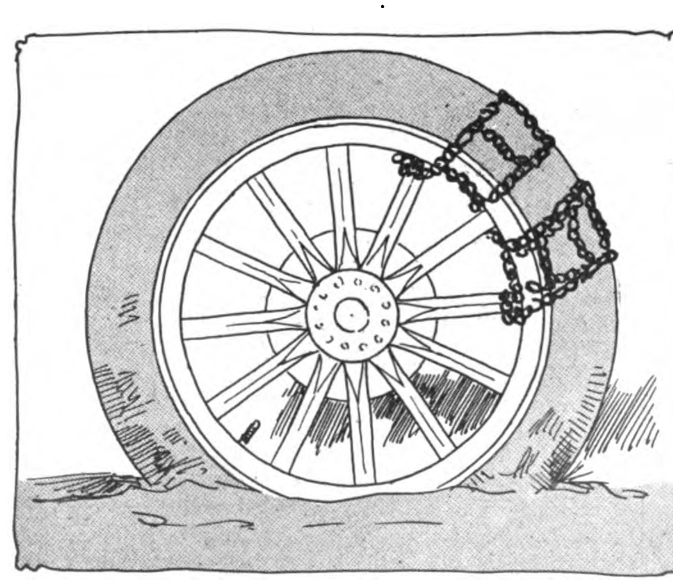


Fig. 10—How tire chain can be applied as a mud hook

Conclusions From the Army Truck Tests

Every Year the Military Authorities of France Draw the Line More Strictly Between the Fit and the Unfit Among Commercial Motor Vehicles—Points Relating to Reliability and Accessibility Sharply Brought Out

GENERAL opinion among all directly concerned in the 30 days' trials of French motor trucks which were conducted under military supervision, from the town of Versailles as a center of operations, and have recently been concluded (see account in THE AUTOMOBILE of August 15), ascribes to these trials and the methods adopted for ascertaining all the essential facts in connection with the performances of the vehicles a much greater importance for the rational development of motor truck design and construction details than could be justly credited to any other tests ever held. The basis for this opinion is to be found in the duration and thoroughness of the trials, the total absence of prizes and awards and the impartiality of the military authorities. Observations have been made and opinions have been expressed in connection with these tests wholly without reference to considerations of commerce or publicity. Some of these observations will be found of value and interest to users, owners and makers of motor trucks anywhere, although local conditions may in some cases impose a different interpretation of the facts from that which is accepted as final, or conclusive for the present, in France.

In a general way the first notable conclusions after the trials had been in progress for some time, under rather severe weather conditions, were to the effect that the forty chain-driven vehicles had demonstrated no advantages by reason of their driving system over the twenty-two shaft-driven vehicles, that wood wheels are still preferable for trucks, that rubber tires are a necessity at all speeds exceeding 12 kilometers per hour, that even the wheels of trailer wagons must be so shod to make these vehicles sufficiently durable, that on the whole the trailer is an unsatisfactory adjunct and that motor brakes are practically indispensable. A large number of more detailed observations are of record. A well-known technical commentator, writing over the name of "Lambda" in *Omnia* of August 10, notes the fact that many constructors, among whom Renault, Saurer, Berliet, De Dion-Bouton, place a positively acting centrifugal governor inside of the crankcase where the driver cannot get at it, so that it becomes mechanically impossible for him to drive the empty truck faster than the loaded one or beyond its predetermined maximum speed. The wheel brakes need to be improved, he says. If the transmission, which begins at the clutch, is out of order or disconnected, one depends absolutely on the wheel brakes to hold the vehicle. They must be capable of doing this on the steepest hill, and he refers to the brakes on Parisian omnibuses as a model for imitation with regard to construction—which includes an oil-tight casing around the brake drum—as well as in regard to the system for keeping them in order. But, he adds, it would also be very desirable to have the motor brake, as used on Saurer or Panhard trucks, generally adopted. It represents the only braking method admissible for vehicles of considerable tonnage in hilly countries with long gradients.

DIAGRAMS OF MOTOR BRAKE ACTION

On this subject of motor brakes Captain Renaud gives additional information in a lengthy technical analysis of the trials appearing in several issues of *La Technique Moderne*. It is summarized graphically in the indicator cards presented as Fig. 1, showing, first, how the motor ordinarily functions, secondly, how it functions when the Panhard motor brake is applied and thirdly, how it functions when the Saurer motor brake is put into action. In the Panhard motor the camshaft for the exhaust valves is mounted so that it can be displaced lengthwise by pressure on a left-foot pedal; and as the clutch remains engaged when the brake is in action the driver's left foot is free for this purpose. The cams are broadened and are formed with two special bosses on that portion which does not engage the exhaust valve stems when the motor is in normal operation. But when the shaft is displaced these bosses produce the action shown in the second diagram, which is as follows:

Suction stroke—Induction of a small amount of air through the admission valve and the carbureter, whose air apertures are closed, resulting in an approximate vacuum in the cylinder.

Compression stroke—Sudden opening of exhaust valve causing an inrush of gas or air but followed by immediate closing of the exhaust valve and compression of the cylinder contents, both valves being now closed.

Third stroke—Sudden opening of the exhaust valve allowing the compressed gases to escape, again followed by immediate closing and the formation of an approximate vacuum by the descent of the piston; normal opening of exhaust valve at end of stroke.

Fourth stroke—Exhaust valve open and resistance none, excepting the piston friction.

THE POWER OF THE BRAKES

This method results in a negative work of the motor equal in volume to 65 per cent. of the work which the motor can develop for traction purposes, but, as the losses in efficiency which are normally due to frictions in the transmission mechanism of the vehicle become favorable for holding the car back, the total braking effect is, under the supposition of a transmission efficiency of 70 per cent. equal to 92 per cent. of the normal motor work. In other words, with this motor brake it is possible to hold a vehicle back on any hill over which the motor could pull it up by using the same gear speed for the braking that would be used for traction.

The means used in the Saurer motor are even more powerful. The camshafts are not modified and are not displaced longitudinally, but a worm gear control mounted upon a shaft placed in the axis of the steering post enables the driver to change the timing of the exhaust camshaft and at the same time acts upon the carbureter so that nothing but fresh air is admitted to the induction manifold. The admission valves are opened and closed as usual and the exhaust valves are opened at the end of the second (the compression) stroke and closed at the beginning of the fourth (the evacuation) stroke. The motor is thus transformed into a two-cycle air compressor with the following strokes:

First stroke—Induction of air at the admission valve.

Second stroke—Compression of air; all valves closed.

Third stroke—Opening of exhaust valve, escape of compressed air and induction of fresh air through the exhaust valve which remains open.

Fourth stroke—Compression of this air, all valves being closed.

First stroke—Opening of admission valve, escape of the compressed air followed by the induction of new air through the open induction valve, etc.

The total braking work reaches about 95 per cent. of the traction work of which the motor is capable and, counting with the resistance in the transmission mechanism as in the case of the Panhard system, this rises to about 130 per cent. of the normal traction work of the motor.

[There seems to be an error in the author's supposition that the work performed by the gravitation of the vehicle on the hillside can reach the percentages mentioned, since the air pressures reached under braking action under no circumstances approach those produced by the explosions in normal motor operation, and a comparison of the areas of the three diagrams seems to confirm this doubt. As, however, the motor brake is not intended to hold a vehicle on a hill or to drive it backward uphill but to permit it to descend at a moderate speed, the high percentages mentioned should not be required.—Ed.]

One of the military commissioners acting as judges has given separate expressions in *Omnia* of August 10 to some of the intimate observations which the close supervision of the long-continued and arduous work of the trucks permitted him to make. His most important remarks relating to the lessons of the tests are summarized in the following.

COMMENT BY ONE OF THE JUDGES

Most of the motors are capable of giving continued service without accidents or excessive wear, but few of them operate without injury to the chassis. A motor can evidently not be transferred successfully from a pleasure car chassis to a truck. Vibrations which are harmless or even unnoticed on a light chassis become very powerful on a truck frame. No very clear explanation has yet been given of this fact, although it may be that the touring car chassis is too flexible to furnish the reactions by which the vibrations grow in intensity. At all events I have seen an unexceptionable touring car motor communicate to all such pieces of a truck as rivets in mudguards and spindles of clockwork a wild rotation around their axes resulting in extremely rapid wear. It follows from this fact that the truck motor should be one of slow rotation. Perhaps the six-cylinder type would give good results, but the army regulations exclude it. The most experienced motor truck builders have this year equipped their vehicles with large slow-speed motors regulated by a governor. An ingenious expedient adopted by one of them consists in placing the governor under the influence of the speed lever, so that the motor is limited to 800 revolutions on the high speed, but can speed up to 1,000 revolutions on the reduction gears. This renders it practicable to maintain a very uniform vehicle speed in spite of gradients.

Magnetos and carbureters left nothing to be desired. Though the motors were left hot under the open sky every evening and were covered with dew in the morning, it was very rarely that they could not be started with a single turn of the crank, whether alcohol, gasoline or benzol was the fuel used. The commissioners are for that matter insisting that the magnetos and tires of all subsidized vehicles shall be made interchangeable even if of different manufactures, and the tendency among the truck builders to buy standard carbureters, rather than making their own, supports this standardization of the principal organs. In the case of radiators the same trend seems to be working toward the Solex type with centrifugal fan.

STRENGTH AND DIMENSIONS OF PARTS

Clutches on trucks should be more powerful than on a light vehicle with the same motor power. It is evident, for example, that at the start with a heavy load the clutch must be slipped longer and consequently must be capable of absorbing more work without overheating. The cone type has proved harsh in engagement and the multiple-disk clutch too slow in the release. The Dion-Bouton metallic plate clutch was the only one giving full satisfaction with heavy loads.

The majority of the gear boxes had four speeds, but these were often poorly assorted. The third speed was too near to the fourth and was very seldom used. In practice, when the motor was of sufficient power, three speeds gave as much satisfaction as four. The gears should be much stronger than on pleasure cars of the same power, because a harsh start or acceleration of a light car is relieved by yield and slip of tires but catches the gears of a truck as between hammer and anvil.

A MISSING CONSTRUCTION FEATURE

It is astonishing that no vehicles were presented at the trials in which the gear box was provided with a free shaft adapted to be thrown in mesh to actuate a pump, a crane or any other mechanical tool. In places where the truck must now await its turn among horse-driven trucks, having no better facilities than these for quick loading and unloading, and where the shortness of the haul prevents it from making up for waiting-time by its greater speed on the road, such an arrangement might turn a doubtful economical balance in its favor.

Even in the cases where iron-tired rear wheels gave satisfaction and endured the speeds demanded—and only two such cases went on record, in both of which the rear wheels were not drivers—little accidents occurred, such as fracture of brake rods and loosening of bolts, which could only be ascribed to vibrations originating in the iron tires. In one instance solid rubber tires bursted like pneumatics, and the cause seemed to be a weak axle which alternately bent and straightened under the influence of the road shocks and made the tires scrape to and fro transversely, finally splitting them.

If the program of the trials had included descents of several kilometers in length it is doubtful if the brakes, which were uniformly quite efficient for stopping the vehicles, would have proved acceptable as speed reducers. Hardly any size of mechanical brake would be sufficient for transforming the continued gravitation of heavy loads into heat without trouble. The motor brake, on the other hand, does not accumulate heat units, as it throws them out with every release of its air charge.

Spring suspensions are not yet what they should be. The chassis suffer greatly from the fast runs without load which are demanded of them. Results showed that the load should be between the springs rather than above them, confirming the experience established for touring cars. The shackles should be long and their joints carefully machined and lubricated.

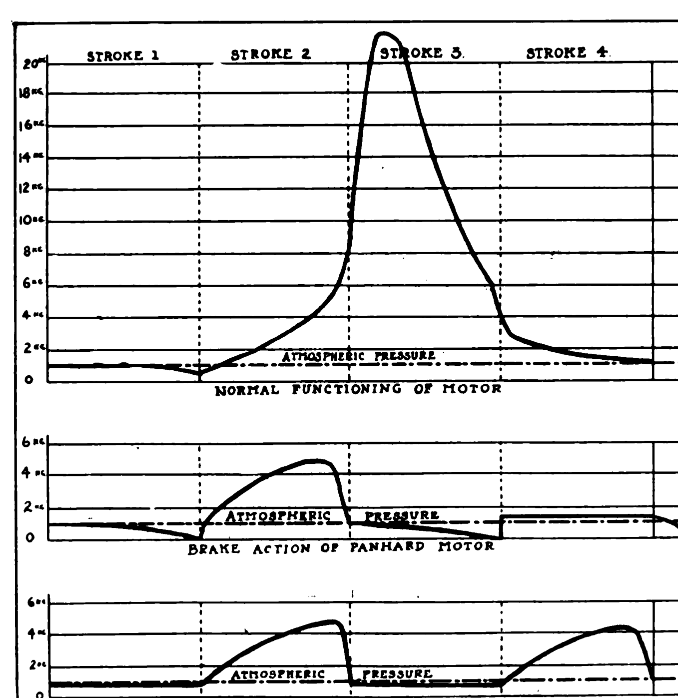


Fig. 1—How motor brakes transform the piston pressures

PATENT DEVELOPMENTS FROM ACROSS THE ATLANTIC

ALTHOUGH the attention of the automobile public in general has been centered on the patents issued in this country for some time, inventors in the lands over the seas have not been idle. In fact, they have been very busy emulating the ingenious Yankee and have conceived some ideas and produced some devices which bid fair to achieve worthy places in the automobile industry. Realizing the importance of these developments, THE AUTOMOBILE has prepared the following brief review of the most important patents issued by the British Patent Office during the month of July.

Valve Gear of Argyll Class—By means of which a sleeve valve is simultaneously reciprocated and oscillated.

The mechanism, Fig. 1, actuates a sleeve valve around or inside a cylinder by two cranks C1 and C2, which are driven from the half-time gear shaft. Reciprocating motion is imparted to the sleeve by the crank throw R and the link L which is connected to a pin P; the latter is carried in lugs on a collar C3 which bears on the flanges F at the lower end of the sleeve. The crank C2 has a spherical crankpin P1, from which a link L1 and connecting mechanism consisting of a universal joint—which is shown by shading—transmits the oscillatory motion.

No. 7,942 British—to J. S. Matthew and Argylls, Ltd., Alexandria, Dumbartonshire, England.

Double Horizontal Sleeve Valve Motor—In which two telescoping sleeves are provided for every pair of cylinders.

The sleeve valve mechanism for a four-cycle, four-cylinder engine shown in Fig. 2, comprises a pair of telescoping sleeves S and T serving one pair of cylinders C1 and C4, and another pair of sleeve valves U and V having the same relation to cylinders C2 and C3. Tightness between the valves and the guides in which they work is obtained by piston rings R surrounding the outer sleeves S and U. The inner sleeves T and V are hollow and the exhaust may pass through them to the exhaust pipe E. The inlet manifold is connected by leads P and P1 to the two pairs of sleeve valves, and the passage of gases into and out of the cylinders is governed by the registering of ports in the sleeves and the cylinders. The movement of the valves is controlled by a single half-time eccentric H carrying two blocks which work in slotted arms, whereby a stirrup S1 is reciprocated. This in turn oscillates a lever M. The sleeves S and T are connected to the stirrup S1 and the sleeves U and V to the arms of the lever M.

No. 8,510 British—to G. J. de Jong, Antwerp, Belgium.

Differential Gearset—Which is combined with the gears of a transmission set.

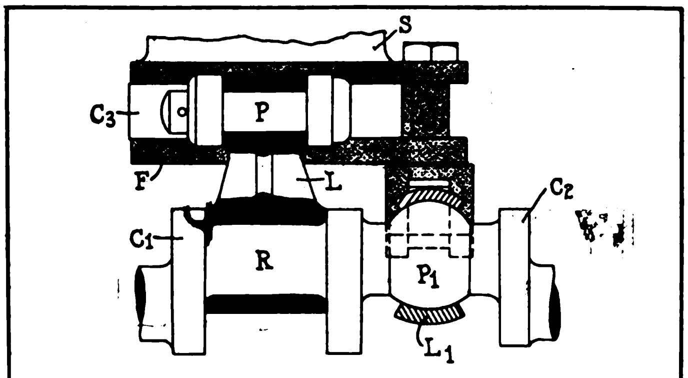


Fig. 1—Matthew and Argyll rotating and reciprocating valve

In this invention, Fig. 3, the driving shaft carries two bevel pinions A and B; these, and another pair A1 and B1 which are freely mounted mesh at diametrically opposite sides of annular bevel gears D, C and D1; any one of these gears may be clutched to the casing E of the differential and the entire mechanism is removable by withdrawing it in the direction of the drive shaft. Gears C, D and D1 and the casing E are mounted in ball bearings carried by the housing H and may be removed after taking the cover C1 off the large casing, whereby the

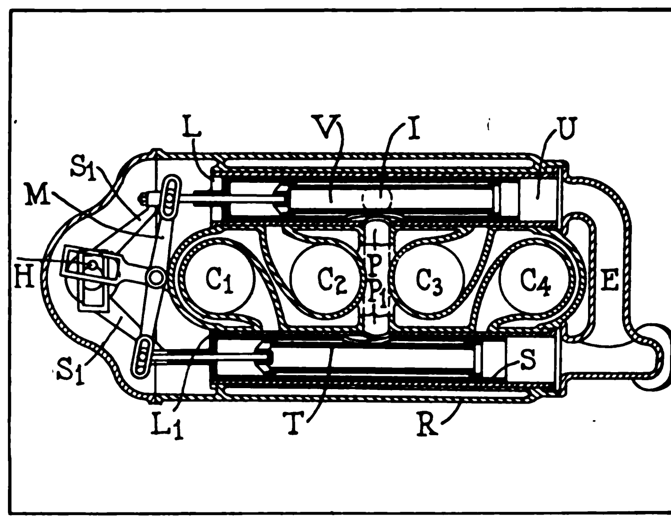


Fig. 2—De Jong double reciprocating sleeve valve motor

whole differential mechanism is lifted out. The gears D, C and D1 have internal clutch recesses receiving projections of clutch disks which slide in the casing E.

No. 7,608 British—to W. T. Martersteck, Sharon, Pa.

Combustion Engine Carbureter—In which the passage of air is controlled by a sleeve valve sliding in the mixing chamber.

The carbureter, Fig. 4, described in this patent has a straight passage extending through it, in which are located valves adapted to move transversely. These valves are arranged telescopically and are independently actuated. The mixture is controlled by a valve V which is cut away on one side and which contains a plug valve P. The lower end of the latter varies the air passage which surrounds the fuel nozzle N. The lower end of the valve V is cut away so as to fit over the nozzle while the plug leaves a small fuel and air space around the nozzle, even when it bears directly on the same.

No. 6,348 British—to F. H. De Veulle, Birmingham, England.

Fuel Feed—The demand of the engine regulates the supply.

This patent on fuel carburetion relates to the arrangement shown in Fig. 5, in which the pump P supplies a liquid fuel to the engine cylinder C, being controlled by the movement of a fuel reservoir on a counterbalanced lever L which controls the suction valve of the pump. The reservoir moves when the quantity of fuel supplied to it from the pump exceeds or falls short of that passing to the engine. Gaseous pressure is supplied to the reservoir from a gas bottle G.

No. 8,867 British—to C. Kloos, Amsterdam, Holland.

Internal Combustion Motor—In which the piston is so formed as to provide a channel between the combustion chamber and the space in which the combustible mixture is compressed.

In this engine, Fig. 6, the mixture is compressed in an annular chamber which is formed at the front of the cylinder. The mixture is introduced through a valve V and cylinder ports P and Q. The latter register, at regular intervals, with ports P_1 and Q_1 in the piston wall, and it will be seen that, when the port P is uncovered by the piston, the charge compressed in the annular chamber is transferred therefrom through the ports Q and Q_1 into the combustion chamber.

No. 8,878 British—to C. T. D. Sangster, Bournbrook, near Birmingham, England.

Hydro-Carbon Fuel Carbureter—In which the throttle has the form of a sleeve valve governing the main air inlet.

The principal feature of this carbureter, Fig. 7, is the use of a sleeve valve S which fits into the mixing chamber C of the carbureter. Sleeve S surrounds a throttle valve V which is also shaped as a sleeve valve, and, when moved up or down, covers or uncovers the main air port M of the carbureter. After descending to a certain level the throttle uncovers the auxiliary inlet A. The fuel nozzle which is seen in the lower portion of the carbureter is surrounded by primary air ports Q which are

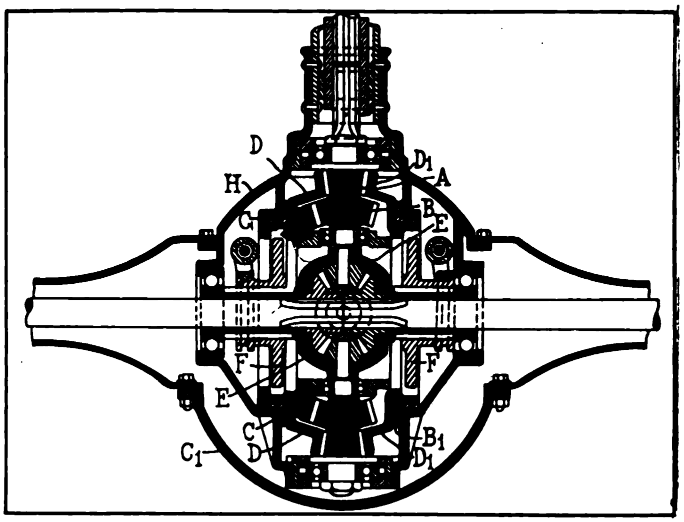


Fig. 3—Marterstock differential gearset for automobiles

controlled by a valve W loaded by a spring S_1 and actuated by the same handle bar which operates the throttle valve V.

No. 9,235 British—to J. A. Mackay, Harrogate, England.

Automobile Engine Carbureter—In which the air enters through tapered channels and is given a whirling movement.

In this carbureter, Fig. 8, the liquid fuel is supplied through a number of nozzles O in a transverse bar T, which is located between two tapered air channels C_1 and C_2 through which the air is supplied to the mixing chamber. The rotary valve V

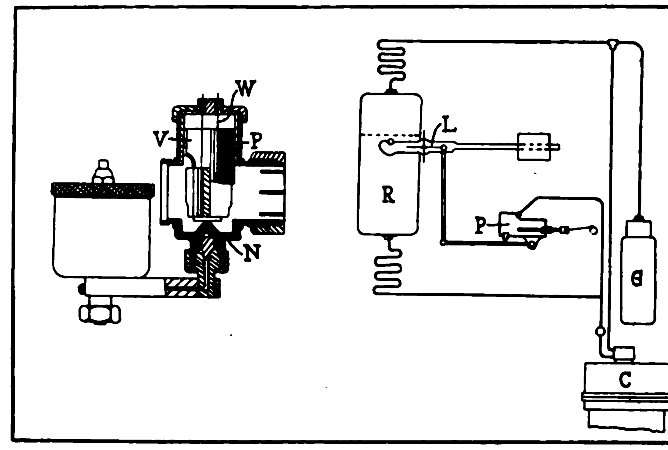


Fig. 4—De Veulle carbureter. Fig. 5—Kloos fuel feed

governs the extent to which the mixture passage P is opened, and the lower end of the throttle cylinder is provided with a choking plate which imparts a whirling motion to the air entering through the two supply channels. By this arrangement the movement of the throttle controls the ratio of mixture of air and fuel.

No. 9,252 British—to H. R. Barrett, Manchester, England.

Sleeve Valve Automobile Engine—In which two horizontal sleeves are reciprocated above the cylinder head through which the gases enter and leave.

This engine, Fig. 9, is designed to operate on the four stroke cycle. The inlet of the charge and the exhaust of the waste gases are controlled by a pair of tubular telescoping valves V_1 and V_2, the former of which contains a partition whereby it is divided into two chambers L and E which are in constant communication with the inlet and exhaust manifolds respectively. The valves are reciprocated independently of one another by the action of two cranks C_1 and C_2 driven at half engine speed and set at 45 degrees to one another. Ports in the valves provide communication between the cylinder combustion chambers and the proper manifolds at predetermined periods of the engine cycle.

No. 6,447 British—to Société des Establissements Lyonnais Rochet-Schneider, Lyons, France.

Spark-Plug—In which the positive electrode and its insulation may be moved up and down inside the shell.

The spark-plug described in this patent is shown in Fig. 10. Its positive terminal P and the insulation I are mounted inside a sleeve S which is slidable in the bushing of the plug and has a conical face adapted to seat on the gland G against which it is held by the pressure of a spring S_1. The sleeve moves toward

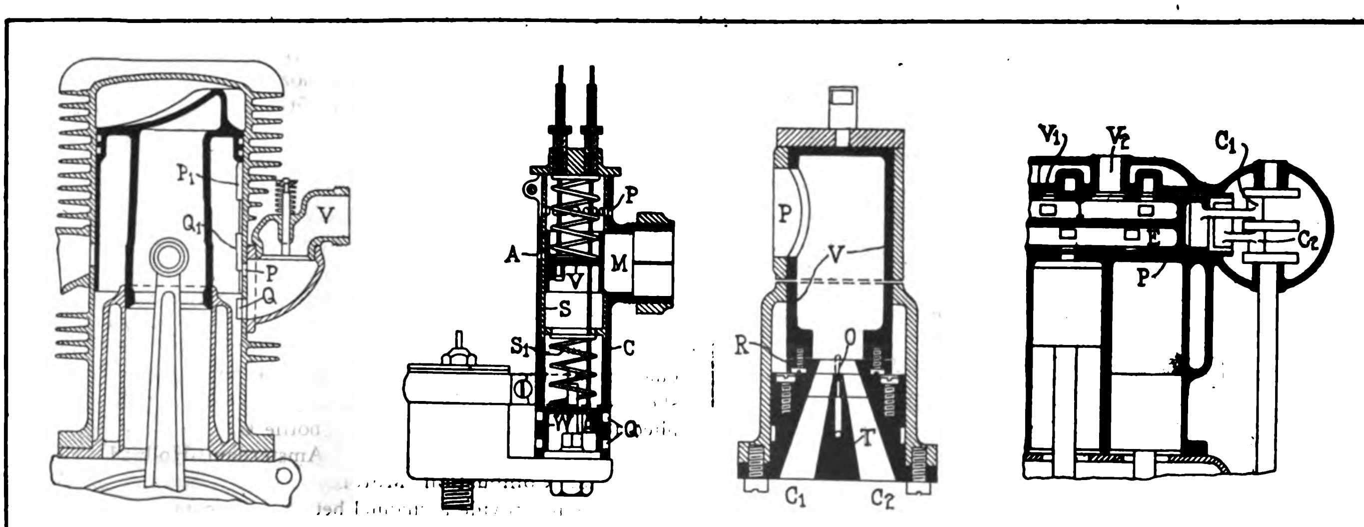
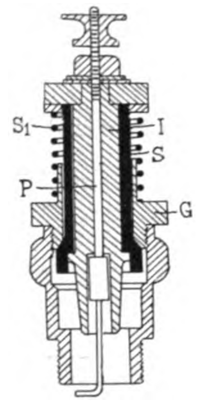


Fig. 6—Sangster internal combustion motor. Fig. 7—Mackay carbureter. Fig. 8—Barrett carbureter. Fig. 9—Rochet-Schneider motor



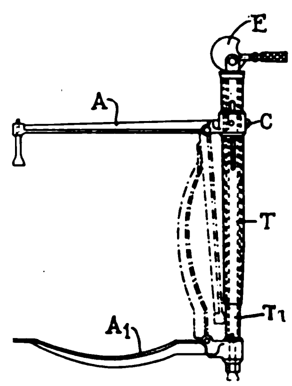


Fig. 10—Wallace-Green plug. Fig. 11—Zehnder valve tool

the interior of the cylinder during the suction stroke of the latter, whereby air is admitted and passes the sparking point of the electrodes. The shell may be provided with a brush or scraper against which rubs the central electrode P which is thereby cleaned of carbon deposits.

No. 77,787 British—to F. H. Wallace and T. Green, Stourbridge, England.

Valve Removing Tool—In which the arms for compressing or extending the valve spring are carried on two telescoping tubes.

The device referred to in this patent is a valve remover, Fig. 11, which is composed of two telescoping tubes T and T_1, each one of which carries a folding arm, A and A_1. The inner tube T_1 has an eccentric or cam lever E at its upper end, by means of which the device is operated. The arm A is hinged to the tube T by an adjustable collar C, and is fitted with a spindle S designed to engage the valve; the arm A_1 has a forked end for the purpose of embracing the valve stem.

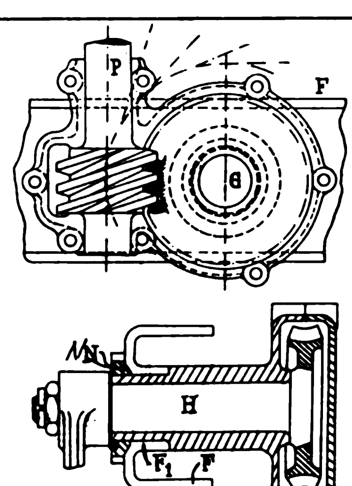
No. 7,654 British—to J. Zehnder, Granichen, Switzerland.

Steering Gear Adjustment—Obtained by interchangeable parts.

This patent refers to a method of adjusting steering columns to compensate for wear. In Fig. 12, the steering post P is adjustable around the worm spindle H; the worm and worm wheel are inclosed in a casing which is clamped to the frame F by means of a nut G. The portion F_1 of the frame may be replaced by a separate member.

No. 6,975 British—to A. Leruitte, Liege, Belgium.

Internal Combustion Motor—In which two pistons work inside of one another forming a separate compression and combustion chamber.



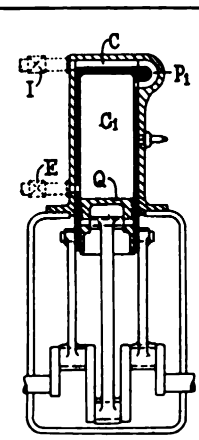


Fig. 12—Leruitte steering gear. Fig. 13—Downie engine

A scavenging engine is the subject matter of this patent. The cross section, Fig. 13, shows how the feature of perfect scavenging is obtained by the use of a double piston composed of an outer piston P and an inner one Q, both of which are actuated directly from different throws of the crank shaft but which have the same stroke. On the suction stroke of the engine the mixture is admitted through the pipe I into the space C, in which it is compressed during the following stroke by the piston P. Toward the end of the compression stroke when the piston P reaches its highest position, the compressed mixture is transferred from the compression space C through the passage P_1 into the combustion space C_1 where it is ignited, the explosion driving down the piston Q. The exhaust valve E is contained in a pipe just above the position which piston Q assumes after passing through lower dead center.

No. 6,119 British—to W. Downie, Stranraer, England.

Hydraulic Transmission System—In which a sleeve formed as a dog clutch may be shifted to engage a driven shaft or to move another sleeve on the same shaft which actuates a pump mechanism.

The transmission system, Fig. 14, which is the subject matter of this patent, is so constructed that it provides a direct connection between the driving shaft and the driven shaft or that the movement of the driving shaft may be made quicker or slower by means of a system of pumps. The connection between drive shaft and driven shaft is obtained by the engagement of the combined sleeve and dog clutch S with a member M on the driven shaft, while the pumps are actuated in the following way: If the sleeve S is shifted in the direction opposite to the one in which it engages the member M, it is brought into engagement with the sleeve S_1 on the drive shaft D. S_1 carries the mechanism M_1 which actuates the pump or pumps by means of which the gear ratio between the two shafts is regulated.

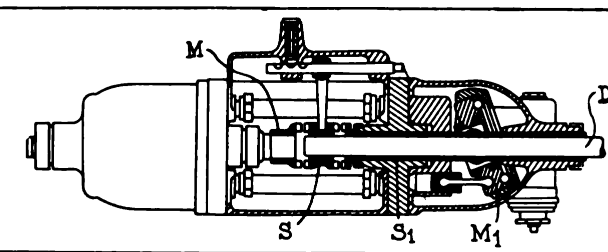


Fig. 14—Delaunay-Belleville hydraulic transmission system

No. 6,525 British—to Soc. Anon. des Automobiles Delaunay-Belleville, Saint Denis, France.

Non-Skid Device for Tires—Consisting of a transverse leather strap which is studded with metal plates.

This patent has reference to a tread band, Fig. 15, providing a non-skid surface for the tire casing. The band consists of a leather strap L which is faced with studded metal plates M bent around it and held to it by means of points P. This leather strap is passed from one side of the tire to the other in zig-zag manner, being fastened at the bead lines by means of hooks H which engage the spokes of the wheel and are made in two threaded parts constructed to permit of adjusting the straps.

No. 7,438 British—to W. Haseloff, Steinau, Germany.

Method of Carrying an Illuminating Number—The license number of the car is visible on the body.

This patent, Fig. 16, refers to the indication of the license number on the back of an automobile body, preferably by painting it on to the same. In order to have the number visible during the hours of the night a lamp which projects a powerful beam of light on the number is positioned below the same and attached by brackets to the chassis or the body of the car.

No. 4,864 British—to B. F. Ruettiger, Bonn, Germany.

Internal Combustion Motor—In which a large charge is admitted to the cylinders.

In this engine, Fig. 18, a single sleeve valve S opens the inlet port P toward the end of the suction stroke of the cylinder.

This feature of the design permits the residual dead gases in the cylinder to cool during the suction stroke and to contract, so that a relatively large fresh charge is drawn in when the inlet port is opened. The advantage thereby derived is still more accentuated by the fact that a late opening of the inlet port increases the vacuum in the cylinder, which also insures a maximum charge of mixture. The exhaust port E is located at the top of the cylinder and is opened at the beginning of the exhaust stroke, while the auxiliary port E1 opens toward the end of the power stroke. The inlet port P is arranged slightly above the lever of the port E1.

No. 5,014 British—to R. Miller, New York City, N. Y.

Carbureter for Automobile Motor—In which the primary air inlet is controlled by a sleeve valve providing also a choke tube for the mixture.

The carbureter, Fig. 22, described in this patent is of the float-feed type and the regulation of the fuel air ratio is obtained through the use of a sliding valve V. The lower part of this valve is shaped as a sleeve which may be moved up or down to vary the cross section of the main air intake A while the upper portion of the valve forms a plug which fits the carbureter housing, part of which is cut away at A1 to provide auxiliary air inlet. The fuel flows from the float chamber to the fuel nozzle N, the opening of which is governed by a needle valve F. The nozzle is held in place by a conical shoulder S and a nut N1, while a drain plug P1 is located at a passage communicating with the interior of the nozzle. At low engine speeds the valve V is held in its lowest position by a spring S1 interposed between it and the top portion of the carbureter housing which spring is compressed when the throttle is opened to speed up the motor. The mixture outlet is by means of an elbow extension arranged at the level of the plug portion of the valve.

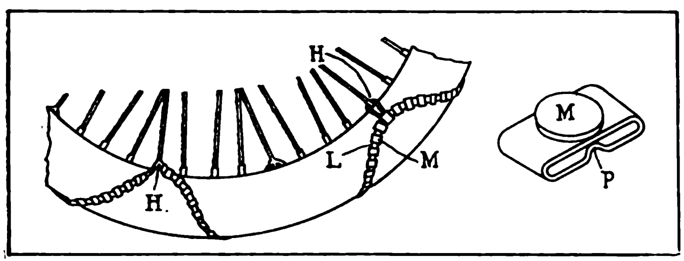


Fig. 15—Haseloff non-skid device for pneumatic tires

No. 5,215 British—to T. Carter, Weaste, Lancashire, England.

Sectional Rubber Tires—The tire blocks are each formed with a bead embracing the wheel rim.

The tire referred to in this patent, Fig. 20, consists of a number of individual rubber blocks or sections which are moulded with bead portions B fitting into the flanges of the wheel rim and with others, B1, bearing on the outside of these flanges. The bases of the tire blocks are covered with a layer of canvas C and are provided at their ends with holes H which are adapted to receive wooden wedges of plugs designed to hold the blocks securely in place. In the center of each block there is a sponge-rubber core R vulcanized in place. The patent also mentions that the rim may be formed with detachable segments removable for installing the blocks on the wheel. This method is used for mounting all blocks except the last one, which is put in place and secured by radial bolts engaging the holes H in the two neighboring blocks.

No. 7,930 British—to F. Milan, Lockwood, England.

Tire Protector and Cover—Being composed of narrow transverse strips of rubber and fabric.

The cover referred to in this patent, Fig. 17, comprises a series of narrow strips T of rubber and fabric, which are arranged transversely over the tire tread and secured to one another by means of metal side rings R which may be formed with scalloped ends so as not to cut the fabric and rubber. Fig. 17 shows cords C inserted in the protector strips; these cords have looped ends. The strips also have canvas tapes C1 and are secured to the rings R by buttons B engaging holes H in these strips.

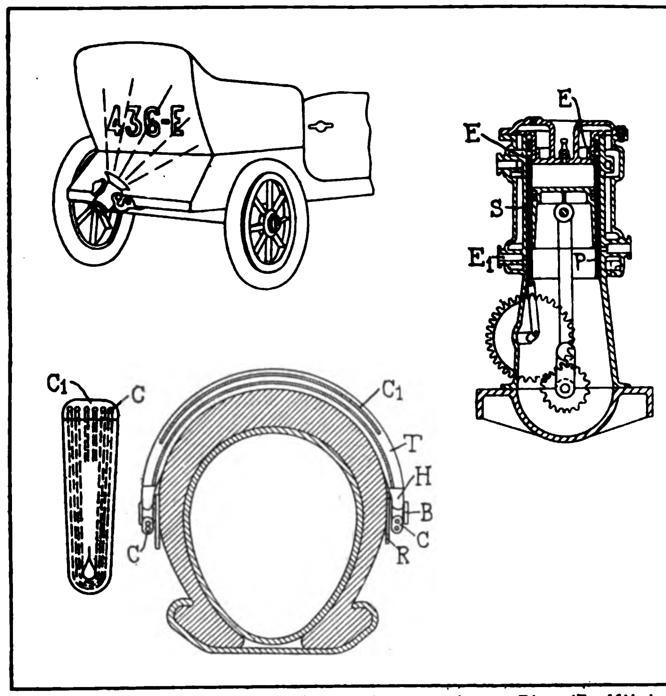


Fig. 16—Ruettiger scheme of carrying number. Fig. 17—Kitchen tire tread. Fig. 18—Miller sleeve valve motor

No. 7,338 British—to J. G. A. Kitchen, Scotforth, Lancashire, England.

Automobile High-Speed Signal—Wherein an electric circuit is opened when the axle revolves at or above a certain speed.

The signal, Fig. 21, described in this patent is displayed to the driver at any speed below a given number of revolutions of the axle. When the axle reaches this critical speed the shaft R, which may be fixed at varying distance from the axle A and which carries a centrifugal governor controlling an electric circuit, is rotated so fast that the deflection of the governor opens the circuit which it closes at lower speeds. The result is that the signal mentioned above ceases to be displayed to the driver.

No. 8,999 British—to R. Kaiser, Geneva, Switzerland.

Adjustable Spark-Plug—In which a contact between the central electrode and the shell may be made.

This patent described the spark-plug, Fig. 19, in which the terminal may be short-circuited owing to the following method of construction. The insulation I is surrounded by a rotatable sleeve S carrying a metal plate M which is a conductor of electricity. When the sleeve is turned into the position shown in the illustration, the metal plate M contacts with the insulated electrode P by means of a spring-pressed plunger P1. The sleeve is held on the plug by screws S1 in the plug body entering a groove in the sleeve.

No. 7,810 British—to D. W. Player, Folkestone, Kent, England.

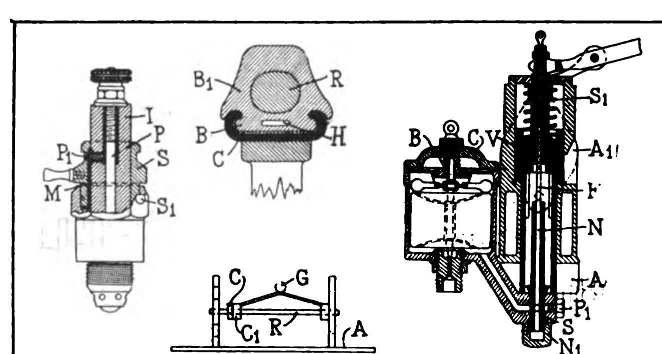


Fig. 19—Player spark-plug. Fig. 20—Milan block tire. Fig. 21—Kaiser speed signal. Fig. 22—Carter carbureter

English Test Solid Tires

Truck Department of the N. A. A. M. Presents Article by A. E. M. Turner Who Praises American Product

Blames Road Conditions for Small Mileage Obtained by Trucks in This Country

COMPREHENSIVE tests of solid tires in England, covering the use of thirty-seven British automobile trucks ranging in size from 1 to 6 long tons capacities, have been concluded recently with most illuminating results so far as tire mileages are concerned.

The truck represented six different makes, including some motor omnibuses and the average of the whole lot was 17,409 miles per set of six tires and based upon the consumption of three sets to each truck.

The compiler of the figures, A. E. M. Turner, of London, in commenting on the comparative service of tires states that with one exception, the British tire makers are behind those of the European continent and that the American tires were as good or better than those of the continental factories. In the face of the fact that users of American trucks get materially lower figures in miles than the appended table shows, the comment of Mr. Turner on the quality of American tires seems to prove that road conditions are accountable. In THE AUTOMOBILE last summer it was shown that the average of 1,000 truck tires in actual use was somewhat in excess of 11,000 miles. The British experience shows that the average guarantee of American tire makers is on the conservative side.

The article of Mr. Turner is presented by the truck department of the National Association of Automobile Manufacturers, as follows:

"The mileage shown as the result of using a particular size of rubber is the figure obtained from wearing out three sets of six rubbers, or eighteen tires in all. These results are all from vehicles used in actual service—not from manufacturers' demonstration machines—and have come from two or three vehicles each of the same make and load capacity in the different sets of results. To wear out eighteen tires might take a truck four years or more, and then even this would not give a representative result, as, while one truck might have an exceedingly careful driver who might get an extra 1,000 or even 2,000 miles out of his tires, three vehicles would be more likely to have average treatment meted out to them.

"All mileages given are for the band type of tire. Pressed-in or grip tires are used very little in England. The figures are from records kept on the services of large business concerns. (In making comparisons with American vehicles it should be remembered that English motor trucks are rated in long tons, equivalent to 2,240 pounds.)

"The six makes of chassis appearing in the table are the products of the following manufacturing companies:

Chassis	Manufacturer	Location
Karrier	Clayton & Co., Ltd.	Huddlesfield
Lacre	Lacre Motor Car Co., Ltd.	Letchworth
Leyland	Leyland Motors, Ltd.	Leyland, Lancashire
Commer	Commercial Cars, Ltd.	Luton
Belsize	Belsize Motors, Ltd.	Clayton, Manchester
Hallford	J. & E. Hall.	Dartford, Kent

"The Lacre 2-ton chassis has a four-cylinder 30-horsepower engine, which is exceptionally large for a British 2-ton truck, the average horsepower of seven makes of this capacity being 20 horsepower. The Lacre company have no engine between a two-cylinder 18-horsepower model and its 30-horsepower, four-cylinder engine.

"The remaining well-known make, the Dennis, has been purchased principally by McNamara & Company, Ltd., the big motor haulage contractors of Finsbury, London, E. C., but they will not part with tire mileages. The Dennis chassis are all fairly small-wheeled machines—32 and 34 inches all around—and I have heard various complaints of tire trouble in connection with them. I think the fact of the matter is that if a cheap, undersized or defective rubber has been fitted to a small wheel it simply hastens the collapse of the tire, but does not necessarily destroy it. As you no doubt know, an inferior tire seldom wears out, but it gets destroyed easily in ordinary use, collapses, leaves the rim or band, etc.

"London motor buses, running on 4-inch singles, front, and 4-inch twins, rear, fitted exclusively to cast steel wheels, give about 21,000 miles per set of six rubbers on an average. Peter Union (German) tires are instrumental in getting this big average.

"Trucks and wagons with live-axle types of final drive give, under fair treatment, a bigger mileage from tires than chain-driven chassis, mainly owing to the nice take-up of the drive.

"Of the few remaining cases in Britain where the driver is seated over the engine, it is found that the life, particularly of the front rubbers, is greatly decreased. The weight on the front rubbers is greatly increased, and the tendency, as the vehicle is being propelled over the road, is for them to be driven into the road. It is, therefore, most economical to have the engine under a bonnet, from the point of view of tire economy.

"The writer would like to add that he has been fairly actively in touch with rubber tires since 1892, and whether in carriage or solid motor tires, he has always found American rubber tires either distinctly better in quality, or at any rate as good as the best Continental tires. The main fault which I found in American tires was that there was not enough wearing rubber in them. They were merely shallow pads round the rim, and so we did not get a great mileage out of them. Their rubber, however, invariably wore with perfect evenness."

Capacity Rating, tons	Tire Sizes—Front, single, inches	Tire Sizes—Rear, twin, inches	Mileage, per set of six tires	Loads Carried—Out, tons	Loads Carried—Return, tons about	Nature of work	Where used
			KARRIER CARS				
1	32x3	32x2½	21,700	1¼	¼	Ry. parcels dely.	London
1½	32x3	32x3	19,867	1½	¾	Liquor delivery	London
2	32x3½	36x3½	22,180	2¼	1½	Cotton transport	Provinces
2½	32x4	36x4	17,360	2½	¼	General hauling	Provinces
3	32x4	36x4	15,841	3	?	Oil tank wagons	Provinces
4	32x4½	36x4½	16,180	4¼	3½	Cotton transport	Provinces
			LACRE				
1	34x3	34x2½	23,200	¾	¼	Drapery & furn.	London
1½	34x3½	34x3½	16,870	1½	1½	Carpet cleaning	
2	34x4	34x4	18,740	2	2	Carpet cleaning	
3	34x4	34x4	15,460	3¼	Empty	Haul. cases from docks	
4	34x4½	34x5	21,863	4	2¼	Gas hardware & supplies	
5	34x5	40x5½	16,910	5¼	1½	Building material	
			LEYLAND				
1	34x3½	34x3	24,670				
1½	33x4	34x4	21,721	1	½	Mineral water	Provinces
2	33x4	35x4	17,102	1½	¼	Furniture delivery	London
2½	33x4	36x4	17,008	2	1¼	Bottled beer	London
3	33x4½	37x4	15,200	3½	2	Bottled beer	London
4	34x5	40x5	16,800	4	2½	Beverages	
5	34x5½	40x5½	15,060	5	4½	Beer and cotton	
6	34x6¼	40x6¼	15,780	6¼	2	Barreled beer	
			COMMER				
1½	32x3	32x3	20,900	1¼	¼	Paper	
2	32x3	32x3	15,840	2	¾	Gas hardware	London
3	34x4	34x4	16,974	3	½	Provisions	
4	34x4½	34x5	15,602	4	1½	Furniture	
5	36x5½	40x5	16,002	5	3	Building materials	
6	36x6	40x5½	14,865	5½	2¼	Contract haulage	
7	36x6¼	40x6¼	12,304	6½	3½	General haulage	Pickfords
			BELSIZE				
1	32x2½	32x2½	18,885	1¼	¼	General haulage	
1½	32x3½	32x3	17,570	1½	1½	Cotton transport	
3	36x4½	36x4	16,975	3	1½	Machinery transport	
5	36x5½	36x5	14,090	5¼	4½	Cotton transport	
			HALLFORD				
1½	34x3	36x3½	17,508	1¾	1¼	Laundry delivery	
2	34x3	36x3½	14,986	2	1	Boots and leather	
2½	34x4	40x4	16,808	2¼	1¾	Contract haulage	
3	30x4	40x4	13,962	3	2	Gen. contract haulage	
4	30x4½	40x4½	14,670	4	2	Bottled beer dely.	
5	32x5½	40x5½	16,680	5	1½	Barreled beer dely.	

Truck Rating and Weight

Commercial Vehicle Committee of N. A. A. M. Studies Relation of Chassis Weight to Rated Capacity

Considers Both Gasoline and Electric Machines—Fair Degree of Uniformity Shown

IN the accompanying table are given the averages of the actual weights of American motor truck chassis of the various load capacity ratings, as supplied by the manufacturers of 325 gasoline vehicles and forty-nine electric models. Also, the means of the average weights corresponding with the curves shown on the accompanying chart; and for comparison the average of the weights of from three to ten most successful makes of trucks in each capacity rating.

For example, the average of the chassis weights of forty-nine different makes of 3-ton gasoline trucks is 5,509 pounds. To bear a uniform relation to the average weights of all other capacities the weight should be 5,600 pounds. But the average of actual weights of ten well-known and successful makes of three-ton trucks is 6,070 pounds, which exceeds the average of the 49 makes by 470 pounds. On the chart the dots indicate the average actual weights in the capacities most numerously represented.

Reference to the table will show that in most truck sizes the average weights of the selected few representative makes of gas trucks is in excess of that of all makes combined. The conclusion is that the companies that have had most experience rate their trucks lower or build them heavier and stronger than the new makers.

The weight of the body is an important factor in the problem presented but as the weight of similar body types is generally proportionate the lesson taught is valuable even without including the body weight in the summaries and averages. The accompanying article was formulated and presented by the Commercial Vehicle Committee of the National Association of Automobile Manufacturers and is one of a series of important publications touching the theory and practice of automobile truck engineering and operation.

These articles so far have included the distribution of trucks which appeared in last week's issue of THE AUTOMOBILE and the English tests of solid tires on the opposite page.

LOAD RATINGS AND CHASSIS WEIGHTS OF MOTOR TRUCKS

GASOLINE VEHICLES

Capacity rating (pounds)	No. of models reported on	Average actual chassis weight (pounds)	Means of all chassis weights (pounds)	Average weight or 3 to 10 leading makes (pounds)
500-800	11	1221	1300	1373
1000	23	1786	1780	1728
1200	10	1880	2000	....
1500	34	2190	2400	2331
2000	46	2986	2900	3230
3000	30	3727	3750	3536
4000	44	4505	4500	4721
5000	4	5125	5050	5233
6000	49	5509	5600	6070
7000	10	6080	6100	6100
8000	16	6423	6550	6500
9000	3	6381	7000	....
10000	32	7603	7400	8232
11000	1	7800	7750	....
12000	4	7920	8150	....
13000	3	8966	8550	....
14000	2	8700	8900	8700
15000	..	....	9300	....
18000	..	....	10500	....
20000	3	11240	11250	9860
	325			

ELECTRIC VEHICLES

Capacity rating (pounds)	No. of models reported on	Average actual chassis weight (pounds)	Means of all chassis weights (pounds)	Average weight or 3 to 10 leading makes (pounds)
500-800	7	2375	2375	2540
1000	11	2755	2750	2700
1500	3	3518	3300	3350
2000	7	3525	3800	3716
2500	4	4270	4300	....
3000	2	4124	4750	....
4000	6	5592	5600	5439
5000	..	....	6250	....
6000	1	7000	6900	7000
7000	4	7439	7400	7851
8000	..	....	7850	....
10000	3	8438	8700	8438
12000	1	10000	9500	....
	49			

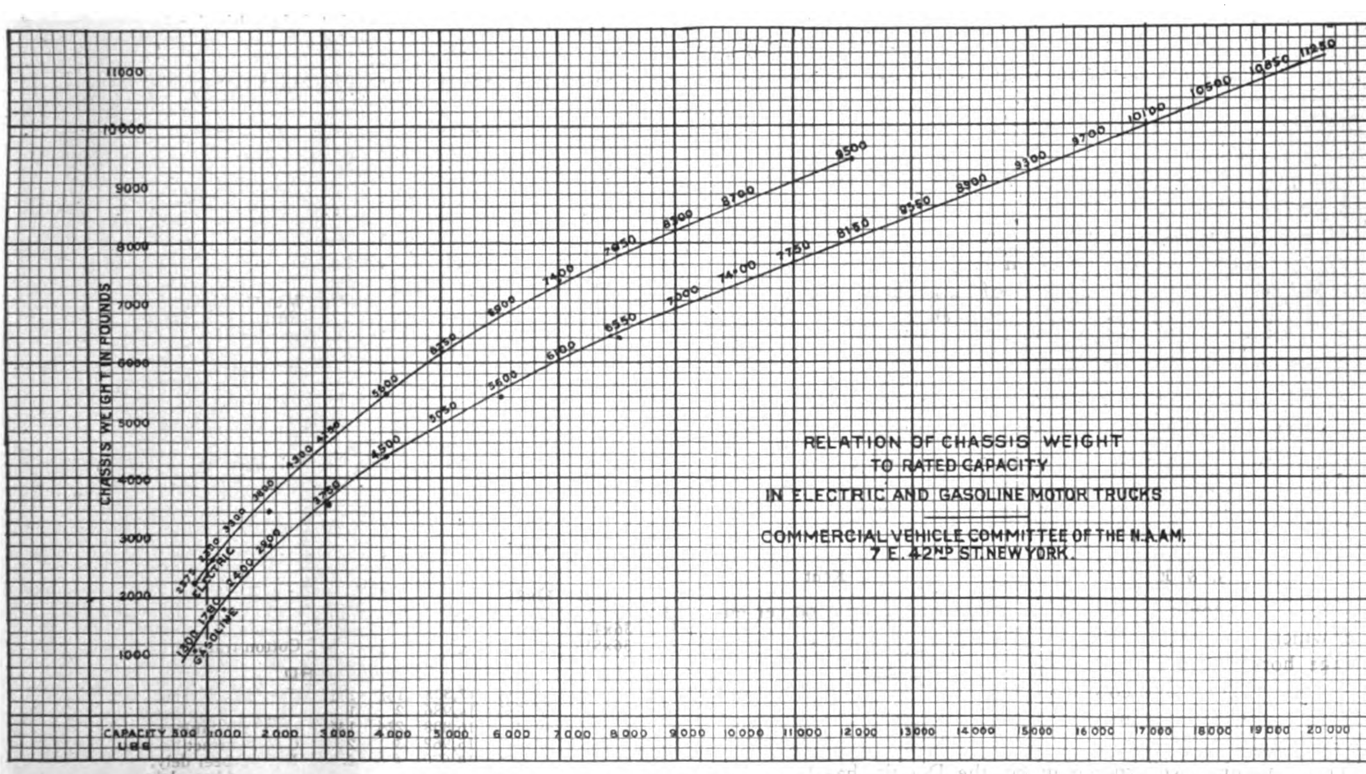
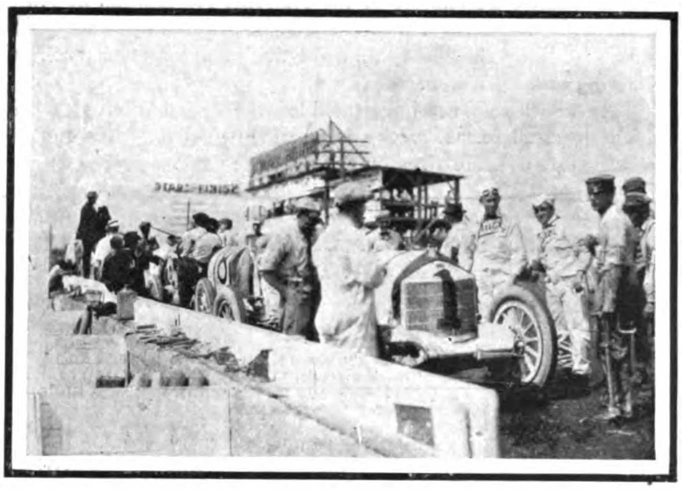


Diagram constructed by the Commercial Vehicle Committee of the N. A. A. M. showing relation of chassis weight to rated capacity



Knox and Benz at the pits waiting for the start

De Palma a close second and Mulford right behind. The Benz, except for three laps, the first, the twenty-third and the twenty-fourth, had been the leading car so far throughout the entire distance of 203 miles. It looked as though the three would finish in the order named above. Each was maintaining terrific speed, and no change in their relative positions took place until the thirty-fifth, or next to the last lap. Bergdoll was about a minute in the lead of De Palma, when on the back stretch he was forced to stop for tire change. This gave De Palma an opportunity for the second time that day, and in the thirty-fifth lap he passed the Benz car while it was still making the tire replacement. There was no stopping him now, and Bergdoll was obliged to cross the tape second to the Italian, after practically leading the field from the start of the 305-mile run.

Mulford did not finish his race. On the thirty-third lap, when nearing the grand stand, he was overcome by the intense heat, and nearly relinquished control of the speeding Knox. His mechanician leaned over and guided the big car to the pit. Mulford was lifted from the machine and assisted to the hospital tent by Referee Beecroft, while his mechanician, William Chandler, jumped into the driver's seat. One of the pit attendants got in beside him and the Knox was sent away again to make the remaining three laps.

Big Crowd on Friday

On Friday the Jenks Trophy, Aurora Trophy and Illinois Trophy events were run simultaneously before a crowd only slightly less than that which viewed the larger races of Saturday. Merz in the Stutz was the winner of the Illinois Trophy event, while his teammate, Anderson, was a good second. These two cars were the only ones to finish the race of twenty-four laps, or 203 miles and 1,896 feet. The Rayfield and National entries in this race did not finish, the former driven by Hobbs, being out in the third lap with a broken crankshaft bearing, and the National, piloted by Whalen, being obliged to quit the race after nine laps on account of a break in the magneto drive. This left the two Stutz cars the contenders for first place in this event, which was the longest of the day.

Merz led the Illinois Trophy race from the start, while up to the eighth lap Whalen in the National was a close second, cutting down the former's lead with each lap up to the fifth. In completing the fourth lap it looked as though Whalen might overtake his rival, so quickly had he gained. At the end of the fourth lap the time of the two leaders was as follows: Merz, Stutz—30:20; Whalen, National—30:44. Merz made this fourth lap in just 1 second less than Whalen, completing the circuit in 7 minutes and 34 seconds. In the next lap, however, Merz made the fastest time of his race and increased his lead over the National by 9 seconds. His time for this lap was 7 minutes and 28 seconds.

Anderson Passes Whalen

Whalen retained second place up to the eighth lap, while the other Stutz, driven by Anderson, was fast gaining. It was at the completion of his eighth lap that the latter succeeded in nosing out the National for second place. Whalen completed another lap, and was on his tenth circuit when misfortune overtook him and put his car out of the race. The magneto coupling broke and the damage proved of such magnitude that he was compelled to withdraw from the big races of Saturday.

Whalen's dropping out left the race entirely in the hands of the Stutz cars, which had a merry time of it together from the ninth lap to the finish. Both cars continued to perform consistently to the end, Merz maintaining his lead over Anderson

TABLE SHOWING PRINCIPAL FEATURES OF CONSTRUCTION AND EQUIPMENT OF THE CARS WHICH RACED AT ELGIN

Car No. 1st day	2d day		Magneto	Ignition System	Carbureter	Tires Make Front-Rear	Tires Size Front	Tires Size Rear	Gear Ratio	Speeds	Direct Drive	Shock-Absorber	Oil
	1	**Knox Six**	Bosch	2-spark Independent	Rayfield	Michelin	36 4½	37 5	1 95/100	3	3	Mondex	
	2	**Mercedes**	Bosch	Double	Rayfield	Michelin	34 4	35 5		4	3	Truffault-Hartford Mercedes rear	
41	3	**Mason Spl**	Splitdorf	Dual	Schebler	Michelin	32 3½	32 3½	2 3/5	3	3	Mondex	
	4	**Mercedes**	Bosch	Double	Rayfield	Michelin	32 4	37 5	1⅞	4	3	Mercedes	
	5	**Fiat 70**	Bosch	Double	Rayfield	Michelin	34 4	35 5				Truffault-Hartford	
32	6	**Falcar**	Splitdorf		Rayfield	Michelin	32 4	32 4	2 11/19	3	3	Truffault-Hartford	
21	7	**Stutz**	Splitdorf		Schebler	Michelin	34 4	35 5	2 1/3	3	3	Truffault-Hartford	Monogram
	8	**Benz**	Bosch	2 magnetos	Benz	Fisk	36 4	36 4½		4		Benz Mondex	
	9	**Fiat**	Bosch	Double	Rayfield	Miller	34 4	35 5				Truffault-Hartford	
33	10	**Falcar**	Splitdorf		Schebler	Michelin	34 4	34 4	2 10/19	3	3	Truffault-Hartford	Polarine
23	11	**National 40**	Splitdorf		Schebler	Michelin	34 4	34 4					Oilzum
24	12	**Stutz**	Splitdorf		Schebler	Michelin	34 4	35 5	2 1/3	3	3	Truffault-Hartford	Monogram
35	14	**Mercer**	Bosch		Rayfield	Firestone	32 4	32 4	2½	3	3	Truffault-Hartford	Monogram
36	15	**Mercer**	Bosch		Rayfield	Firestone Prowadink	32 4	32 4	2½	3	3	Truffault-Hartford	Monogram
42		**Ford**	Bosch	Single	Kingston	Michelin	30 3	30 3½	3	Planetary		None	
43		**Herreshoff**	Bosch	Single	Rayfield	Michelin	32 3½	32 3½	2⅜	3	3	Truffault-Hartford	
31		**Mercer**	Bosch		Rayfield	Firestone	32 4	32 4	2½	3	3	Truffault-Hartford	Monogram
34		**Mason**	Splitdorf		Rayfield	Michelin	32 4	32 4	2 3/5	3	3	Truffault-Hartford	
22		**Rayfield 6**	Mea		Rayfield	Michelin	35 5	35 5	2⅛	4	3	Mondex	Oilzum

practically as at the tenth lap. In his twelfth lap, however, Merz lost 50 seconds when he was obliged to stop at his pit for gasoline and oil. He was off again with a lead of but 8 seconds for the twelfth lap over his rival, Anderson. The latter took advantage of this opportunity to cut down the breach between himself and Merz and on completing the next lap the leader maintained his position by a margin of only 2 seconds.

In the following lap, however, Anderson was compelled to stop at the pit to take on gasoline and oil, losing 30 seconds for this, giving Merz a lead of 1 minute and 4 seconds for the fourteenth lap. From this time on until the end of the race the two cars stayed about the same distance apart. Anderson's fastest lap was his tenth, which he negotiated in 7 minutes and 31 seconds, 3 seconds slower than Merz's fastest of 7 minutes and 28 seconds.

The two pit stops for lubricant and fuel were the only ones made during the entire race, no tire trouble being met with by the two cars. Merz completed the race in 184 minutes and 32.25 seconds, while Anderson made the twenty-four laps in 186 minutes and 14.15 seconds. Merz averaged 66.11 miles an hour for the long grind of 203 miles.

Six cars in the Aurora Trophy race limited to machines of from 201 to 300 cubic inches piston displacement, were the next to be sent off by Starter Fred J. Wagner amid a cloud of smoke and in order according to their entry numbers.

Hughes Takes Lead and Holds It

Hughie Hughes in his Mercer, although the last to start, got the lead on the first lap and retained that position throughout the entire race of 152 miles. His time for the initial lap was 7:52, one of slowest of his race. His team-mate, Spencer Wishart, was in second position for three laps. In the fourth lap, giving up this position to Pullen in another Mercer. The latter did not lose this position throughout the rest of the race crossing the tape second to Hughes.

Hughes piloted his car at the average rate of 65 miles an hour, while Pullen's average speed was 62.3 miles an hour. The former made his fastest time on the next to the last lap, making the course in 7:23. Pullen's time on his fastest lap was 7:48.

The little Mason, driven by Roberts, ran a good race coming into third place on the fourth lap and staying in this position up to the fifteenth except for the ninth when Wishart succeeded in nosing it out and only momentarily, however. In the sixteenth Trussel in a Falcar gained third position and the Mason was

Velle truck used to transport the militia guards

unable to head it off in the remaining three laps of the race.

Hughes ran a consistant race throughout, stopping only once at the pit when he was far in the lead and even this stop was unnecessary. He informed the pit attendants that his team-mate, Pullen, had blown a tire on the back stretch. Wishart was obliged to stop at the pit in the eleventh lap for tire change. He ran two more laps and was obliged to drop out of the race because his oil lead broke, together with his water pump, beyond immediate repair. The other five starters completed the race. In the fourteenth round Roberts was forced to stop his Mason to tighen up the shock-absorbers on his car which, due to its light weight, was hard to hold on the road, especially on the rougher back stretch.

The fastest lap of the entire race was run by Hastings in a Falcar who in his ninth circuit succeeded in making a time of 7:22. Hughes' fastest lap was 1 second slower than this. He was not pushed, however, and no doubt could have cut his time down considerably had it been necessary.

Hughes' taking of this year's Aurora Trophy race makes him a two-time winner of this event.

The Jencks Trophy event went to Mason entry No. 41 which

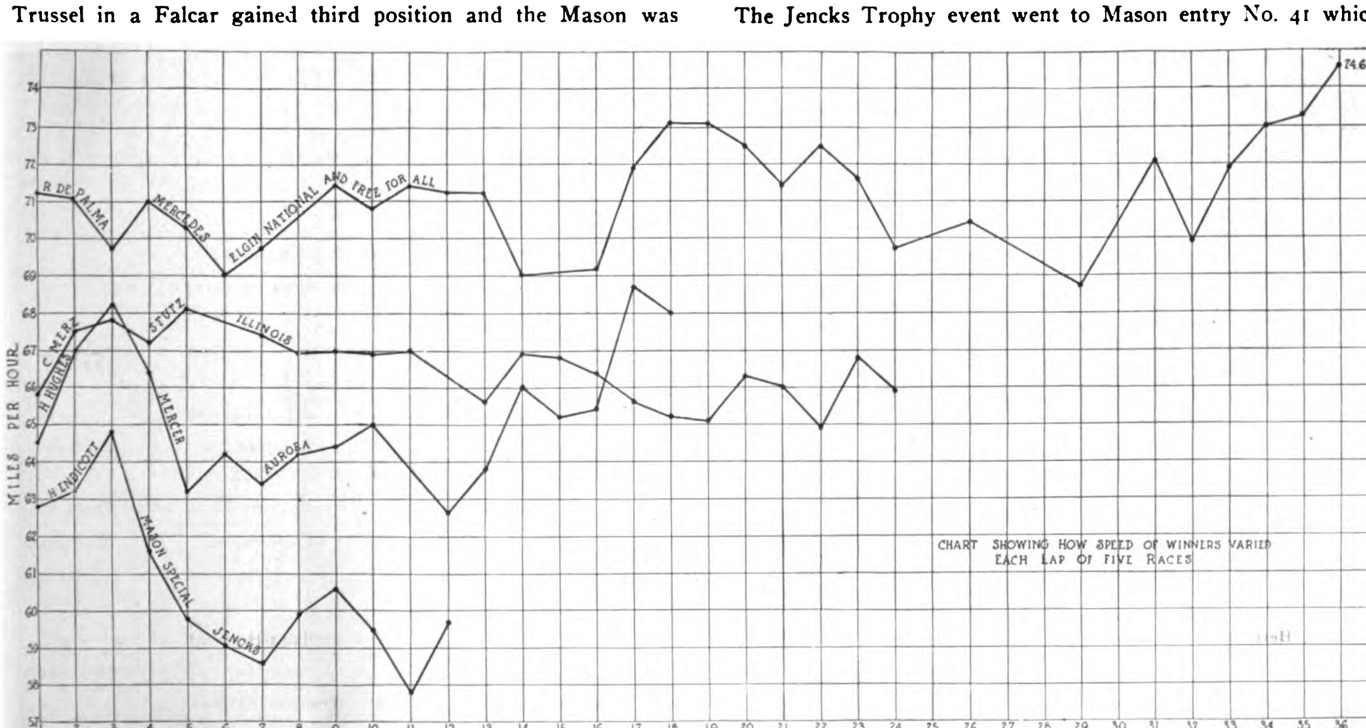


Chart showing variations of running speed of the winners of each race run at Elgin last week

Technical Aspect of Race

Car Design and Equipment Showed Numerous New Features

THE most marked feature of the Elgin meet was the small amount of tire trouble which even the bigger cars had. There were twenty-five recorded cases of tire replacement for the 2 days' racing, and on the first day, when the lighter cars performed, only two stops were made at the pits for tire changes. These were both in the Aurora trophy race, as neither car in the Jencks race nor in the Illinois trophy event had to slacken its speed for this purpose. This applies to the cars which finished in the several events.

Saturday's races saw sixteen tire replacements at the pits, ten of which were right rear tire changes, four left rear and a front change. On numerous occasions when it was necessary to stop at the pits for tire changes advantage was taken of the forced wait to refill oil and gasoline tanks.

On the second day's racing, seven pit stops were made to refill oil, gasoline and water tanks, two to change driver, and one for carbureter adjustment. On the previous day two stops were made to replenish tanks, one for carbureter adjustment and one for the tightening of shock-absorbers. The total number of stops on Friday was six and on Saturday twenty.

Practice troubles were few on the first day; there were no tire changes and the only other two breakdowns were those of Mulford, who broke his crankshaft, and of Hobbs, driving a Rayfield, who burned out an engine bearing. On Saturday, however, Tetzlaff, while in practice, put his car permanently out of the race by shearing one of the differential gears.

A noticeable feature of the Herreshoff entry was that the tires were carried on clincher rims and not on quick-detachable racing rims, which all the other cars used. Wordingham, who drove the car, was obliged to depend on the tires which were on the machine to last throughout the race as, had he been obliged to replace a damaged tire by the clincher method, the time required would have been sufficient to put him out of the running. The Rayfield car carried no extra tires and would have been obliged to run on a damaged shoe from any part of the course back to the pit.

Attention should be called to the fact that none of the cars were stock machines and all were entered under Class C, which requires that the manufacturers must have made at least fifty of the machines for the previous season. Most of the larger cars had been seen before by the racing fraternity and presented no strikingly new features of construction. The Benz car had its rear wheels provided with thin aluminum disks which were bolted to the spokes. This was done with the idea of reducing wind resistance and not for strengthening the wheels, as the metal was too thin for that purpose.

Most of the cars had the conventional type of racing-car exhaust, although the Mason entries had their exhaust pipes coming upward through the tops of the hoods, a feature which no doubt was of great annoyance to the drivers of these machines. The other cars, with the exception of the Ford and the Knox, exhausted below the chassis. The big Knox Six had an exhaust pipe for each cylinder, the six pipes coming out of the left side of the hood. The Ford car was nearly ruled out of the race because the exhaust manifold had been completely removed and no other scheme had been adopted to lead the gases outside of the hood. F. E. Edwards, Chairman of the Technical Committee, at first refused to let the car start, but later stretched a point and permitted it to enter the race, after the lower half of the hood on the exhaust side had been removed, permitting the gases to escape into the air.

The Mason cars were the only ones in the races which had left-hand drive, while Hugh Hughes' Mercer was also distinctive in that it was provided with wire wheels. In making tire changes, the entire wheel was removed and an extra wheel quickly put in its place. This method was undoubtedly faster than that of the other contestants who used demountable rims and many were favorably impressed with the wire wheel showing, both for aiding in keeping the car on the road and for the quick tire change feature.

was driven by Endicott at an average speed of 60.7 miles an hour. He had practically no opposition throughout the entire race and was the only one of the three starters to complete the run of 101 miles and 3,588 feet, or twelve laps. His total time was 100 minutes and 42.9 seconds. The other two entries were Ford and the veteran Herreshoff driven by Wordingham. It was too bad to push this well-known car into a race when it was not in condition and it was out of the race after one lap on account of a broken wheel. It was, however, running an easy second to Endicott's Mason when the accident occurred.

The Ford entry driven by Henning, which was another veteran, completed six laps when it was ditched and put out of the race permanently. Its performance, though slow, was consistent for the 50 miles which it ran. After it was put out of the race Endicott had things all his own way and finished in his own time without a single stop for tire change or for adjustment of any kind, but keeping his machine humming along at a fast pace all the way to the finish line.

TABLE SHOWING THE POSITIONS OF THE CONTESTANTS DURING EVERY LAP OF THE FREE-FOR-ALL

No.	Car	Driver	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1	KNOX SIX	R. Mulford	3	3	2	3	3	2	2	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	2	3	2	3	3	3	3	3	3	3	3
2	MERCEDES	C. Clark	6	6	6	6	4	Out																														
4	MERCEDES	De Palma	1	2	3	2	2	3	3	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	1	1	2	3	2	3	2	2	2	2	2	2	2	1
5	FIAT 70	T. Tetzlaff	5	5	5	5	5	4	4	4	4	4	4	4	4	5	5	5	5	4	4	4	4	4	4	4	4	4	Out									
8	BENZ	E. Bergdoll	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	2
15	MERCER 35	H. Hughes	4	4	4	4	6	5	5	5	5	5	5	5	5	4	4	4	4	Out																		

TABLE SHOWING THE POSITIONS OF THE CONTESTANTS DURING EVERY LAP OF THE ELGIN NATIONAL RACE

No.	Car	Driver	Lap 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
4	MERCEDES	De Palma	1	1	2	1	1	2	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	KNOX SIX	R. Mulford	2	2	1	2	2	1	1	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
12	STUTZ	C. Merz	4	4	5	4	3	3	4	3	5	5	5	6	7	4	7	7	7	6	6	6	4	4	4	4	3	3	3	3	3	3
3	MASON SPL	M. Roberts	7	7	7	8	9	8	8	8	8	8	8	8	8	5	6	6	6	5	5	5	5	5	5	5	4	4	4	4	4	4
7	STUTZ	G. Anderson	4	4	4	5	4	4	3	5	3	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5
5	FIAT 70	E. Hearne & G. Dix	6	6	6	6	6	5	5	4	4	3	3	3	3	7	8	8	8	7	7	7	6	6	6	6	6	Out—Transmission trouble.				
14	MERCER 35	S. Wishart	8	8	8	9	8	7	7	7	7	7	7	7	6	6	5	5	4	4	4	4	7	7	7	7	Out—Broken oil lead and water pump.					
15	MERCER 35	H. Hughes	3	3	3	3	7	6	6	6	6	6	6	5	5	5	4	4	5	Out—Burned out crankshaft bearing.												
2	MERCEDES	G. Clark	9	9	9	7	5	Out—Car skidded—ran into fence—broke both rear wheels.																								
6	FALCAR	H. Hastings	Car not in racing condition.																													
10	FALCAR	G. Trussel	Car not in racing condition.																													
11	NATIONAL 40	N. Whalen	Magneto drive damaged on Friday, putting car out of race.																													

Ralph De Palma's Story

Driver Who Won Double-Header Describes the Race

SOME interesting sidelights on the feature races of Saturday were told by Ralph De Palma, who stated that without a doubt it was the hardest contest in which he had ever participated. The weather was the hottest which has visited the Middle West this year, and the boiling sun beat down furiously upon the speeding drivers, much to their discomfiture. According to De Palma, the back stretch was the hottest, and was very much like an oven, despite the fact that the big Mercedes which he was driving was traveling at a speed of over 70 miles an hour. The heat from the engine swept directly back to the cars and occupants to add to that from the sun's rays.

De Palma changed three tires during the 305-mile run, all at the pits. This, of course, means that after each blow-out he drove for some distance on the flat damaged tire or rim. It was quicker to do this than to have to stop at the point at which the tire gave way, since the facilities for changing were better and more rapid at the pit. The Italian used a total of 29 gallons of gasoline for the thirty-six-lap free-for-all race, thus averaging 10.5 miles to the gallon. His tank has a capacity of 38 gallons, and while at the pit on one occasion he took on 10 gallons and the tank was half full at the end of the race.

Speaking of the course, De Palma stated that it was one of the best on which he had driven, and that it was an easy matter to pass any other car, the width being amply sufficient. At 90 miles an hour the slight roughness of the road surface is not noticeable at all, he stated, while at 60 miles the unevenness is perceptible, but is by no means a disturbing factor. The course is better than that over which the French Grand Prix is run in that respect, as in that event he was frequently obliged to run along for some 15 miles on the course before being able to pass any other car.

Perhaps the most interesting feature of De Palma's races and the one which brings out the obstacles with which he had to contend to win Saturday's events was that from the tenth lap on he was unable to throw out the clutch, it remaining frozen for the remaining twenty-six laps. He was having trouble with his clutch before the race, and delayed the start for 10 minutes while his attendants tried to put it in good condition. Had it been necessary for him to stop on the back stretch for any purpose, he could never have been able to start again. To change gears at that time it was necessary to speed the motor up to what was judged to be the correct speed, then to jam in the gears and run the chance of stripping them. This requires intimate knowledge of the motor's operation. When he stopped his car for tire changes at the pit it was necessary to stop the motor. It was in starting it again that the greatest chance of damage was run. The rear wheels rested in a pool of oil, and the fact had much to do with the prevention of harm to the transmission. If the motor had been speeded up sufficiently, De Palma threw in the lower of the two gears, which he was able to use, putting the strain immediately on the rear wheels. The oil allowed them to spin around in getting the car going again and gave sufficient flexibility to prevent damage. The Mercedes clutch is of the special spring type, the spring being coiled around a drum, and contracting on it when engaged. The drum became cracked, spreading out and jamming within the spiral, rendering positive and unalterable connection between the engine and transmission.

On the twenty-ninth lap the air pressure in the gasoline tank became so great that it was necessary to stop at the pit to reduce it. It had reached about 8 pounds to the square inch.

Some mechanical details of the Mercedes which De Palma drove may be of interest. The motor has a bore of 131.8 millimeters and a stroke of 180 millimeters, giving it a piston dis-

Table Showing the Fastest Lap of Each Entry and Speed of Same, as Compared with Piston Displacement

No.	Name	Bore	Stroke	Piston Displacement cu. in.	Fastest Lap	Time	M.p.h.
	JENCKS TROPHY RACE						
41	Mason Special..	3 13-16	5	228	3	7:51	64.62
43	Herreshoff	3 3-8	3 5-16	133.6	1	10:49	47.00
42	Ford T........	3 3-4	4	176.7	5	11:52	42.8
	AURORA TROPHY RACE						
36	Mercer	4 3-8	5	300.17	17	7:35	66.9
35	Mercer	4 3-8	5	300.17	8	7:39	66.4
31	Mercer	4 3-8	5	300.17	15	7:48	65.1
34	Mason	3 7-8	5	235	11	7:58	63.62
37	Falcar	4 1-8	5 1-4	280.6	16	8:58	56.7
32	Falcar	4 1-8	5 1-4	280.6	7	9:38	52.7
	ILLINOIS TROPHY RACE						
24	Stutz	4 3-4	5 1-2	390	6	7:30	67.6
21	Stutz	4 3-4	5 1-2	390	12	7:35	66.9
23	National	5	5 11-16	448	4	7:35	66.9
22	Rayfield	4	5 1-2	414.6	1	8:35	59.1
	ELGIN NATIONAL TROPHY RACE						
8	Bergdoll	6.2	6.3	780	3	6:51	74.1
1	Knox	4 3-4	5 1-2	584.8	28	6:54	73.6
4	Mercedes	5.17	7.08	588	36	6:49	74.4
5	Fiat	5	7 5-8	598	13	7:09	71.0
15	Mercer	4 3-8	5	300.17	4	7:16	69.9
2	Mercedes	5 1-8	7 1-8	587.9	4	7:21	69.1
7	Stutz	4 3-4	5 1-2	390	15	7:25	68.4
12	Stutz	4 3-4	5 1-2	390	30	7:27	68.2
14	Mercer	4.39	5	301	20	7:32	67.4
3	Mason	3 7-8	5	235.8	22	7:44	65.7

This table shows the consistent performance of the cars when displacement and weight are considered.

TABLE SHOWING THE POSITIONS OF THE CONTESTANTS DURING EVERY LAP OF AURORA TROPHY RACE

No.	Car	Driver	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
31	MERCER	N. Pullen	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
32	FALCAR	H. Hastings	6	4	4	4	2	6	6	6	6	6	6	6	6	5	5	5	5	5
33	FALCAR	H. Trussel	5	5	6	5	5	5	5	5	5	5	4	5	5	4	4	3	3	3
34	MASON	M. Roberts	4	6	5	3	3	3	3	3	4	3	3	3	3	3	3	4	4	4
35	MERCER	S. Wishart	2	2	2	6	4	4	4	4	3	4	5	4	4	Out				
36	MERCER	H. Hughes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

TABLE SHOWING THE POSITIONS OF THE CONTESTANTS DURING EVERY LAP OF ILLINOIS TROPHY RACE

No.	Car	Driver	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
21	STUTZ	G. Anderson	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
22	RAYFIELD	W. Hobbs	4	4	Out																					
23	NATIONAL	N. Whalen	2	2	2	2	2	2	2	3	3	Out														
24	STUTZ	C. Merz	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

TABLE SHOWING THE POSITIONS OF THE CONTESTANTS DURING EVERY LAP OF JENCKS TROPHY RACE

No.	Car	Driver	1	2	3	4	5	6	7	8	9	10	11	12
41	MASON SPL	H. Endicott	1	1	1	1	1	1	1	1	1	1	1	1
42	FORD 1911	Henning	3	2	2	2	2	2	Out					
43	HERRESHOFF 20	W. G. Wordingham	2	Out										

Harking Back a Decade

What Stirred the Automobile World 10 Years Ago—High Price of Gasoline—Racing on Road and Track

Chicago Automobile Facilities Transported More Than 2,000 Persons Every Day

FROM *The Automobile and Motor Review*, September 6, 1902: Every day from 2,000 to 2,500 persons in Chicago ride in public service automobiles, which have come to displace the horse-drawn carette and various forms of busses. There are at present seventeen motor vehicles divided into six lines which make quick trips through the shopping district.

A. C. Newby, of the National Electric Vehicle Company, of Indianapolis, has made a run in one of the cars turned out by that company of 118 miles on one charge. An ordinary 44-cell battery was used.

Exports from New York, including cars and parts, for the week ending August 30 amounted to $11,600.

C. A. Benjamin has left Syracuse to take charge of the Chicago branch of the Locomobile Company of America.

The American Bicycle Company, incorporated for $30,000,000 has defaulted on the semi-annual interest payments on its issue of 5 per cent. gold sinking fund bonds and proceedings have been instituted to have the concern adjudicated bankrupt.

Increasing demand for gasoline has served to advance the price of the 90-degree grade from 17 to 19 cents a gallon. While the big majority of automobile owners are comparatively wealthy men, it has been determined to ask the National Association of Automobile Manufacturers to investigate the underlying causes of the advance.

According to a report made to the National Capital Automobile Club, practically every physician of standing in Washington owns at least one automobile.

President Lee H. Smith of the Buffalo Automobile Club reports that the organization now has a membership of 200, which represents probably 1-5 of the total number of automobiles owned in Buffalo.

The Baker torpedo, Winton's Bullet and the Ford racing pair are to be seen at the race meeting which will be held in Cleveland.

The Fords were built particularly for track work and have been pointed for the 10-mile handicap and Australian pursuit races.

The Chicago Automobile Club has adopted a new system of classification for cars entered in its forthcoming meet at Joliet. The formula is to 1-100 of the weight into the horsepower, so as to give the horsepower per 100 pounds and then classify the cars according to similarity of results. Herbert Crane, of Racine, Wis., has adopted the motor vehicle as a means for delivering milk to his customers. Mr. Crane says that he only spends from 15 to 20 cents a day for fuel.

Low wheels came in by degrees. The vehicle world, usually so quick to snap up anything which had the appearance of being good, was peculiarly slow in adopting them. To produce a rigid wheel and at the same time preserve the elasticity so necessary to an easy-riding vehicle has been the aim of the manufacturers for years. It was not until the advent of pneumatic tires that the opportunity of accomplishing such a result became possible.

While there is a certain amount of opposition to all forms of automobile racing, we believe that the great majority of American motorists, including the makers, are in favor of a continuance of the sport on the road as well as on the track.

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placement of 599.2 cubic inches. In English units the millimeter measurements given above are 5.2 by 7.06 inches. The carbureter is a Rayfield, while the magneto is of Bosch make of the two-spark type. The spark was set for 5-16-inch lead. The gear ratio on high is 1 5-8 to 1. There is no direct drive to the car, power being transmitted through gears for all speeds. The horsepower developed by the motor, which is of four-cylinder type, is 37 at an engine speed of 400 revolutions per minute, 90 at 1,650 revolutions and 114 at 1,850 revolutions. The pistons are of cast iron and are fitted with two rings each. At the top, the pistons have a clearance of .03 inch, at the middle .02 inch and at the bottom .015 inch. The clearances are much greater than those given to the average automobile to allow for greater expansion due to greater heat.

De Palma drove this same Mercedes in the Indianapolis races, and no alterations of any consequence have been made in it since then.

Moline Sees Labor Day Hill Climb

MOLINE, ILL., Sept. 3—Over 5,000 people lined the Sixteenth street hill Labor Day morning and watched Jack Stickney, in a stripped Velie, make the best time of the day, taking the free-for-all with a mark of 17 seconds flat. Stickney and Rose, both Velie drivers, carried off a majority of the honors, winning three firsts and a second. Oscar Priester, of Davenport, in a Pope-Hartford, won the Josephson cup in the amateur drivers' class, making the good time of 17 1-5 seconds. The Pope-Hartford cars took second honors with two firsts and two seconds. The summary is as follows:

Car	Driver	Time
CARS COSTING FROM $1,000 TO $1,800		
Velie	Rose	20:00
Velie	Stickney	21:80
CARS COSTING LESS THAN $2,000		
Velie	Rose	22:00
FREE-FOR-ALL RACE		
Velie	Stickney	17:00
CARS COSTING OVER $1,800		
Lozier	French	18:00
Pope-Hartford	Petersen	18:20
CARS COSTING $1,000 AND LESS		
Overland	Knowles	21:00
CARS COSTING $2,000, CARRYING FOUR PASSENGERS		
Pope-Hartford	Priester	18:00
Pope-Hartford	Petersen	19:00
AMATEUR-DRIVEN CARS		
Lozier	Priester	17:20
Velie	French	18:20

Manitoba Run to Be on Varied Roads

WINNIPEG, MAN., Aug. 31—To obtain every condition of road in the province from sand, mud, swamp, rough, rocky and the smooth, even, hard-packed roadway, the contest committee in charge of the annual endurance run has decided upon the following route:

From Brandon to Carberry and then from Carberry north to Neepawa and from Neepawa to Brandon.

From Brandon the contestants will return by way of Wawanesa, Glenboro, Treherne, Fannystelle and Starbuck.

This route will give a run of between 350 to 400 miles and will take in every variety of district.

Rain Spoils Brighton Meet

The Labor Day meet held on the Brighton Beach 1-mile track on Monday and which was scheduled to include seven events, was postponed after the fifth because Bob Burman declined to race on the wet track in his new 300-horsepower Blitzen Benz II. This event was announced as the star performance of the day.

The other attractions were a 5-mile match race between an E-M-F and a Bergdoll, the former, driven by Billy Burke, winning in 6:2.35; a 5-mile race between Stutz (Dave Lewis), White

(Kyle) and Marion (Strauss), finishing in the order named, with the Stutz arriving in 5:16.61; the same Stutz and White cars and their drivers against Burman in his Ohio, which was disabled on the homestretch of the first lap. This was won by the White in 5:5.14; the first heat of a match race for the Remy Brassard, between Burman, in Blitzen Benz, Hickman, in a Mercedes, Kyle, in the White, and Grennan, in a Benz, Burman going to a spectacular finish; 25-mile race between two Bergdolls, a Marion, Stutz, White and Cutting, the last driven by Burman and finishing in 25.28.56, beating the White by 12 seconds. The grandstand was filled fairly well despite the inclement weather.

A. A. A. Pathfinder Completes Trip

NEW ORLEANS, LA., Sept. 2—Coated with Louisiana mud, the pathfinder of the American Automobile Association's national reliability tour, a Flanders electric coupé, reached its destination in this city last week. The car was met by a column of 100 local automobiles and was escorted to the city hall where official welcome was extended. The pathfinder was 28 days in covering the route from Detroit.

Much of the highways covered is in excellent shape but the map-maker reports that many miles represent the most primitive stage of road-building. Little tire trouble was experienced en route.

Labor Day Races at Albany

ALBANY, N. Y., Sept. 3—Arthur Lang, of Albany, N. Y., on Labor Day competed with William Earl, of Kinderhook, at Parry's Island and defeated him in a 30-horsepower machine, making 5 miles in 8:11 3-4. The second event was won by Frank Baymer, who made 5 miles in 8:03, and the third event was taken by Sam Shaw in 7:57 for 5 miles. The final event was another 5-mile event which was won by W. Knapp in 9:09.

Garage Show Planned at Omaha

OMAHA, NEB., Sept. 3—Omaha will have a fall automobile show, during the Ak-Sar-Ben carnival week, in order that the 1913 models of the cars may be shown to the thousands of outsiders who come to the city during that time, the last week in September and the first in October.

It will not be held at the auditorium where the February shows are given, but will be a street or garage show. This was decided at a recent meeting of the Omaha Automobile Dealers Show Association.

The garages will be decorated with the association colors, green and white, some of the dealers having worked out elaborate decoration schemes. The Omaha streets are strung with rows of incandescent lights during the carnival, and these will be extended up along automobile row. All of the companies will have a complete line of the new models on display.

It is estimated that the combined automobile show and carnival will induce a large per cent. of the state dealers to visit the city, as many have already signified their intention of doing so. There will be a large number of prospective buyers.

The promise of bumper crops in the state is leading all of the automobile men to predict record sales this fall.

If the Patent Office Took Fire

It is claimed by the *Revue de L'Automobile* that paper can be made incombustible by means of an immersion in a very strong solution of alum and that the result is still better if the immersion is repeated after the first coating has been dried. The method is recommended for the safeguarding of documents, private or public, as it is inexpensive and, far from affecting the legibility and appearance of documents injuriously, even preserves the whiteness and the surfaces of paper to which it is applied.

Calendar of Coming Events

What the Months Ahead Have in Store for the Automobilist—Shows, Conventions, Race Meets, Etc.

American and Foreign Fixtures of Importance Set Down in Chronological Order

Shows, Conventions, Etc.

Aug. 24-Sept. 9....Toronto, Can., Display of Automobiles, etc., at Canadian National Exhibition, Transportation Building.
Sept. 5-15.........San Jose, Cal., Automobile Show, San Jose Automobile Dealers' Association.
Sept. 14-21........Chicago, Ill., Annual Fall Festival and Show, Chicago Automobile Trade Association.
Sept. 17-20........Denver, Col., Convention International Association of Fire Engineers.
Sept. 23-Oct. 3.....New York City, Rubber Show, Grand Central Palace.
Dec. 7-22 ....Paris, France, Paris Automobile Show, Grand Palais.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 11-25, 1913...New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Feb. 1-8...........Chicago, Ill., Annual Automobile Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
Feb. 24-March 1...St. Louis, Mo., Annual Automobile Show.
March 3-8.........Pittsburgh, Pa., Annual Automobile Show.
March 8-15........Boston, Mass., Annual Automobile Show.
March 17-22.......Buffalo, N. Y., Annual Automobile Show.
March 19-23.......Boston, Mass., Annual Truck Show.
March 24-29.......Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Sept. 29-30........St. Louis, Mo., Track Races, Universal Exposition Company.
Sept. 9-11.........Chicago, Ill., Commercial Vehicle Reliability Run, Chicago Motor Club.
Sept. 11-14........Buffalo, N. Y., Third Annual Reliability Tour, Automobile Club of Buffalo.
Sept. 17...........Milwaukee, Wis., Grand Prize Race.
Sept. 20...........Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.
Sept. 21...........Milwaukee, Wis., Vanderbilt Cup Race.
Sept. ....Washington, D. C., Reliability Run, Automobile Club of Washington.
Oct. 7-11..........Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 7-20..........National Tour American Automobile Association.
Oct. 12............Salem, N. H., Track Meet, Rockingham Park.
Nov. 6.............Shreveport, La., Track Meet, Shreveport Automobile Club.

Foreign.

Sept. 26-Oct. 6....Bourges, France, Agricultural Motor Car Exposition.
Nov. 8-16.........London, England, Olympia Automobile Show.
Jan. 11-22.........Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.

Grand Prix for 3-Liter Cars—It is announced in *L'Auto* of August 20 that a long-distance road race for "light vehicles" with a maximum cylinder volume of 3 liters will be held in June, 1913, separately from the *Grand Prix* race of the Automobile Club, and not jointly with this event as at the Dieppe race this year. The reason for this decision is that the new regulations for the club's race provide a maximum fuel consumption of 20 liters per 100 kilometers, which provision is so liberal that motors with 100 by 200 millimeters bore and stroke and developing 140 to 150 horsepowers can keep within it, and that consequently mainly cars of very great power can be expected to compete for its honors. As, on the other hand, the public is more deeply interested in cars of smaller dimensions which come nearer to the type usually bought by it, the organizers consider it desirable that the race for 3-liter cars shall be continued from year to year. It is foreshadowed that a maximum fuel consumption lower than 20 liters per 100 kilometers will be stipulated for this race for light vehicles and that it will be placed so low as to bring the superiority in fuel economy for which the European and especially the French automobile industry have been striving, into sharp contrast with the performances of the small American cars whose rapidly increasing sale in the European market is based on merits of a different order and is causing great anxiety.

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Increasing the Speed

ELGIN, ILLINOIS, with its now-famous 8.5-mile road racing circuit is fast climbing the scale of the Goddess of Speed, and if the promoters continue annually to improve the course it will not be long before it will hold the record for a genuine road course, as it is one of the very few courses over which road races are run in which the natural course of the Illinois roads is followed and in which advantage has not been taken of banked turns of large radius in order to get headliners in the press on the speed attained in miles per hour.

From an average speed of 62.5 miles per hour in 1910 to 66.45 in 1911 and to 68.4 this year in the Elgin race for under 600 cubic inches piston displacement over the same course shows the improvement that is being made in cars and also furnishes fuel to the ever-increasing inquiry, "What is going to be the speed limit of motor cars in road races in America?" These figures must be analyzed carefully; otherwise an increase of over 15 per cent. average speed within a lapse of 2 years might be misinterpreted. During the 1910 and 1911 races competition was limited to stock cars. This year it was a non-stock event, but with the same piston limitations of 600 cubic inches as ruled in the stock régime. It must also be borne in mind that roads are being improved from year to year, that drivers are becoming more expert and also more familiar with the course. With all of these matters considered the fact still remains that cars are annually becoming speedier. The fastest lap of 1910, 64.5 miles per hour was raised to 70.45 last year and carried still onward to 74.5 this year. At this pace the speed in a few years may reach the amazing average of 80 miles per hour for the race and easily 90 miles per hour for a single lap.

Of the many factors that are contributing to higher speed in racing cars, the **reduction in weight of reciprocating parts and car balance must receive premier consideration.** The reducing of piston and connecting-rod weight is becoming more general. With the forged steel piston machined to the minimum weight, with hollow tubular connecting-rods and with but a piston ring or two it is now possible with additional piston clearance to get reliability that endures the tremendous speed of hundreds of miles at over 60 miles per hour. Many engineers who have carved for themselves niches in the motoring temple of fame in pleasure car design, have become discards in racing car design, solely due to lack of familiarity with the unlooked-for strains that continued speed imposes on the car mechanisms. Thanks to French aggressiveness, many of these problems have been sufficiently exploited so that today there are a few milestones to blaze the trail in this comparatively unexplored field of car engineering. To date, where engineers have overstepped prescribed limits in weight reduction there have been breakdowns due to lack of fatigue factors in the parts, these, however, having proven their strength adequate for the short test. The forged piston and light connecting-rod are today in a status similar to that of the steering knuckle parts of 2 or 3 years ago when often half a dozen broke in a single race. Today the broken steering knuckle is an unheard-of factor in racing, and it is to be hoped that within a few short years the seized piston or broken connecting-rod will be equally extinct.

Car balance has won several races within the last 3 years, previous to which time it was not considered seriously, the engineer and driver working more on larger valves, improved timing and stronger chassis parts. Today the weight carried on the forward wheels and that carried on the rear wheels is considered to the second or third decimal place. The car is weighed and re-weighed and every effort made to get to get the weights the same. This insures a car that will hold the road no matter at what speed it travels and when a car clings to the roadway there is not any loss in slippage between the tire and the road such as there is when the car is bounding into the air and permitting the rear wheels to spin at abnormally high speed while off the ground, only to act as an emery wheel to grind off the rubber on the tire treads when they finally strike the road surface. Due to such conditions car balance is imperative; it saves the motor from racing, it saves the tires from grinding off the tread and it saves the driver the discomfort of being pounded as he so often is.

Racing is for advertisement and it is questionable if there is any other phase of a racing machine that attracts greater attention than its ability to cling to the road surface and to run smoothly at high speeds. Every car driver, and nearly every car owner who has toured over American roads is familiar with the pounding received in the tonneau seat due to stiff springs, poor body positioning, bad shock-absorbers and lack of car balance. To such the well-balanced car appeals with special significance.

Continued high speed has demanded more adequate lubrication, and while a few years ago there was often nearly half as many gallons of oil fed to the motor in a race as there were consumed gallons of gasoline today this extravagance has been eliminated and racing cars are being perfected which can carry an oil supply for a race of 500 miles, and one or two claim to carry capacity for 1,000 miles. The lubrication has been confined to force-feed to the bearings of the crankshaft and the connecting-rods. With such a system the amount of oil needed as compared with that consumed in splash is less than one-half and better results are being obtained. France is acting commendably in its announced rules for its 1913 Grand Prix race in which gasoline consumption is made a factor. The new rules require that the racer shall average approximately 14 miles to the gallon of fuel. The club is mastering the situation by insisting on manufacturing its own gasoline tanks, the fittings and pipings, and placing official observers over the cars to see that no violation of the rule is committed. Similar action was taken four or five years ago, but there was not any permanent result. Today with the rapid rise in the cost of fuel the enormous increase in the number of cars and other factors it is expected that something permanent will result so that, as far as motor efficiency is considered, there will be something rational in the racing machine, so that the stock product of the factory will benefit in this regard as a result of the races. That which is irrational cannot continue and even in free-for-all racing the rules must be marked by rational limitations. Otherwise the venture will consume itself in its own extravagances.

Canadian Customs Touring Rules

Great Increase in Number of Cars Crossing the Border Renders More or Less Red Tape Necessary

MONTREAL, QUE., Aug. 31—In view of the steadily growing volume of automobile tourist traffic between Canada and the United States, and vice versa, it is thought by local customs to be a fitting time for them to generally remind travelers, of the rules and regulations to which they must conform if they wish to journey without inconvenience or delay.

For Canadian-owned cars going into the United States it was explained this morning by the official in the department of the chief collector of customs, the owner thereof must first ask permission from the local customs authorities to export his car for touring purposes.

When this has been done, the car owner will be supplied with two forms which must be made out in duplicate giving name and address of owner, with the name of manufacturer of the automobile, the manufacturer's number, the number of cylinders in the car, the style, seating capacity, color, style of running gear, with what extras, glass windshield and speedometer, together with the numbers of each of the tires, back and front, etc.

One copy of the lengthy form so made out is to be given to the customs office at the last customs port on this side of the line, while the other is kept by the car owner until he returns to Canada, when it is given to the customs officers for purposes of comparison, with the duplicate in his possession.

In the case of American tourists coming into Canada not only must conditions like the aforesaid be complied with, but each car owner must deposit the sum of $25 as a mark of good faith as well as a bond representing twice the duty collectable on the car. Thus, for instance, if an American car worth $5,000 comes into Canada and on a basis of 35 per cent. is liable to pay $1,750.00 duty, the owner must take out a bond for $3,500 with some guaranteed bond company.

The bond expires and the $25 good-faith money is handed back as soon as the American car leaves this side.

If, however, an American tourist, coming into Canada, can produce two Canadians to sign a personal bond, the cash bond stipulation does not become necessary.

Over 500 automobiles, Canadian and American, have crossed the boundary line between Province and New York State since May 1 last.

Canada Has 21,920 Automobiles

Ontario Leads Provinces in Number of Cars in Use While Alberta Has Highest Population Ratio

MONTREAL, QUE., Sept. 3—The extent of the cult of the automobile in this country is clearly reflected in the following table showing the population and the number of cars now in use in each province of the Dominion:

Province	Population	No. of cars	Population per car
Nova Scotia	492,338	578	851
New Brunswick	351,889	592	594
Quebec	2,002,712	2,500	801
Ontario	2,523,208	7,338	344
Manitoba	455,614	3,000	152
Saskatchewan	492,432	2,537	194
Alberta	374,663	3,000	125
British Columbia	392,480	2,375	165

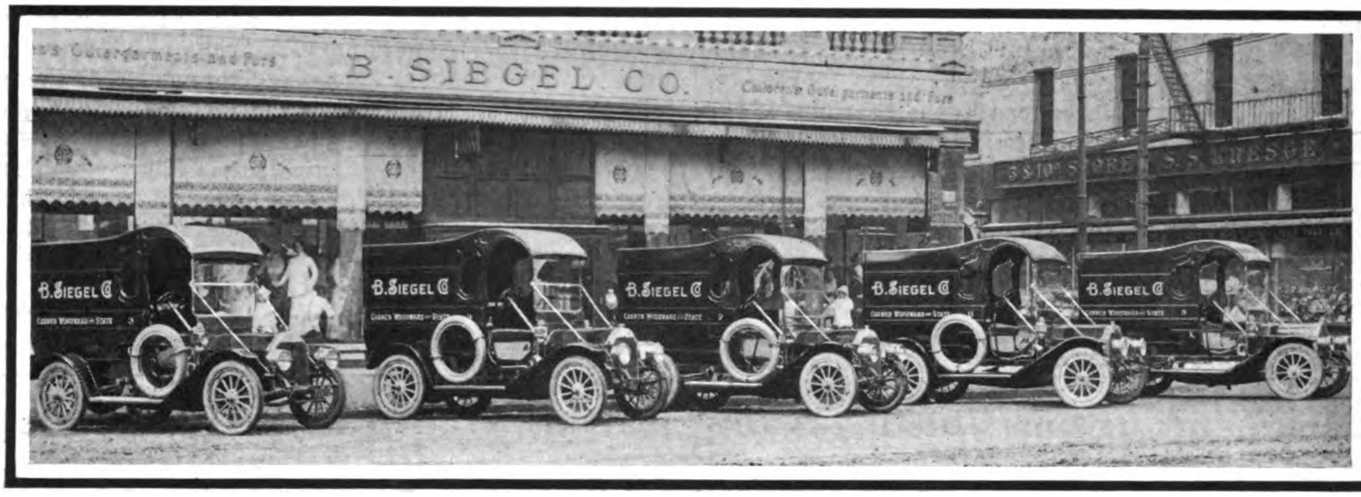
In comparison to population Alberta has the greatest number of cars. Last year 700 licenses were issued in Calgary and about 350 in Edmonton. Manitoba comes next with one auto to every 152 people in the province, and British Columbia third with one auto to every 165 persons. Nova Scotia has the smallest number of cars, and the ratio of autos to population here is the lowest. Ontario leads in the number of machines in use and has one car to each 344 of population. Western Canada generally is a far larger buyer than the East.

In addition to the licenses to residents of Ontario, 4,001 licenses were granted to tourists. In Manitoba cars transient through the province are not registered and have 30 days for touring that part of the country. After that time they are considered resident and have to take out a license.

Prince Edward Island is the only province which prohibits the use of motor vehicles on its highways and public places. This was thought necessary in the interest and for the safety of the traveling public. The penalty for breaking this law is $500 or 6 months in jail.

The following is a comparative statement of automobiles imported into Canada from the United States during 1909 to 1911, as compiled by the Department of Commerce and Labor:

Year.	No.		Value.	
1909	1,230		$1,457,129	
1910	3,102		3,340,326	
1911	4,687		5,057,927	
		9,019		$9,845,382
Value automobile parts:				
1909			$2,230,509	
1910			1,023,386	
1911			1,726,842	
				2,980,737
Total valuation of automobiles and parts				$12,826,119



The B. Siegel Company, Detroit, Mich., now has five Cartercar trucks which displace fifteen horses in the delivery department

SIEGEL Company's Five Cartercars—The above photograph shows the five Cartercars used by the B. Siegel Company, Detroit, Mich., in place of fifteen horses, which were formerly required to accomplish the deliveries. Located as this firm is, right in the very heart of the most congested business district, they could not possibly continue the old style delivery system without sacrificing considerable business.

Studebaker Declares Dividends—The Studebaker Corporation, Detroit, Mich., has declared its regular quarterly dividend of 1¾ per cent.

Halcomb Opens N. Y. Salesrooms—The Halcomb Steel Company, Syracuse, N. Y., has opened a sales office at 95 Liberty street, New York City, in order to give more efficient service to its customers.

Mitchell Joins Republic Tire—G. L. Mitchell has resigned managership of the Toronto, Ont., branch of the Diamond Rubber Company to become partner in the Republic Rubber Company, Detroit, Mich.

Eastern Canada Leads in Sales—Statistics just issued by a Canadian financial paper indicate that more automobiles are sold in western Canada than in the eastern section proportionately to the population.

Reo Divides Yearly Profits—The Reo Motor Car Company, Lansing, Mich., has announced its third distribution of profits this year amounting to about $200,000, which is 10.9 per cent. on its capital of $2,000,000.

Detroit Automobile College Opened—Wolverine Automobile College has been opened at 942 Jefferson Avenue, Detroit, Mich. Chester Arthur, formerly with the Automobile School of America, is chief instructor.

Baillargeon, President Peerless Tire—J. W. Baillargeon, president of the Autobus Company, Montreal, Que., has been chosen president of the Peerless Tire Company, organized to manufacture and market a leather tread steel-studded tire.

Lumbach with Studebaker Corporation—Henry Lumbach, assistant engineer of the R-C-H Corporation, has resigned to accept a position with the Studebaker Corporation as chief tool maker. His resignation will take effect September 1.

Arnold Enters Smith Company—E. A. Arnold, chief engineer and sales manager of the Metal Products Company, Detroit, Mich., resigned August 1, to enter the employ of the A. O. Smith Company, Milwaukee, Wis., as consulting engineer.

Muntz President Consolidated Motors—Gerard Muntz, director of Schacht Motor Car Co.., of Hamilton, has been chosen president of Consolidated Motors, Limited, Toronto, Ont., which has located its new establishment at 112-116 Richmond Street West.

Hamilton Club's Membership Campaign—The Hamilton, Ont., Automobile Club, largest of the affiliated clubs in the Ontario Motor League, is planning a big membership campaign and Secretary J. Overell and Main Johnson are arranging details and planning the organization.

Moyer Pathfinder All-Iowa Tour—W. E. Moyer, president of the Iowa Automobile Association, Des Moines, Iowa, left in a Hudson on September 1 to blaze the way for the All-Iowa tour which is to be held late in September. The tour will have entries from all parts of the state.

Truck Displaces Four Horses—A 2-ton motor truck has displaced two teams of horses in the service of the New York Central Railroad at West Albany, N. Y. The truck was placed in service hauling supplies and material from the city to the various departments of the railroad company.

Beedee Manager Wilcox Branch—R. E. Beedee, Davenport, Ia., has accepted the position of assistant general manager of the St. Louis, Mo., branch of the Wilcox Motor Car Company, Minneapolis. Mr. Wilcox has been for the last three years assistant manager of the Western Flour Mills Company, the largest milling company in Iowa.

Prince Edward Island Automobiless—Prince Edward Island is the only province in Canada that prohibits the use of automobiles on its highways and in public places. The penalty for violating this law, which was enacted because it was thought to be necessary to public interest and for the safety of the traveling public, is a fine of $500.00 or 6 months in jail.

New Agencies Established During the Week

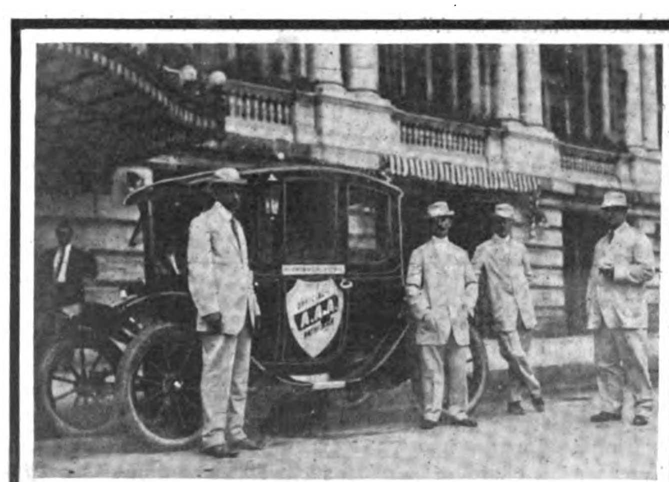
Place	Car	Agent
Akron, Ind.	R-C-H	Karl B. Gast & A. A. Gast
Alexandria, La.	R-C-H	W. H. Ratcliffe
Albuquerque, N. Mex.	R-C-H	E. L. Bradford
Baltimore, Md.	Keeton	Baltimore Garage Co.
Baltimore, Md.	Lozier	The Schall-Crouch Auto Co.
Baltimore, Md.	Paige-Detroit	The Schall-Crouch Auto Co.
Batavia, N. Y.	R-C-H	Robert L. Hiller
Bayonne, N. J.	R-C-H	W. H Dykeman
Bay Ridge, N. Y.	Henderson	Chas. Frederick
Bordentown, N. J.	R-C-H	Samuel F. Garrison
Boston	Paige-Detroit	Lozier Motor Car Co.
Boston	Marmon	F. E. Wing Motor Car Co.
Bristol, Tenn.	R-C-H	Cannon Elect. Co.
Cambridge, Md.	Detroiter	F. J. Brannock
Canton, Ill.	Henderson	Meade McCatchey
Carlsbad, N. Mex.	R-C-H	Carlsbad Auto Co.
Charleston, S. C.	R-C-H	Automobile & Marine Motor Co.
Chattanooga, Tenn.	Packard	Bill Jones Auto Co
Chestertown, Md.	Detroiter	J. W. Russell
Chicago, Ill.	Henderson	I. G. Tennant & Co.
Chicago, Ill.	R-C-H	F. Ebann
Chicago, Ill.	R-C-H	W. C. Sporleder
Dallas, Tex.	American	Sacksteder-Potter Co.
Dallas, Tex.	Marion	Sacksteder-Potter Co.
Davenport, Ia.	White	Davenport Auto Truck Co.
Decatur, Ill.	R-C-H	G. F. Wisegarver
Deming, N. Mex.	R-C-H	Crescent Garage
Des Moines, Ia.	Everitt	Brown Corley Motors Co.
Des Moines, Ia.	Marion	Ryan Motors Co.
East Orange, N. J.	Henderson	Harold C. Slater
Edmonton, Alberta, Can.	Henderson	Standard Motor Car Co., Ltd.
Elyria, O.	Garford	Jackson & Harrison Auto Sales Co.
Enderlin, N. D.	R-C-H	W. J. Baribean
Fall River, Mass.	Henderson	F. W. Davis & Sons
Fresno, Cal.	Henderson	L. E. Grider
Fresno, Cal.	R-C-H	E. W. Johnson Co.
Gilroy, Cal.	R-C-H	McKenney & McKenney
Golden, Ill.	Henderson	Thesen & Gronewald
Grand Rapids, Mich.	Franklin	The Stratton & Woodcock Automobile Co.
Grand Salene, Tex.	R-C-H	B. W. Carrington
Green City, Mo.	R-C-H	Boyce & Born
Hamilton, Ont.	Regal	Stacker & Feeder Co.
Hardinsburg, Ind.	R-C-H	May & McPheeters
Havre de Grace, Md.	Detroiter	Sanders Machine Shop
Houston, Tex.	R-C-H	Northrupp & Clark
Howard, Pa.	R-C-H	Jackson Kline
Inverness, Miss.	R-C-H	Wallace & Tolar
Jamestown, N. D.	R-C-H	Wallace Donnelly Co.
Janesville, Minn.	R-C-H	E. Dieudonne & Son
Joplin, Mo.	Hupp-Yeats	C. H. Back
Kansas City, Mo.	Franklin	W. F. Kneip & E. F. Williams
Lake Wilson, Minn.	R-C-H	L. L. Grier & A. S. Peters
Lancaster, Pa.	Henderson	Automobile & Supply Co.
Lansford, N. D.	R-C-H	Brunner & Chambers
Las Animas, Colo.	R-C-H	P. W. Pittman
Le Roy, Kan.	R-C-H	P. C. Jones
Lima, O.	Chalmers	W. E. Rudy
Lindsay, Cal.	Henderson	E. C. Graham
Madison, Wis.	Cadillac	Statz Motor Car Co.
Madison, Wis.	Stoddard-Dayton	Statz Motor Car Co.
Madison, Wis.	Studebaker	Statz Motor Car Co.
Marlton, N. J.	R-C-H	Middleton Motor Co.
Martinsburg, W. Va.	Detroiter	Shenandoah Garage
Milwaukee, Wis.	Cadillac	Jonas Automobile Co.
Minneapolis, Minn.	Cartercar	Minnesota Cartercar Co.
Minneapolis, Minn.	K-R-I-T	Northwestern Auto Co.
Mays Landing, N. J.	R-C-H	Harry F. Birch
Montreal, Que.	Panhard	Major & Co.
Nacogdoches, Tex.	R-C-H	Baker & Wilson
Nashville, Tenn.	Franklin	Cumberland Motor Car Co.
New York City, N. Y.	Havers	Knickerbocker Motor Car Co.
Northport, L. I., N. Y.	Henderson	D. & W. Lawson
Ottawa, Ont.	Franklin	The Pink-McVeity-Blackburn Co.
Ottawa, Kan.	R-C-H	John Nelson & Son
Penn Yan, N. Y.	Rambler	A. H. Wagner
Petaluma, Cal.	Henderson	J. J. Tanner
Petersburg, Va.	Detroiter	George B. Carter
Pittsburg, Pa.	Henderson	Forbes Motor Car Co.
Plymouth, Ind.	R-C-H	F. H. Kuhn
Rialto, Cal.	R-C-H	J. W. Cramp
Riverside, Cal.	R-C-H	A. R. Riley
Rochester, N. Y.	Henderson	Knipper-Kipp Co.
Rochester, N. Y.	National	Mathias R. Kondolf
Rockland, Me.	R-C-H	Albert C. Jones
Roswell, N. Mex.	R-C-H	Pecos Valley Auto Co.
Roswell, Ga.	R-C-H	H. A. Walton & C. W. Ellington
Sacramento, Cal.	Henderson	Sacramento Motor Sales Co.
Santa Ana, Cal.	R-C-H	Frank Vegely
Seattle, Wash.	Stutz	W. P. Brawley & C. H. Moers
Selma, Ala.	R-C-H	S. H. Watts
Scranton, Kan.	R-C-H	Michael & Sappenfield Garage Co.
Skowhegan, Me.	Cartercar	Clyde H. Smith Auto Co.
Souderton, Pa.	R-C-H	The Souderton Garage
Springfield, Mass.	Henderson	Forest Park Garage
St. Catharines, Ont.	Reo	Reo Sales Company
Stockton, Cal.	R-C-H	E. E. Gross
Swedesboro, N. J.	Henderson	H. F. Hunter
Syracuse, N. Y.	Alco	Jefferson Garage Co.
Taneytown, Md.	Detroiter	George W. Demmitt
Tonom, Ont.	Panhard	Consolidated Motors
Tonom, Ont.	Schacht	Consolidated Motors
Toronto, Ont.	Gramm	Shaw Overland Sales Co.
Toronto, Ont.	King	Matheson Sales Co.
Tucson, Ariz.	R-C-H	Alfred S. Donau Auto Co.
Utica, N. Y.	Cartercar	L. H. Gardiner
Utica, N. Y.	R-C-H	I. R. Gardiner
Washington, D. C.	Pierce-Arrow	Foss-Hughes Co.
Watertown, Wis.	Overland	Buroff-Fuller Motor Co.
Watertown, Wis.	Regal	Buroff-Fuller Motor Co.
Wenona, Ill.	R-C-H	H. L. Webber
Wessington Spr'gs, S. D.	R-C-H	Western Machine & Motor Co.
Wichita, Kan.	R-C-H	C. A. Jones
Williamsport, Ind.	R-C-H	John E. Briggs
Winchester, Va.	Detroiter	E. A. Rogers
York, Pa.	Henderson	Auto & Truck Sales Co.
ELECTRIC CARS		
Boston	Flanders Electric	J. S. Harrington & Co.
Washington, D. C.	Hupp-Yeats	Storm Motor Car Co.
COMMERCIAL VEHICLES		
Atlanta, Ga.	Federal	Cole Motor Co. of Ga.
Buffalo, N. Y.	Federal	Sanderson & Burghardt
Columbia, S. C.	Federal	Gibbes Machinery Co.
Cleveland, O.	Federal	Eckenroth Sales Co.
Davenport, Ia.	Velie	Davenport Auto Truck Co.
Davenport, Ia.	White	Davenport Auto Truck Co.
Larned, Kan.	Federal	W. S. Young
Mobile, Ala.	Federal	Mobile Auto Co.
Memphis, Tenn.	Federal	John F. Cubbins
New Orleans, La.	Federal	Fairchild Auto Co.
Pittsburg, Pa.	Federal	Union Motor Car Co.
Sioux City, Ia.	Federal	Interstate Auto & Sup. Co.
Tecumseh, Mich.	Federal	L. C. Hayden
Tonom, Ont.	Detroiter	Consolidated Motors
Watertown, Wis.	Chase Truck	Buroff-Fuller Motor Co.
Washington, D. C.	Pierce-Arrow	Foss-Hughes Co.
Washington, D. C.	G. M. C.	G. E. Chapman
Washington, D. C.	Lauth-Juergens	Warren Motor Sales Co.
Winnipeg, Can.	Mack	Canadian Fairbanks Morse Co.

Tampa-Mitchell Agency Fails—The Mitchell automobile agency, Tampa, Fla., has failed. Marvin O. Hubbell, the agent, has left for parts unknown, although no criminal action is alleged.

Curtiss District Manager Chase—Royal B. Curtiss, of Stepney, Conn., has been appointed district manager of the Chase Motor Truck Company, Syracuse, N. Y., succeeding C. W. Moody, who resigned.

De Lisser Homeward Bound—Horace de Lisser, chairman of the Board of Directors of the Ajax-Grieb Rubber Company, sails for home August 31, on the steamer France. His mission was to establish Ajax agencies throughout Europe.

Flanders Electric Ends Trip—The Flanders Colonial Electric Pathfinding car of the American Automobile Association finished its long trip of over 1,721 miles from Detroit, Mich., to New Orleans, La., last Wednesday. The car was the center of an admiring throng which voiced its appreciation of the car's consistent performance under trying conditions.



The A. A. A. Flanders Colonial electric pathfinder and its crew

Pierce 5-ton truck which participated in Connecticut maneuvers

Colby Builds Branch—The Colby Motor Company, Minneapolis, Minn., branch is building a two-story structure 50 by 150 feet which is to be completed in 3 months.

Hadley Joins Lenox Company—W. K. Hadley will shortly join the Lenox Motor Car Company, Boston, Mass., as general sales manager and purchasing agent.

Jonas Company's New Building—The Jonas Automobile Company, Milwaukee, Wis., will on October 15 take possession of the new Cadillac Building now being erected for the firm.

Auto-Jack Marmon Equipment—The Marmon company, Indianapolis, Ind., announces the Hartford Auto-Jack as well as the Truffault-Hartford shock absorber as regular factory equipment.

Ford Has No 1913 Announcement—Adopting the 1908 Model T as a standard, as heretofore, the Ford Motor Company, Detroit, Mich., has no car announcement for 1913 to make to the trade.

Brown Resigns from Mais—Will H. Brown has resigned from the Mais Motor Car Company, Indianapolis, Ind. He will devote his attention to the Brown Commercial Car Company, Peru, Ind., which he organized.

Number Plate Contract Awarded—The Ohio Automobile department, Columbus, O., has awarded the contract to supply 75,000 sets of number plates for the year 1913 to the Scioto Sign Company, of Kenton, O., at its bid of 22 1-4 cents per set.

T. C. A. in Syracuse—Frederick H. Elliott, secretary of the Touring Club of America, which has previously been located with headquarters at Albany, announces that his organization will shortly open headquarters at the Onondaga Hotel in Syracuse, N. Y.

Seattle Club's Run—The third annual run of the Automobile Club of Seattle, Wash., will be to Cohasset Beach, Wash., August 30-31. The total distance from Seattle to Cohasset Beach is 171 miles. The route has been well marked to the beach.

State Fair's Automobile Show—An automobile show is being held at the Indiana State Fair, Indianapolis, Ind. This is the first time there has been any elaborate display of automobiles at the fair. There are nearly a dozen firms represented.

Establish Canadian Mack Agencies—An agreement between the Canadian Fairbanks-Morse Company and the International Motor Company, New York City, for the establishment of a chain of service stations throughout Canada, was recently put through. The principal stations will be at Montreal, Toronto, Winnipeg, and Regina.

Cars May Displace Mules—The experiment of towing canal-boats by automobiles was made last Tuesday at Pendleton, N. Y., by William Gleasner, superintendent of the Great Lakes Company, barge-canal contractors. With a 30-horsepower automobile he towed a canal-boat loaded with lumber for a distance of 3 miles at the rate of 6 miles an hour.

California's Sales Decrease—July showed a decided falling off in the number of new automobiles purchased in California as compared with the records of several preceding months. The report for July shows that 2,327 automobiles were licensed during the month, an average for each working day of eighty-six. During the 4 months preceding July the daily average was over 100, and in June reached 109.

Pierce-Arrow in War Maneuvers—The Pierce-Arrow 5-ton truck made a fine record in the recent army maneuvers. This truck hauled the Fourth Brigade baggage and supplies from Buffalo to New Haven, Conn., then participated in the army maneuvers and returned overland to Buffalo with its original load. The accompanying photograph shows the truck as it was, just ready to leave the armory of the Sixty-fifth Regiment, N. Y. N. G., for the scene of the maneuvers.

Automobile Incorporations

AUTOMOBILES AND PARTS

Augusta, Maine.—United Motor Equipment Company; capital, $1,000,000; to manufacture motors. Incorporator: E. M. Leavitt.

Buffalo, N. Y.—A. W. Haile Motor Company; capital, $25,000; to deal in automobiles. Incorporators: Arthur W. Haile, Bradley H. Phillips, E. C. Schlenker.

Chicago, Ill.—Parker Motor Company; capital, $5,000; to manufacture motors. Incorporators: Hugo W. Schnetzky, Frederick D. Parker, Archie E. Cole.

Elizabeth, N. J.—Franklin Automobile Company; capital, $25,000; to manufacture motors. Incorporators: W. H. Reynold, M. Gordon, L. Koplan.

Flint, Mich.—Sterling Motor Company; capital, $300,000; to manufacture motors. Incorporator: W. C. Durant.

Hamilton, O.—Hamilton Vehicle Company; capital, $50,000; to manufacture automobiles. Incorporators: A. A. Dornbush, Louis J. Brenig, William Kloeb.

Indianapolis, Ind.—Hydraulic Transmission Company; capital, $200,000; to manufacture hydraulic transmissions. Incorporators: Wm. F. Ernest, Paul Millholland.

Indianapolis, Ind.—W. K. Millholland Machine Company; capital, $50,000; to manufacture motor car parts. Incorporators: W. K. Millholland, Paul Millholland, A. M. Millholland.

Montreal, Que.—Drednot Motor Truck Company; capital, $50,000; to manufacture motor trucks. Incorporators: W. L. Haskell, H. S. Rose, John S. Rigby, V. S. Rose, L. C. Haskell, J. E. Merritt, D. S. Whittall.

New York City, N. Y.—Triple Action Carbureter Company; capital, $200,000; to manufacture carbureters. Incorporators: Mathias Weiwoda, Frederick Hooschar, Edmund F. Driggs.

New York City, N. Y.—Viking Manufacturing Company, of Manhattan; capital, $25,000; to manufacture automobiles. Incorporators: A. R. Bangs, R. Condon, A. O. Briggs.

New York City, N. Y.—Roulements E. DeBois Ball Bearing Company; capital, $25,000; to manufacture ball-bearings. Incorporators: John S. Sherman, W. W. Sherman, H. T. Sherman.

Pittsburgh, Pa.—Universal Shoe & Forge Company; capital, $50,000; to manufacture automobile parts. Incorporators: J. H. Wall, P. A. K. Black.

Pontiac, Mich.—Pontiac Automobile Castings Company; capital, $15,000; to manufacture motor parts.

Racine, Wis.—Wadewitz Machinery Company; capital, $50,000; to manufacture motors.

Stillwater, Minn.—Republic Motor Company; capital, $10,000; to manufacture automobiles. Incorporators: G. H. Sullivan, L. L. Manvering, Paul H. Guilford.

Troy, N. Y.—Pinoeer Motor Car Company; capital, $10,000; to manufacture automobiles. Incorporators: H. J. Richardson, N. R. Holmes, G. N. Nay.

Union, N. Y.—Clifton Automobile Company; capital, $10,000; to manufacture automobiles. Incorporators: Benjamin F. Krom, Walter Sakuette.

GARAGES AND ACCESSORIES

Albany, N.Y.—Fiat Motor Sales Company; capital, $300,000; to deal in motors, engines and machinery for automobiles. Incorporator: Charles L. A. Whitney.

Birmingham, Ala.—Robertson Tire & Automobile Company; capital, $2,000; to deal in supplies. Incorporators: J. E. Vandergriff, E. R. Minhinette, Jr., W. W. Robertson.

Boston, Mass.—Fenway Garage Company; capital, $250,000; to carry on a garage business. Incorporators: Josiah C. Cannon, Chester W. Engel.

Boston, Mass.—Motor Monitor Company; capital, $20,000; to deal in supplies. Incorporators: Howard P. Soule, Gardner W. Chase, Richard S. True.

Boston, Mass.—Standard Automobile Supply Company; capital, $100,000; to deal in supplies. Incorporators: Michael F. Culliney, Edith W. Shepherd.

Charlotte, N. C.—Model Garage; capital, $25,000; to carry on a garage business. Incorporators: R. F. Price, E. T. James, R. B. Cochrane.

Chicago, Ill.—Chicago Cyclecar Company; capital, $2,500; to deal in motors, automobiles. Incorporators: Franklin A. Dean, Jr.; Harris Carman, Lufkin Dwight P. Green.

Yeoman Becomes Ames Manager—Mr. George W. Yeoman has become general manager of the Ames Motor Car Company, Owensboro, Ky.

May Raise Insurance Rates—Insurance companies in Baltimore, Md., are raising the rates of accident premiums on automobiles in consequence of the steady increase in mishaps.

Winning Cars Rayfield Equipped—De Palma, in a Rayfield equipped Mercedes, won the Elgin National Race. Mulford, driving Knox, also equipped with a Rayfield carbureter, came in second.

Goodyear's Baltimore Building—The Goodyear Tire and Rubber Company, Baltimore, Md., is erecting a handsome new building at the corner of Cathedral and Preston streets. Frank M. Olmstead is manager.

Bromwell with Nebraska Cartercar—Tom Bromwell, who for several years has been sales manager for the H. E. Fredrickson Company, has resigned to accept a like position with the Nebraska Cartercar Company, Omaha, Neb.

Braender Tire Brooklyn Branch—The Braender Rubber & Tire Company, New York City, with factory at Rutherford, N. J., has established a branch office and salesroom at 1211 Bedford avenue, Brooklyn, N. Y. S. W. Smith is manager.

Automobile Incorporations

CHIPLEY, FLA.—Punctureless Tire Company; capital, $12,500; to make tires. Incorporators: L. W. Crow, J. S. McCreachy, C. B. Dunn.

CINCINNATI, O.—J. C. Hopkins Manufacturing Company; capital, $10,000; to manufacture automobile gloves. Incorporator: John C. Hopkins.

DILLON, S. C.—Roach & Carmichael Company; capital, $3,850; to deal in automobiles. Incorporators: C. A. Roach, H. H. Carmichael.

HIGHLAND PARK, N. Y.—Walter Williamson Automobile Company; capital, $10,000; to deal in automobiles. Incorporators: W. M. Williamson, Watson Whitlesey, Vernon J. Miller.

HULL, QUE.—Hull & Ottawa Garage Company; capital, $40,000; to carry on a garage business. Incorporators: V. P. Leduc, Jos. Gravelle, J. Fortin, Chas. Leduc, L. A. Leduc, E. Morin.

INDIANAPOLIS, IND.—McLellen Automobile Shop; capital, $1,000; to deal in supplies. Incorporators: F. P. McLellen, F. E. Barrett, J. M. Miles.

KANSAS CITY, MO.—Packard Kansas City Motor Company; capital, $2,000; to deal in automobiles. Incorporators: Joseph B. Renshaw, Robert Sloan, R. J. Ingraham.

MEDINA, O.—Medina Machine Company; capital, $25,000; to deal in repairing all kinds of machinery. Incorporators: F. W. Woods, F. M. Branch, C. R. Warner, C. V. Neumeyer, W. T. Kennedy.

MILWAUKEE, WIS.—Badger Oil & Specialty Company; capital, $25,000; to deal in supplies. Incorporators: Benjamin Margeles, W. A. Nash, R. M. McKay.

MILWAUKEE, WIS.—Lozier Livery Company; capital, $25,000; to operate a motor livery service. Incorporators: Richard H. Knowles, R. P. Druecker, F. W. Loomis.

MINNEAPOLIS, MINN.—Dahl Punctureless Tire Company; capital, $6,000,000; to manufacture tires. Incorporators: I. Seery, Russell N. Stewart, Homer St. Denehy, Thomas A. Callahan, Thomas C. McNamee.

NASHVILLE, TENN.—Cumberland Motor Company; capital, $10,000; to deal in automobiles. Incorporators: W. D. Caldwell, J. H. Cheek, J. O. Cheek, Jr.; D. M. Bayer.

NEW YORK CITY, N. Y.—Trevent Tire Company; capital, $100,000; to manufacture tires. Incorporators: N. A. Sterling, M. Rachmil, S. King.

NEW YORK CITY, N. Y.—Ideal Automobile and Garage Company; capital, $10,000; to carry on a garage business. Incorporators: John W. Colloph, Reginald H. Smith, Alfred P. Morewood.

NEW YORK CITY, N. Y.—North River Garage; capital, $20,000; to carry on a garage business. Incorporators: W. E. Lockwood, Leonard E. Jelly, Robert E. Shaw.

PORTLAND, ORE.—Automobile Air-Rotar Company; capital, $15,000; to deal in machines and automobiles. Incorporators: Albert F. Jones, T. L. Corteau, James E. Manter.

SAN ANTONIO, TEX.—Guarantee Motor Car Company; capital, $10,000; to deal in automobiles. Incorporators: J. F. Hagan, H. J. Smith, C. W. Voss.

ST. JOSEPH, MO.—Ardery Holliday Motor Car Company; capital, $10,000; to deal in automobiles. Incorporators: J. W. Ardery, J. W. Holliday, W. S. Thomson, Charles Ardery, W. H. Watson.

TROY, N. Y.—Troy Motor Company; capital, $10,000; to deal in automobiles. Incorporators: Fred S. Snyder, Frank A. Snyder, John B. Wood, J. A. Wendell, Richard G. Thornmeyer, H. P. Schoenmaker, C. R. Kilmer.

WILMINGTON, DEL.—Overman Tire Company; capital, $3,000,000; to manufacture tires. Incorporator: Herbert E. Latter.

VANCOUVER, CAN.—Pacific Automobile Company; capital, $500,000; to carry on a taxicab business. Incorporators: Noel Humphreys, G. M. Gibbs, A. S. French, J. L. Langan.

CHANGES OF NAME AND CAPITAL

CHICAGO, ILL.—Keith Car Company; increase of capital from $30,000 to $100,000.

CLEVELAND, O.—Marathon Tire & Rubber Company; increase of capital from $10,000 to $100,000.

COLUMBUS, O.—E. M. F. and Flanders Sales Company; change of name to G. E. Thomas Company.

ST. LOUIS, MO.—St. Louis Motor Truck Company; increase of capital from $17,500 to $22,500.

Cavalry in the maneuvers as seen from the tonneau of a Thomas

Guests of Oakland Manager—The district manager, retail sales force and service department men of the Atlanta branch of the Oakland Motor Company were the guests of Manager L. F. Smith at a banquet recently in the banquet hall of the M. & M. Club, Atlanta, Ga.

Has Its Own Transportation—The Pence Automobile Company, Minneapolis, Minn., will commission its own exclusive automobile freight train to travel all winter between Flint, Mich., and Minneapolis, Minn., to haul 2,500 Buick cars from the factory to the Northwestern distributing agency.

Office Opened at Springfield—The Essenkay Company of Chicago, that recently opened a place in Boston, has done so well that salesrooms for the product have been opened now at Springfield, Mass., at the corner of Fort and Water streets. It is known as the Western Massachusetts Essenkay Company.

Carter Car in Minnesota—The Minnesota Carter Car Company has been organized with A. R. Workman, formerly of Ainsworth, Neb., as president. A factory branch of the Carter Car Company, with Minnesota, Montana, the Dakotas and northern Wisconsin as the distributing territory, will be established.

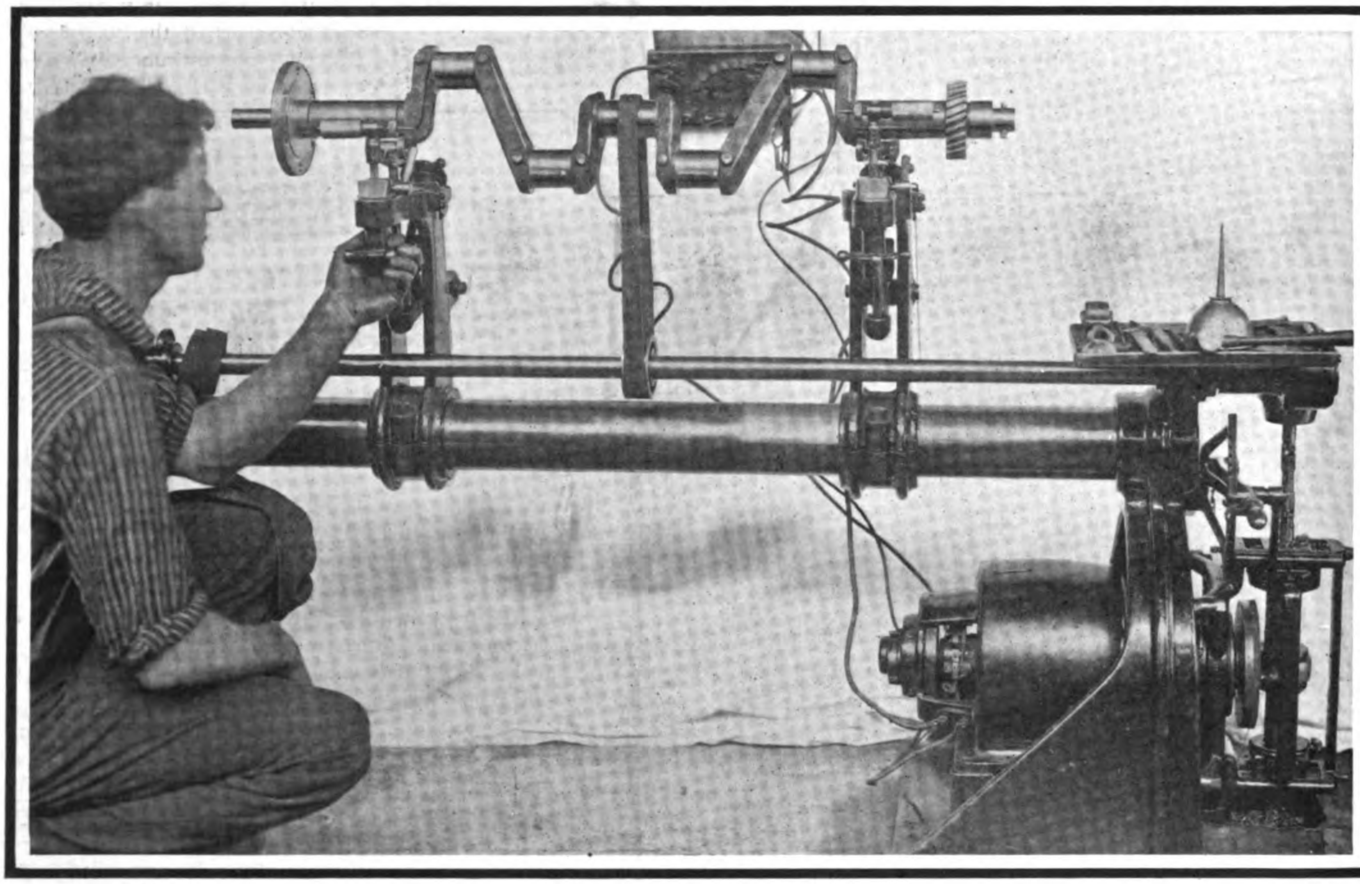
Texas Automobile Sales Increase—The sales of automobiles in Texas for the past few weeks show a remarkable increase owing to the harvest of an abundant wheat and oat yield, the prospects for a great corn and cotton crop and many other favorable conditions. Dallas dealers declare that the demand for machines is greater than the supply.

Berkeley Motor Car Company Formed—The Berkeley Motor Car Company has just been formed in Boston by J. H. Freeman, formerly with the Cadillac, as manager, and George Tollman, of the Chalmers, to deal exclusively in used cars, the new company announcing that it gives a guarantee that if anything goes wrong within a year on a car, due to the car itself, it will make good the loss.

Grossman Offers Milwaukee Prizes—The Emil Grossman Company, New York City, manufacturers of automobile accessories, are offering the following prizes to participants in the Milwaukee races, providing they use Red Head spark-plugs: To the winner of the grand prize, $500; to the winner of the Vanderbilt Cup, $500; to the winner of the Pabst Trophy, $100, and to the winner of the Wisconsin Challenge, $100.

Slupecki Making Carbureter—Lawedig Slupecki, inventor of an auxiliary carburetion device for gasoline motors, now being manufactured and marketed by the American Compensated Valve Company, of Manitowoc, Wis., is making exhaustive tests of a new type of carbureter which permits of the use of the heavier distillates of petroleum instead of gasoline. The device is being tried on a powerful motor boat built by Mr. Slupecki for use on Lake Michigan.

Factory Miscellany



Machine which is used in the plant of the Haynes Automobile Company, Kokomo, Ind., for balancing crankshafts accurately

The object of this machine is to obtain the kinetic balance of the rotating parts of the motor. The static balance of the part is secured by merely trying the parts to determine if they can remain stationary at any point when supported at the axis. This machine gives the running balance of the parts with great accuracy, thus tending to reduce vibration when the motor is running. When measured mathematically the balance of a machine can never be perfectly determined because both primary and secondary forces and moments are involved, and although the first may be reduced to zero the secondaries can rarely, if ever, be nullified.

MORROW'S Elmira Factory—The Morrow Manufacturing Company, Elmira, N. Y., makes all the small parts for the Overland cars, manufactured by the Willys-Overland Company, of Indianapolis, Ind., and Toledo, O. The accompanying photograph shows the Morrow plant.

Gibney Remodeling Lee Plant—The James L. Gibney Company, Philadelphia, Pa., is remodeling the J. Ellwood Lee plant at Conshohocken for the manufacture of truck tires.

Dean Horns for Studebaker—The Studebaker Corporation of Detroit, has placed an order with the Dean Electric Company, of Elyria, O., for 45,000 "Rexo" electric horns to be delivered during the coming year.

Stegeman's New Milwaukee Factory—The Stegeman Motor Car Company, of Milwaukee, Wis., has just finished moving into its new plant with general office quarters at 606 Linus street. Their new factory will increase the present capacity and give them an annual output of 500 trucks.

No New Rambler Factory—Officials of the Thomas B. Jeffery Company, of Kenosha, Wis., state that the company does not contemplate the erection of any new buildings on the 9-acre tract adjoining its present works, recently purchased, for the present. The additional land is to take care of the future needs of the Rambler works as they may develop.

Chase Company's Model M—The Chase Motor Truck Company, Syracuse, N. Y., announces to the trade a new model express truck of 500 pounds capacity. It is to be known as "Model M" and has a 12-horsepower, two-cylinder motor, planetary transmission with two speeds forward and reverse and chain drive. The wheelbase is 84 inches and the weight 1,500 pounds.

Wadewitz Company's Experimental Shop—The Wadewitz Machinery Company, of Racine, Wis., incorporated a few weeks ago with $50,000 capital, is establishing an experimental shop at Racine for the practice of motor car engineering and the manufacture of devices for the general mechanical engineering field. One of the principal devices already perfected, and to be manufactured without delay, is a spring starter for motor car engines, which has proven successful in exhaustive tests made by motor car manufacturers at Racine.

Canton Spring Company's Factory—A building permit has been issued for the erection of a $10,000 plant on Dueber avenue, Canton, O., for the Cleveland-Canton Spring Company, which will make all kinds of vehicle springs.

Smith Automobile Plant Sold—The Smith automobile plant was purchased at bankrupt sale by C. E. Gault and J. D. Mulvane, who will maintain the parts and do a general repair business, but have discontinued the manufacture of cars.

Big Addition to Plant—The General Vehicle Company, Long Island City, N. Y., manufacturer of electric trucks, will make a six-story addition to its present plant here. Plans for the foundation only estimate the cost at $50,000. The building will be located on Starr avenue, Long Island City.

Imperial Rubber Company's Factory—Residents of Tilbury, Ont., carried a by-law last week to grant a loan of $5,000 to the Imperial Rubber Company for immediate construction of their factory in which to manufacture rubberized cloth for automobiles. The loan is repayable in 10 years without interest.

Guarding Against Gas Explosions—As a precaution against gas explosions in the mammoth plant of the A. G. Smith Company, Milwaukee, Wis., manufacturing pressed steel frames, it has been decided to rebuild and relocate the welding department, blown up recently, on ground remote from the general factory buildings, the largest of which measures 345 by 1,025 feet.

Kissel Company's Shop Building—The Kissel Motor Car Company, Hartford, Wis., has broken ground for a large addition to its foundry department, the new shop building having just been completed. The latest structure measures 85 by 121 feet, two stories high. Two large new core ovens are also being constructed and much new power equipment is being placed at this time, this including a 480-horsepower electric generator and an 80-horsepower compresser. An addition to the power plant will be started at once.

Installs Truck Plant—The plant of the Stewart Iron Works, Cincinnati, O., destroyed by fire recently, and which was one of the largest ornamental and structural iron works in the country, will be rebuilt. The regular business of the company has been fence and other iron work of like character, but their new plans embrace the addition of a complete auto truck plant. This will occupy a ground space of 100 by 145 feet. It is the purpose of the company to specialize on the manufacture of 1-ton truck. This branch of the business will be under the supervision of W. M. Taylor, an automobile manufacturing expert, formerly of Toledo, O.

Ford Plant Nearly Ready—With its capacity more than doubled, the new factory of the Ford Motor Company, Detroit, Mich., within the next few months, will be ready to commence on its huge production for the coming year. The size of the foundry has been doubled, as has that of the heat-treating plants and machine shops. The big gas engine of 1,500 horsepower that has been doing duty furnishing power, the largest gas engine in the world, is soon to give way to an even larger one, an engine of 5,000 horsepower. At present about 350 cars are being built in 8 hours. When the new apparatus is in commission the Ford factory will be in a position to turn out more than twice that number of completed model T's in an 8-hour day.

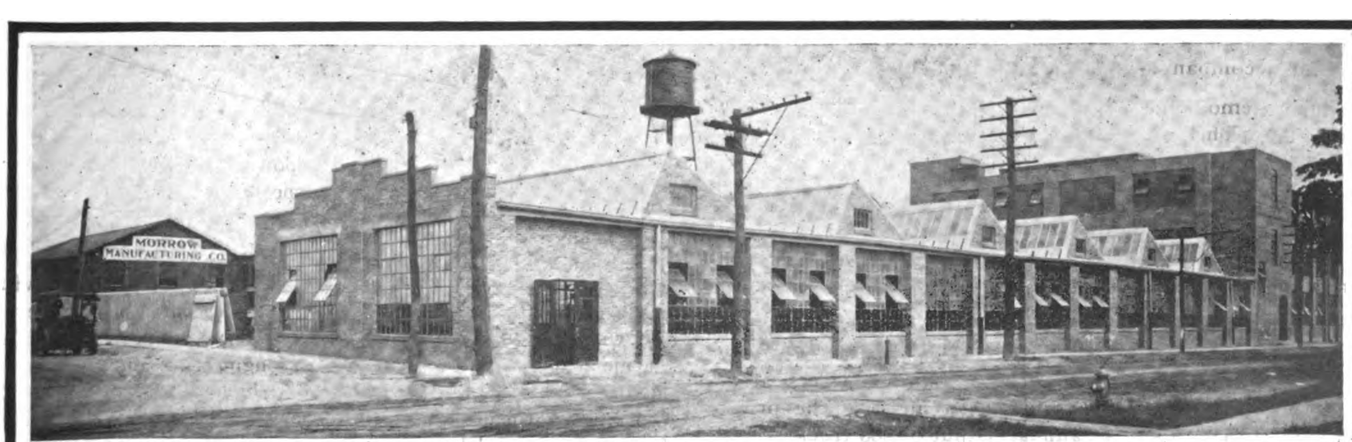
Overland's Unique Building Plan—The Willys-Overland Company, which is doubling the capacity of its plant in Toledo, O., has employed a unique method of construction in the erection of the new transformer station in the center of the big factory buildings which has created considerable interest among contractors. After signing the contracts President J. N. Willys awoke to the fact that carrying the material for the new structures through the main gates would block the factory system and more or less cripple the production of Overland cars, which cannot at best be turned out fast enough to supply the orders that are daily pouring in, as well as interfere with the testers and hold up the installation of new machinery, parts and materials. A consultation with architects and contractors followed and it was decided to have all cement, glass, dynamos and other materials carried over the tops of the three-story factory building. Derricks were raised and spouts constructed for the work. All cement is being mixed outside the main plant, hoisted above the outside factories and poured through the spouts to the site of the new building. Thus the work on the new building is progressing with all possible speed and the efficiency of the Overland production is being maintained. It costs more, but results justify the expense.

Machine Shop and Foundry Figures

WASHINGTON, D. C., Sept. 3—Census figures on the foundry and machine shop industry in the United States when the thirteenth census was completed show that there were 13,253 shop establishments in the United States, employing 615,485 perons. The employees were divided as follows:

Proprietors and firm members	9,851
Salaried officers	21,754
Male clerks	42,242
Female clerks	10,627
Average wage-earners	531,011
Total	615,485

The value of products per annum is figured at $1,228,475,148. The statistical bureau reports that the sum of $688,464,009 is added to the cost of materials by the manufacturing processes. In the industry, Pennsylvania takes first rank and New York second.



Factory of the Morrow Manufacturing Company, Elmira, N. Y., which makes all the small parts for Overland cars

Patents Gone to Issue

AUTOMOBILE Carbureter—In which the nozzle opening is altered with different throttle adjustments.

The carbureter referred to in this patent is seen in Fig. 1, where A is the air inlet of the mixing chamber, O its outlet and N the nozzle through which the gasoline enters that chamber and which is regulated by a needle valve V. The gasoline enters the carbureter at E and passes into the mixing chamber after having passed through the float chamber, where its level is regulated by the float F. The capacity of the passages A and O may be varied by two throttles, each serving one of them and attached to a shaft which extends through these passages. The throttles are regulated by a throttle lever secured to the above mentioned shaft. A clever construction L is independent of the throttle lever, but is actuated thereby for opening the fuel valve V, permitting also of adjusting the lever L without disturbing the throttles controlling A and O.

No. 1,033,886—to William M. Gentle, Greenwood, Ind. Granted July 30, 1912; filed December 1, 1910.

Exhaust Whistle—Which consists of a tube with a slit at its end and a resonant chamber with a suitably shaped, sound-producing edge.

This patent describes an exhaust horn comprising a resonant chamber having an opening through its wall, against which is placed the slit-like opening of a tube which is adapted to be connected to the exhaust pipe. This tube has its lower portion movable, so that, if this portion is moved away from the tube, the slit is widened and the exhaust gases passing through the tube are afforded an unobstructed exit therefrom.

No. 1,031,678—to Elias W. Schurman, assignor to the Randall-Faichney Company, Boston. Granted July 2, 1912; filed January 25, 1909.

Automobile Extricator—Mechanism for hauling automobiles out of mudholes in the road, etc.

In Fig. 2 is shown the device described in this patent. It consists of a frame which is formed of a U-shaped bar, the ends of which are connected by a cross-piece C. From the side bars of the frame, legs are suspended at front and rear and cross bars B are attached to the inner extensions of the legs. Extensions E pendant from the end of the frame are rearwardly inclined, and adapted to enter the road surface to form means for anchoring. A drum is mounted on the frame and to an extension of its journal a toothed wheel is secured; a pawl connected to the frame is adapted to engage the toothed wheel to prevent backward rotation of the drum. On the shaft or journal of the drum an operating lever is mounted which carries a pawl engaging the toothed wheel so as to move it by stages. A flexible connection is provided, the end portion of which is wound around the cable, and another connection is attached to it and has its end secured to the axle of the automobile, so that by rotating the shaft of the drum, the car may be moved.

No. 1,034,635—to Henry S. McCall, Ogeechee, Ga. Granted August 6, 1912; filed February 20, 1912.

Compressed-Air Engine Starter—In which a flexible connection moved by a piston rod spins a spool on the crankshaft.

This patent refers to a starter mechanism, Fig. 3, consisting of a compressed-air motor cylinder C in which a piston P is reciprocated by the pressure of air entering at the side of the cylinder. The piston has a piston rod R secured to it; to the end of the latter a flexible connection F is secured which is laid around suitable idler sheaves and around a spool S connected with the crankshaft by a clutch mechanism. The piston rod also carries means for controlling the inlet and exhaust of compressed air to and from the starter cylinder.

No. 1,035,091—to George Hartwell Kelley, Gainesville, Fla. Granted August 6, 1912; filed July 21, 1911.

Automobile Self-Starter—Composed of a gas reservoir in communication with an engine cylinder and charged through a valve from the latter.

The starter referred to in this patent is seen in Fig. 4. It consists of a reservoir chamber connected with one of the engine cylinders, an automatic valve being interposed between these two parts. There is also a valve which serves to provide communication between cylinder and reservoir to allow of charging the latter. This valve has a cam surface and the automatic valve has a part which is in the range of action of the automatic valve and adapted to be lifted thereby.

No. 1,034,274—to George E. Miller, Oakland, Cal. Granted July 30, 1912; filed November 9, 1911.

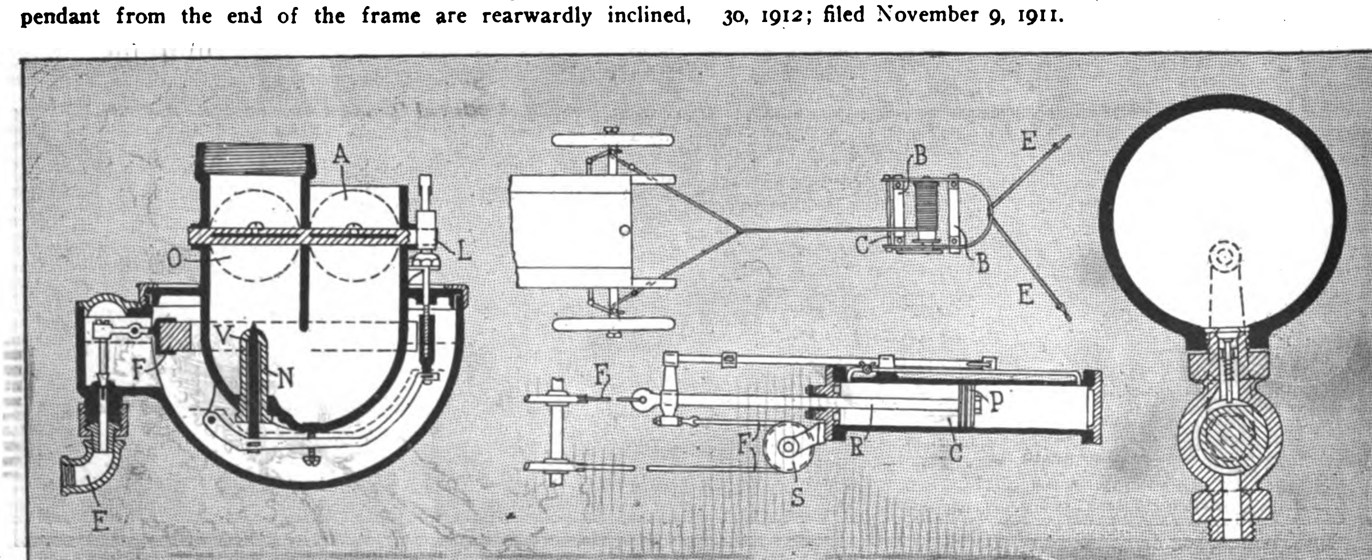


Fig. 1—Gentle carbureter. Fig. 2—McCall extricator. Fig. 3—Kelley compressed air starter. Fig. 4—Miller reservior self-starter

VOL. XXVII NEW YORK—THURSDAY, SEPTEMBER 12, 1912—CHICAGO No. 11

The AUTOMOBILE

Old Trails National Highway New York to San Francisco

Tale of Interesting Trip Following Famous Historic Santa Fé, Boons-Lick and Cumberland Pike Trails

Cross and Cairn Where a Pioneer Fell

In Arizona, Traveling Was Often Hard

Money Subscribed Along Route to Improve Local Sections — Activity General Across Entire Country

By BERT C. SMITH

THREE-thousand three hundred and fifty-nine miles, the shortest route ever found from the Pacific to the Atlantic, has been completed by an automobile and the route for the proposed national highway has been crosen. Over a road stretching through fifteen states a four-cylinder, 60-horsepower machine was driven in 60 days. This route is the one selected by the Good Roads convention at Phoenix, Ariz., and later by the convention in Kansas City, Mo.

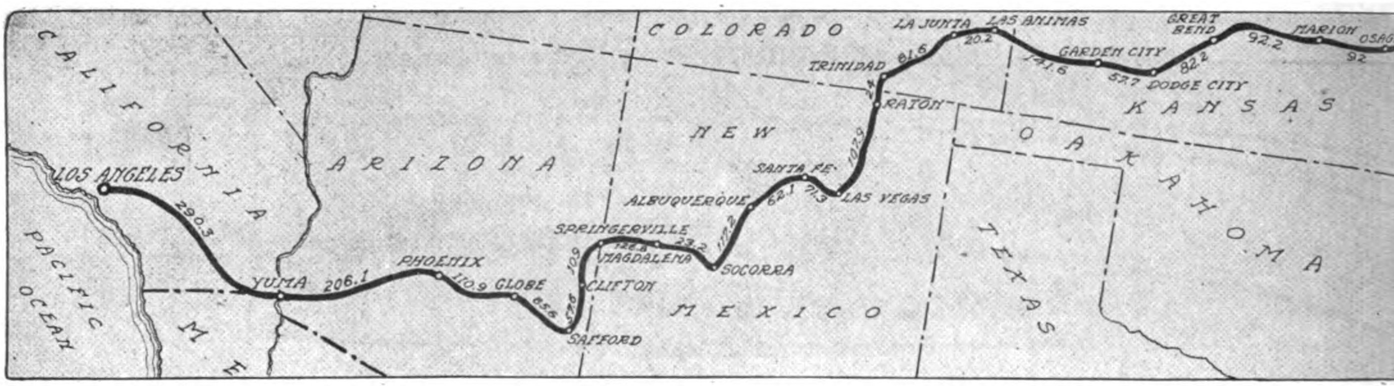
It is one thing to select a transcontinental course and entirely another to drive an automobile over the roads chosen. In order to make the ocean-to-ocean tour a success, it was necessary to cover every foot of the route. On the morning of May 15 the machine was driven out of Los Angeles, Cal., for the ocean-to-ocean tour. Many thought it would be foolish to try and cover the direct route of the Santa Fé trail, the Boons-Lick road and the Cumberland Pike.

The first day's run was through the orange groves of southern California with a night stop at the Glenwood Inn. Here Frank Miller was host. He is one of the greatest good roads boosters in California and before the Times Special left the Mission Inn, Mr. Miller secured two bronze bears which were mounted on the big headlights. He also gave a Mission bell, which was placed on the cowl of the machine.

When the bears were hammered into place they were fixed as an ornament. As the road-scarred machine was driven across the country, however, these became distinctive signs of California and proved as interesting to the highway boosters along the route as any part of the equipment of the car.

Equipped with oversize 37 by 5 1-2-inch tires, the car attracted attention in every village and hamlet. These tires were used in preparation for a fight with the desert sands, but this fight was only a joke as the roads on the Arizona desert are far better than those we found in Maryland.

Our real sand fight, however, came in the Mammoth Wash in



Map showing shortest automobile route yet discovered between the Atlantic and Pacific oceans.—It is 3359 miles and crosses nine distinct

California. Here it was low-gear work for 5 miles and we were forced to deflate our tires. They were not pumped up until we were 20 miles from Yuma. We rolled into the Colorado River city at dusk and were greeted with red fires in the streets and with a band. Here we found the people more than anxious to do their part to help build a national highway. Though there are only a few machines in the city of Yuma, the farmers and merchants there raised $1,000 to begin work at once on the highway through their section.

Water Bottles Indispensable

Leaving Yuma at 5 o'clock in the morning we started a drive of 206 miles over an arid country having no water to speak of. The equipment for this trip consisted of two immense African water bottles and it was well that we carried these. The heat was terrific. It registered at one place on the desert 132 degrees. This does not mean in the shade, of course, as there is no shade.

Soon after leaving Deep Wells, a place that is misnamed, as the wells are dry, we saw an object on the sands that looked much like a coyote. Preparing to run the animal down, John Zak, the driver, was asked to send the car as fast as possible toward the brute. As we neared the object we could see it was not a coyote, but a man on his hands and knees. Opening the throttle, we reached him and found A. E. Weeks, of Whittier, Cal., almost delirious from exposure and lack of water.

Weeks had undertaken to ride a motorcycle across the desert ahead of our car. Seeing the attention the start of the ocean-to-ocean tour had been given by the newspapers, Weeks thought it would be a good stunt to ride a machine across the sands. When we found him he was 80 miles from the nearest water and would have died, according to physicians, had he not been rescued. We carried rim to Phoenix, but were forced to leave his machine on the sands of the lonely desert.

Governor Hunt of Arizona welcomed us in Phoenix, and there we found the sentiment strongly in favor of a national boulevard from the Pacific to the Atlantic. The men of the city raised $2,000 and promised $5,000 additional and plans were made to sign the desert and to put the roads in shape for touring. Here was started a movement which should mean that the highway will be tourable from New York to San Francisco at least a year before the opening of the World's Fair in the Bay City.

From Phoenix, our route took us out to the Roosevelt Dam country by way of Mesa and Tempe. The roads here are excellent. It is an easy matter to drive from Arizona to Roosevelt and then on to Globe, a distance of 109 miles. Though the country is hilly, the grades are not severe or dangerous and the scenery is grand. This part of the tour is most interesting.

From Globe we drove to Safford, a town in the fertile section of Arizona, where the good roads movement is such that the people of Thatcher, a city 6 miles away, journeyed into Safford for an evening meeting and expressed a desire to begin work at once on a national highway. This sentiment was so strong that several automobilists agreed to pilot us on into Clifton, the home of Col. Dell M. Potter, national organizer for the Ocean-to-Ocean Highway Association, under whose auspices the tour was made. Colonel Potter made the transcontinental trip and organized divisions of the Ocean-to-Ocean Highway Association in each of the larger cities.

At Clifton, the townspeople turned out to greet us and a meeting was called at once. This rock-ribbed city is perched on the side of the high hills which have enough copper in them to make the mine owners certain of running treir smelters for another 100 years. This country is sorely in need of roads and at the town of Morenci, a city without a main street, the people again raised $2,000 to help stir up interest in a national highway from sea to sea.

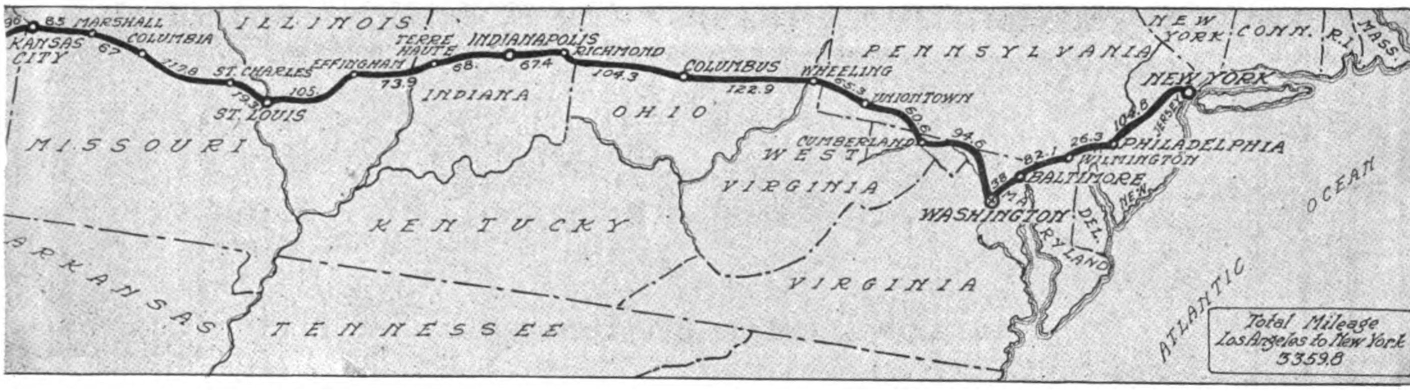
Though we were warned to leave all hope behind as we struck off into the Rocky Mountains to find the shortest route to Springerville, we started without many misgivings. We did examine our brakes, but what followed proved we were not careful enough. This transcontinental journey was to become epoch-making, but we were content to make it in easy stages. Forcing the car toward the high hills we started for the White River Indian reservation.

Indians Dislike Open Exhaust

At the San Carlos River we took observations. The roads are not good, but can be toured over easily. We visited the Apache Indian school and found the young bucks willing to approach the car, but the old warriors refused to approach the machine. The open exhaust was too much for them, though they did not even show surprise as the motor barked angrily. The red men, however, especially the younger ones, showed a keen interest in the preparation for improving the roads and several volunteered to work on the road graders which have been ordered and which will be put into active use at once. In fact, one scraper had arrived and was being used to great advantage.

Leaving the lowlands we struck into the hills. The game we

On the old Cumberland Pike near Cambridge, O.



chains of mountains, two deserts and touches some of the most interesting territory in the United States.—The trip occupied 60 days

found in abundance. Many wild turkeys flew over our heads. The country abounds in deer and there are many bears. We frightened the grouse and quail, but we could not stop to hunt. We were out for a purpose and were anxious to reach a settlement at least before dark.

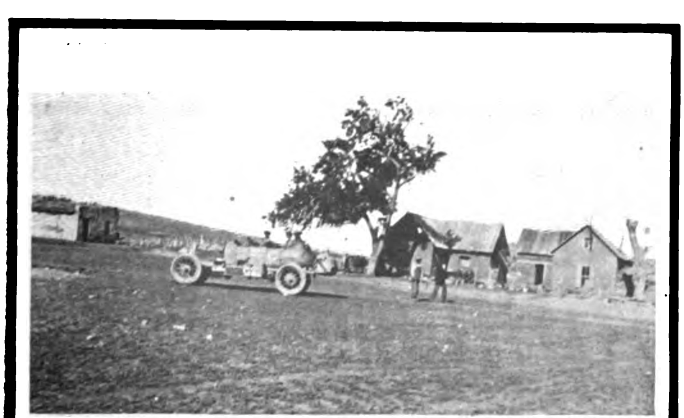
Dropping down the back of the Black Mesa hills came our first accident. We carried on the rear of our car a 30-gallon tank of gasoline. It was necessary to use the brakes constantly because the hills are particularly steep. Before we knew it the oil around the brakes had caught fire from the heat caused by the friction and flames shot up dangerously near that big gasoline tank. Instantly the crew of the car jumped into action to fight the flames.

For several minutes the battle was a losing one. The fire mounted into the tonneau and swept around the tank. The danger of explosion from the gas inside kept us all on edge. While one shoveled dirt the others poured the contents of the water bottles over the flames and finally the fire was stamped out, but the tank was still hot.

After Fire Came Water Trouble

The Black River was only a short distance and we let the machine out and rushed it into the water until it flowed over the hood. This cooled us all off, but we found that it was impossible to crank the motor. Then we trudged away to a distant ranch and told our troubles to the man in charge. He was willing to help and brought a team of mules, but the two mules could not budge the heavy car.

"I'll get my mules," said the rancher, as he started back after the long-eared fellows. It was well that he did as the four animals had a hard time to drag us from the sands of the river out to the opposite bank where we could find traction for the run to the White River. We were in the hills, many miles from a house, but our lights helped us to find our way. We drove over a country many would call dangerous, but our first mishap had taught us a lesson and we took no chances.



Typical ranch life on New Mexico plateau

Far into the night we continued to drive. We had become soaked to the skin while trying to work our car out of the river and the night was cold. It was no use to camp, so we decided to continue to drive. We chugged on and at 4 o'clock in the morning reached the White River Indian agency, where we found a storekeeper who gave us beds in his little shanty.

Gasoline is often high-priced on a trip across the continent. We reached the top-notch figure here when we paid 75 cents a gallon for the fluid. It was worth it, however, as the gasoline is carried more than 100 miles from the nearest railroad. We had been paying 40 cents and that did not seem exorbitant. The 75-cent notch looked high. At one place where the storekeeper collected 40 cents a gallon for gas he slipped 10 cents back over the counter after the bill was paid, saying he was anxious to help build a national highway. That was his contribution. It was accepted with thanks.

Our next stop was at Cooley's ranch, 10,500 feet above sea level, the highest point reached on the ocean-to-ocean tour. Here we found "Old Man" Cooley, as the boys affectionately call him, in charge of a big ranch, a part of which is snowbound for 3 months of the year. He was more than willing to meet us and gave us valuable information about the selection of a route through the government lands which will be open all the year around and which can speedily be made tourable. The land around Cooley's, however, proved hard touring, and we were forced several times to fight our way out of muddy dips in the shade of the immense pine trees.

We were piloted from Cooley's ranch to Springerville by Herman Becker, a storekeeper of Springerville, who is also one of the good-roads workers. He directed us down the side of the high hills into the little border town where a meeting was held by National Organizer Potter, who told the plan for a national highway.

Altitude 8,000 Feet on Divide

The following day we were directed across the continental divide. Here at a point about 8,000 feet up we found the waters in the western rivers flowing toward the Pacific and those of the eastern streams toward the Atlantic, separated by less than 1 mile of rolling hills. This country is not level, but the roads are excellent with the exception of high centers made by the old emigrant trailers who crossed the famous Butterfield trail after having left the Santa Fé trail. These high centers can soon be reduced and will form excellent fillers for the ruts over which the highway is to be built. This section has few habitations, and most of the money for building this part of the highway must be supplied by the government.

Our next stop was at Magdalena. When 40 miles from the little New Mexico city our pilots urged us to press on in order to reach town before dark. We did so, but after having driven at a fast clip for 20 miles we struck deep sand and this delayed us. We reached Magdalena at 11 o'clock at night, but not too late for the highway boosters, who waited for us and held a midnight meeting.

While this country looks dry, in reality it was very wet and natives had to help give the car traction

From Magdalena to Socorro, a distance of 25 miles, the roads are excellent. Entering a pass that has been chopped through the rocky hills, the road leaves the high elevation and drops to a few hundred feet above sea level, or almost to the banks of the Rio Grande. This old Spanish town is replete with incident and is quaint and interesting. It is slow, but the people there are progressive and jumped into the national highway movement with a rare vim and energy.

At the meeting 1,000 members joined the Ocean-to-Ocean Highway Association, and the work in New Mexico was given a solid boost by a proposition which looks particularly good to the leading men of the town, who propose to build a bridge over the Rio Grande and cut off 10 miles of roundabout road. Now it is necessary to take the same bridge as the railroad company. The bridge is all right, but a better one is to be built right out of Socorro, and it will be directly on the line of the proposed national highway.

We found the Rio Grande running bank full and in places it had overflowed. We refused to allow any of the motorists of Socorro to pilot us to Albuquerque, as we learned that the road was flooded and dangerous. We took a chance and started early in the morning, and soon found our way blocked by a stream nearly a mile wide. The view was beautiful, but it did not look inviting to the driver of the ocean-to-ocean car.

The water was not more than 3 feet deep in the worst places, but we found the road boggy and it was necessary to enlist the services of a mule driver, who with two mules helped us to fight the mud for several miles. We toured through an orchard, crossed an alfalfa field and then struck the railroad bridge. Our troubles were over after we had crossed the Rio Grande, at least for a time, and we toured out into the wilds of the mesa between Socorro and Albuquerque, where we struck plenty of sand, but no spots that were not tourable. Of course it was necessary to use the low gear for a number of miles, but this section will lend itself to good-road building.

Missing Lunch a Mere Detail

Mayor D. K. B. Selers met us at Albuquerque after we had lost the road and wandered in the mesa for miles. We found it necessary to retrace our path for at least 20 miles in order to route the roads exactly. While we were off the highway the pilots, who had started from Albuquerque with a fine lunch, missed us and we missed the lunch. The reception in Albuquerque was unique, the people there insisting on us remaining over 1 day for a morning meeting in the Commercial Club and prominent business men of the city pledging themselves in favor of the transcontinental highway.

From Albuquerque to Santa Fé we traveled over a road built for the most part by convicts. This phase of the road situation in New Mexico is of especial interest to those in favor of a national highway. The credit system is in force, and the men in stripes work on the highways and earn merit marks which are counted in their favor and which help to make life much more enjoyable. They are doing remarkable work and have solved some of the hard road problems by building bridges and chopping down dangerous grades. This is especially marked on the grade leading into Santa Fé, which is a model. On an easy climb a mountain is topped and the level stretch leading into the quaint old city is reached.

Here at Santa Fé we struck the beginning of the old Santa Fé trail. In this town, which the old emigrant trailers made their headquarters in the days of '49, we found the old cathedral, the old trail marker, showing where the wagons were started on the last stage of the journey to the Golden West and where the stage coaches in later years were started on the long journey toward the Pacific.

At Santa Fé we were given a chance to preach the gospel of good roads from the rostrum of the State House of Representatives. Men from many of the cities and towns of New Mexico were in attendance and the meeting was a remarkable success. Governor McDonald placed the stamp of his approval on the meeting by giving the ocean-to-ocean organizers a great send-off the following morning.

Water Scarce in Raton Desert

Over a stretch of country made famous by the old-time forty-niners we ran the day after our reception in Santa Fé. Years ago the emigrant trains, with the ox teams, labored across the country, always keeping close to water. On the plains of New Mexico between Santa Fé and Raton, however, it was necessary to dig wells, and here we found what the old pioneers had done to develop a land which has not improved much since

Emigrant train on Santa Fé Trail headed west

Near Socorro, N. M., on the Rio Grande there are some places where a National Highway is badly needed

the first team was driven over the Rockies. The run to Las Vegas is over a scenic route through red hills.

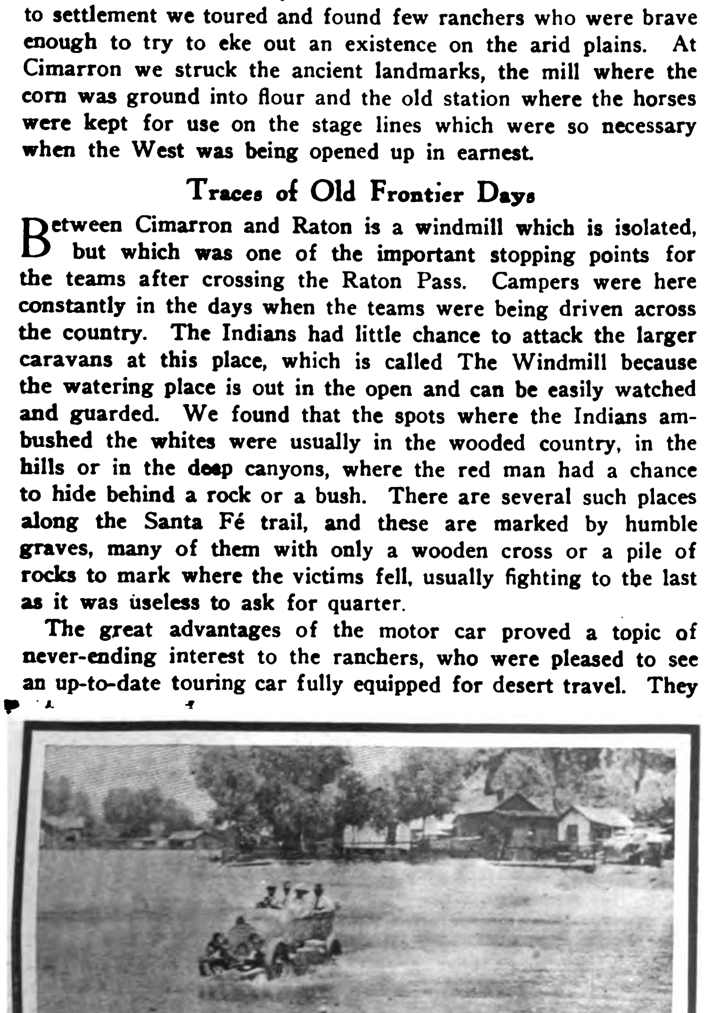
At Cimarron we struck the old Santa Fé trail with the real ruts made by the men who drove across the continent so many years ago. The automobile was driven in these old ruts and the wells located by the pioneers were found, but of course were not needed.

Traveling over the level prairies proved easy for our car, and it was not necessary to fill the radiator. From settlement to settlement we toured and found few ranchers who were brave enough to try to eke out an existence on the arid plains. At Cimarron we struck the ancient landmarks, the mill where the corn was ground into flour and the old station where the horses were kept for use on the stage lines which were so necessary when the West was being opened up in earnest.

Traces of Old Frontier Days

Between Cimarron and Raton is a windmill which is isolated, but which was one of the important stopping points for the teams after crossing the Raton Pass. Campers were here constantly in the days when the teams were being driven across the country. The Indians had little chance to attack the larger caravans at this place, which is called The Windmill because the watering place is out in the open and can be easily watched and guarded. We found that the spots where the Indians ambushed the whites were usually in the wooded country, in the hills or in the deep canyons, where the red man had a chance to hide behind a rock or a bush. There are several such places along the Santa Fé trail, and these are marked by humble graves, many of them with only a wooden cross or a pile of rocks to mark where the victims fell, usually fighting to the last as it was useless to ask for quarter.

The great advantages of the motor car proved a topic of never-ending interest to the ranchers, who were pleased to see an up-to-date touring car fully equipped for desert travel. They enjoyed making the contrast between our car and the best teams they possessed, and figured just how long it would take for their teams to make the run from Raton to Las Vegas, a trick we turned in a day, but which would take their best teams a week to cover.



Fording the San Carlos River in Arizona

Great Reception at Raton

At Raton, the Gateway of the Rockies, we were tendered a reception. Rev. Harvey M. Shields, pastor of the Episcopal church, was in charge of the demonstration, and the people there pledged $2,058, making the total for New Mexico more than $10,000 raised for the good-roads cause. The sentiment of the farmers and ranchers was such that it was determined to put the roads into tourable shape at once, and a bond issue of $5,000,000 was authorized by the state legislature, and this money will be applied to the highway through Mexico and work will be commenced on this road within 12 months.

After a night and a day at Raton we were piloted over the Raton Pass. Here the original road has been repaired, but it follows the path chosen by the pioneers. It only rises to an elevation of 9,000 feet above sea level and never mounts to more than a 9-per-cent. grade. The Raton Pass is one of the best pieces of work on the entire trip. We were warned, or at least told, that our hardest task would be in the mountains of New Mexico. This proved a joke, as the Raton Pass is one of the finest pieces of grade work that we saw on the entire trip, and it is open all the year around. This was only one of the many peculiar things told to transcontinental motorists who are about to make the journey over the southern route. The old Santa Fé trail is open from Los Angeles clear through to Kansas City, and you can start touring to-morrow if you desire to make the trip from sea to sea.

The roads of Colorado cutting the southeast corner of the state are in fine shape for touring. The highway down from the Raton Pass to Trinidad is in as good condition as the transcontinentalist can wish for, and more work is being done. At Trinidad the ocean-to-ocean highway organizers were greeted warmly, and there $5,000 was pledged toward the highway movement by men who seemed to appreciate the good the boulevard will do the entire country.

From Trinidad we toured to La Junta, where another 1,000 enthusiasts joined the movement, and then we sped on to Las Animas. From Las Animas the car was driven over the Colorado-Kansas line into Western Kansas, where the work was taken up on the plains over which the buffalo once roamed. We found thousands and thousands of acres still as wild as when the game was there in quantities, but we also found cities where the national highway sentiment is strongly in favor of the ocean-to-ocean plan. We spent part of a night in a buffalo

Traction was difficult in such spots on the way

wallow into which we had foolishly driven in the belief that we could send the car through on its own power. These wallows were formed by the animals in the hot weather pawing and stamping in the water holes which now are in such shape that a car driven into them must be hauled out by horses. We built our own road out, however, and were just in time to escape a heavy rainstorm which poured down the remainder of the night after we had found shelter.

Our next stopping place was Dodge City, and here we found thousands ready to help put the highway across the country. Here our time changed, and we began to get into Eastern time. We were 2 hours earlier than Los Angeles. We found that Dodge City people appreciate the fact that their city is directly on the route of the proposed national highway, and they turned out to greet us and to help boost. The roads around Dodge City are only in fair condition.

From Dodge City to McPherson the going was good, and we made fast time. At McPherson the entire city turned out to greet us, and in the main streets of the little city a meeting, that will long be remembered by every farmer and every merchant there, was held. In the main street of the town the people pledged $6,000 to the movement and the tour was given a big boost.

At the next stop, Olathe, Kan., another large pledge was made, and by the time the car reached Overland Park, only a few miles out of Kansas City, $43,300 had been promised for the national highway movement. From Overland Park into Kansas City macadam highways were followed all the way, and the tour was ended as far as Kansas was concerned when we struck the Missouri line. We were scarcely across the line before a tornado broke in all its fury, but we had time to reach the hotel.

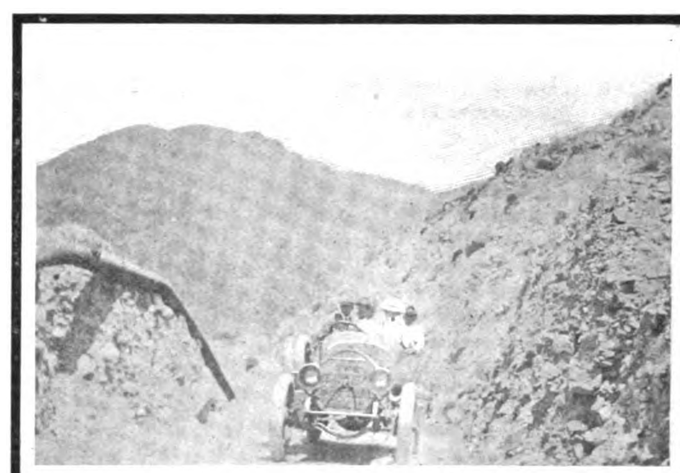
After the convention the work of organizing the Missouri division of the National Old Trails Ocean-to-Ocean Highway Association was begun, and at Independence many old soldiers helped to start the work in real earnest. A goodly company joined and the car was sent on to Columbia, where, at a meeting, another cohort of good-roads boosters was marched into line.

The roads of Missouri were not anything like we were told they would be. From all reports the tour through Missouri would be a fierce one, and we were prepared to battle with mud from the start to the finish of the cross-state run. Instead, we passed over fairly good roads, we had no trouble and we found the men of the state more than willing to listen, and the women, much like the women of Kansas, more than anxious to help the big project.

We left St. Charles late at night for the run into St. Louis, a distance of 23 miles, over good roads. Our tires by this time began to show the wear of the 2,000 miles of going, and we prepared to change the casings, though we were told that we should strike no more bad roads.

We crossed the Missouri River at St. Charles and then at St. Louis we crossed the Mississippi, and were more than halfway on our journey to the Atlantic seaboard. We entered southern Illinois with a great dread of the corduroy roads. We had no idea what we would strike, and we prepared for as fast a run as possible. All our plans were changed, however, at Highland, a town that pledged more money than any other city along the route of its size.

At a meeting held in the public park $15,000 was raised, and the men of the city started a movement which will certainly make history, as good roads are needed in Illinois, where the highways have practically no bottom. We were told that if we



Through one of the passes in California

On the National Road in eastern Ohio

Summit of the Raton Pass entering Colorado.

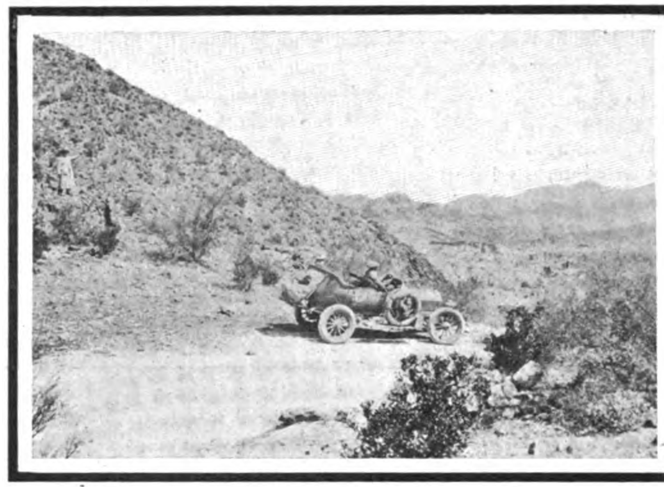
had tried to drive our car across the southern end of the state after a severe rainstorm we would have needed a team of horses every few miles. As it was, our heavy car made the journey comfortably and without mishap.

The work in Illinois was most important. The farmers there seemed to realize just what the national highway is to mean for them, and where there are now practically no roads a macadam highway is to be built. The corduroy roads are to be replaced with rock-ribbed highways. The old turnpikes, which have outlived their usefulness, will be replaced by a firm boulevard over which an automobile can be driven without trouble.

Our first stop in Indiana was at Terre Haute. There we were escorted through the public park, and in spite of the heavy rainstorm we were enabled to see the beauty spots of the beautiful city. At a meeting held there another $15,000 was promised for the ocean-to-ocean highway, and we were pleased to find many of the hard-headed business men of the city in line for the proposition.

Once in the eastern country the task of routing a national highway began to grow in magnitude. The desert wastes were left far behind. Large cities were now being toured and the route must be carefully selected. The Boons-Lick road had been followed its entire length. Now it remained to send the car over the old Cumberland pike. Through Indiana the work was pushed to Richmond, on the Indiana-Ohio line, and here the organizing car was met by Jesse Taylor, one of the good-roads workers of Ohio, and Arch Houston and James R. Marker, the latter Ohio State Engineer. This trio of good-roads boosters undertook to pilot us all the way across the Buckeye state.

At Springfield the work was given a boost. Then at Columbus a stay of 2 days put Col. Potter in touch with some of the big men of the state and a promise of 50,000 members for Ohio



Much of New Mexico looks like this picture

Picking out a road in the heart of the Rockies

was made. This means that in the state that can boast of more miles of good roads than any other section we crossed, the movement is to be pushed forward to the right kind of a finish, which will mean a macadam highway from the western to the eastern boundaries of Ohio.

At Wheeling, W. Va., our pilots, Taylor, Marker and Houston, were forced to leave us, but we had chosen the route of the old Cumberland Pike clear through to Cumberland, and the way was plain. Just outside of Wheeling we were given a real fright when on the grade built along the precipice, over which Col. McColloch leaped when pursued by Indians, our brakes gave out and our car started rapidly backward. Whirling the wheel in the right direction, driver John Zak turned the car off the bridge and directly against the face of the cliff. It was lucky that he did not lose his head, as we all might have been dashed to death had we rolled over the bank to the river 200 feet below. This was the most serious mishap of the long tour, but it turned out decidedly in our favor, and we continued on over the Alleghany mountains toward Cumberland.

The roads of Maryland over which we traveled are poor indeed. We found them in such bad shape that it was necessary to drive slowly to avoid cutting our remaining casings to pieces. The tires had done well. In one front tire we carried Los Angeles air, and we were anxious to keep it intact until we reached New York.

The people of Cumberland turned out royally for us. In the Cumberland mountains we found wild ripe red raspberries and blueberries. The scenery was delightful and easily rivals anything we saw on the entire tour. If the scenery of the Alps in Switzerland is more beautiful than the Alleghany mountains it is worth traveling halfway around the world to see. C. A. Tenney, State Engineer for Maryland, who made the trip with

Leaving Brawley, Cal., for the Arizona desert

Road machine which is at work on the big road us through Maryland, says the scenery of Maryland is grander than that of the Old World, and is more beautiful than anything he could find in Europe.

From Cumberland we drove on to Washington, D. C., where President Taft greeted us. We found the Chief Executive more than willing to listen to our story of a national highway, and he was interested in the project which will mean so much to the people of the United States. We went to the Capitol building, and there found senators and congressmen anxious to take a hand in the proposition, and we secured the pledges of 178 congressmen and twenty-eight senators in favor of a national highway from the Pacific to the Atlantic, built over the old Santa Fé trail, the Boons-Lick road and the Cumberland Pike. Our work in Washington was more than valuable, as for the first time in the history of the movement the proposition was carried right into the camp of the men we need so much to help when this matter is brought up before congress at the next session.

From Washington to Baltimore, a distance of 40 miles, we made the run over good roads, and C. Francis Jenkins, in a car which he has driven across the continent, piloted us all the way and sent us out on the last leg of our journey with the conviction that there are some of the best highway workers in the world who live in this country.

We spent the night at Wilmington, Del., another town directly on the line of the national highway. Here we once more found many who favor building a highway entirely across the United States. The roads in Delaware are in fine shape, but they could be better, and the people of the state seem to realize this fact.

Leaving Wilmington the last morning of the long tour we drove to Philadelphia for lunch and then prepared carefully for the last run into New York. We found the men of the Quaker City ready to help us. We were given a rousing send-off, and a pilot was furnished us for the remainder of the tour into Gotham.

Pouring Pacific Into Atlantic

We reached New York at 5 o'clock in the afternoon and were piloted directly to Coney Island, where we dipped the wheels of our machine in the waters of the Atlantic ocean. There the ceremony of emptying the bottle of Pacific ocean water into the Atlantic was carried out with due ceremony, and this function seemed to catch the fancy of the immense throng which had gathered on the beach.

For the first time in the history of the ocean-to-ocean highway movement water from the Pacific was carried across the continent and poured into the Atlantic, and we were ahead of the Panama canal in mixing the waters of the two great oceans.

The police in New York were more than kind. We had been arrested in Baltimore for not carrying a number. The justice there had refused to fine us after hearing the story of the tour told in the courtroom. The police of New York also were more than kind, and allowed us to tour through the city without a muffler, and helped us in every way to make the finish of the long tour a great success.

The national highway has been routed. The distance from ocean to ocean is 3,359.7 miles. The route is by way of the Santa Fé trail, the Boons-Lick road and the Cumberland Pike.

This road must be built along the lines of the least resistance. It must follow a route that is open all the year. The Santa Fé trail is ideal for such a road. The national boulevard can be made to follow a most scenic course through the lowest point of the Rocky Mountains and across fifteen states.

The eternal question is, "When will this road be built?" The answer is at least 5 years from now, if not sooner. However, it must be put in tourable shape at once. Already the people of California are at work making the Mammoth Wash, one of the worst stretches of the entire journey, tourable. This will be ready before the end of the present year. In every other state the workers there are planning to do emergency road work to get the highways into shape for the immediate use of motor cars.

The work of signing the entire highway is to be done just as soon as possible. Red, white and blue signs, it is believed, will be adopted, and these will be placed from Los Angeles along the line of the proposed national highway right through to New York. In the desert steel signs will be used, and on the state highways the telegraph poles will be painted with red, white and blue signs. In this way it will be possible to follow the Santa Fé trail, the Boons-Lick road and the Cumberland Pike. It is no longer an automobile stunt to drive across the United States.

Transcontinental Stone Road Project

Detroit and Indianapolis Car and Accessory Manufacturers Start Movement To Build Such a Highway

Plan Is to Raise $10,000,000 From the Automobile Industry Before January 1

NEW YORK, Sept. 9—One of the biggest plans for building a stone road from New York to San Francisco was made known in Indianapolis and Detroit today when it was announced that a movement has been started with the motor car and accessory makers in those cities to raise over $10,000,000 from the motor industry throughout the country to purchase crushed rock for such a roadway. The purchasing and delivering of the rock being a part played by the motor industry. The building of the road will be left to the country and state authorities with whom contracts will be made to complete the work within a certain time and according to certain instructions before the materials are turned over to them.

The plan to raise the $10,000,000 from the motor industry is one of the most practical and rational yet suggested in the good roads field. This sum has to be raised by January 1, 1913, a little over 3 months. The plan is to collect from every motor car maker, from every accessory maker, from every car dealer and from owners. With the manufacturers and dealers the plan is to collect a third of 1 per cent. each year for each year, this amount to be taken from the gross receipts of the company, which will provide a fund much in advance of $10,000,000. Cash or notes will not be collected but donation slips issued, which slips will be turned over to a bond company to hold until the permanent organization which will care for the purchasing and delivering of the material is organized.

The plan originated over 1 year ago in the fertile mind of Carl G. Fisher, of Indianapolis Speedway fame and who during the last 12 months has been accumulating data on the cost of road construction, cost of road materials, cost of cement bridges, cost of cement mile posts, etc. During that time he has talked with many manufacturers to find out if they would co-operate in such a scheme. This work started with the Indianapolis car and accessory manufacturers, all of whom agreed with the scheme and at a meeting held today the movement was launched on its practical cost by everyone of the makers agreeing on the plan outlined. A campaign will be made on the Detroit makers the end of this week and it is expected that little difficulty will be encountered and that the industry will practically be a unit on furthering this plan. After Detroit will come Cleveland, Buffalo, Toledo and many other motor centers.

In order that every subscriber to the fund will be protected no construction of any nature will be started until the entire subscription has been guaranteed, and if for any reason the plan should fail all monies will be returned to those having made payment with interest of 3 per cent. By having the required amount guaranteed by 1913 it will be possible to complete the work by 1915 so that the road may be used by motorists attending the Panama Pacific Exhibition which opens in San Francisco in the spring of 1915.

Instead of getting all of the financial assistance from the manufacturers and dealers the plan includes the incorporation of all car owners in the country. This is possible by two classes of membership, one a $5 class and the other $100 class. There is also talk of a third of a $1,000 class. Radiator emblems of different types will be issued to each member according to his class and special wall or window medals issued to all dealers who contribute a total of 1 per cent. of their gross receipts to the fund.

The plans do not call for any peculiar highway route across the states. At present there are two or more transcontinental highways and the matter of deciding whether either of these or a different is to be selected will be left to a commission of the motoring interest. All monies collected or subscribed for the road will be used in the actual purchase of material, which is to be purchased at a price covering delivery at the railroad siding when needed. Prices for material range from 90 cents to $2 per cubic yard, depending on the distance the material has to be hauled. A conception of the amount of rock required for such a highway can be gained from the fact that a roadway 9 feet wide and with rock 12 inches deep costs $1,750 a mile for material. This preposes a short haul. Although by route it is 3,300 miles from ocean to ocean little more than 2,200 miles of transcontinental highway would call for stone construction as there are approximately 900 miles of improved streets in cities, towns and villages on this course. This fact alone, considerably reduces the problem of building such a highway. The fund of $10,000,000 will give approximately $5,000 a mile for road material. and since road material represents from only 30 to 50 per cent. of the cost of building a road it means that instead of a $10,000,000 one across the country there will, in reality, be a $25,000,000 one.

The actual building of the road will be under the state and county authorities to whom the materials will be turned over. The states and counties will sign contracts to build the roads under government inspection. Mr. Fisher has discovered that some of the best rock roads in northern Indiana and northern Ohio have cost but $1,750 a mile for material. It is natural that in building a stone road in Iowa the material will cost more because of the long haulage. This will amount to not more than $800 a mile for any part of the country.

Many additional plans are being furthered in connection with this transcontinental scheme, one of which is the erection of sign posts, one for each donation of $1,000 secured on the plans outlined. Each post would carry a bronze plate containing the name of the donor. Such posts will cost $12 each.

Still another plan is that of entering into arrangements with the telephone companies whose lines are on the selected highway to secure plugging facilities on the line so that the motorist having a break down between cities can immediately get into telephone communication with his dealer, a repairman or garageman. Such a system as this is at present in operation in England and also in certain sections of southern California.

Possibilities Are Great

The possibilities of travel on a transcontinental highway of this nature are unlimited. Supposing 250,000 cars made a return trip over such a highway occupying 40 days. If each car carried four people the daily cost would be $20 or $800 for the round trip. At this same rate there would be an expenditure of $20,000,000 for the 25,000 cars. While this is a broad calculation so far as the number of cars is concerned it will, however, serve to show the value to the towns and cities passed through of such a highway.

Huber Patent May Trouble 20 Firms

Covers Three-Point Suspension—Owners Will Test Its Validity to the Limit —Trial Suit Brought

Date for Return of Temporary Injunction in Ford vs. I. A. L. Case Extended to October 1

DETROIT, Sept. 9—The Emil Huber patent No. 788,407, dated April 25, 1905, covering three-point suspension of the main frame of an automobile bids fair to make trouble for some twenty automobile concerns according to R. A. Parker, of the firm of Parker & Burton, of this city, patent attorneys for the North American Veicle Company, owner of the Huber patent.

Within the last 2 weeks the patent has assumed large proportions, and it is the intention of the owners to test its validity to the limit. Already several concerns have taken out licenses among which are the Packard Motor Car Company, the Havers Motor Car Company, and the Cass Motor Car Company.

The North American Vehicle Company, through Mr. Parker, has sued the Detroit Taxicab & Transfer Company, which concern owns a number of Kelly machines. The Kelly Motor Truck Company, of Springfield, O., is conducting the case for the Taxicab concern through its attorneys, Staley & Bowman, of Springfield, O. It is merely a test case and suit has been brought against the Detroit Taxicab & Transfer Company simply because this concern is the most convenient to get at. The North American Vehicle Company claims that the Detroit Taxicab Company is operating trucks designed along the lines of the Huber patent and in violation of this patent.

The case is now on the docket of the United States district court but it is doubtful if it will come up for consideration during the present term. Should it be lost in this lower court, Mr. Parker states that his client will carry the issue to the Court of Appeals and in that event Judge Dennison, who is an old patent practitioner, will no doubt handle the case.

Staley & Bowman, attorneys for the Taxicab company, on September 3 filed an answer to the North American Vehicle Company refuting the latter's claim.

More Time Given in Ford and I. A. L.

BUFFALO, N. Y., Sept. 9—The date for the return of the temporary injunction issued several weeks ago by Judge John R. Hazel, in United States district court here, directing the International Automobile League, of Buffalo, to show cause in the action brought against it by the Ford Motor Car Company, of Detroit, has been extended to October 1 through agreement of the respective attorneys in the case. The order was to have been returned on last Thursday. The Ford company wants a permanent injunction against the International Automobile League to restrain that concern from selling or advertising for sale Ford automobiles at less than the price fixed by the manufacturers of the Ford cars.

The Ford company in its complaint alleges that the International Automobile League advertised that any person paying $10 would be admitted to membership and would have the privilege of purchasing Ford cars at less than market price. The Ford company declares many orders for Ford cars were taken and that an attempt was made to buy the cars from the makers but the sale was refused. It is claimed that the Buffalo league secretly bought the cars from some Ford dealers and sold them to members of their organization at a 10 per cent. discount.

Trade News of the Week

Westcott and Kline Elected to Membership in the N.A.A.M.—Sales Managers Dates Set

Feps Carbureter Activity—General Motors Promotes Day —Morrow Doubles Capital

THE Westcott Motor Car Company, represented by H. L. Ashly and the Kline Motor Car Corporation, J. A. Kline, have been elected to membership in the National Association of Automobile Manufacturers. The membership of the Metzger Motor Car Company was transferred to the Flanders Motor Company and that of the Rapid Motor Vehicle Company to the General Motors Truck Company.

The two first-named alterations in the membership roll are net additions to the association, but the other two are formal transfers to correspond with business changes that already have taken place. G. G. Luthy succeeds J. B. Bartholomew, for the Bartholomew Company; F. R. Benson succeeds Frank R. Fisher, of the E-M-F Company, and Hanson Robinson succeeds W. R. Innis, for the Studebaker.

The subject of a general meeting to be held in Detroit in October or November was discussed and a committee to arrange the meeting was named.

The association has renewed its agreement for financial cooperation with the American Automobile Association on similar lines to that of 1911. The agreement extends to the end of 1914.

Application for membership in the Chamber of Commerce of the United States will be made by the association.

Four More in Board of Trade

At the last meeting of the Automobile Board of Trade the membership of the United States Motor Company was divided into four heads and individual membership was granted to the Maxwell-Briscoe Motor Company, the Dayton Motor Car Company, the Alden Sampson Manufacturing Company and the Columbia Motor Car Company. Another member was also elected, but no announcement as to its name was made.

Preparations for shaping up the association for its contemplated merger with the National Association of Automobile Manufacturers is progressing and the Dyer license matter, as to the form of the licenses to be granted on application of the organization, is being worked over by the attorneys of both.

Dates Set for Sales Managers

The long heralded convention of sales managers, which was originally scheduled for last July, will be held September 30 and October 1 at the headquarters of the Automobile Board of Trade. The bare announcement of the dates has been made by Chairman Harold O. Smith and the program will be known at a later date.

It was found that the trade was too busy for the convention in July and that the purpose of the meeting would be better served by holding it between seasons.

The regular quarterly and subsidiary committee and board meetings of the Board of Trade and the N. A. A. M. are scheduled for October 2 and 3.

Schoen Takes Up Feps Carbureter

The Schoen-Jackson company, of Media, Pa., has finished the building of a complete plant in addition to the other factories of the company and will manufacture a new type of carbureter to be used on automobiles and boats. The carbureter will be known under the trade name of Feps.

According to the announcement of the company, the device is the invention of J. L. Fritz and among its special features claimed for it by the company is the fact that it has no springs, balls, cams or reeds.

Mr. Schoen learned of the device from its inventor and after some negotiations secured the exclusive right to manufacture for the Schoen-Jackson company, which hitherto has been prominent as a producer of tubing.

Mr. Schoen himself has taken out several patents on carbureters and is a pioneer in the field of automobile research. The Feps device has been given hundreds of severe road tests.

General Motors Advances Day

DETROIT, MICH., Sept. 9—President Thomas Neal, of General Motors Company, has announced the election of William L. Day, late general sales manager of the Mitchell-Lewis Motor Company, of Racine, Wis., as vice-president and general manager of General Motors Truck Company.

Gleeson Murphy, who has temporarily held the office of vice-president and general manager of General Motors Truck Company in connection with his other work at the executive offices of General Motors Company, at Detroit, will in future devote himself exclusively to his regular duties of assistant to the president of General Motors Company.

Morrow Company Doubles Capital

ELMIRA, N. Y., Sept. 9—At the annual meeting here last Thursday of the Morrow Manufacturing Company, manufacturers of transmissions, small parts and automatic screw ma-

Automobile Securities Quotations

Save for the highly speculative issues and those listed upon the New York Stock Exchange, trade in automobile securities during the past week has been dull. Goodrich was the strongest feature of the list, advancing to 80 bid on what appeared to be investment buying. General Motors and Studebaker were also firm. United States Motor Company stock of both issues was very weak on the curb. The 90-day extension granted to the company by the banking and merchandise creditors, expires by limitation on Friday and the weakness of the stock is construed favorably by the street as foreshadowing reorganization.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., common	..	..	150	165
Ajax-Grieb Rubber Co., pfd	..	..	95	100
Aluminum Castings preferred	..	..	99	102
American Locomotive, common	38	39	43½	44½
American Locomotive, preferred	106	107	109	110
Chalmers Motor Company	..	..	145	150
Consolidated R. T. Co., common	5	10	13	16
Consolidated R. T. Co., preferred	10	20	50	60
Firestone Tire & Rubber Co., common	179	181	279	283
Firestone Tire & Rubber Co., pfd	105	107	106	108
Garford Company, preferred	..	..	99	101
General Motors Company, common	42	43	39	40
General Motors Company, preferred	80	82	80	82
B. F. Goodrich Company, common	*243	*245	†80	†81
B. F. Goodrich Company, pfd	*118¾	*119¾	†108	†109
Goodyear Tire & Rubber Co., common	230	240	332	336
Goodyear Tire & Rubber Co., pfd	105	107	105½	106½
Hayes Manufacturing Company	..	..	..	93
International Motor Co., common	..	..	27	28½
International Motor Co., pfd	..	..	84	85
Lozier Motor Company	..	..	50	60
Miller Rubber Company	..	..	..	145
Packard Motor Co., preferred	..	..	105½	107
Peerless Motor Company	..	..	115	120
Pope Manufacturing Company, common	42	46	39	40
Pope Manufacturing Company, pfd	72	77	73	74
Reo Motor Truck Company	8½	10	9	10½
Reo Motor Car Company	23½	25	22	24
Studebaker Company, common	..	..	44	45
Studebaker Company, preferred	..	..	94½	95¼
Swinehart Tire Company	..	..	98	100
Rubber Goods Company, common	85	95	100	105
Rubber Goods Company, preferred	100	105	107	110
U. S. Motor Company, common	30	32	2	2½
U. S. Motor Company, preferred	70	71	7	7½
White Company, preferred	..	..	107	109

*Old. †New.

chinery for Overland automobiles, it was voted to increase the capital stock of that organization from $500,000 to $1,000,000. The papers making formal application for the increase have been completed by Attorney Royal Scott, of the Willys-Overland Company, and rushed to Secretary of State Lazansky at Albany.

Of course, action by the state officials in matters of this kind is merely formality. The increase was made necessary to cover investments already made in the local Morrow factory. The $500,000 increase already is actually covered by money put into the business in the way of equipment, buildings and stock. At the meeting election of officers also was held. A. P. Morrow, Elmira, was re-elected president. Other officers re-elected were: Vice-president, John N. Willys; treasurer, Walter B. Stewart; secretary, Edwin A. Morrow.

Big Registration Gain in State

ALBANY, N. Y., Sept. 9—Secretary of State Lazansky reports that the receipts of his office for the registration of automobiles and licensing of chauffeurs up to and including August 31, 1912, for the 7 months of the fiscal year beginning February 1, are $1,000,844.25. The sources of this revenue follow:

Pleasure vehicles, 90,186	$796,670.00
Commercial vehicles, 8,636	42,370.00
Chauffeurs' licenses, 41,406	116,685.00
Dealers' licenses, 1,665	24,975.00
Dealers' extra numbers	10,831.00
Miscellaneous receipts	9,313.25
Total	$1,000,844.25

The total number of licenses issued for the 7 months has been 100,700, compared to 85,301 for the 12 months ending January 31, 1912. The number of chauffeurs' licenses up to August 31 is 41,406, compared to 35,900 for the entire fiscal year previous.

Market Changes of the Week

The most important feature of the week's market was the advance in the price of Bessemer and open-hearth steel. The advance on each was $1.50 a ton, on Monday, as a result of the great activity in the industry. Lead advanced $.22 1-2 per 100 pounds, rising gradually throughout the week, closing on Tuesday at $5.10.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Change
Antimony, per lb.	.07½	.07½	.07½	.07½	.07½	.07½	....
Beams & Channels, 100 lbs	1.51	1.51	1.51	1.51	1.51	1.51	....
Bessemer Steel, Pittsburgh, ton	22.50	22.50	23.50	23.50	24.00	24.00	+1.50
Copper, Elec., lb.	.17⅝	.17⅝	.17½	.17½	.17 11/20	.17 11/20	— .00 1/20
Copper, Lake, lb.	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	....
Cottonseed Oil, Sept., bbl.	6.36	6.41	6.35	6.40	6.41	6.50	+ .14
Cyanide, Potash, lb.	.19	19	.19	.19	.19	.19	....
Fish Oil, (Menhaden)	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime	.85	.85	.85	.85	.85	.85	....
Lead, 100 lb.	4.87½	4.90	4.90	4.90	5.10	5.10	+ .22½
Linseed Oil	.69	.69	.69	.69	.69	.69	....
Open-Hearth Steel, ton	23.00	23.00	24.00	24.00	24.50	24.50	+1.50
Petroleum, bbl., Kansas crude	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa. crude	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine Up-River Para	1.20	1.19	1.19	1.19	1.17	1.17	— .03
Silk, raw Ital	....	4.15	....	....	....	....	....
Silk, raw Japan	....	3.85	....	....	....	....	....
Sulphuric Acid, 60 Beaumé	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs.	47.10	47.50	47.45	47.45	48.00	48.25	+1.15
Tire Scrap	.09⅛	.09⅛	.09⅛	.09⅛	.09⅛	.09⅛	....

Hupp Increases Capital

Issues $2,500,000 Common to Balance Earnings Diverted to Company—Big Stock Dividend

E. R. Hollander Heads Fiat Sales Company Which Will Market Factory Product in East

DETROIT, MICH., Sept. 9—The stock of the Hupp Motor Car Company has been increased from $500,000 to $750,000, according to the papers which recently have been filed with the secretary of state. This capital increase is made possible through the transfer of $250,000 from the company's surplus to its capital account.

This disposition of its surplus was voted at a recent meeting of the stockholders of the Hupp company, at which it was also voted to allow a 50 per cent. stock dividend on account of the capital increase.

The Hupp company reports prosperous conditions, and has planned to make about 9,000 machines for the coming season.

Hollander Heads Fiat Sales

ALBANY, N. Y., Sept. 11—At special meeting of the directors of the Fiat Motor Sales Company, the $300,000 corporation just organized at Manhattan, these officers were elected: President, E. R. Hollander, New York; vice-president, Henry M. Sage, Albany; secretary, R. D. Willard, New York; treasurer, Chas. L. A. Whitney, Albany.

The new concern will handle the Fiat in New York, Albany, Boston, Providence and New England.

Rate Boost Delayed for Month

Final action on the part of the railroads to advance the classification of automobiles as outlined in previous issues of this publication, has not been taken and the matter has gone over until the October meeting of the Southern Classification Committee.

Under the proposed change, the car-load rate from New York and New England common points to the Pacific Coast would be raised from $3 to $3.30 per 100 pounds; from Buffalo-Cleveland-Pittsburgh common points, $3.20 in place of $3 and from Detroit common point of $3.10 instead of $3.

The change was contested by the National Association of Automobile Manufacturers.

Rubber Market Awaits Auction

Crude rubber sagged again last week under trading of smaller volume. The trade is awaiting the London auction which will dispose of from 900 to 1,000 tons of plantations, considerably more than has been offered at one of the fortnightly sales this year. Receipts at Para during August amounted to 1,655 tons, according to bulletins from that port. South American rubber shares are reported active and on the verge of a boom. The present price level is on a basis of $1.17 1-2 per pound for upriver fine.

Sedwick to Manage Speedway

INDIANAPOLIS, IND., Sept. 10—Charles W. Sedwick has been appointed manager and Homer McKee, publicity director of the Indianapolis Motor Speedway. Neither will give up his other business. McKee is advertising director of the Cole Motor Car Company. Plans are to start at once preparing for the 500-mile Memorial Day race.

U. S. Motor Co. Fails

Creditors Apply for Receivers When Agreement as to Reorganization Falls Through After Many Efforts

Liabilities Estimated at $12,250,000 with Nominal Assets of $15,300,000

INVOLUNTARY bankruptcy proceedings of a friendly character were entered against the United States Motor Company late tonight, in the United States District Court before Judge Charles M. Hough, of the Southern District of New York. The petitioning creditor is the Brown & Sharp Manufacturing Company. The parties to the suit are the United States Motor Company, Alden-Sampson Manufacturing Company, Brush Runabout Company, Columbia Motor Car Company, Dayton Motor Car Company and the Maxwell-Briscoe Motor Company.

Judge Hough forthwith named W. E. Strong, of the Central Trust Company, and Roberts Walker, formerly head of the Rock Island System, as receivers under bond of $150,000. The bond was originally placed at $75,000, but owing to the fact that ancillary proceedings will be instituted immediately in Indiana, Ohio, Michigan, New Jersey, Connecticut, Rhode Island and Massachusetts the amount of the tentative bond was doubled.

The liabilities of the company are estimated at $12,250,000 and the assets, consisting of cash, bills receivable and securities of subsidiary and other corporations, are valued at $15,300,000. The assets are largely embraced by the factory plants of the subsidiary companies, which are scheduled at $6,250,000, against which there is a secured indebtedness of $200,000. The quick assets, as of July 31, amounted to $9,250,000. Factory inventories, which represent an item of $4,000,000, are included in the foregoing item as also is the amount of $2,500,000 which represents all the cash on hand and bills receivable.

The liabilities of the company consist of $6,000,000 of debenture bonds, while the remainder, amounting to $6,250,000, consists largely of the merchandise and banking claims against the company.

Does Not Mean End of Company

Appeal to the courts, according to practically everybody interested in the matter, does not mean that the end of the company is at hand. On the contrary, they say that under the receivership much aggravating delay and expense can be saved by having the federal court take jurisdiction. It is also pointed out that when the time comes for reorganization some plan to assess the stock or wipe it out can be accomplished with more dispatch than such an end could be accomplished without a receivership.

The date to which the extension goes is Friday and the sudden determination to file the proceedings was taken in order to forestall legal proceedings in the state courts and elsewhere.

The whole trouble with the company is lack of ready money. Several of the subsidiaries are in excellent shape individually, particularly the Maxwell-Briscoe Motor Company, in which plant the book value of the stock is 100 per cent. of its value. But owing to the combination of circumstances the funds that must be devoted to caring for current needs, back debts and for financing the 1913 manufacturing campaign are short of the required amount.

In the bill of complaint it is stated that the receivables owned by the subsidiary companies are in many instances not immediately capable of collection in any way and that the motor company is liable upon the entire indebtedness. It is also said that through the indiscriminate issue to banks and others of promissory notes now outstanding, as aforesaid, intricate and involved questions exist as to the equities and rights of the defendant companies as between one another, which can be adjudicated only through one suit in equity wherein all such questions can be determined.

In another section of the bill the following condition is outlined:

While the motor company and the subsidiary companies have a large amount of supplies and materials on hand and there are in the hands of the selling companies for sale completed automobiles of the value of about $2,000,000 (on July 31), the conditions of the automobile industry are such that said finished product can not be sold in time to provide for the payment of the matured and maturing obligations of the said companies and neither the motor company nor the subsidiary companies have now adequate or sufficient funds, and are unable either by realizing upon their quick assets, even at a great sacrifice, or by securing further loans, or otherwise, to meet their current obligations which have already matured and will mature in the near future, and in view of the present financial condition of said company it will be impossible for any of them in the near future to raise by loans or otherwise sufficient funds to enable them to prosecute their business.

Percy Martin, head of the British Daimler Company and the Birmingham Small Arms Company and a leading exponent of the Knight motor in England, made a detailed inspection of all the plants of the United States Motor Company last summer. He stated after the inspection, which was very thorough, that the companies were in condition to produce automobiles worth from $20,000,000 to $25,000,000 annually as far as machinery and equipment were concerned.

Some of Mr. Martin's Suggestions

Quoting from Mr. Martin's report, under date of August 22, the following extract is interesting: "If a definite policy or program could be given to the various manufacturing installations and if a wise distribution of the work according to its suitability to the equipment of the various plants were dictated, I think that the economies from a manufacturing standpoint would be such that the difference between the manufacturing cost for a given article and that of the best factories in the United States will be very slight, in fact, negligible for the present scheme of reorganization."

Continuing Mr. Martin says:

"The present state of the plants, which are being practically shut down due to lack of work, is a very serious matter and is rapidly destroying the spirit of progress which apparently did prevail and certainly should prevail with all of the factory managers. The sooner a definite policy can be launched, whether such policy be in every detail correct or not, the advantages to the company will be very great."

In another place he says:

"As to the Sampson truck business, as well as the Brush plant in Detroit, I am inclined to believe that those factories could be closed to advantage and the very good supply of machinery and plant at present located there profitably distributed among the other factories."

The chief plans of reorganization that are being discussed include a proposition to assess both classes of stock $22.50 per share. Another is to obtain an agreement among the creditors to accept stock issues in the reorganized company for their claims, dividing the claims into classes and settling them according to their class.

The matter is returnable before Judge Hough on the third Monday in October. Rosenberg & Levis have been named attorneys for the receivers; Joline, Larkin & Rathbone will represent the Central Trust Company and the banking creditors to the amount of $5,000,000. Parks & McKinstry will be associated as counsel. Sidney S. Meyers, who is a member of the creditors' committee, will act for the merchandise creditors.

How to Paint a Roadster

Requires Different Treatment From the Touring Car or Limousine—Paint Suffers More From Vibration

For Color Scheme, Dark, Rich Red Tones Are to Be Preferred—Other Attractive Hues

A READER of THE AUTOMOBILE suggests that information be given for painting a roadster. The roadster type of car, in not a few respects, must be treated somewhat differently than the touring car or cars of even a larger build. Usually it is more difficult to keep paint and varnish solid and intact on these light, jolting, quick-moving cars, than upon the cars holding firmer to the earth by reason of their greater weight. These light cars suffer from vibration, against which it is hard for the most elastic paint to prevail.

Choice of colors is not an easy selection to make for the roadster. Colors which upon the larger field of the bigger cars appear to splendid advantage are often entirely unsuited for display. upon the restricted space of the roadster. The roadster is a type of car that needs attention. By virtue of its small size it is rather a wretched looking car under even the mildest form of neglect. To appear the genteel and jaunty car that it really is it must be kept constantly under a good raiment of varnish, and as often as the color becomes worn and dingy, and perhaps takes on the spots of the leopard, it should be put through the paint shop for expert treatment.

When it makes entry to the shop the first move on the part of the painter should be to mark all the furnishings belonging to the car and put them away in the racks designed for such things. Give the car a sharp look over and determine the amount and extent of painting repairs necessary, granting, of course, that the owner has not stipulated precisely the requirements he is prepared to pay for. Anyhow, get the car upon strong supports to a height that will permit the cleaners to prowl under the car and clean up the mechanism. If anything, these small cars get more badly stuck up with thick grease, road dirt, etc., than the larger machines. A good plan in cleaning is to first saturate the mechanism and cleanable parts with a mixture of one part crude oil and three parts turpentine, and let stand for several hours, at the expiration of which time give the parts a fresh supply of the oil turpentine mixture following with knife scraping and dry wiping with burlap cut into 5-inch strips. Plenty of oil and grease will likely be found on the body of the car, and upon the chassis, which it will be necessary to remove with small pieces of waste or clean rags saturated with turpentine.

Touching Up Defective Places

Having the surface and parts below the body line clean, go go over the body with No. 1 1-2 sandpaper. Any chipped or defective places upon the surface of either the body or chassis should be touched up with an oil pigment mixed, so as to dry in at least 24 hours. When dry, such defects should be draw-puttied to fetch them out level with the surrounding surface. Use a hard drying putty, and after 24 hours rub these splotches of hard pigment down level with the remaining surface, using for the purpose a small rubbing brick dipped in turpentine, or gasoline, if the insurance people will allow it.

Sandpaper the chassis down to a smooth and solid foundation, making sure with respect to both body and chassis that the surface is clean and fine.

If there are no deep surface checks the color may now be put on directly over this old paint foundation. If checks appear which the color and the varnish are not certain to eliminate, it is advisable to apply a coat of lead paint mixed with enough turpentine to flat down without any glass. Beat up some oil-ground lead in turpentine and add enough of some color corresponding in shade to the final color selection to give it the right appearance.

This coat will dry in 24 hours fit to lightly sandpaper with No. ½ paper. In either event the surface is now ready for the color coat, or the ground coat used to support the color coat in case a semi-transparent color or lake coat is to be used.

All colors, or practically all colors, used upon automobiles at the present time are ground in japan and in preparation for use require only to be thinned with turpentine. For every seven parts of turpentine use one part raw linseed oil as a binder for the pigment. For the second coat of color use ten parts turpentine and one part raw linseed oil. This proportion of oil does not materially delay the drying of the color, and it gives it a gripping power and an elastic property which are vital to its durability.

Apply the color with a 2 1-2-inch camel's hair flat brush. If a lake pigment is to be used the second coat of flat color may be omitted and a coat of the flat lake—that is, lake beaten up with turpentine to dry without gloss—applied. Over this use a glazing of lake made by first breaking the lake up with turpentine to a brushing consistency and then adding the rubbing varnish in sufficient quantity to give a mixture consisting of 1 ounce of color to a full pint of rubbing varnish. Apply this varnish color or glaze coat in the same manner that you would flow on the varnish coat. Knock the gloss from this coat in due time by rubbing it with a soft sponge dipped first in water and then in pumice stone flour. Stripe and ornament on this surface and apply a coat of clear rubbing varnish. Give this coat, at the proper time, a solid rubbing with water and pumice stone flour, and finish with a hard-drying varnish specially designed for automobile work. Such in a rather brief outline is the way to get the painting and finishing operations along in proper order.

Possible Color Selections

In color for the roadster, dark, rich reds, like aurora red, automobile red, No. 40 carmine and twentieth century red, deep shade, are to be preferred. Deep-toned maroon is another effective red in connection with which may be mentioned English scarlet lake, Munich lake, English or American crimson lake, and purple lake. This latter, it will be noted, is an exceedingly popular color just now and withal very beautiful. Richelieu blue and ultramarine blue, both magnificent colors, with a wealth of effects in them, are popular roadster pigments. Napier and thistle green are enticing colors for the small car. Automobile and battleship gray, picked out with black and gold lines, show the roadster to the very finest advantage.

One important consideration in this matter of color selection for the roadster, or for any other small type of car, is that, generally speaking, a single color, fitly chosen, is in the main more effective and serves best to display the charm of outline and figure than a combination of two or more colors. Neat, effective striping, executed in quiet colors of strong individuality, and cast with artistic precision upon the surface, serves best to accentuate the graceful lines and the choice color display cast over the car.

The quantity of material required to repaint the roadster as above directed will be found approximately as follows:

Body

Lead, mixed ready for use	1 quart
Hard-drying putty	1 pound
Sandpaper	6 sheets
Color, per coat	¾ pint
Varnish color, 2 coats	1 quart
Clear rubbing varnish	1 pint
Finishing varnish	1¼ pints

Chassis

Lead, mixed ready for use	¾ quart
Hard-drying putty	½ pound
Sandpaper	4 sheets
Color, per coat	1 pint
Varnish color, one coat	1¼ pints
Clear rubbing varnish	1¼ pints
Finishing varnish	1½ pints

Array of Test Data of Many Touring Car Motors Showing Need of New Formulas for Power Ratings—Pointers from Berlin on Safe Construction of Garages—Dr. Riedler's Scientific Valuation of Cars

POWER of Modern Motors—In 1906 the Automobile Club of France adopted the formula $P = 0.0028 D_3$ for estimating the power developed in each of the cylinders of an automobile motor. For taxation purposes the French government adopted a variation of this formula indicating a horsepower about 17 per cent. smaller. Since that time many different formulas have been proposed in which not only the diameter of the cylinder D but also the stroke L is considered. The Imperial German Automobile Club states that the formula used for taxation purposes in Germany is $P = 0.3 nD^2L$, or for a four-cylinder motor $P = 1.2 D^2L$, but that this is meant to indicate the power available at the rims of the driving wheels. The Royal Automobile Club of London used for some time the formula $P = 0.4 nD^2$, in which the bore is in inches, while in the German and French notations it is in millimeters. Following laboratory experiments and the widely adopted lengthening of the stroke, the English formula was changed to $P = 0.464\, n(D + L)\ (D - 1.18)$.

Now the French Automobile Club proposes to divide the motors into four classes according to their piston speeds and to include the number of revolutions *w* among the factors considered (see account in these columns, THE AUTOMOBILE, August 8), and pleasure cars constitute two of these classes. In the first class the piston speed is up to 6 meters per second, and in the second class it is above this figure.

As 6 meters per second corresponds to 1,178 feet per minute, while the basis for the American formula is 1,000 feet per minute, the power ratings arrived at according to the proposed French formula would for this reason alone exceed the current American ratings by nearly 20 per cent. if the number of revolutions *w* of the motor were not specifically considered.

The proposed formula for motors in the first class—which are those which afford a comparison with the motors used in American cars—is $P = (n \div 2)\ (D^2Lw \div 10^8)$, or for a 4-cylinder motor $P = 2D^2Lw \div 10^8$.

Transposing this formula into inch measurement, but without considering the small difference between French and American horsepower, it becomes $P = 2D^2Lw \div 6{,}102$, as 1 inch equals 25.4 millimeters and the millimeters in bore and stroke are cubed in the French notation, so that the divisor 10^8 should be divided by the cube of 25.4 which is 16,387. For comparison a 4-cylinder motor of 4-inch bore and 5-inch stroke gives according to the French formula 31.5 horsepowers at 1,200 revolutions per minute and 25.6 horsepowers according to the standard American formula, and, as 1,200 revolutions per minute gives a piston speed of 1,000 feet per minute with a stroke of 5 inches, the two ratings are comparable. It is thus seen that the new method of rating allows a horsepower nearly one-fourth higher than the customary American formula, even where the motor dimensions are conservative, and in the case of a long stroke motor the difference becomes more pronounced.

The basis from which the French formula was evolved is found in actual bench tests of a large number of different motors used in French touring cars of 1911 manufacture. The bench data relating to these motors are given in the appended tables, Nos. 1 and 2. It is noted that many among the motors listed in the tables have a piston speed in excess of 6 meters per second and these are in the second class for which the French formula is written with a divisor of 1.9 instead of 2. For comparison, the last column in the tables gives the rating which the motor in each case would have under the standard American formula $P = nD^2 \div 2.5$.

For truck and omnibus motors in which the average piston pressure is higher than the average in touring car motors, it is found that the French formula should be figured with a divisor of 1.8 instead of 2, and this conclusion is based on the test data obtained with the truck, omnibus and delivery vehicle motors listed in Table No. 3 (see page 527).—From *Bulletin Officiel*, June.

TABLE NO. 2—BENCH DATA OF FRENCH 1911 TOURING CAR MOTORS WITH 1, 2, 6 OR 8 CYLINDERS

Bore in m/m D	Stroke in m/m L	Revolutions per Minute W	Horsepower P	Piston Speed in Meters per Second	Mean Piston Pressure in Kg cm2	American Rating in Horsepower
			Two-Cylinder Motors			
125	160	800	16, 5	4, 3	5, 2	19.10
90	130	1450	14, 5	6, 3	5, 9	10
85	150	1400	16	7	6, 6	9.12
80	120	1400	11	5, 6	6, 4	7.90
80	120	1200	9	4, 8	6, 2	7.90
75	110	1800	9	6, 6	5	7.16
75	130	1730	14	7, 5	7	7.16
75	150	1400	12	7	6, 4	7.16
75	120	1200	8	4, 8	6, 2	7.16
75	130	1200	9	5, 2	4, 5	7.16
66	120	1400	6, 9	5, 6	5, 4	5.25
			One-Cylinder Motors			
110	110	1400	9	5, 1	6	7.50
90	150	1400	8, 8	7	5, 9	5.
84	130	1400	5, 1	6, 1	4, 5	4.50
80	140	1300	6	6	6, 6	4.
			Six-Cylinder Motors			
80	140	1200	24	5, 6	7	4.
80	120	1600	35	6, 4	5, 9	24.
80	148	1600	40	7, 9	5, 5	24.
75	120	1600	29	6, 4	5, 6	21.20
66	125	1400	15	5, 8	6, 2	15.75
			Eight-Cylinder Motor			
70	130	1400	34, 3	6, 1	5, 6	24.20

REGULATIONS for Garages—In Berlin the police supervise the observance of rules relating to buildings and fire risks, and this year new rules have been promulgated for garages which are found to have a bearing on the most desirable architecture of dwellings as well as business buildings in any country. They are rendered practically in full in the following, and are applicable in all cases where the total capacity of the fuel tanks in automobiles stored in one room amounts to more than 15 kilograms.

Whenever possible motor vehicles are to be stored in closed rooms and in special buildings.

The use of basements is admissible in the following cases:

(1) Private Garages—When the basement rooms are accessory to dwelling rooms on the same plot and the vehicles serve for the personal use of the resident, and then under the following special conditions: (a) At most two cars must be placed in each car compartment; (b) the walls and roofs of each compartment must be fireproof; (c) automatic ventilation of the floor must be provided; (d) the car compartments must not be connected with other basement rooms; (e) they must be accessible by means of an inclined driveway or an elevator; if by an elevator, there must be a specially secured rear exit to the open air, and this may also be demanded if the entrance is by driveway; (f) more than 8 cars must not be placed in the basement rooms of one building.

(2) Business Garages—(a) If the storage rooms are placed under yards or under buildings which preferably are used for automobile traffic and at all events only for business; (b) they must not be connected with the upper stories; (c) they must have two entrance driveways in different directions and in addition be provided with a sufficient number of rear exits to the open air.

Walls, roofs and windows—(a) The outer walls of garage rooms must be solid. (b) Each room must have fireproof ceiling and fireproof, unbroken partition walls at least 10 centimeters thick. (c) Windows and skylights must be made of fireproof glass (for example Siemens-Drahtglas, Electroglas, Mechanoglas, Solfacglas, Galvanoglas) in iron frames.

An exception is allowed for special single-story garage buildings whose outer walls are at least 6 meters from doors and windows in other buildings and if no dwelling rooms are arranged over the storage rooms. These need not be fireproof or equipped with special glass, but if these buildings are more than 20 meters long a fire wall must extend above the roof for every 20 meters of length.

Repair shops must be separated from storage rooms by unbroken fireproof walls of at least 10 centimeters thickness.

Number of cars stored—As a rule not more than 3 cars must be stored in the same compartment; in the special cases above mentioned only 2.

Floors—The floor must be incombustible and must not absorb oil. It must in each compartment drain toward a pit-like depression under the stand of the car and must slope upward toward the entrance.

Doors—(a) Doors in front walls must open outwardly. (b) The wall over doors and windows and underneath dwelling rooms must be fireproof and unbroken to a height of 1.1 meter, and, if this is not possible, protection must be provided by means of an incombustible shutter in the door or window frame capable of being raised on hinges, or a roof 1.1 meter broad must be placed over the opening on the outside of the building, so arranged that it may easily be clapped down. The special glasses mentioned may be used for these purposes.

Heating—Fireplaces must not be used in storage rooms. Heating by saturated steam or hot water is permitted, but the radiators and pipes must be protected by wire netting or perforated sheet iron at a suitable distance.

Lighting—(a) The lighting of the premises must be effected by incandescent lamps operating without access of air and inclosed in tight-fitting globes which also inclose the bulb frames; or else it must be effected by means placed outside of the storage room and securely separated from it. In other features the rules of the Society of German Electrotechnicians are to be followed. (b) Where push-contact lamps cannot be dispensed with for business reasons, such lamps are admissible if placed at least 1.5 meter above the floor and of the construction especially permitted by the police. (The permitted constructions are the Eicken, the Southwest Electric company's and the Bergmann Electric company's types). (c) The car storage room must be entered only with electric or Davy safety lamps. (d) The lighting of fire or light, lighting or extinguishing of vehicle lamps and also smoking are prohibited, and this must be made known conspicuously at entrance doors.

Ventilation—Ample provision must be made for carrying into the open all gases which may settle along the floors.

Storage of fuel—The ordinary police regulations relating to the storage of mineral oils are ruling, and in the storage rooms and repair shops neither full nor empty gasoline or similar cans nor oil-soaked rags must be stored.

Storage above the ground floor—When motor vehicles are stored above the ground floor the following additional demands are made: (a) Elevators for motor cars must be outside of the building. (b) The ceilings of each floor must be unbroken. (c) All exits are to be provided with ground-joists of incombustible and impervious material and of sufficient height. (d) The storage rooms must have a sufficient number of exits and at least two, as far one from the other as possible and leading to difficult conditions, the police reserve the right to make special rooms must have exits to special stairways.

Large plants—In the case of large establishments or difficult conditions, the police reserves the right to make special demands.

TABLE NO. 1—BENCH DATA OF FRENCH 1911 4-CYLINDER TOURING CAR MOTORS

Bore in m/m D	Stroke in m/m L	Revolutions per Minute W	Horsepower P	Piston Speed in Meters per Second	Mean Piston Pressure in Kg cm2	American Rating in Horsepower
160	180	1112	98, 5	6, 7	6	62.40
135	140	1308	56, 5	6, 1	5, 3	44.
130	200	1200	60	8	4, 6	42.40
130	140	1200	50	5, 6	5, 5	42.40
130	150	1380	70	6, 9	5, 9	42.40
125	150	1400	60	7	5, 7	40.
120	140	1000	30	4, 7	4, 6	36.
120	144	1400	45	6, 7	4, 9	36.
120	140	1300	40	6	4, 8	36.
120	160	1200	44	6, 4	5	36.
110	150	1380	44	6, 9	5, 5	30.50
110	160	1400	52	7, 5	6	30.50
110	110	1370	28, 1	5	4, 9	30.50
105	150	1500	53	7, 5	6, 7	27.25
100	140	1450	38	6, 8	5, 8	24.
100	160	1400	43	7, 5	6	24.
100	140	1200	30	5, 6	5, 6	24.
100	140	1400	38	6, 5	5, 1	24.
100	140	1400	35	6, 5	5, 6	24.
100	140	1200	26	5, 6	4, 8	24.
100	120	1128	21, 7	4, 5	5	24.
100	140	1574	37,34	7, 3	5, 9	24.
100	130	900	24	3, 9	5, 9	24.
100	140	1100	26	5, 1	4, 9	24.
100	140	1800	40	8, 4	4, 5	24.
100	140	1400	33, 5	6, 5	4, 9	24.
95	130	1450	34	6, 3	6, 2	22.50
92	150	1500	38	7, 5	6, 3	20.25
90	130	1250	25	5, 4	6	20.
90	160	1400	19	7, 5	6, 6	20.
90	150	1500	36	7, 5	6, 2	20.
90	140	1200	22	5, 6	5, 1	20.
90	160	1700	45	9	6, 4	20.
90	140	1500	30	7	5, 5	20.
90	130	900	19	3, 9	5, 7	20.
90	130	1500	30	6, 5	6	20.
85	130	1450	28, 5	6, 3	6, 5	18.25
85	140	1500	33	7	6, 8	18.25
84	130	1200	18, 1	5, 2		18.
80	140	1500	28	7	6, 5	15.75
80	140	1500	24	7	5, 6	15.75
80	120	1200	15	4, 8	5, 1	15.75
80	160	1400	15, 2	7, 5	6, 6	15.75
80	120	1800	21	7, 2	4, 8	15.75
80	130	1730	29	7, 5	6, 3	15.75
80	120	1200	15	4, 8	5, 1	15.75
80	120	1200	14	4, 8	4, 8	15.75
80	120	1600	22	6, 4	5, 6	15.75
80	148	1600	28	7, 9	5, 8	15.75
80	120	1450	18, 3	5, 8	5, 1	15.75
80	160	1200	20	6, 4	5, 1	15.75
80	120	1671	20, 5	6, 7	5	15.75
80	120	1000	13	4	4. 8	15.75
80	140	1400	23, 3	6, 5	5, 3	15.75
75	110	1600	18, 2	5, 9	5, 7	14.30
75	120	1250	15, 5	5	5, 8	14.30
75	120	1400	13	5, 6	4, 3	14.30
75	140	1300	15, 2			14.30
72	120	1600	18	6, 4	5, 7	13.10
70	170	1700	20	9, 6	4, 4	12.10
70	150	1400	10, 8	7	6, 6	12.10
70	110	1600	15	5, 9	5, 4	12.10
70	130	1730	24	7, 5	6, 8	12.10
70	110	1200	11	4, 4	5, 3	12.10
70	100	1500	12, 5	5	5, 3	12.10
70	130	1400	18	6, 1	5, 7	12.10
66	120	1400	14, 9	5, 6	5, 8	10.50
65	110	1400	10, 5	5, 1	5, 1	10.10
65	130	1600	18	6, 9	6, 4	10.10
65	120	1600	15	6, 4	5, 8	10.10
65	100	1800	11			10.10
62	100	1700	10, 5	5, 7	5	9.
62	110	1400	8, 5	5, 1	4, 5	9.
60	120	1800	13	7, 2	5, 2	8.
60	100	1800	9			8

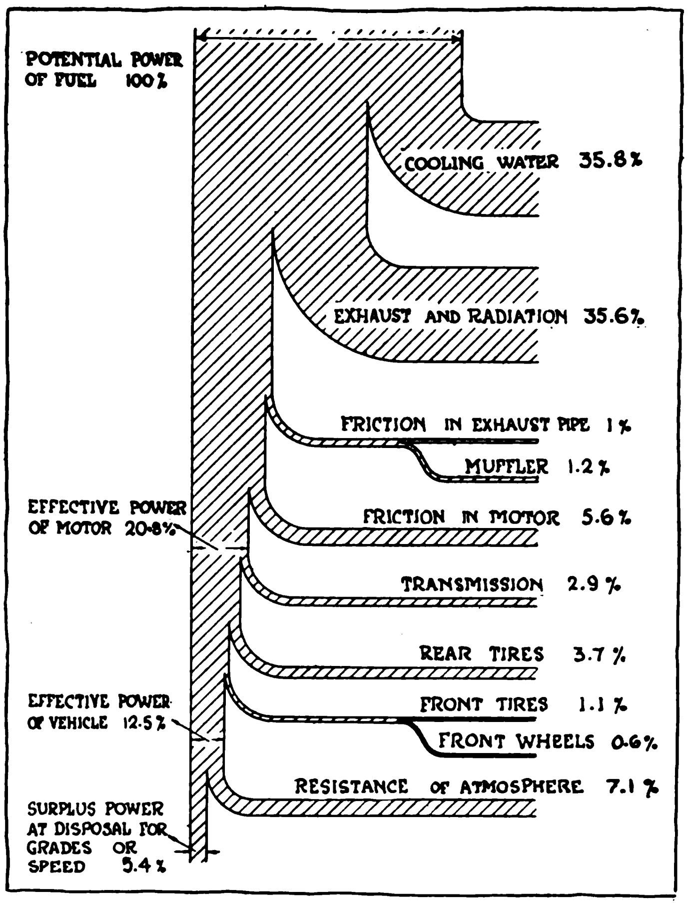


Fig. 1—Wastes and frictions in 30-horsepower car going at 60 kilometers per hour

Fire Extinguishers—The provision of fire extinguishers, such as chemical preparations, sand and hydrants, is recommended for small plants and required of medium and large establishments.

Sewerage—A special permit must be obtained from the police sanctioning the drainage system.—From *Zeitschrift des Mitteleuropäischen Motorwagen Vereins*, middle of August.

DIAGRAMS of Wastes and Frictions—Among attempted scientific investigations of automobile values on a basis of tests of materials, motors and complete vehicles, none have attracted so much attention or given rise to so many dissenting opinions as the work of Professor Dr. Riedler conducted largely at the Royal Technical Highschool of Berlin and accounted for in a book called *Wissenschaftliche Automobil-Wertung* (Scientific Automobile Valuation), which has also been translated into French. The accompanying diagrams, Figs. 1 and 2, are taken from a review of this book and may be assumed to represent the thermal wastes and different forms of friction which occur in a car at two widely varying speeds as accurately as these important factors may be determined.

In Fig. 1 the heat units contained in the fuel are taken as a basis, and it is shown what becomes of them in a car of 30 horsepower operated at a speed of 60 kilometers per hour. The enormous percentages which go to waste in the cooling-water, by way of the radiator, and in the exhaust gases point the way for the very ambitious inventors who may eventually succeed in producing an internal combustion motor which, like the steam engine, may be protected against the loss of heat instead of being purposely exposed to it. The transmission, on the other hand, is found to consume only about 3 per cent. of the fuel's power value, on direct drive, but this is equal to about 15 per cent. of the effective motor power, since the motor does not transform more than 20.8 per cent. of the fuel into work. In another instance Dr. Riedler found, however, that 27 per cent. was utilized, but that was the maximum. The value of 5.6 per cent. for friction in the motor, which means largely piston friction, equals a waste at this point amounting to about 28 per cent. of the effective motor power. If it were reduced to one-half, as might perhaps be accomplished by a different piston design or material, by improved lubrication and by offsetting of the crankshaft, the effective motor power should thus be increased 14 per cent. at ordinary fast traveling speeds. It is stated that in the case represented in Fig. 2 the loss due to friction in the motor, which is not shown in the diagram, amounted to 18.5 horsepower, and this figure is not proportionately larger than the figure taken from Fig. 1, while the vehicle in this case is a 75-horsepower Adler racing car going at 114 kilometers per hour and with a motor turning at 2200 revolutions per minute. From this it would seem either that friction in the motor does not increase with motor speed and power, or else that the racing motor in question was distinctly superior on the point of friction to the 30-horsepower motor in the other car.

In Fig. 2 the losses are not traced back to the fuel, but only to the effective motor power. If it is assumed that the latter also in this case is only one-fifth of the fuel power, the percentages of the mechanical losses and of the air resistance are proportionately five times higher than in the first case and should be divided by 5, if the losses in the two cases are to be compared. The form of the diagram shows that it represents top speed. There is no power to spare for grades unless the speed is first reduced. The 48 per cent. air resistance is the last factor in holding the car back. It might be expected to be nearly 4 times as great as the air resistance scheduled on Fig. 1, as the car speed is nearly double, but the powers at work are also very different, while the shape of the racing car is the more favorable of the two, and consequently the actual increase in the air resistance by passing from 60 to 114 kilometers per hour—in two different cars—is found by Dr. Riedler's test to amount to little more than 33 per cent. of the utilized horsepower. That the tires on the rear wheels consume about 18.5 per cent. of the available power in one case and 26.7 per cent. in the other case may seem astonishing, but these figures include the bearing friction and the air resistance to the rotation of the wheels.

Calculation of Centrifugal Pump Throw—An analysis of the unknown factors in the fire engine work that may be accomplished by the use of centrifugal pumps, involving also a criticism of existing constructions, is presented in a book by Prof. H. C. A. Ludewig published by M. Krayn, Berlin. The work is based on tests.—From *Die Turbine*, August 20.

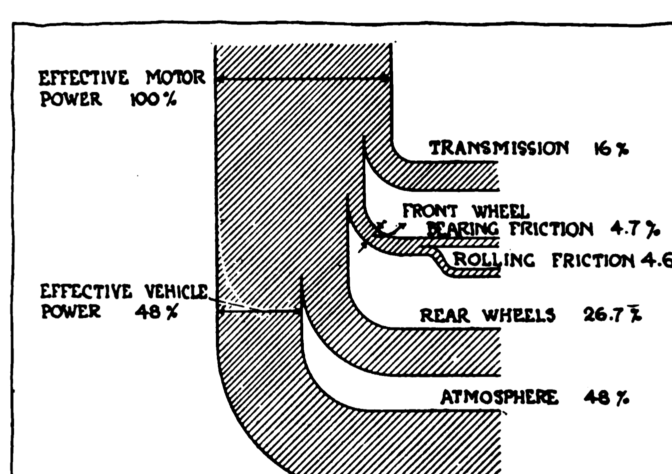


Fig. 2—Diagram of motor power utilization in 75-horsepower car at 114 kilometers per hour

Discuss Metric System

Several Engineers Prominent in the Automobile Industry Give Their Views on the Measurement Situation

One Considers English System Just as Good, While Others Think the Change Impossible

SINCE publishing the two articles on the Metric and English systems of measurements in The Automobile for August 22 and 29, several letters have come in from eminent automobile engineers discussing the two systems, the practicability of their adoption, and various phases of the situation. Four of the most interesting of these communications are given herewith.

V. A. Longaker, of the American Motors Company, believes our present system as good as the metric. He says: "Notwithstanding the fact that the United States Government legalized the metric system in 1866, it has not made very great strides. I realize that the system is very strongly recommended abroad, but going into the matter thoroughly and viewing it from every standpoint it would appear that while it has some advantages over the English system, at the same time it has its disadvantages as well in that it has not eliminated the multiples of three or reduced the necessity of prime numbers.

"It would appear that in this country the growing practice of subdividing the inch by thousandths gives us as good a basis of measurement as the metric system, and avoids the necessity of throwing out of service millions of dollars' worth of tools that are now in the hands of workmen that would be valueless if the metric system was to go into full recognition.

"Our shop superintendent is of the opinion that the crying need at the present time is the abolishment of many thread sheet metal and wire gauge standards now in general use. If these could be standardized it would be a step in the right direction. My personal opinion is that the thing for us to do is to work out the evils that are of crying need and let the metric standard force itself upon us gradually."

All Industries Must Agree

A. **Schimpff, of the engineering department of the Schacht Company,** believes a change would be difficult. A part of his statement is as follows: "The metric system must be acknowledged the simplest and easiest method of calculation, inasmuch as its denominations increase or decrease decimally by the factor of 10 with enumerations defining their respective worth, thereby eliminating fractions and various terms used in our present method. If adopted in America and put to general use, other methods being abolished, the metric system would in our opinion be a success, although it would cause years of labor and expense on account of new machinery, tools, etc., that would be required. For one industry alone to take up this system would add to it extra work, as it would still have to maintain its present method in order to interchange with like industries that have not taken up the metric system.

"As far as foreign export of automobiles is concerned it would seem the most reasonable to us to have required data and measurements converted into the metric system just as you would translate one language into another. For instance, when medicine concerns put directions in packages for export they give the directions in four or five different languages. In short, it would be as serious a change as when the Big Bull Moose recently tried to change our spelling. It would cause no little amount of trouble among those who are thoroughly familiar with our present system and knowing nothing of the metric, it certainly seems useless to make a change just now. Of course one could debate on this subject for days, but just at the present time we believe the disadvantages would outweigh the advantages."

David Ferguson, of the Pierce Arrow engineering staff, believes an attempt to change would mean the loss of thousands of dollars. He says: "We think that there are no two opinions as to the advantages of the metric system were it not for the fact that all existing factories have had the latter in use so long that they would look upon a change now almost with dread. We, ourselves, have been engaged in the automobile industry for 11 years and during that time have made a great many models, all of which are still running, and there is a vast amount of work required in making up new parts for these, so that if we were to adopt the metric system in the near future we would still have to work to the old system for repairs. This would cause endless confusion for everyone concerned.

Change Would Involve Too Much

We have thousands of dollars invested in tools, jigs, gauges, etc., on the old system so that the idea of a change appears appalling. We think that all manufacturers in a country should adopt that country's system of measurements, and we do not think it advisable for a few firms either individually or collectively to deviate from this until such time as the country at large adopts a new standard. There are too many systems at present, and the A. L. A. M. did a splendid work when it standardized bolts, nuts and screws.

"The owners of foreign cars in this country often have great difficulty in replacing a worn or a broken part because of its metric measurements, and it would place owners of a domestic machine in the same position, especially in out-of-the-way places, until such time as this system came into very extended use."

Howard Marmon, of the Nordyke & Marmon Company, does not believe it would be possible to make the change for the following reasons:

"I do not believe there is any argument possible concerning the intrinsic merits of the metric system, as compared with the system we have now in use, but, practically, do not believe that it would be possible to adopt the metric system in any factories now running on the inch and foot and pound methods because of the immense number of tools, jigs, drawings, etc., that would immediately become valueless, as in my opinion it would not be sufficient to simply transpose inch measurements to the metric equivalent.

(See Text on page 524)

TABLE NO. 3—BENCH DATA OF FRENCH TRUCK AND OMNIBUS MOTORS

Bore in m/m D	Stroke in m/m L	Revolutions per Minute W	Horsepower P	Piston Speed in Meters per Second	Mean Piston Pressure in Kg cm2	American Rating in Horsepower
			Four-Cylinder Motors			
145	145	1050	55	5, 1	5, 4	52.12
130	140	900	43			42.
125	140	900	40	4, 2	6, 4	38.65
110	140	860	25, 5	4	4, 9	30.
105	160	1000	32			27.25
100	180	1000	36	6	5, 7	24.50
100	120	1000	22	4	5, 8	24.50
95	130	1100	22			22.50
90	140	1100	26	5, 1	6, 5	20.
90	120	1500	28	6	6	20.
85	130	1200	21, 5	5, 2	6	18.25
84	130	1200	18			18.
			Three-Cylinder Motor			
145	145	1050	40	5, 1	5, 2	39.20
			Two-Cylinder Motors			
145	145	1050	30	5, 1	5, 8	26.15
100	160	1050	15, 5	5, 6	5, 8	12.

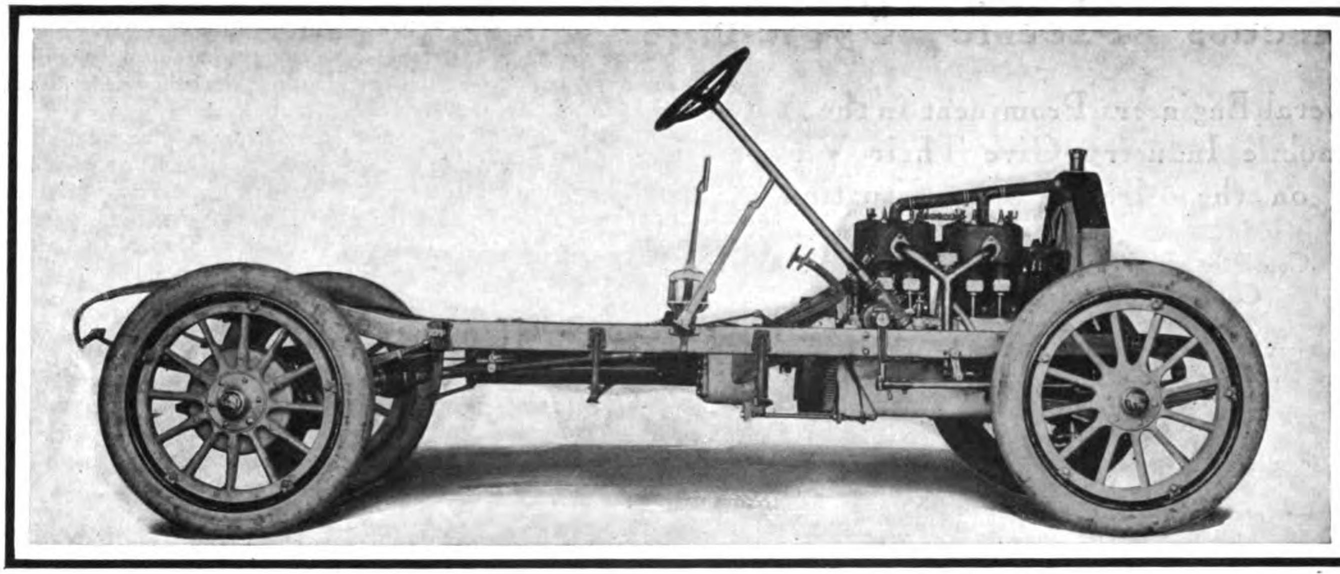


Fig. 1—Stripped chassis of the Haynes car. Note teeth on the flywheel for starting system

Haynes Has Starter

Model 22 for 1913 Has Few Changes, Modification of the Suspension Being Among the Most Important

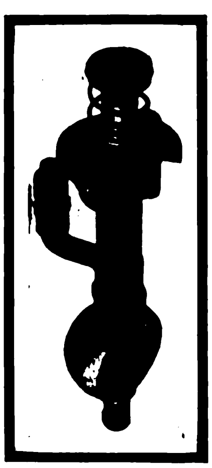


Fig. 2—Part sectional view of the oil pump

FOR the season of 1913 the Haynes Automobile Company, Kokomo, Ind., will put on the market its first car equipped with a self-starter. For a long time the engineering staff has been experimenting with starters and, although it has been known that eventually the Haynes cars would be so equipped, it remained for the model 22 to bring out the system in all its detail. That they have the courage of their convictions is shown by the fact that the car is not equipped with a starting crank. The new car is a continuation of the model 21 with many added refinements of a minor nature. The oiling system has been changed slightly, the oil pump now being located at the top and outside of the crankcase, instead of within it at the bottom. This gives a little better arrangement as regards accessibility. The rear spring suspension is also changed, the modification being the attachment of the spring hanger bracket to the end of the frame, Fig. 11. The three lower spring leaves in the upper set have been continued back of the clip for a distance of 3 1-2 inches to act as a stop by striking on a rubber bumper located at the center of the lower half of the spring. The spring suspension at the front end has also a minor change, the frame end being dropped 2 inches lower than in the model 21.

In the model 22, the motor is of the T-head type. The four cylinders are cast in pairs and are spaced to give a three-bearing crankshaft. The bore of the motor is 4 1-2 inches and the stroke 5 1-2 inches. The cylinders are gray iron castings with open spaces between the lower ends and are designed with a view of distributing the waterjacketing over every part exposed to the heat of the motor. A feature of the waterjackets which is peculiar to Haynes practice, and which is continued in model 22,

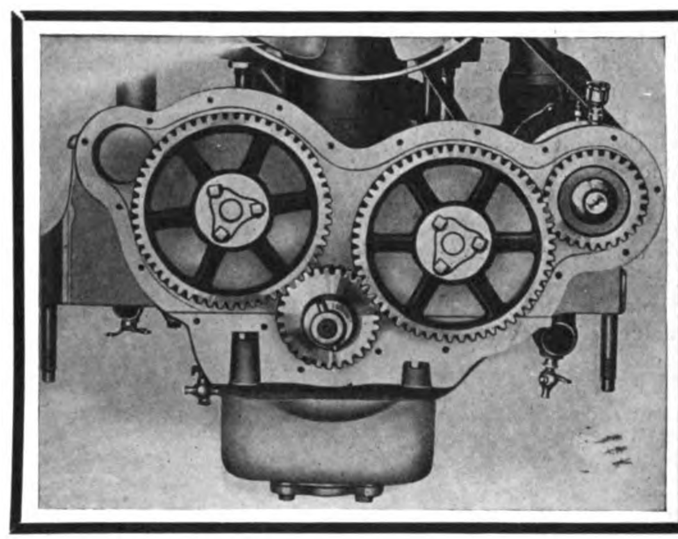


Fig. 3—The timing gear train of the T-head Haynes car for 1913

is that the sections over the cylinders are removable and integral with the cylinder branches of the water manifolds. This renders it possible to clean out the waterjacketing at any time by simply removing the stud bolts which pass through the waterjackets and into bosses on the top of the combustion spaces of the cylinders. This arrangement gives a water circulating space which is unusually free from obstructions, allowing a clear passage of water through the jackets. The jacketing around the valves is particularly noticeable on account of its great sectional area and the fact that the stems are cooled nearly to the head of the valve.

The valves are all of the same diameter, this dimension being 2 1-4 inches. The lift of all the valves is 5-16 inch. The valve action is housed within a cylindrical casing, as may be seen in Fig. 5. A removable cover plate permits of the adjustment of the valves, however, so that wear may be compensated for by virtually lengthening the stem of the valve. The latter adjustment is made by turning the nuts shown in the right view of the power plant, Fig. 5. A feature of the valve action, outside of the large capacity of the waterjackets mentioned above, is the length of the guides. These extend to the point where the curvature of the valve head commences and tend to materially reduce any warping action that the intense heat of combustion would exert on the exposed metal.

The pistons are of the same material as the cylinders, being gray iron castings. They have four 1-4-inch rings, all of which are located above the wristpin. The wristpin passes through the piston, being held in the usual manner by bosses cast in the latter. A difference in the method of supporting the wristpin may be noted, however. That is, instead of preventing the pin from oscillating with the connecting-rod by a stud bolt or a pin through one of the bosses, there is a stud with a nut and lock nut through each piston boss, giving a double assurance against the wristpin working loose and developing trouble. The wristpin is hollow and provides a wide bearing space with ample clearance between the bearing itself and the piston bushings. The vertical plane of the wristpin is offset 1-2 inch from the plane of the crankshaft to secure a maximum of turning effort at the beginning of combustion in the motor cylinder.

The connecting-rods are of I-beam section, the upper bearing being 2 1-4 inches in width and the lower or crankpin bearing 3 inches in length. The dimensions of the main bearings are as follows: Front, 4 1-2 inches; center, 3 inches; rear, 5 inches. The diameter of the crankshaft is 2 inches.

The crankcase is in two parts. The upper part forms the foundation for the cylinders and also carries the four supports by which the motor is held. In view of this, the aluminum casting has been thickened locally to take care of the strains it is called upon to bear. The ribs on this casting are also numerous as it has to sustain the weight and vibrations of the motor besides the strains falling upon the supports when traversing rough roads. The upper halves of the crankshaft bearings are carried in bridges in this casting. The lower half of the crankcase carries the bottom halves of the crankshaft bearings and also the oil reservoir and splash troughs, which will be touched upon later. This part of the crankcase is also of aluminum and is shown in Fig. 4.

The splash system of lubrication is used entirely as the oil is not forced to any bearing. The oil is carried in the crankcase reservoir and is lifted from there by the pump which is shown in Fig. 2. This pump carries the oil to the longitudinal pipe illustrated in Fig. 4, where the entire lubricating system is shown in detail. The pump is a plunger attached directly over the intake valve camshaft and is operated by an eccentric from this shaft. The spring which will be noted in the view of the pump is for the purpose of keeping the plunger seated against the eccentric so that the drive will be positive and there will be no noise. This spring, it will be observed, works on an inner wall of the pump casting and does not touch the plunger so that there is no danger of the latter becoming scratched through the action of the spring. The plunger casing is also protected by this arrangement and the danger of marring the walls of this housing is eliminated so that the pump cannot become leaky due to the scoring of the walls.

Returning to the longitudinal pipe into which the oil is forced after leaving the crankcase, it will be seen that the latter is pierced at four points in its length by circular holes through which the oil is free to pour. These holes are arranged so that there is one below each cylinder and through each hole flows the oil which supplies the particular cylinder beneath which it is located. The bottom part of the crankcase is divided into two parts by a horizontal tray, which is shown in sectional view in Fig. 4. This tray has a wavy contour which forms a set of troughs, one below each cylinder. In each trough there is a standpipe which allows the oil to flow back from the trough to the reservoir beneath the horizontal tray. Each standpipe is located directly beneath the throw of a connecting-rod.

The oil from the longitudinal pipe will fill the trough below each cylinder up to the level of the top of the overflow standpipe. When this point is reached the oil will drop back into the reservoir below and thus automatically keep the oil level constant. There are two scoops on each connecting-rod so arranged that one scoop will pass to either side of the overflow standpipe. As the connecting-rods sweep around, these tubular scoops pass through the oil in the troughs and churn the oil into a spray which is thrown about the entire crankcase and which lubricates the cylinders as well as all the bearings contained in the crankcase. In order that the lubrication of the crankshaft bearings be as positive as they can possibly be made, oil ducts have been cut into the bearing bushings to permit the oil to flow by gravity directly into the bearings. These oil ducts, or passages, are clearly shown in Fig. 4.

The oil returning to the reservoir is cleansed to remove any possible impurities before again being passed through the pump. This is effected by a screen placed around the suction end of the pump. A refinement in the pump itself is the placing of a reservoir in the upper part of the pump which catches the oil and holds it under pressure, thereby giving a constant flow. The oil reservoir is equipped with a float gauge which tells the

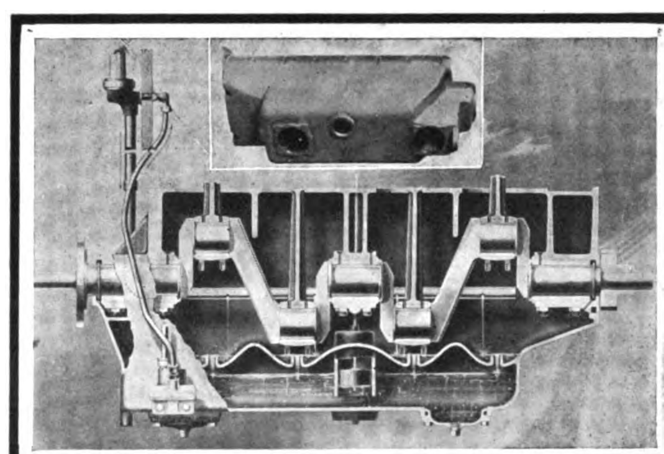


Fig. 4—Two views of the crankcase, showing the oiling system in operation

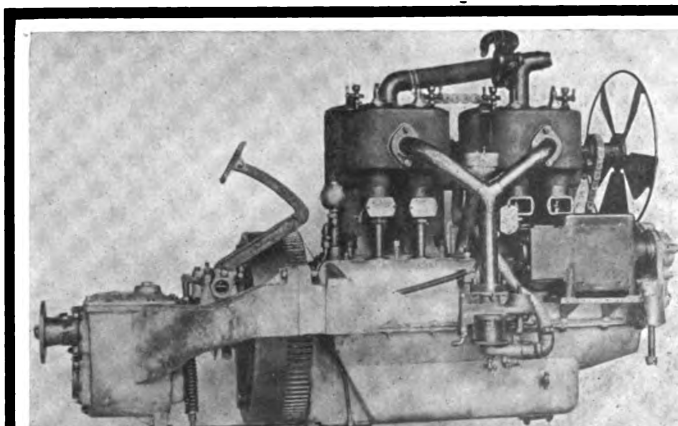


Fig. 5—Right side of motor with valve cover removed.

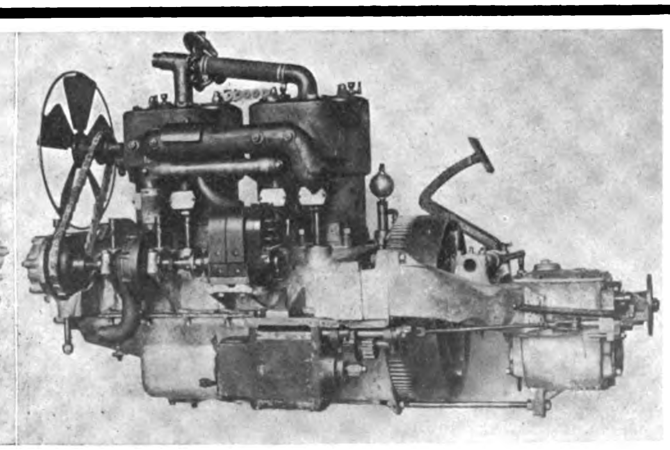


Fig. 6—Left side of motor, showing mounting of starter

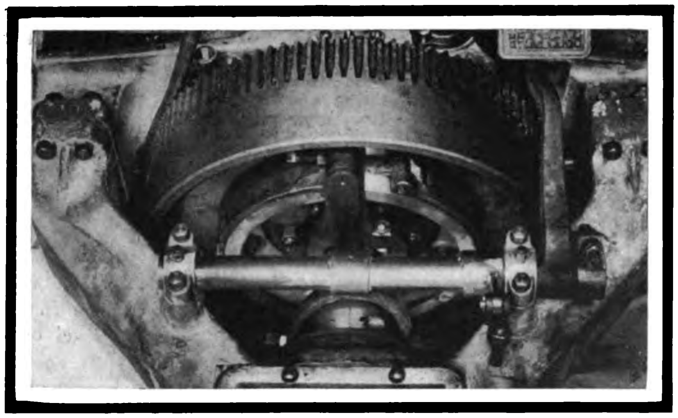


Fig. 7—View of the flywheel operated by the starting motor gears

operator at all times the amount of oil in the crankcase. The gauge consists in a cork float located in the crankcase and held in a cylindrical chamber with a rod extending through the chamber and up through the crankcase to a position between the two cylinder blocks. The gauge may be seen in the views of the oiling system and also in Fig. 5, which shows the right side of the motor.

To prevent the leakage of the oil past the crankshaft at the ends of the crankcase an oil ring is fixed upon the crankshaft turning with it. These rings are located very near to the points on the shaft where it leaves the crankcase and they turn in grooves cut into the crankcase. When the oil works its way out to these rings it is thrown off by centrifugal force and flows back through a small duct to the crankcase. Besides the regular drain plugs in the crankcase through which all the oil may be removed when desired, there are two handholes of large diameter located one at each end of the crankcase. A large plug beneath the float permits the gauge to be taken down when necessary.

The carbureter used on the Haynes model 22 is the 1 3-8-inch Stromberg, model B. This is of the concentric float type without waterjackets. It has separate adjustments for low and high speed and is fitted with a hot-air horn for taking the heated air

Fig. 8—Front view of the Haynes model 22 with full equipment

from around the exhaust pipe and also has a means of closing the air valves to secure a rich mixture for starting. The gasoline feed to the carbureter is by gravity, the tank being located under the front seat with a direct flow to the carbureter.

The ignition system employs the Eisemann dual magneto with storage battery for starting. Only one set of spark-plugs is used. The balance of the electric equipment, which includes the lighting and starting system, is of the highest interest as it marks another step in the self-starter field, where a conservative concern is first going over to the self-starter after having refused to furnish one as regular equipment on its previous cars. The system is entirely a Haynes product, being designed at the Kokomo plant by the Haynes engineers. Two views of it are shown in the accompanying illustrations, Figs. 7 and 9. It consists of three parts, a generator, a motor and a storage battery. The operation of the starter is similar to the usual method by which the electric lighting and starting systems are operated. The electric starting motor is geared to the flywheel and turns this over by power derived from the storage battery. When the motor starts under its own power the starting motor is automatically disengaged. When the speed of the car ap-

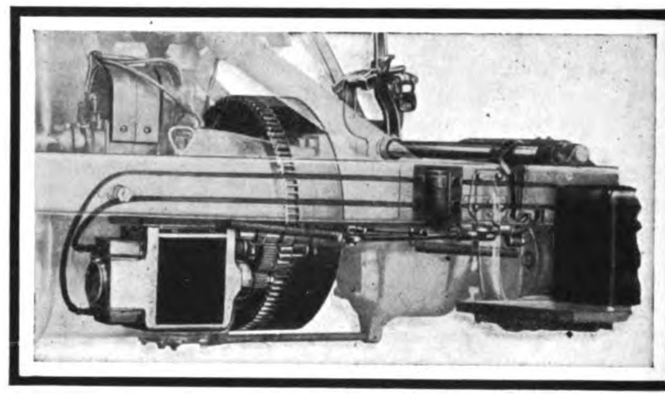


Fig. 9—Arrangement and mounting of the Haynes starting system

proaches 10 miles an hour the 12-volt generator is cut in and the storage battery commences to be recharged. So that the storage battery cannot discharge back through the generator when the car is standing idle, the automatic cut-out breaks the circuit between the generator and the storage battery. This cut-out is located in a compact box carried on the dashboard. The source of the electric lighting current is the same storage battery as is used for starting. The battery has a capacity of 100 ampere-hours. The starting system is operated from the seat of the car by first placing the switch on the battery side and then placing the right foot on the brake pedal. With the heel of the left foot a lever on the left side of the change gear quadrant is depressed and the change gear lever is then brought into the special starting slot and pushed firmly and quickly down as far as it will go. When the motor starts the handle is released and springs back into neutral position again. There is a mixture control located on the dash by means of which the required rich mixture for starting in cold weather can be furnished. The gearshift quadrant is fitted with a lock by means of which the lever is held in neutral so that it is impossible to operate the car without possessing the key.

As in the past, the Haynes clutch is of the contracting band type. This has been one of the features of Haynes construction for 15 years. It consists of a contracting steel band encircling a hardened steel drum. The latter feature is new this year as up to the present time the drum has been of bronze. The drum is bolted to the flywheel of the motor, while the steel band is keyed to the gearset shaft and drives the gears. When the clutch is engaged the band closes tightly about the drum, but while running free there is no drag at any point as the band is expanded about its entire circumference. The band is forced to contract by a wedge-shaped shipperhead which is tapered on one side only. This throws a lever one way to engage and another way to disengage the clutch.

On the 1913 model, the three-speed gearset is supported by aluminum arms on the bottom of the motor crankcase. The gearset quadrant is arranged, however, for an extra notch to take care of the starting system. The shafts of the gearset are mounted on roller bearings throughout. From the gearset, the power is transmitted through a universal joint protected by a metal cover to the propeller shaft. Another universal joint, also protected by a metal cover, is located at the rear end of the propeller shaft and transmits the drive directly to the floating Timken rear axle. The material of the propeller shaft is nickel steel and the ends are square to fit the metal-covered universal joints.

The rear construction is clearly shown in Fig. 11. In this view the axle driveshaft is removed. This can be done simply by removing the hub caps and pulling out the axle. The differential housing can be removed by taking out the bolts in the coverplate. This leaves the entire differential exposed to view and permits of adjustment to compensate for wear. The Timken axle is fully adjustable in this direction as both the drive

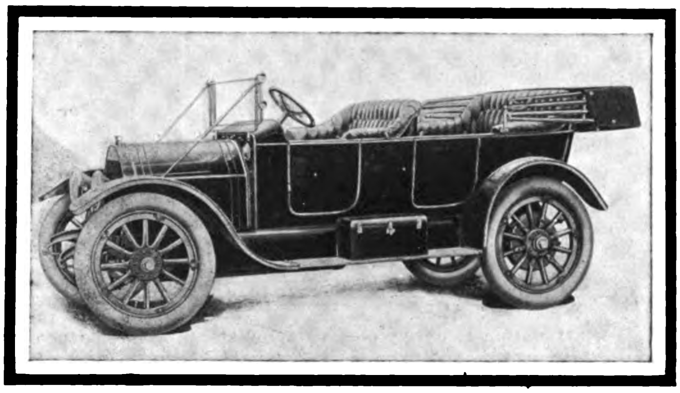


Fig. 10—Side view of the model 22, note long cowl and straight body

pinion and differential wheels can be moved so as to give perfect engagement after either has worn.

The brakes are large and consist of two entirely independent sets. These are shown in Fig. 11. The diameter of the brake drum is 14 inches and the width is 2 1-2 inches. The running set of brakes is of the external contracting type, while the emergency brake set is internal expanding. Extra heavy spiral springs are used in both sets, and which may be seen in the illustration, prevent the brakes from rattling and also eliminate any tendency to drag. The brakes are lined with Raybestos and both sets engage on the same drum, which is located between the two sets. Adjustments on the contracting brake are all external, while those on the internal brake may be made by removing the rear wheel which carries the brake drum attached to it. Other adjustments for wear on the lining or for eliminating lost motion at the levers or through the linkage can be made by means of adjustment points provided on the brake rods. A transverse equalizing bar prevents the brakes from exerting more pressure on one drum than on the other and in this way tends to prevent unequal tire wear to a great extent.

The chassis frame is of pressed steel channel section, having a depth of 4 inches and a flange width of 1 1-2 inches. The frame is toed in at the front a distance of 3 inches to allow of a decrease in the turning radius. The front axle is shown in Fig. 8, which illustrates the entire front of the car. It is of I-beam section and of drop construction. The depth of the axle is 2 inches and it is drop-forged in a single piece, the spring pads being integral. The wheel spindles are 1 5-16 inches in diameter. All bearings are of the Timken roller type.

Wheels are the same both front and rear. They are of the artillery wood type and have twelve spokes. The tires are 36 by 4 1-2 inches front and rear. The springs are semi-elliptic

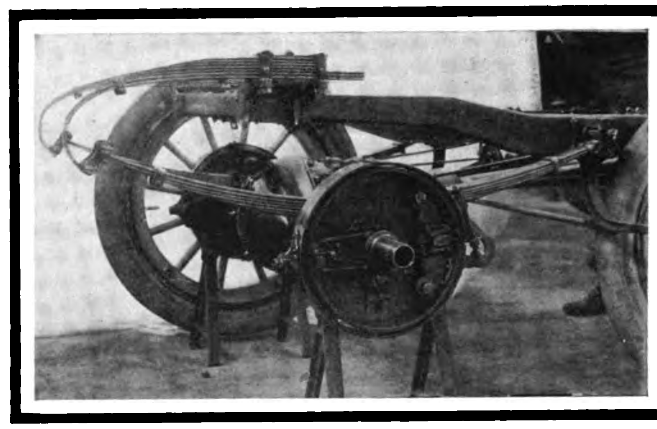


Fig. 11—View of rear system, showing suspension and brakes

in the front and three-quarter elliptic rear. The front springs are 40 inches long and 2 inches in width, while the rear springs are 48 inches long and 2 inches wide. The front springs have seven leaves, while the rear springs have six. The spring shackle bolts are all fitted with grease cups.

A worm and gear type of steering gear is used. There are no modifications in the mechanism since the improved pattern brought out in model 21. The 18-inch steering wheel also introduced in this model is continued.

The body is made throughout of sheet steel. It has foredoors. The front, side and rear views of the body are shown in Figs. 9, 11 and 13, respectively. The features which will be especially noted are the straight-line construction, the long cowl, method of carrying spare tires and the luxurious upholstery. The leather used throughout is black hand buffed. The spring backs to both seats are filled with curled hair. The body is black and is given eighteen coats of paint, all of which are hand rubbed. The metal work is black enamel and nickel.

This year's equipment includes a silk mohair top, top boot, E. & J. electric headlights, electric starter, electric horn, electric cowl light, glass front, three oil lamps, Warner autometer, bumper rail, horn, coat and foot rails, tire tools, full tool equipment and one extra Baker demountable rim.

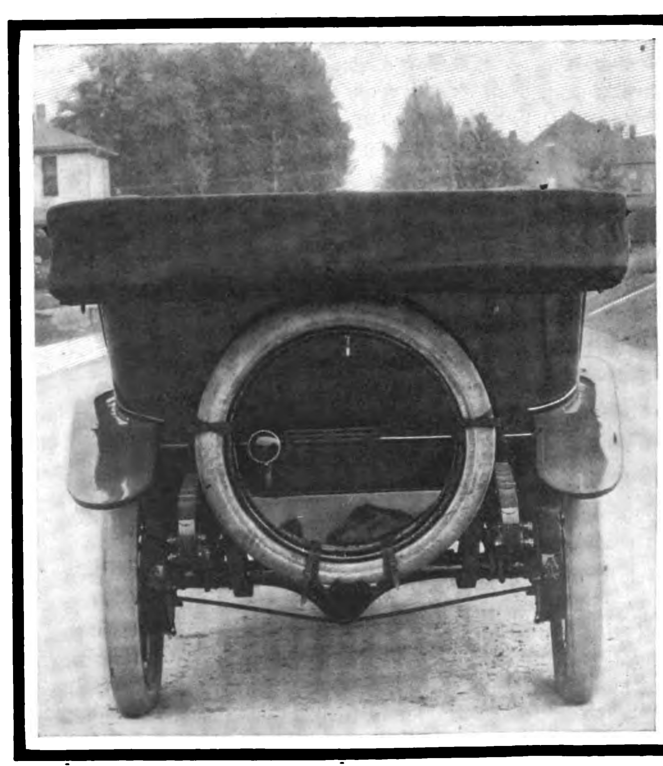


Fig. 12—Rear view of 1913 Haynes, showing brackets for tire

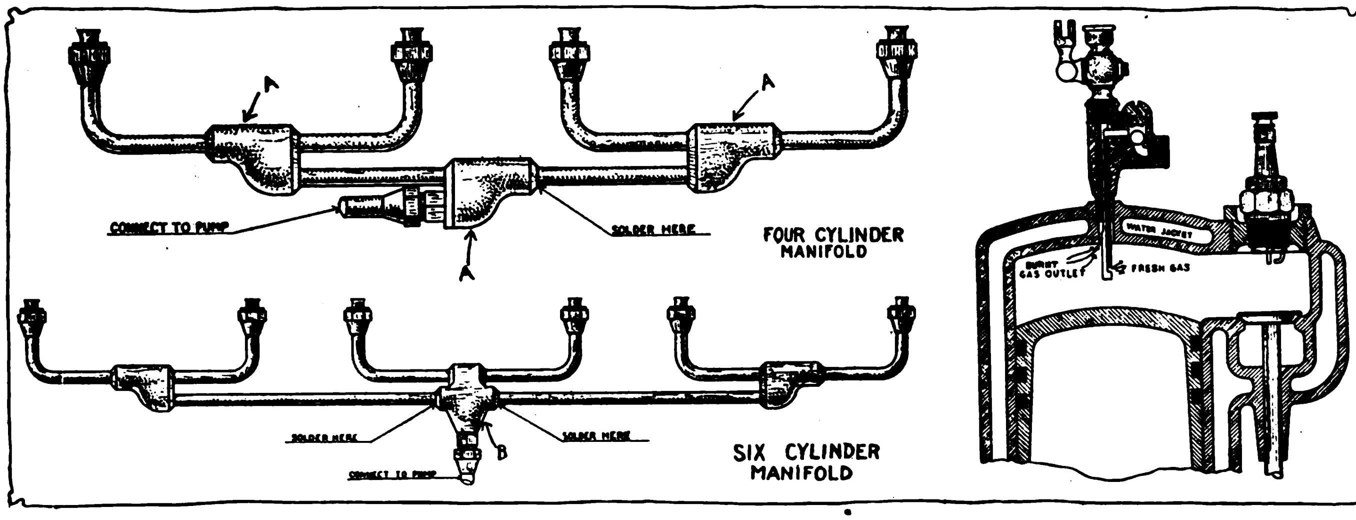


Fig. 1—Starting manifolds used in installing the Shur-Go gasoline apparatus; section through check valve

Shur-Go Starter Employs Gasoline

Consists of Carbureter, Pump and Check Valve—Carbureted Air Injected Into Cylinder Starts Motor

Pump Can Be Used in Connection with Compression Release to Scavenge Cylinders

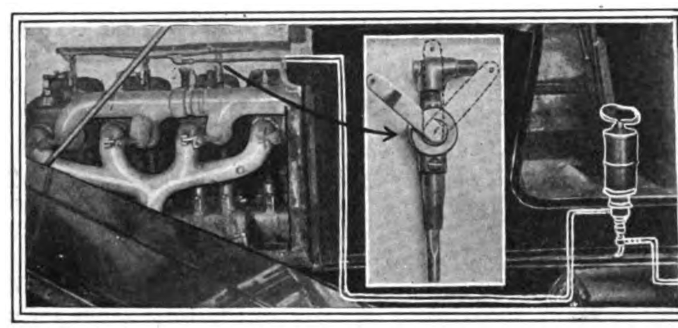


Fig. 2—Installation of device on four-cylinder car with enlargement of cylinder attachment

A STARTER which relies upon carbureted air, the natural fuel of the gasoline motor, for its operation is sure to be of uncommon interest. Such a starter is the Shur-Go, manufactured by the Shur-Go Starter Company of New York City. The installation and the component parts of this starter are shown in the accompanying illustrations. As may be seen, the apparatus consists of a small hand pump located near the driver's seat, a check valve on each cylinder, and the necessary tubing connecting these parts.

The hand pump is connected with the regular gasoline tank, which is located on the suction side of the pump. When the handle of the pump is pulled up a mixture of gasoline and air is drawn up into the barrel of the pump. A downward stroke on the pump forces this mixture into the cylinders, providing the starting charge.

The switch is then turned to the battery position and the charge in the proper cylinder is fired, starting the motor.

Pump Also Scavenges Motor

The pump may also be used as a scavenger before introducing the charge into the cylinder. This is done by opening the compression relief cocks by means of a connecting rod operated from the dash, which permits all the compression cups to be opened at once. The pump is then used to force out the dead gases through the compression relief cocks, which leaves a fresh charge in the cylinder for starting purposes. When there is a quantity of dead gas in the cylinder it will be necessary to force it out in the manner just described before starting. This operation can be done in about 30 seconds by simply opening the compression release, making four or five strokes on the pump, closing the release and then pumping another charge into the cylinders and turning on the switch.

The pipe which leads from the pump to the cylinders runs into a small manifold of special design, depending upon whether the motor is a four or six-cylinder. These two types of manifold are shown in Fig. 1. The connections at A and B must be carefully soldered at the joints so that there is absolutely no leak or the device cannot possibly work. This is a matter entirely of care in the installation, but special emphasis has been laid upon the point by the manufacturers as the device will not operate properly unless a gastight connection is made between all the parts of the manifold.

The combination check valve and compression cock used in connection with the starter is shown in section in Fig. 1 and in an exterior view in Fig. 2. The former shows the different passages for the exit of the burnt gases and the intake of the fresh gas. The ball check which prevents the burnt charge from blowing back along the pipe line to the starter pump is also seen in the sectional view.

The pump is in reality a combination pump and carbureter. The carbureter is located in the base of the pump below the stroke of the plunger. When the plunger of the hand pump is pulled up gasoline is sucked from the tank around a needle valve which is capable of adjustment in the usual manner by turning a handle located beneath the carbureter part of the pump. At the same time, air is drawn in through a separate air valve across the spray of the needle valve and an explosive mixture formed. The carburation is thus effected before the mixture ever enters the pump which sends it to the cylinders. Owing to the agitation of the gas in passing through the pump barrel and along the pipe line the mixture is perfect by the time it is forced into the cylinders.

The air valve in the carbureter may be regulated as well as the needle valve so that the mixture which reaches the cylinders is under control of the operator. The correct mixture once ascertained, however, it will not be necessary to make any changes and lock nuts are provided on both adjustments to hold them permanently in place after they are once set. In installing the device it will be unnecessary to change the factory setting.

Great Britain Has Latest One-Man Top

Rotax Is Opened and Closed by the Driver While He Remains in The Automobile

Simplicity and Practical Design Have Been Combined in Its Constructional Features

AMONG the various devices which have recently been evolved in England with the idea of increasing the comfort of the automobile driver, the Rotax top of the Rotax Motor Accessories Company, 43 Great Eastern street, London, E. C., deserves special mention, as it may be opened and closed by the efforts of a single person without leaving the car.

This object is realized by the peculiar construction of the skeleton of the top, consisting of two series of arms which are attached to the body of the car at four points. In addition to these points of suspension, the front edge of the top is held to the dash by two straps laid through eyes provided thereon.

Operation of the Rotax Top

When closed, the top presents the neat appearance shown in Fig. 1, where all the arms are shown folding upon one another, the material of the top arranging itself between the arms, due to the peculiar method of fastening it to the bows. When the top is to be put up in position, the driver first loosens the straps holding the top down to the body and then takes hold of one of the upper arms, drawing it forward. This results in the position of the top seen in Fig. 2. The end of the longest of the forearms, on each side of the top, is formed with a lateral pin or staple, projecting from the arm. This pin fits into a hook formed by the end of a short, upwardly bent metal arm which is screwed on to the automobile body, directly opposite the fore door. One of these hooks is provided on either side of the car and when the forearms are attached to these hooks, the appearance presented by the top is that seen in Fig. 3. The top is then fully opened by drawing the front forward, which is done when the two tension straps depending from the front top edge are pulled by the driver. As soon as the top is brought into the fully extended position the tension straps are secured to the eyes mentioned above, which are attached to the vertical front board of the cowled dash and in Fig. 4 are concealed by the side lamps.

The downward rear portion of the top is attached to the body by snap locks which pass through metal eyelets attached to the top material. As to the method of attaching the top fabric to the structure or skeleton, this is done by nails along four points of every bow. The bows themselves are of wood, the ends of which are reinforced by steel connections and hinges. All along the edge of the top extends a reinforcing strip of doubly laid fabric and through this are driven the tacks or nails employed to secure the latter to the bows.

The British maker claims that the Rotax top may be opened or closed within a few seconds. While this may be true and naturally present a great advantage over the top which cannot be in or out of position in less than several minutes, there are a few objections to this type. The fact that it is possible to open or close the top from the seat makes it necessary to do without a top cover, which naturally does not improve the appearance of the car. Another doubtful point is whether the average driver will be capable of manipulating the top, on a seven-passenger touring car, without spoiling the upholstery of the front seats. These two points call for improvements of the top, whereby the driver may operate it without getting on the seat, for one thing, while the whole subject of the seat-operated top would receive a considerable advance if the appearance could be brought to be on a par with that of the now conventional type of top which presents a neat and distinguished appearance if it is given suitable attention.

It will depend on whether these little refinements in top construction will be added to the sweeping changes by the makers that the seat-operated top will be more generally introduced in the near future. It stands to reason that every well-to-do automobilist will be ready to pay a slightly higher price to increase the ease of his driver to any appreciable extent, as this course would in turn result in the latter's taking better care of the automobile than if this work is a difficult one.

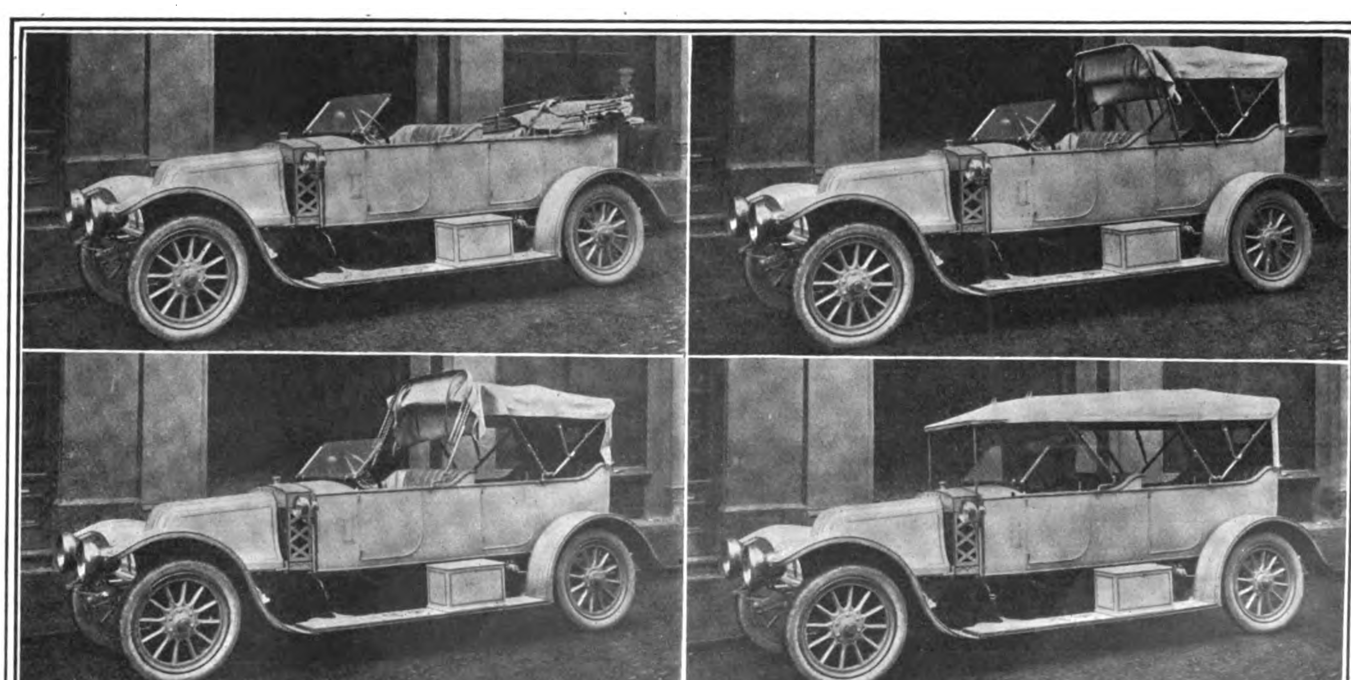


Fig. 1—Showing the Rotax top in closed position on a car
Fig. 2—Top partially pulled up from the closed position
Fig. 3—Top almost in place—front arms hooked onto body
Fig. 4—Showing the top completely opened for service

Record of Shop Materials

Forms Used by Metropolitan Service Departments for Drawing Parts and Materials From Stock Rooms

Methods of Recording Spare Parts Which Are Used in The Repair of Automobiles

THERE is a widely prevalent idea that the automobile repair business is bound to be a loss to anyone engaging in it. This idea is perhaps due to the fact that the repair department, or service department, as it is now most generally called, does not turn out any new products, but merely proposes to put used and injured mechanisms in workable condition again. This sort of business is naturally not as profitable as a factory, where large amounts of materials are handled in the same standardized manner day by day, so that the workmen occupied with the manufacturing operations may do their work rapidly enough for the production of an appreciable profit. In the repair department, however, every job calls for a treatment all its own and individual attention to its requirements, which naturally consumes very much time and a proportionate slice of the profit.

Nevertheless, a considerable degree of economy may be maintained, even in the repair shop, and, as its operations may hardly be standardized, the end cannot be reached except by perfectly utilizing all the time of the workmen and all the material used in the shop. To be in a position of enforcing a course of economy, the service department superintendent must be in the possession of most exact records of the labor and material used in his shop and of their distribution. A number of forms suitable for this work of recording repair shop costs are described and illustrated herewith.

Requisition Is Principal Form

Having taken up keeping records of the time used on repair jobs in the August 29 issue of THE AUTOMOBILE, we will now proceed to review a number of material-recording blanks used by the repair departments conducted in New York by a number of prominent and up-to-date automobile companies.

The present method of recording used material ordinarily embraces the use of a single form, the requisition or stock room order. Few concerns provide for the situation which arises when the stock of the repair department has to be replenished, either on the occasion of an individual repair order or when the clerk notices that his stock of any single article runs low. These concerns use a purchase requisition which is filled in by the clerk and sent to the company's main office, where a purchase order is made out and sent to the dealer, who furnishes the required part to the company.

The requisitions are filled out by the workmen requiring repair parts, are O. K.'d by the foreman and turned over to the stock room clerk, who exchanges them for the part or parts named on them. He also keeps a filing system in which the quantity of every type of part kept in stock is recorded and corrected daily, the parts being piled in bins of consecutive numbers and a card being used for the contents of each bin.

The designs of requisitions used by various companies differ, and, while one would expect that every concern would have a system fitting its needs, this is by no means true. The requisitions used by some large firms are very crude, while, on the other hand, some minor companies, so-called, often use excellent designs, which are adapted for a variety of conditions. It is very natural that the larger the business of a company, the more elaborate should be the design of its requisition. Many large companies, however, consider the repair department an unimportant branch of their business, especially if they have not conducted it for a long time, and this explains the paradoxical condition just outlined.

Simplest Types of Requisitions

Simplicity is one of the features of Form 4, used by the White Company, of New York, whose service department is located at 631 West Fifty-seventh street. It is a thin, white slip, 5½ by 3¾ inches and coming in a book, from which it is detached by tearing a perforation. All slips are numbered consecutively and filled out by the workman who requires material. The data entered on the requisition include the card number, or rather job number, of the repair work which occupies the workman, the date on which the slip is filled out, the nature and quantity of the material required. After filling out the requisition, the workman takes it to the foreman, who O. K.'s it, and then to the stock room clerk, who delivers to him the material which he needs, and files the requisition until the next morning, when he checks it off against the stock file, which he corrects at the same time. After this has been done, the requisitions are sent to the office of the company so that the material used on the various jobs may be charged to the owners of the cars being repaired.

Fully as simple is the requisition design of the Haynes Company's repair shop, 250 West Fifty-fourth street, New York City. This type of requisition, Form 5, is of the same size as

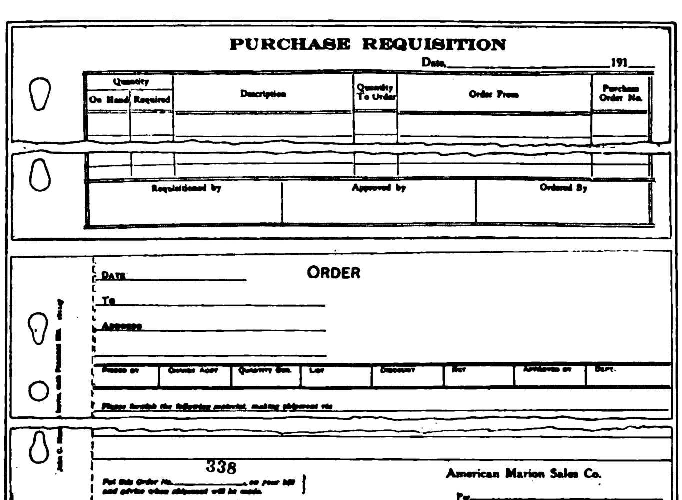


Fig. 1—Purchase requisition of American-Marion Sales Company
Fig. 2—American-Marion Sales Company's purchasing order

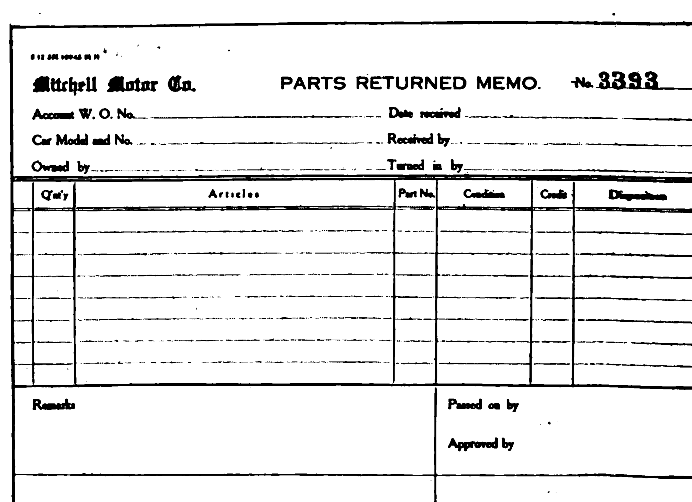
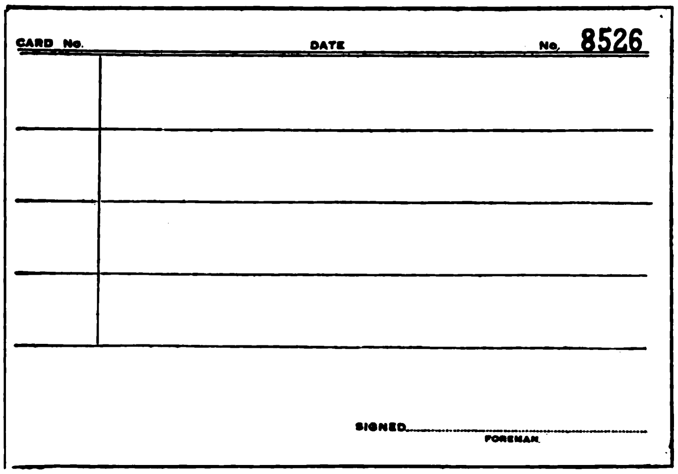
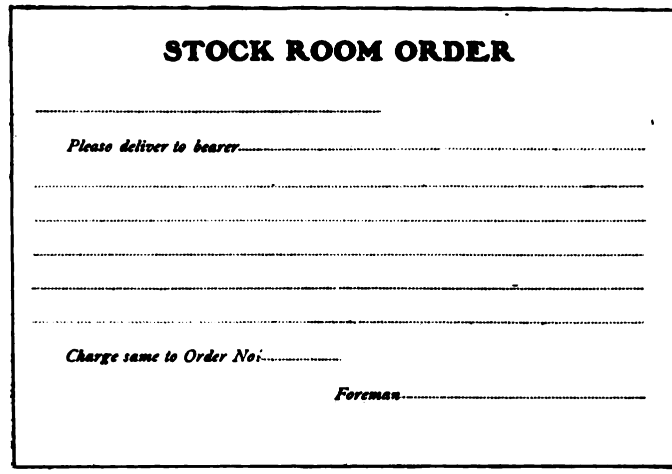


Fig. 3—Mitchell Motor Company's form used when damaged parts replaced under the guarantee are returned to the stock room


CARD No. DATE No. 8526

SIGNED FOREMAN

Fig. 4—Requisition used in the shop of the White Company, illustrating a simple design of this form


STOCK ROOM ORDER

Please deliver to bearer

Charge same to Order No.

Foreman

Fig. 5—Another simple type of requisition, used for drawing parts from the stock of the Haynes Company

Form 4, being white with black printing, and provides a space for the material to be drawn from stock, the job number to which the material should be charged, and a space for the signature of the foreman. The date is put down at the top of the slip. Like Form 4, Form 5 comes in pads, and after its use is completed it goes to the office of the company's bookkeeper, who makes a notation of the material used on the account of the customer. Then the requisition is filed away with other requisitions in the order of their dates.

The degree of differentiation in form design, which progresses with the activity of a company's service department, is shown in the next type of blank, Form 10. This design is a requisition used by the Peerless Motor Car Company of New York, 1758 Broadway, whose service branch comprises four departments: Paint, trimming, body and repair, or machine shop, department, which use three distinct forms. The design of all the forms, however, is identical, and the difference lies only in the colors used by the various shops. Not only does this feature provide variety and a means of easily distinguishing the requisitions used by various departments, but, to make sure that no confusion occurs among the different requisitions of the repair departments, every requisition is made with a carbon copy. These copies are also made on slips of various colors, every set of original and copy requisitions coming in a book, from which they are detachable by a perforation. The forms in each book bear consecutive numbers. The colors used for the requisitions of the various departments are as follows: Paint department, original, light blue; copy, ochre; trimming department, copy and original, pink; machine shop, original, lemon colored; duplicate, light blue. The body department uses the same type of requisition as the trimming department, being under the management of the same department head.

All of these requisitions are 7½ by 5¼ inches and printed in black. Spaces are provided for the entries of the repair order number, the date on which the requisition is filled out, the time when the material is to be delivered to the department requiring it; also the description of the part or material to be drawn from stock, and the quantity.

Duplicate Forms Are Often Used

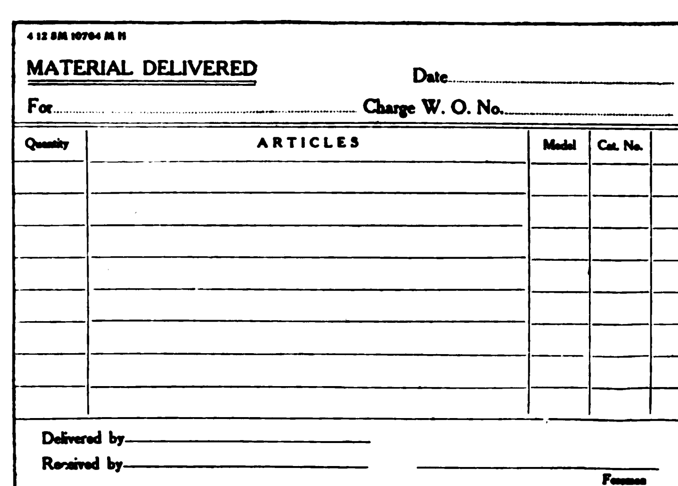
To indicate the cost and the price of parts drawn from stock, two columns marked C.P. and S.P., respectively, are provided on the requisitions. These columns, as well as the one marked Part Number, and in which is entered the number of the bin wherein the part is kept, are filled in by the stock room clerk.

In filling out these requisitions, the workman also enters the model of car for which the part is required, after which he signs his name at the bottom of the form. The latter is then O. K.'d by the foreman and sent to the stock room to be filled. The clerk filling the requisition also signs the order, and after having corrected his stock records from the requisitions which he has filled during the previous day, all these requisitions are sent to the bookkeeper's office. The process of filling the requisitions and delivering the material to the department requiring it is the same in all cases, whether the material is demanded by the paint, trimming, body or machine shop.

A very similar type of blank, Form 8, is used by the New York service department of the Oakland Motor Company. This form comes in books 8⅝ by 5½ inches and is filled out in duplicate, the original going to the stock room, while the carbon copy remains in the book. The original is printed on white paper, while the carbon copy is printed on a light sort of yellow paper. Both forms are numbered consecutively. This form differs in no essential way from Form 10, described above, and contains spaces for the quantity, bin number and nature of the material required by the shop, and two blank columns in which the cost of the material and the price at which it is to be charged are entered. Job number, date and signature of the foreman are also provided for by spaces, while the workman filling out the requisition, and the stock room clerk supplying the material, sign the form at any suitable place.

Parties Concerned Sign Blanks

A smaller type of form, including most of points covered by Forms 8 and 10, is Form 6, used by the Mitchell Motor Company, of New York, 419 West Fifty-fifth street. The blank, Form 6, used by this company, is 6 by 4¼ inches and comes in pads, each white original blank being followed by


MATERIAL DELIVERED Date

For Charge W. O. No.

Quantity	ARTICLES	Model	Cat. No.	

Delivered by

Received by

Foreman

Fig. 6—Requisition blank of the Mitchell Motor Company, showing differentiation of data

MATERIAL USED

Q'n'ty	Articles	C NC	Price	Amount	Q'n'ty	Articles	C NC	Price	Amount

Fig. 7—Blank for recording all the materials use in connection with an individual repair job, used in the service department of the Mitchell Motor Company, New York City

a yellow duplicate blank. These forms are not numbered, and as they are filled out the original is sent to the stock room to be filled, while the carbon copy immediately goes to the office of the service department superintendent. On top of this form the date, the name of the workman ordering the material, and the number of the repair job on which it is to be used are entered. The bulk of the form is devoted to the description of the part or parts to be delivered to the workman, the model of the car for which they are required, the catalog number of the part to be drawn from stock and the quantity of the material. Before this requisition is sent to the stock room it is signed by the foreman, and after being filled by the stock room clerk and the person receiving the material, whether this is the workman himself or a boy. The latter course, that is, the use of a boy for calling on the stock room to obtain the repairs for the workmen, is an economic one applied by this company as well as several other progressives.

Cost and Charge Price Are Noted

The Mitchell Company uses another blank, Form 7. designed to be a record of all the materials used in connection with the repair work done on an individual repair job. Form 7 is 8½ by 11 inches and ruled with two groups of five columns each, which are filled with the name and quantity of the material required, a notation of whether it is to be charged to the car owner or to be carried by the company, a column for the cost and one for the sales price. This form is made out in duplicate, and while the original remains in the office of the superintendent, who fills out this blank, a carbon duplicate thereof is sent to the foreman of the shop. As the workmen doing the repair on the car use material which they receive from the stock room, they save the carbon copies of these requisitions, and, when the repair is finished, deliver them to the foreman. The latter enters all the material used in connection with the repair on the reverse side of the work order, that is, on Form 7, which is then returned to the superintendent with the complete repair job.

Another type of requisition blank, Form 9, is used by the American Marion Sales Company, 1896 Broadway, New York City. This form is made out with a duplicate on plain yellow paper which, however, is stamped with the same number as the original, Form 9. This is 5 by 8 inches and printed on white paper. It comes in book form and the blanks are numbered consecutively. Spaces provided on this blank afford an opportunity of recording the nature and quantity of the material used, the price per unit of same, the total value of the material, the date on which requisition is filled out, the name of the workman making it out and the number of the job for which the material is required. In the lower left hand corner of the blank the condition on which the part is used, that is, charge or gratis, is entered, and another space is reserved for the signature of the person receiving the goods specified on the requisition. The signature of the stock room clerk delivering the material is entered in the lower right hand corner of the blank, and after the material is disbursed and the stock records have been rectified by the clerk, he also signs the space marked Entered, near the upper right hand corner of the blank. There is also a narrow column near the right edge of the blank in which the price named on this form is checked by the superintendent or his assistant, if it is correct.

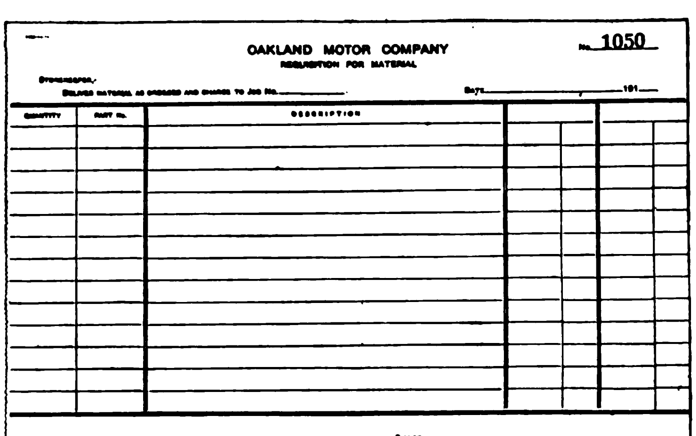

OAKLAND MOTOR COMPANY
No. 1050

Fig. 8—Oakland Motor Company's requisition, a specimen of up-to-date design in material recording blanks

A form used by the Peerless company for the recording of all the material used in connection with a certain repair job is the blank shown as Form 11. This form is made out in duplicate and one copy is sent to the repair shop with the car, while a duplicate remains in the office of the superintendent, who makes out repair order with which the car is brought in.

Forms Used with Parts Returned

This form is 10¾ by 17 inches, printed on yellow paper with red lines and black lettering. As reference to the illustration shows, its design is very elaborate and comprises columns for the recording of the following materials, as they are being used from day to day on the repair work: Regular parts of the automobile, gasoline and oil, waste and other materials which are used on every job, and, finally, whatever special material has to be bought from outside. The date on which these materials are used, the job ticket, giving the repair number of the car, and the total cost of the material and the price which is charged for the same, are all entered in one line. The left half of Form 11 is entirely devoted to this sort of records and affords space for entries on 35 working days. The right half of the form is designed with classification of the various materials used on the car, that is, for the repairs of which parts were drawn from stock. Below this portion, a space is reserved for a record of the time expended in the various departments during the repair of the car, the cost of this labor and the charges made for it. A similar short digest of all the materials used is given below the total labor record and these data serve as a basis for the bill which is sent to the customer.

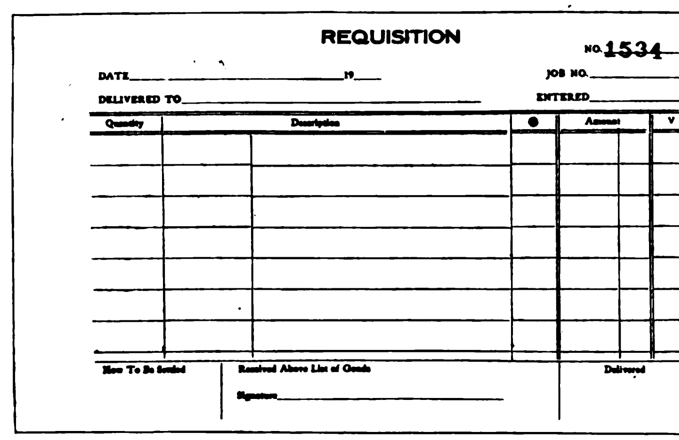
Some companies make special provision for the case of repair parts or other material being out of stock by using a purchase requisition such as Form 1. This requisition is filled out by the stock room clerk when he finds that his supply of a certain part required by the shop has run low. One of the best forms in use for this condition is Form 1. It is 5 by 8 inches, of thin white paper with black print, and is filled out with a duplicate or carbon copy on plain yellow paper. Since the use of a purchase requisition is rather unfrequent, these requisitions are not numbered, but come in pad form and are punched for insertion in a binder, after being filled. On the top of the purchase requisition appears the date on which it is made out and below the same specifications of the material to be purchased for the purpose of replenishing the stock of the service department. These specifications include a description of the part or material to be bought, a statement of the quantity on hand and that required by the shop; of the quantity to be purchased for the purpose of replenishing the stock of the service or parts may be obtained. The requisition, signed in the lower left hand corner by the stock room clerk, is looked over and approved by the department superintendent and is then handed to a member of the company's office, who makes out a purchase order and signs the purchase requisition, at the same time entering the number of the purchase order on the requisition.

After the material specified on this form has been received by the company, the stock room clerk checks it off on his carbon copy, which is then sent to the company's office and filed away with the original purchase requisition to indicate the matter has been settled.

Purchase Requisitions and Orders

The order used by the American-Marion Sales Company in purchasing parts, etc., is shown in Form 2. This form is exactly the same size as the purchase requisition and is punched in the same way, permitting of filing both types of form in one binder. The original of the order is white and the duplicate blank is light red, and both are printed in dark blue. The order provides space for the date on which it is filled out, the name and address of the company which supplies the material or parts to be bought, and the terms of sale.

Ten lines are devoted to the description of the material to be furnished by the dealer to the company's service department. Every set of original and duplicate orders bears consecutive


REQUISITION

NO. 1534

DATE ____ 19__ JOB NO. ____

DELIVERED TO ____ ENTERED ____

Quantity	Description		Amount	√

How To Be Sended | Received Above List of Goods | Signature ____ | Delivered

Fig. 9—American-Marion Sales Company's requisition, designed to give information of every essential detail

numbers on the bottom of the blank. The name of the clerk who signs the order is written in the lower right hand corner of the blank.

There is another case in which material is added to the stock of the company, although only temporarily. This refers to the return of inferior and damaged parts replaced by the service department under the guarantee, and which are afterwards returned to the factory for credit. Such temporary additions to the stock are accompanied by a Parts Returned Memorandum, Form 3. This blank is used by the service department of the Mitchell Company, and is made out in duplicate, one copy remaining in the office of the superintendent, while the other goes with the parts to the stock room, being returned to the superintendent after the damaged parts have been shipped to the factory. The nature and quantity of the material, date of receipt and name of car owner who returned the part, as well as other details are entered on this blank.

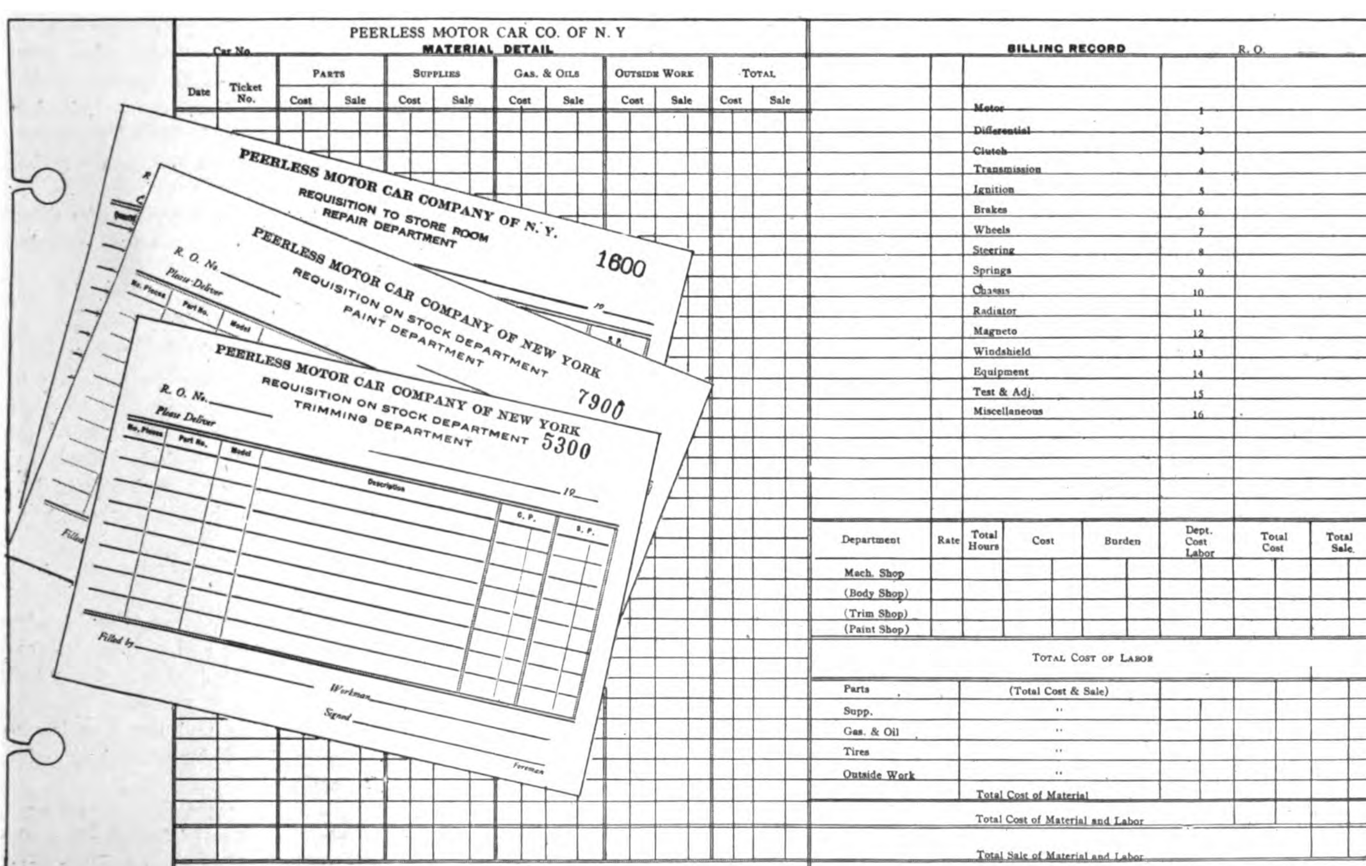


Fig. 10—Requisition blanks used by the various repaid shops of the Peerless Motor Car Company's service department. Fig. 11—Principal record sheet on which all material used on a job is noted in detail and totaled

Carbureter Performance; Differential Lock Explained; Slipping Clutch Cured; Some Questions on Motor Clearance; Points Against Metric System; Welding Job Spoiled Cylinder; Tip on Gear Changing

Points on Holley Carbureter

EDITOR THE AUTOMOBILE:—I am using a Holley carbureter and would like to know a little more about it than I do now. Kindly tell me what economy I should expect with this carbureter and let me know if there have been any *bona-fide* tests made which can be shown by curves or in tabular form. I am using the model H. What is the best method of adjusting this carbureter for use on a touring car?

Williamsbridge, New York City. R. T. CORRY.

—A section through the Holley model H carbureter is shown in Fig. 6. This carbureter as may be seen by the illustration is of the concentric float type which means that the center of the ring float is in the same perpendicular line as the center of the spray nozzle. There is but one adjustment point on the carbureter: this is the knurled needle valve screw which is shown in the sectional view of the carbureter. Start the motor and allow it to run as slowly as it will without stopping. Turn the needle valve to the left until it runs steadily and then see if the motor can be throttled still lower. When the motor idles properly, that is will run at a reasonably slow rate without missing, speed up the motor and turn the needle valve, if necessary, to the right to find if better running will result. When the best success is obtained at high speed try the low speed again to see if the motor still idles as it should. In this manner the adjustments are worked back between high and low speed until the proper mixture is obtained at both. It must be remembered that it is desirable for the sake of economy to make the mixture as lean as possible and still get good results. The mixture is made leaner by turning the needle valve to the right.

Tests have been made on this carbureter by the Holley people and they have given out a set of curves which have been published in the literature of the company and which are reproduced here. Fig. 2 shows a horsepower curve secured with a 4 by 4.5 inch motor when using the Holley carbureter. The feature of this curve is the steady rise up to 1,600 revolutions per minute. Below the horsepower curve in the same illustration is a curve showing the revolutions per minute and pounds of fuel per brake horsepower-hour of a four-cylinder 3.75 by 4-inch motor. The curves shown in Fig. 1 are taken from three separate cars and show the difference in economy at ordinary driving speeds with motors of different size and design. The upper curve is a 3.75 by 4-inch motor of four cylinders, the second a four-cylinder 4 by 4.5-inch motor and the third a 4 by 4.75-inch six-cylinder motor.

Where to Secure State Laws

Editor THE AUTOMOBILE:—Could you tell me where I could get information on the automobile laws of California? What are the requirements to get a chauffeur's license in that state? I am 17 years old.

Cottonwood, Cal. L. SAFLEY.

—Address the Secretary of State at Sacramento, Cal. The requirements to become a chauffeur, as well as full information regarding the state laws, will be furnished for the asking.

Motor Overheats After Welding

Editor THE AUTOMOBILE:—We have a 1910 Garford Studebaker four-cylinder touring car. Recently we had the cylinders welded where they had cracked on account of the water in the jackets freezing last winter. The first time it was welded, the cylinders leaked. The second time proved to be entirely satisfactory. Now, the water overheats. The radiator has been overhauled by competent repairmen and the pump works satisfactorily. The timing of the ignition is also satisfactory. We use a light cylinder oil.

My question is: Would the welding of the cylinders cause the overheating in this particular case, and if not, what would be the possible reason for this trouble?

Pittsburgh, Pa. H. A. M.

—There may be one or more causes for the overheating of the water after the welding job was completed. In the first place there is a possibility that the cylinder still has a crack which is so slight that it does not open up until submitted to the heat of combustion. When this occurs there is a marked tendency for the water to overheat. Another possible cause is that in the reboring the cylinder was cut too close to the water-jacket, leaving the metal thin at that point. The most probable cause, however, and the one to which you may ascribe your trouble is that the jacket is clogged by some metal which has become lodged in the jacket space. This prevents the free circulation of the water, and besides becoming very hot itself, permits the water to become overheated also.

If any of these explanations is the one that fits your case there will be nothing left for you to do but to buy another cylinder casting, which will cost you $62.70.

Questions as to Motor Design

Editor THE AUTOMOBILE:—Kindly answer the following:

1—What compression should a cylinder register with a bore of 5 inches and a stroke of 5 1-2 inches?

2—How much space should there be between the top of the piston and cylinder when the piston is at the highest point?

3—If the valves are 1 13-16 inch in diameter, and open 3-8 of an inch, where should the piston be when the inlet valve begins to open?

4—Where should the piston be when the exhaust opens, in inches, to get the best results?

5—If valve opens 3-8 of an inch, how much space should there be between the valve cap and valve, in inlet and exhaust valves?

6—Is it practical to replace present valve caps with longer or deeper ones, to get more compression?

7—How much space do the Packard 30 and the Simplex 50 have between the top of the piston and cylinder at highest point, and also how much pressure in pounds?

Rye, N. Y. CHESTER E. LOUNSBURY.

—1—For ordinary touring work a pressure of 65 pounds at the top of the compression stroke is very good. For racing this pressure may run up as high as 120 pounds. The first mentioned, however, is very good for all around work.

2—This depends altogether on the cylinder design and how the compression space is arranged. That is, if the motor were T-head it would have less clearance than if the motor had its valves in the head because there would not be so much volume taken up in the valve recesses in the latter model. A clearance of at least 1 inch is left in all designs.

3—The crank should be about 10 degrees on its circle past dead center. This would correspond very closely to 1 3-4 inches measured around the circumference of the flywheel.

4—The exhaust valve would open 40 degrees on the crank circle before lower dead center. This would be about 7 inches circumferentially on the flywheel. The position of the piston at this time is best figured graphically by laying out the crank circle to scale and then drawing in the desired angle of 40 degrees and projecting from the point at which the angle cuts the circumference of the crank circle over to the vertical diameter of the circle or cylinder axis produced. The distance between the point at which this projection cuts the vertical diameter of the crank circle and the intersection of the crank circle and the vertical diameter gives the distance in inches that the piston has to travel before reaching lower dead center.

5—This height is determined by the port area required to get the gases into the cylinder at the proper velocity. A longitudinal vertical section taken through the center of the valve will also pass through the center of the cap and show the area of the port. This must be at least as great as the area of the valve or the gases will be choked on entering the cylinders. It would seem that at least 1 inch clearance should be left here on a rough estimate in order that there will be no choking effect, and a greater clearance than this would be desirable. This clearance is measured above the extreme lift of the valve.

6—The gain in compression secured in this manner would be so slight that it would be innappreciable. It would not be advisable to let the lower part of the valve cap extend into the combustion space as it would not be properly cooled and the chances are that carbon trouble and preignition might develop.

7—The Packard 30 has about 1-inch clearance and a compression pressure of 60 pounds. The Simplex 50 has a clearance of about 1 1-4 inches and a compression pressure of 70 pounds.

Center Steer as a Solution

Editor The Automobile:—The right or left control controversy, now being discussed in your paper has, I am sure, been of interest to thousands of motorists, but like many other motor-car problems, will, in the writer's opinion, never be definitely settled.

The arguments, pro and con, have much to commend both systems and the question would finally resolve itself into a matter of personal choice. The motor cars of the future will, I think, be so designed as to admit of having the steering column on either side, thus giving the purchaser his choice. Another, but less logical, way out of the difficulty, would be to mount the steering column in the center, with room for a passenger on each side. Probably though, this will never be done, at least on pleasure cars, because there would be no room for the steering gear and connections.

East Canaan, Conn. D. C. Canfield.

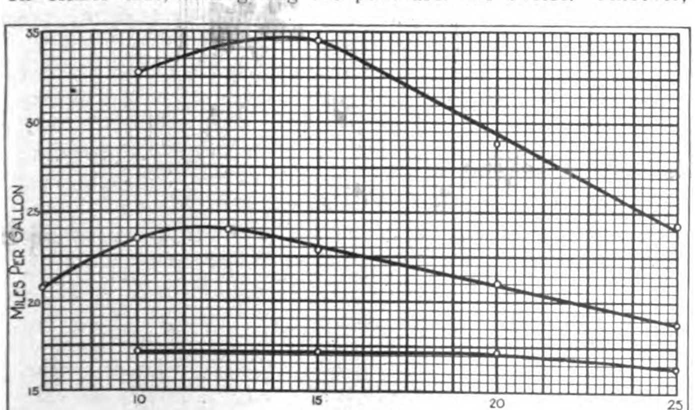


Fig. 1—Economy tests with Holly carbureter. From top to bottom, the first curve was taken on a four-cylinder motor with 3.75-inch bore and 4-inch stroke; the second on a four-cylinder 4 by 4.5-inch motor and the bottom curve from a six-cylinder 4 by 4.75-inch motor

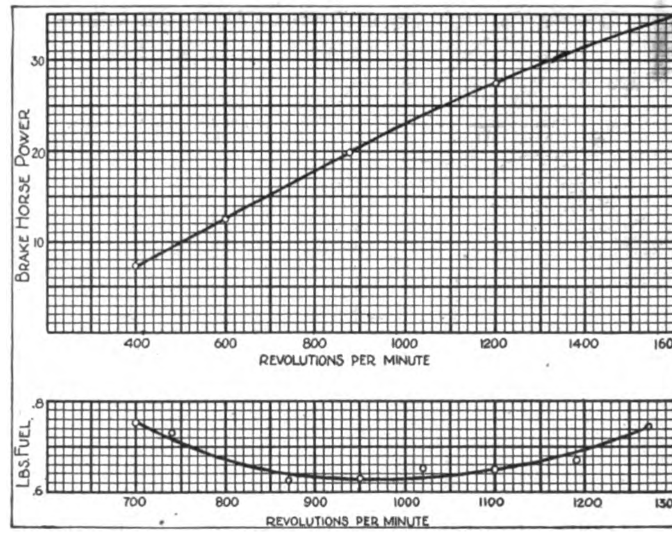


Fig. 2—Brake horsepower curve of a four-cylinder 4 by 4.5-inch motor with Holley carbureter and the fuel consumption per brake horsepower curve of a 3.75 by 4-inch motor with a carbureter of the same make

Wants Tank Under Dash Cowl

Editor The Automobile:—My car carries the gasoline tank under the front seat and consequently the carbureter has had to be located as low as possible to get gravity feed, which, of course, has necessitated a long manifold. As I have difficulty in starting the engine, especially when cold, I am taking the liberty of asking you what effect it would have to place the gasoline tank under the cowl (which in my case is perfectly feasible) and then raise the carbureter so that the manifold would be shortened about 10 inches.

Would such a change be likely to create any unfavorable working conditions?

Lima, O. C. I. Lufkin.

—There would be nothing unfavorable in making the suggested arrangement, provided that you arranged your piping so that you would be in no danger of having trouble with air locks. Keep the piping straight and, above all, do not have any vertical bends, because it is the latter that cause air locks to the greatest extent. The greatest practical difficulty would be in the shortening of the manifold. This can be done by a competent mechanic, however, who would not interfere with the proper flow of gases from the carbureter to the cylinder by changing the general design of the manifold.

Duryea Dislikes Metric System

Editor The Automobile:—Regarding the article on the metric system in The Automobile for August 22 and 29, I wish to state:

The metric system was devised by a political favorite and theorist and not by a practical man. The meter was assumed to be a certain part of the world's circumference, which has never been measured absolutely, and changes as the years go by, most likely; and which measurement is now known to be incorrect. The author would have shown much better sense had he chosen as his meter the standard British yard. He thought, as do many others, that there is merit in the number ten, whereas, as a matter of fact, it is unfortunate that ten was made the base of our system of notation. Twelve, which we daily use when we say a dozen, or sixteen, or twenty-four, corresponding to the letters of the alphabet, would have made a much

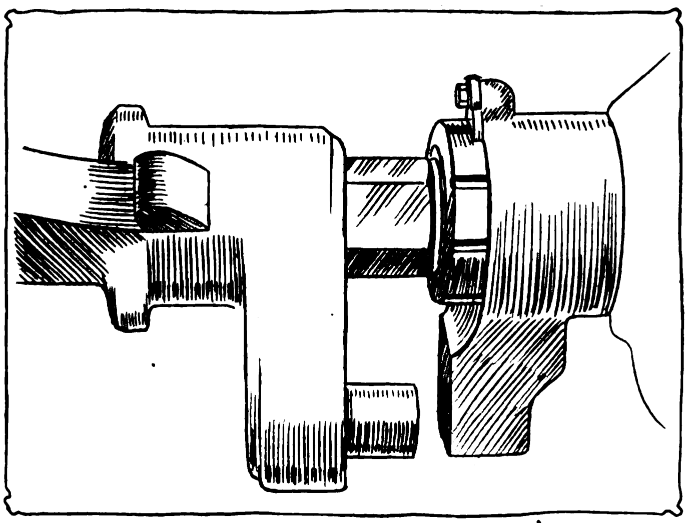


Fig. 3—Differential lock as employed on the Alco truck

better numerical base. See The New Art of Arithmetic in Nystrom's Mechanics.

But, without quarreling with the base, the system is fine for theorists, but less fine for practical people. Most people count by two and divide by two. Quite a number count three at a time, but few can count five at a time. The duodecimal system permits counting by twos, threes, fours, or sixes, and fits many jobs better than a decimal system. So long as things remain rectangular it will be easier to put twelve in a box than ten, and it is foolish to fight physical facts like this.

Further, the French themselves do not make use of the metric system, as one would expect. Where we say a tire is 30 by 3 inches, they say it is 750 by 75 millimeters, which is a mellifluous mouthful, but not so easy of comprehension by average brains nor so handy as our present method. If any one needs a decimal system we can just as well say thirty-thousand-thousandths inches to indicate the diameter of the wheel decimally, and with as good sense as the common metric reading.

The main objection, however, is that the system interferes with prevailing systems which cannot be discarded. If I wish to build an addition to my house I must cut things in feet and inches and must fit gas pipes which are threaded with inch threads. To introduce an additional system alongside of these old ones means a needless confusion. It means a loss of time and money. It offers no commensurate gain. It is much better for us to standardize a few of the present measurements and use them, rather than introduce still another. We have now, for example, three general varieties of screw threads, the V, the United States standard, and the Automobile, each with a large number of sizes, so that no one knows whether a 1-2-inch bolt has a 12, 13, 14 or 20 thread; and other sizes are equally uncertain. If we add to these the metric, we simply go from bad to worse. In the textile trades three lengths, or ells, are used, varying by some inches, and formerly based on the length of the workman's elbow.

If your readers wish to know more of the objections to the metric system I suggest that they read The Metric Fallacy, by Frederick A. Halsey, and The Metric Failure, by Samuel S. Dale, published by the D. Van Nostrand Company, New York City.

Saginaw, Mich. CHARLES E. DURYEA.

Changing Gears Without Noise

Editor THE AUTOMOBILE:—In a recent number of THE AUTOMOBILE a subscriber asks how to shift gears from high to second without grating them. I wore out two gears myself before getting on to the knack of doing it properly. Here is, I think, the only correct way to do it: First, throw out the clutch, then bring the gears to neutral and let in the clutch at the same time. Press the accelerator slightly, speeding up the engine a little, then throw out the clutch and put the gears in second speed. You may need a little practice to do it neatly but when you get the knack of it you will not make a click.

Burlington, Vt. ELMER E. GOVE.

Engine Knocks in Ascending Hill

Editor THE AUTOMOBILE:—Every time I ascend a hill there is a distinct knock in my motor. When running along level ground I never have this trouble and when I shift back into

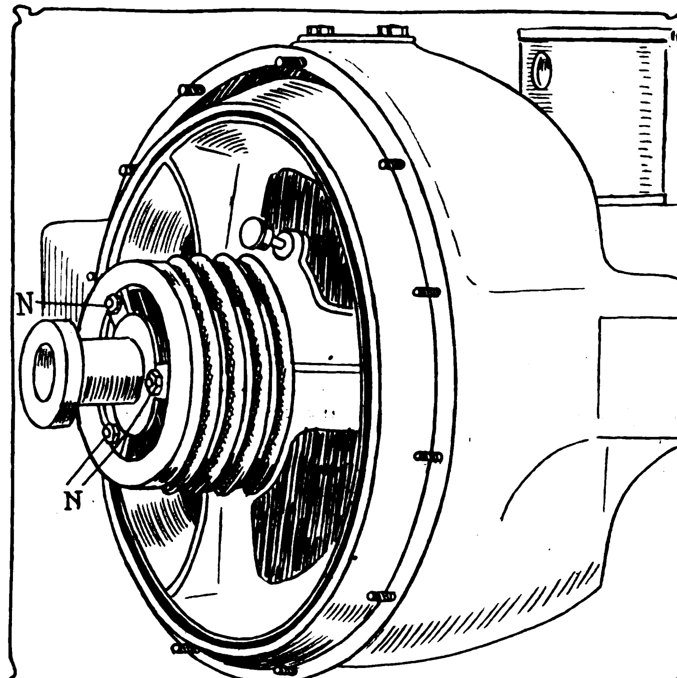


Fig. 4—Adjustment nuts, N, on Cole leather-faced cone clutch

lower gear the trouble also disappears. One hill I could readily take on high if it were not for this.

Chappaqua, N. Y. S. B. STEVENS.

—The trouble is that the spark is not retarded far enough in ascending the hill. When the motor is turning over slowly the spark occurs sooner than it should and causes the knock. Turn the timer back further on its axis in order that the spark can be made to occur earlier.

Five-Cylinder Motor Discussed

Editor THE AUTOMOBILE:—I am interested to know the whys and wherefores in regard to a five-cylinder, four-cycle motor, the cranks set at 72 degrees to fire in rotation.

I think there must be some reason why such a motor has not been brought out, as far as I have been able to learn but a very few of this design have been produced. The Adams-Farwell company makes a rotary of five cylinders and a reciprocating motor with five cylinders has been made, so I have been told, that gave the best of satisfaction, reducing vibration to the minimum. There would be a uniform torque as the power stroke of one cylinder would not be completed before the next took hold. If there are disadvantages please lay them bare, as I wish to get at the real facts in the case.

Waterbury, Conn. H. D. B.

—There is not much data at hand on the five-cylinder motor, although one was made some time ago and was said to be very successful. The opinion of the designer of that motor, Mr. H. Dock, is as follows:

"I believe the only reason why this type of engine is not built is because its merits have not been investigated, for, in my judgment, which the performance of a motor of this type will bear out, there is nothing in the line that will equal them unless it be a seven cylinder.

"In one or two instances wherein I tried to interest automobile manufacturers in this engine I was met with the argument 'that the public were satisfied with the four or six, therefore, why the use of improving?'

"In a five-cylinder engine there is nothing to invent, but I did, I believe, build the first one of its class in Philadelphia in 1901. Since then in connection with the concern which had the contract I built the government field searchlight engine and others and wherever they have been put in commission they give satisfaction.

"For automobile use they are much superior to the four or six as the shaft is in constant torque, one cylinder being always in pressure, and the machines in which I have ridden with the five cylinders are the best hill-climbers of any.

"As to balancing, this class of engine was a surprise, for while I was building the first one many interested engineers saw it and the general opinion of all was that it would be so out of balance as to be worthless.

"But, as a matter of fact, it is the quietest, smoothest engine

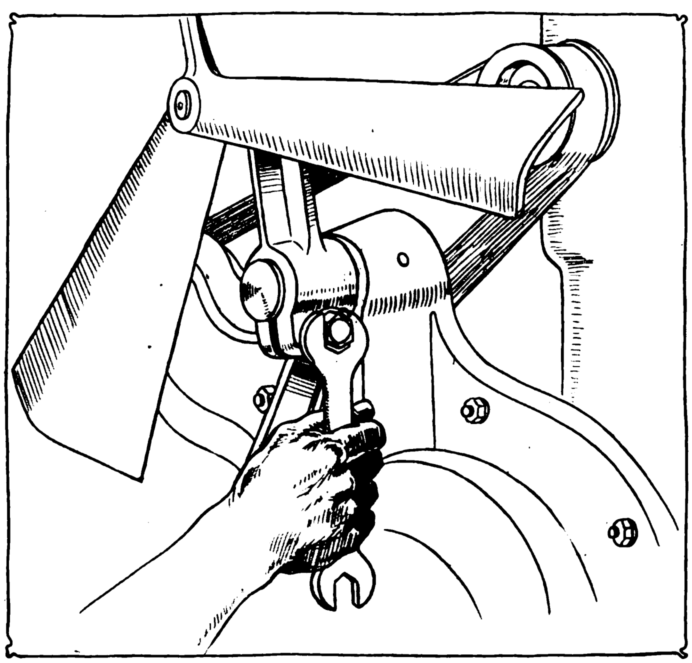


Fig. 5—Nut loosened to adjust tension on Cole fan belt

I have found and more flexible by far than its four- or six-cylinder brother.

"Finally it is my belief that whenever some enterprising manufacturers of automobiles takes up the five cylinder he will have a walkover and command the field, given that his production is always first class."

This is an interesting topic and one which could be further discussed to advantage. There is a lack of data as regards actual performances on the road and Mr. Dock does not state what cars were ever manufactured that used his motor. THE AUTOMOBILE has no record of any such.

Uses of a Differential Lock

Editor THE AUTOMOBILE:—In reading the story on the army maneuvers up in Connecticut recently I noticed the remark that some device was necessary to lock the differential of a truck so that the traction would be exerted on both wheels instead of the wheel that happend to be lodged in some slippery hole. Of what does such a device consist and what does it look like?

New Rochelle, N. Y. LIEUTENANT.

—The accompanying illustration, Fig. 3, shows the form of this device as used on the Alco trucks. The large dog slides along the hexagonal shaft shown in the illustration until the projection on the end slides into the hole opposite it. The two parts then turn as one. This locking device is placed in the rear system at a point where its engagement will cause the two driving axles to rotate as one. It is useful at any point where the action is apt to fall more heavily on one wheel than on another.

Cure of Slipping Cone Clutch

Editor THE AUTOMOBILE:—The clutch on my Cole car slips. I have been driving the car for some time in this condition but I am afraid that if I continue to do so the leather will become glazed. How do you go about preventing the slip?

(2) Will you also kindly tell me what to do to prevent the belt on my fan from slipping when I am traveling at slow speed?

White Plains, N. Y. SUBSCRIBER.

—There are three nuts on the clutch which you will be readily able to locate after a study of Fig. 4. The nuts are labeled N in the illustration and should be turned to the right four or five turns to increase the tension on the clutch spring to the desired point. This will end the trouble with the clutch unless it be that the leather is soaked with oil, a situation, however, which is not probable in the Cole car. If you find oil on the surface of the leather, block the clutch out of engagement by placing a prop against the pedal and against the seats or some other point in the car and wash off the leather with gasoline. When this is dry apply a thin coating of neat's foot oil.

(2) To adjust the fan bracket so that the belt will not slip at low speeds, it is necessary to loosen the nut shown in Fig. 5. Swing the bracket up so as to increase the tension on the belt and then tighten the nut again.

Credit to Reference Work

THE AUTOMOBILE takes great pleasure in acknowledging its indebtedness to "Our Weights and Measures," by H. J. Chaney, for the assistance rendered in compiling the recent series of articles on the English and metric systems of measurements.

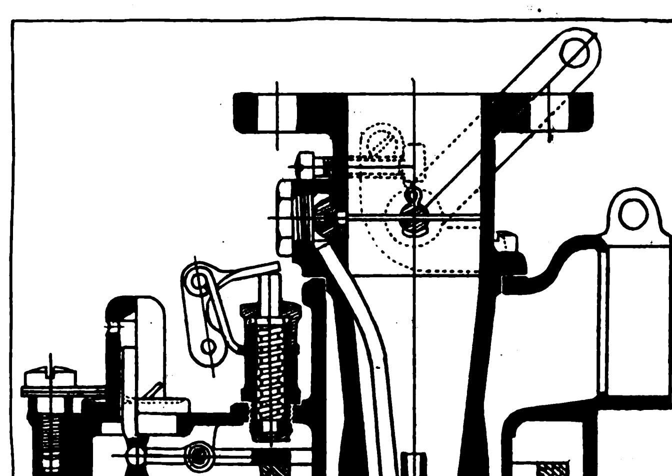
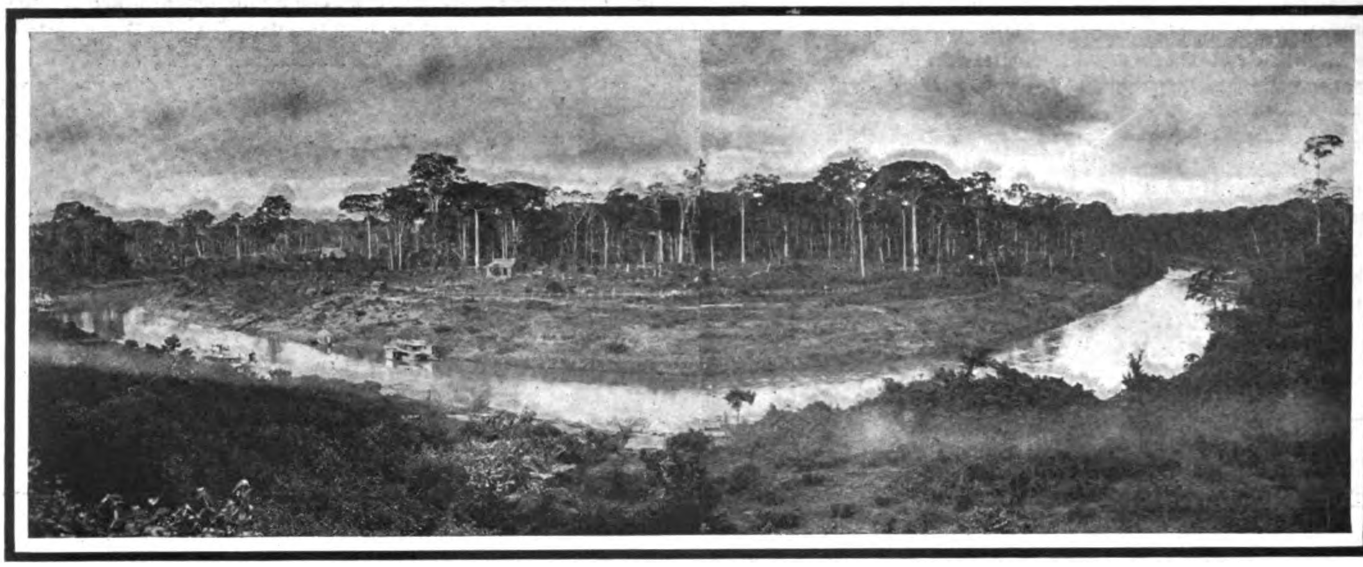


Fig. 6—Section of Holley carbureter showing single adjustment point



The Acre Valley viewed from Cobija on the frontier of Bolivia in the heart of the rubber country

Brazil Plans Big Increase In Rubber Yield

New Law Provides Remissions of Duties to Encourage Industry, Bonuses for Planting and Subventions for Factories Estimated at $15,000,000 a Year in Effort to Bring Annual Crop to 60,000 Long Tons

INDIGENOUS rubber produced in the great Amazon Valley will reach a total of approximately 40,000 long tons during 1912, according to the opinion of experts, delegates and officials assigned by the Brazilian government to be present at the forthcoming international rubber exposition which opens at the Grand Central Palace Monday, September 23.

Already several of the Brazilian leaders have arrived in New York City and are busy with the installation of the exhibits and they are enthusiastic with regard to the prospects for the years to come.

The reason for their enthusiasm is that the federal government of Brazil has passed a series of laws this year aimed to increase the production of rubber along scientific lines. They can foresee a time in the near future when the total production will be from 25 to 40 per cent. higher than it is at present and a valuable improvement in quality of the gum raised.

Statute Is Wide in Its Terms

The new law, decree 2,543A, was approved January 5 and the regulations to put it into effect April 17. The law exempts all utensils and material intended to be used in the culture of seringueira, castilloa or caucho, manicoba and mangabeira from customs and petty administrative charges. Secondly, it provides for bonuses for planting or replanting fields and orchards of the trees mentioned. For planting 12 hectares the planter may claim 2,500 milreis, or about $800. A hectare is, roughly speaking, 2 1-2 acres. The bonus of $800 is for planting seringueira, but the other varieties also entitle him to lesser sums. These bonuses are due 1 year before the first harvest. The size of the bonus may be increased 5 per cent. if the planter shows that he has raised food plants on the cultivated portion of his plantation.

The government will have sixteen experimental stations.

For the establishment of the first refinery for the seringa, which shall reduce the various qualities to one uniform grade for exportation, the government offers as much as $128,000 in the form of a bonus. In order to be eligible the factory must invest at least four times the value of the bonus.

Immigrant inns, hospitals, and small agricultural colonies are specified and promised by the government and various narrow-gauge railroads to tap the rubber country, improved waterways and betterments in transportation otherwise are encouraged by relaxation of customs duties on materials and by subventions.

Bonuses for Food Production

In order to encourage planters to produce food stuffs, bonuses are offered in the way of payments and remission of duties on materials. These subventions cover not only grain, vegetables and pasturage, but also meat and lacteal products, fish and other food elements for man and beast.

Once in 3 years the government will promote an exhibition at Rio de Janeiro embracing the rubber industry at which large prizes will be offered for improvements in cultivation and production methods.

Reduction of the export duties levied by the states of Amazonas, Parana and Matto Grosso by agreement between the federal government and those of the states is authorized and complete exemption of seringa rubber for 25 years is outlined. This provision depends upon affirmation of the three states mentioned.

Estimating the results of this new law in a financial sense as it affects the government, involves two financial factors. First, the loss of revenue due to the relaxation of customs duties, and, second, the payment of the direct bonuses authorized. Both factors will depend upon the extent of the increase in production and preparation for such production. The government of Brazil has authorized the opening of a bureau of credits to have jurisdiction over the project and under the law an annual accounting must be made to the legislative branch of the government.

The regulations of April 17 cover the provisions of the foregoing law under eight headings as outlined in the original decree.

Under the heading covering bonuses for new cultivation, it is provided that 250 trees per hectare of seringueira or castilloa, or about 100 trees to the acre, is the minimum for which bonuses will be paid. With regard to manicoba and mangabeira 400 trees per hectare are specified.

A special bonus of $150,000 in specie is offered for factories wherein the native rubber may be turned into articles of commerce such as at present form a material item of importation.

The immigrant inns are to be established at Belem, Manaos and in the Acre and will be large enough to accommodate 3,500 persons and will be operated under governmental auspices.

In a word, the law contemplates increasing the production of Brazilian rubber and is by far the greatest bit of paternalistic legislation that ever found its way into the statute books of a nation.

In case any considerable amount of territory is brought under cultivation by reason of the law, and if the manufacturers and shippers and producers are stimulated to build the factories, railroads and other elements of the problem, it is conceivable that the remissions, subventions and bonuses may reach $15,000,000 a year.

In case such a result is accomplished, it is estimated that the production of crude rubber in Brazil alone will approximate 60,000 long tons, while the agricultural wealth will increase by at least $50,000,000 annually, entirely aside from rubber.

The Amazon valley covers all the land drained by the Amazon River and its tributaries. This includes practically all the rubber country of Brazil and Bolivia and much of Peru and the states lying along the northeast coast of South America. But it does not include territory outside the watershed of the Amazon.

The chief branches of the Amazon are the Tocantins, Xingu. Madeira, Negro, and there are probably twenty lesser streams which drain territories little known at present. Most of the country is a primeval jungle, only the most superficial effort at trade exploitation having been made to bring it into commercial bearing.

Contractors Profit Largely

For one reason, the supply of rubber from the jungles that are in communication with the world has proved sufficient to take all the attention of those engaged in the work so far. Difficulties of transportation are the main causes for the lack of rapid extension of the explored field.

The most widely known grade of rubber produced in the Amazon valley is designated as up-river fine Para. This grade comes to commercial attention in the shape of elongated balls weighing from 60 to 120 pounds and even more or less than those figures, depending upon the conditions under which it was smoked. The work is done by the men who gather the latex from the forests where the Hevea Brasiliensis grows.

These men are recruited from among the Indian natives, cross-breeds and variously mixed classes, only a small percentage of the seringueiros, or rubber gatherers, being of pure or approximately pure white blood.

They are installed in semi-permanent camps and each is assigned to a certain route covering about 100 trees, which may be scattered for a mile or more. Generally each man has at least two routes to cover on alternate days or less frequently.

The regular process is to start at dawn, armed with a small tapping axe such as is shown in the initial illustration herewith, and several hundred small tin cups. The seringueiro covers in succession each of the trees in his route for the day, hacking them in promising spots and attaching a cup below each of the wounds inflicted on the bark of the tree.

By mid-forenoon he can finish such work on the average route and then follows the collection of the latex. The gatherer goes first to the tree he tapped earliest and thence proceeds throughout the route. The latex is collected in tin vessels, as a rule, such as 5-gallon oil cans.

How the Rubber is Collected

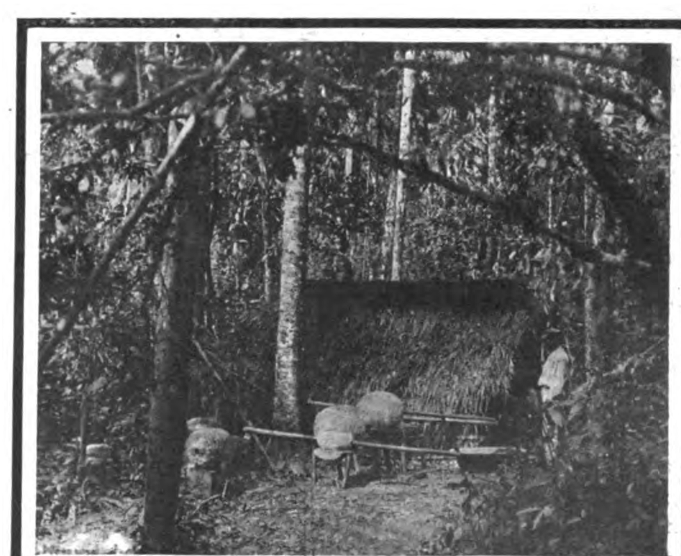
Having collected the rubber milk he returns to camp and proceeds to smoke his store of juice by building a fire and burning in it the nuts of the urucuri palm, which produces a rich, oily smoke. In this smoke the seringueiro holds a wooden paddle which has been dipped in the latex. As each layer dries, more latex is added until a great ball is produced. Having smoked his rubber, the seringueiro has nothing to do until tomorrow.

The next day he works his alternate route and continues thus until Saturday.

While much of the labor is handled according to the plan outlined above, there is another plan that was formerly very popular and which still obtains to a large extent. This is the contract system by which the producer credits the seringueiro with about half the market price of the rubber he brings into the producer's warehouse and will take all he can collect, providing the seringueiro agrees to buy his supplies at the company store. The contractor does not aim to make much actual profit on the rubber, but it has been shown that the bulk of his profits come from the sale of supplies to the workman.

Under this plan, the seringueiro reports at the company warehouse on Saturday with his week's production. He may have as much as 300 pounds of first grade rubber, but the gen-

Settlement near Monte Mo., showing house used by rubber workers



Hut of a seringueiro where smoking and collecting keep him busy

Specimen of hevea over 16 feet in circumference

eral run is much less than that amount. Ordinarily a man can collect from 10 pounds to 60 pounds of latex in a day and the average yield of rubber is only from one-third to one-half of the volume of the latex. On an average probably 25 pounds would be conservative. This would make the average weekly production per man range from 50 to 75 pounds.

After being credited with, say, $30, or its equivalent, he buys his supplies for the next week at good round figures and goes back to his work.

The season is from May to December, during the low stage of the Amazon and its tributaries. During the other months tapping is discontinued.

The methods used in the collection of rubber are commensurate with the class of labor employed. The supply of hevea trees is much greater than has been supposed and the utmost lavishness has been used in tapping those under production. As a general thing, the method used in tapping is simply for the seringueiro to whack his hatchet into the tree wherever there appears to be a promising bit of bark. Some of them wipe off the surface to remove moss and lichens before tapping, but the rule is to tap hard and often and wherever convenient.

In some of the estates an entirely different method is in vogue. There, the workmen use the most advanced procedure and the tapping is done by fishbone, excission and incision methods, using tools of the highest efficiency. The difference in yield is materially in favor of the latter system. This is counterbalanced to some extent by the time saved owing to the less detailed care required under the former method of collection.

But whatever the method used in producing and collection, the next step is to market the product. The crude rubber is inspected at the first warehouse. Sometimes the balls are cut open to prove their integrity. This procedure was forced upon the contractors after some of them had credited up good round sums for the rubber turned in by certain seringueiros only to find that it contained a material percentage of sand, earth, hardwood and even small animals and vegetation. These extraneous substances added to the credited weight, but did not bring in any revenue to the contractor because the ultimate consumer always had to be shown that he was getting rubber according to grade and a 7-pound rock in a ball sold as pure up-river fine Para was never paid for at rubber prices.

Having satisfied himself that he was crediting up to the seringueiros only what was due, the contractor proceeds to ship his rubber down the river to Manaos or Para (Belem). If the territory in which he is engaged is located, for instance, on one of the branches of the Madeira River or equally remote place, the first stage may be by raft or flatboat to the first of the numerous falls and rapids to be found in the upper reaches of all Brazilian streams. Sometimes the rubber is portaged around the falls and reshipped on other rafts and flatboats to the next stage. When the navigable portion of the stream is reached, a transfer is made to one of the small flat-bottomed steamers and the rest of the long journey is accomplished in that manner.

Sea-going vessels reach Manaos and Para is a regular seaport for ships of almost any size.

Rubber goes from the Brazilian ports all over the world, but the bulk of it finds its way to the United States, largely by way of England. The reason for the roundabout route is that there is a lack of direct transportation facilities between Para and New York.

Advances in the old systems of coagulation met with little favor in Brazil until recently, although much ingenuity and money were spent in attempting to introduce progressive ideas. Heat coagulation without smoking is now attracting some attention, while various mechanical devices to apply the smoke by other than the wasteful methods now in use are being tried out. Chemical coagulation is a subject which is now centering the eyes of scientific Brazil and some other countries upon the production of rubber.

At the forthcoming show in New York a special booth will be devoted to the manufacture of rubber according to various processes. The latex will be taken as it came from the trees and will be subjected to all the manufacturing processes in common use and to the experimental practice of the chemists that may come into use at a future date.

Under present conditions it is necessary to macerate and

Castilloa trees close to seringueiro's quarters reduce even the best grades of Para to a fine pulp and then to wash the pulp until it has been divested of all grit and foreign substances. This is a preliminary step toward manufacture and the rubber loses approximately 20 per cent. by weight of its original volume in washing.

The whole process of washing might be obviated if the rubber shipped as crude contained none of the impurities that are removed by washing. In the plantation type of crude this end has received more attention than it has in Brazil. The production of plantations therefore more nearly represents a net yield than does Para.

Special attention will be paid to this phase of the question at the show. It is estimated that the introduction of scientific methods in coagulation will add not only to the quality and value of the indigenous rubber, but will actually result in a greater tonnage through the saving of what now goes to waste during the process of smoking.

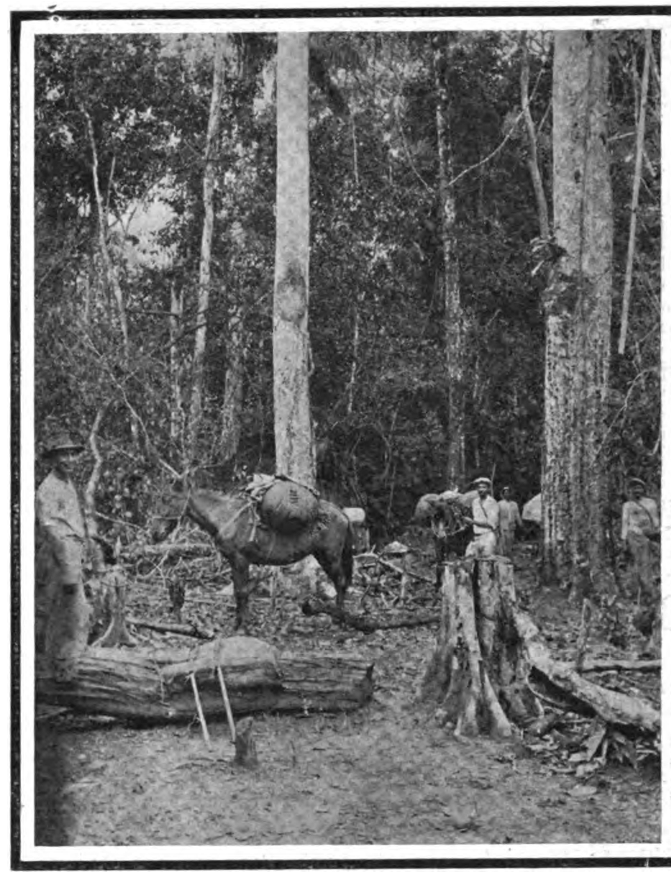
Dr. Eugenio Dahne, representative of the agricultural department of the Brazilian national government to the United States, denied that the new law passed by his government was to be the basis of another valorization scheme. In discussing this phase of the matter Dr. Dahne said:

"Brazil is not trying to valorize rubber. It is seeking to increase production by remitting duties, paying bonuses for planting, so that the yield may be increased under scientific conditions; paying rewards to planters who raise the necessities of life for their employees and others, much of which must be imported at present; by subventions and bonuses to manufacturers and railroad companies and steamer lines.

"It is not a valorization scheme—emphatically not."

According to Henry C. Pearson, a leader in the rubber industry of the world, the existence of speculation in crude rubber is both affirmed and denied by those interested. In the Amazon country when rubber is low in price in the markets of the world, the producers claim that speculators are at work and, on the other hand, the traders, particularly the consumers, claim that the price level is the result of the operation of the law of supply and demand.

When prices are high the rubber producers lay it to supply and demand, while the consumers complain of manipulation. Thus showing that both branches of the rubber industry are moved by exactly the same arguments as apply in all other lines.



One method of shipping rubber to navigable waterways

Castilloa trees felled in the forest are easy tapping

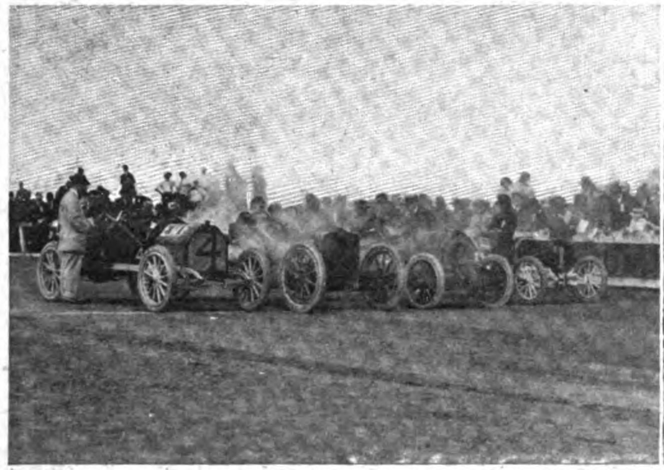
Mr. Pearson says that the whole business is speculative. There is no absolute standard as to grade. The crop yield of even a single country is exceedingly difficult to forecast. The consumers can rarely say what amount of rubber will be required in any given industry for a year ahead. The rate of exchange is also an element of uncertainty as it varies within certain limits almost day by day.

The practice of buying for future delivery is followed pretty generally by consumers.

Heretofore it has been a rather easy matter to cause wild fluctuations in the rubber market because the value of the product itself and the comparative smallness of the yield lent themselves to the purposes of outside speculation. Nowadays the branches of the Banco de Brasil, located in various places in the rubber country, are authorized to advance substantial amounts to producers. This is the plan that has been referred to as an adaptation of the coffee valorization scheme. Its effect is to make the market steadier by protecting supplies in weak financial hands. Otherwise the price level would be subject to a wild market whenever a buyer started bidding at a time when the supply was small, or a producer tried to sell a big shipment when the demands had been satisfied.

Baron Gondoriz, who nearly cornered the market four separate times, once wrote the following arraignment of the United States for the awkward commercial procedure as far as Brazil was concerned. The letter, of course, was written long ago.

"If North America really desires more reciprocal trade relations with Brazil they might be secured through the agency of a carefully managed bank at Para, based upon American capital. The monthly business there in agricultural products of the Amazon Valley amounts to $2,500,000. Fully two-thirds of this material goes to the United States and the rubber men of the United States pay American gold for it through the English banks, and the rubber producer supplies the demand in merchandise, thus providing for a heavy profit to the middleman."



Start of one of the races held at Winnipeg, Canada

View of the track during one of the contests at Winnipeg

Bob Burman Breaks Record

Clips More Than 3-4 Second From Circular Dirt Track Mark in 300-Horsepower Jumbo Benz

CLIPPING a shade more than 3-4 second from the mile circular dirt track record, the Jumbo Benz, rated at 300 horsepower and driven by Bob Burman at Brighton Beach Saturday, made a new mark for the speed brigade to shoot at.

The new record was made in a special event staged for the purpose of showing the car under ideal speed conditions. The start was impressive, following an easy circuit of the track to the head of the stretch where Burman turned loose his motor and whisked over the line at spectacular speed. He swerved to the rail at the stand and then cut across the track to the clubhouse turn, shaving the inner circle and going far out on the track at the back stretch. The straightaway is rather long and the Benz covered it at the rate of nearly 100 miles an hour, cutting in close at the stable-turn and turning into the stretch with a roar came down to the line at brilliant speed.

The timers announced the new record as 47.85 seconds. The former mark was 48.62 seconds, which was made by the Blitzen Benz with Burman driving, last year. The speed attained was at the rate of a little less than 75.24 miles an hour.

The summary of the other events follows:

UNDER 300 CUBIC INCHES, 5 MILES, NON-STOCK

Car	Driver	Position	Time
Mercer	Ainsley	1	5:13
E-M-F	Burke	2	

UNDER 600 CUBIC INCHES, NON-STOCK, 5 MILES

Car	Driver	Position	Time
Cutting	Burman	1	4:45
Stutz	Lewis	2	

FREE-FOR-ALL, 3 MILES, REMY PRIZE AND BRASSARD, FLYING START IN HEATS

Car	Driver	Position	Time
Benz	Burman	1	2:46
White	Kyle	2	
Mercedes	Hickman	3	

SECOND HEAT

Car	Driver	Position	Time
White	Kyle	1	2:57
Benz	Burman		Collision
Mercedes	Hickman		Collision

UNDER 600 CUBIC INCHES, 40 MILES, NON-STOCK, FOR W. B. TROPHY

Car	Driver	Position	Time
Ohio	Burman	1	42:9
Stutz	Lewis	2	

HANDICAP, 5 MILES

Car	Driver	Position	Time
Stutz	Lewis	1	5:04

Oldfield the Star at Winnipeg

Big Program Run Off Before an Enthusiastic Crowd of 10.000 Without a Single Mishap

WINNIPEG, MAN., Sept. 6—The Ninth Annual Race Meet of the Winnipeg Automobile Club was the most successful meet ever carried out in western Canada. Barney Oldfield and the other two members of his team, Lew Heinemann and Bill Fritsch, proved a great attraction in addition to the usual club events on the big program which totalled eleven events in all.

The track record for 1 mile, previously held by W. C. Power, in a Buick car, was reduced by Oldfield in the Christie to 54 seconds flat. Oldfield also set a new track record of 1 minute, 50 seconds for the 2 miles.

The chief event of the day for local drivers was the 25-mile race for the Dunlop trophy, and was again won by Billy Rogers in a Ford car in 25 minutes, 32 seconds.

The big crowd of 10,000 people, the largest ever in attendance at a race meet in Canada, evinced the greatest enthusiasm over all events, and Rogers came in for a wonderful reception at the end of the Dunlop trophy race.

Rogers also won the mile against time in 60 seconds flat, for the Gas Power Age trophy, the Goodrich trophy, and the Club purse of $100, which in addition to the $300 first prize money in the Dunlop trophy race gave him practically a clean sweep in the local events.

The meeting was under the auspices of the Winnipeg Automobile Club, and was managed by A. C. Emmett, the club's racing manager, and not a single mishap of any nature marred the success of the meet. The meet was so successful in every respect that already negotiations for another series of races to be held next year have been started.

The following is a summary of events:

1 MILE AGAINST TIME FOR GAS POWER AGE TROPHY

Car	Driver	Time
American	W. Rogers	1:02
Firestone	Ben Davies	1:03⅘
E-M-F	W. Masters	1:09

1 MILE AGAINST TIME

Car	Driver	Time
Christie	Barney Oldfield	0:54

10 MILES FOR STOCK CARS, 160 CUB. INS. PISTON DISP.

Car	Driver	Time
Empire	E. W. Rugg	8:45

5 MILES FOR STOCK CARS, 230 CUB. INS. PISTON DISP.

Hupmobile	A. McLeod	7:10
Empire	E. W. Rugg	7:50

2 MILES AGAINST TIME

Christie	Barney Oldfield	1:50

10 MILES OPEN, STRIPPED CARS

Ford	Billy Rogers	10:40
American	Ben Davies	10:59

5 MILES

Cino	Oldfield	5:22½
Benz	Heinemann	

10 MILES, OPEN STOCK CARS ONLY

Case	Norman Rollins	13:45
Everitt	Simmins	13:55

5 MILES, OPEN

Cino	Fritsch	51:04

DUNLOP TROPHY RACE, 25 MILES, STRIPPED CARS

Ford	W. Rogers	25:32
American	Ben Davies	
E-M-F	W. Masters	

5-MILE HANDICAP

American	Ben Davies	5:50
Cino	W. Fritsch	

Alco Climbing Over Sierras

AUSTIN, NEV., Sept. 9—With 3,560 miles of its coast-to-coast trip finished, the Alco truck of Charles W. Young & Company, which is hauling the first consignment of goods from manufacturer to customer at opposite ends of the country, reported here on its way from Philadelphia to Petaluma, Cal.

The last few days of the journey have been in the nature of almost continuous mountain climbing. Checking in at Eureka, the truck left the road beside the railroad and cut its way across untraveled trails for 70 miles to Austin.

For the second time in its long journey the vehicle has encountered a blinding snowstorm that it plodded through for a whole day.

Between Elko, Nev., and Eureka the truck had to climb 5 miles over the crest of the Humboldt Mountains on a new road that was fresh plowed out of the mountain side when the old road had been washed away by recent heavy rains.

RENO, NEV., Sept. 10—*Special Telegram*—The Alco Transcontinental Truck is in this city, it having covered to date 3,753 miles. The last part of the trip from the Rocky Mountains to this point has been characterized by sand traveling which has been almost impossible in places. The sand changes its positions with every wind storm and during the last few days the truck has traveled over 3 feet of sand in places under which was the original road. From this point to San Francisco, the road is practically boulevard, so that so far as the trials of the truck are concerned, they are practically over.

Great Crowds at Hamline

More Than 100,000 Spectators Watch Annual Automobile Races at the Minnesota State Fair

MINNEAPOLIS, MINN., Sept. 9—More than 100,000 persons saw the Minnesota state fair automobile races Saturday afternoon, September 7, on the Hamline track midway between the Twin Cities. The immense grandstand was filled with 75,000, and the crowd stood in the paddock, in the infield, and on Machinery hill, overlooking the track from a distance.

The races were under direction of Dr. C. E. Dutton, state representative of the A. A. A., and were electrically timed by a Warner instrument. Rain late in the day shortened the program and prevented running off a dead heat in the first event between Oldfield in a Cino car and Ulbrecht in a White Streak. Wonderlich was barred, owing to notice of disqualification by taking part in an unsanctioned meet. G. L. Moore drove the Marquette-Buick instead. Heineman was let in on last year's record and application for license as driver in 1912. The summaries follow:

CLASS E, NON-STOCK, 5-MILE

Car	Driver	Time
Cino	Barney Oldfield	5:05
	White-Ulbrecht, second; Case Disbrow, third.	

CLASS C, NON-STOCK, 5-MILE, 301 TO 450 CU. IN. DIS.

Benz	Barney Oldfield	5:17 2-5
	Case-Endicott, second; Jackson-Wilson, third	

CLASS E, 10-MILE, CARS OF 600 CU. IN. DIS.

FIRST HEAT

Simplex	Disbrow	10:03 3-5
	Case-Heineman, second; Case-Nikrent, third.	

SECOND HEAT

Simplex	Disbrow	10:15
	Case-Nikrent, second; Case-Nikrent, third.	

ONE-MILE RECORD TRIAL

Christie	Oldfield	:51 1-5
	Simplex-Disbrow, second.	

AUSTRALIAN PURSUIT RACE

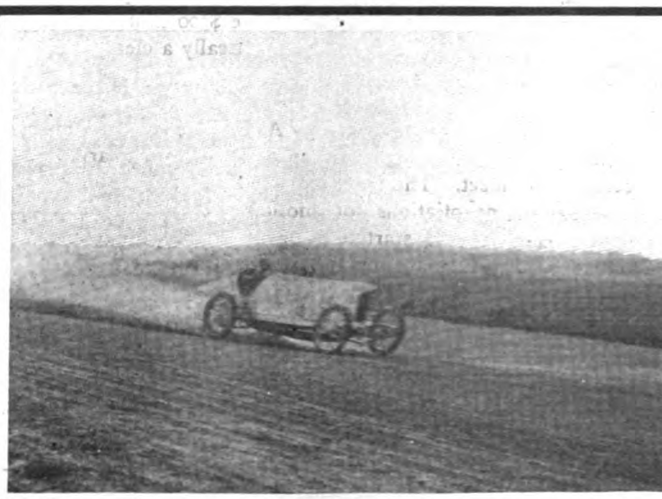
Cino	Oldfield	13:07 2-5
Case	Nikrent	

ONE-MILE RECORD TRIAL

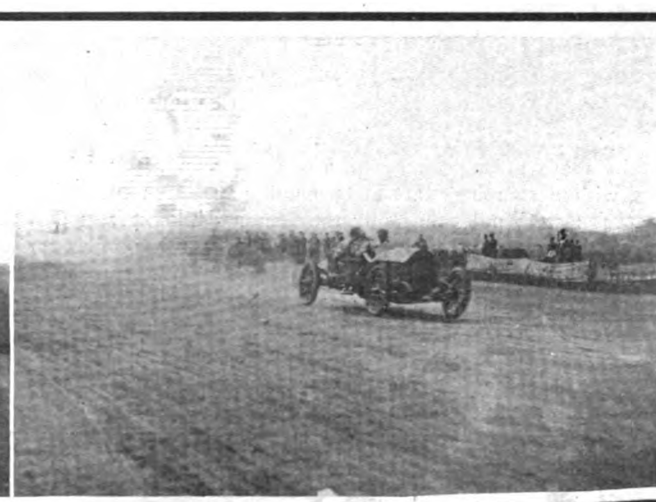
Christie	Oldfield	:53 2-5

RECORD TRIALS

Simplex	Disbrow	1-Mile	:52
"	"	2-Mile	1:42 2-5
"	"	3-Mile	2:37
"	"	4-Mile	3:28 1-5
"	"	5-Mile, Record	4:20



Burman's Jumbo Benz breaking the record at Brighton



Ainslee's Mercer leading Burke's E-M-F at Brighton

Peugeot First In Sarthe Grand Prix

Goux Drives Winner To An Easy Victory—Lion-Peugeot In Front at the Finish of 2-Liter Race

Average of 101.53 Miles An Hour Made By Boillot in 7-Kilometer Race at Boulogne-sur-Mer

PARIS, Sept. 9—Special to THE AUTOMOBILE—Jules Goux, driver of the Peugeot, was an easy victor in the Sarthe Grand Prix, covering 402 miles in 5:31:54. His team-mate, Boillot, after 5 laps marked by considerable tire trouble, while in second position, had leaky water connection allowing water to escape into the crank chamber. The motor seized. The Fiat failed to start. Crespelle, in S.P.A., in the big section, was never dangerous. The 3-liter race, uniting fourteen starters, was won by Zuccarelli in a Lion-Peugeot. Thomas, in a Peugeot, set the pace, but was unable to maintain it long. Duray then took it up, running his Alcyon in the lead for awhile, then held back, due to lubrication troubles. Halen distanced Zuccarelli, going ahead, followed hard by Barriaux and Duray in Alcyons, Champoiseau and Croquet, in Schneiders, after 10 or 12 laps. Goux was easily first with Zuccarelli, Barriaux, Champoiseau and Molon closely bunched. In the last lap, 5 miles from home, the steering gear of Barriaux's Alcyon was broken while the car was only 1 minute behind the winning Peugeot. Nicodemi was held up in the traffic along the course. He started 15 minutes late, later did fast work. Guyot stopped at the starting line with clutch troubles, later, after taking on gasoline, his car was burned. The results were:

SARTHE GRAND PRIX
THREE-LITER RACE

Car	Driver	Time
Peugeot	Goux	5:31:54
S.P.A.	Leduc	6:55:15
Lion	Zuccarelli	6:12:25
Schneider	Champoiseau	6:30:36
Vinot	Molon	6:31:31
Schneider	Croquet	7:33:00
Vinot	Junior	7:16:13
Schneider	Nicodemi	7:71:36
Cote	Dever	7:41:35
Hispano	Riviere	7:50:00
Alcyon	Duray	

Boillott Stars at Boulogne

Sets Many Record Marks

PARIS, FRANCE, Aug. 30—Seven kilometers over give and take roads at an average of 101.53 miles an hour; 3 kilometers with a standing start at 86.9 miles an hour; the flying kilometer at 77.66 miles an hour; the standing kilometer at 64.6 miles an hour; the mile standing hill-climb at 58.44 miles an hour, and 300 meters standing start on a 14 per cent. gradient at 44 miles an hour—such was the star performance of Georges Boillot on the 4.3 by 7.8 Peugeot with which he won the Grand Prix race. The records were put up in connection with the annual 4-day meeting at Boulogne-sur-Mer, when Boillot was the fastest in all the events in which he competed. Undoubtedly the best performance was the 7-kilometer race at the average of 101.53 miles an hour. This was run over a moderately-surfaced road comprising a kilometer length with a gradient of 8 per cent. The previous record over this distance was held by the 200-horsepower Darracq, having a cylinder volume double that of the Peugeot, and averaging 85 miles an hour. In this run Boillot easily defeated his fastest kilometer on a perfectly straight and level road in the grand prix at Dieppe. On that occasion his time was 99.86 miles an hour. Bruce Brown's speed over the same measured kilometer was 101.67 miles an hour. It should be noted that under the Boulogne rules the cars had to take part in all the races, from the 14 per cent hill-climb to the flying kilometer without a change of gear ratio. So far as Boillot was concerned there was no attempt to increase speed by the adoption of a stream line body, the only change from his Dieppe racing equipment being the absence of mud guards. The car was fitted with Rudge-Whitworth wire wheels shod with Continental tires.

In the 3-kilometer event, standing start, the grand prix Peugeot was alone in its class. The second best time was made by a Crespelle having a single-cylinder De Dion Bouton motor of 4 by 7.8 inches bore and stroke, which was timed in 1 minute 51 2-5 seconds, being at the rate of 60.2 miles an hour. Riviere on a four-cylinder Hispano-Suiza of 2.5 by 7.8 inches bore and stroke put up 2 minutes 6 2-5 seconds; Ramet's Gregoire occupied 2 minutes 10 1-5 seconds, and the one-lunger Cohendet 3 minutes 16 4-5 seconds. In the touring car class Joerns' Opel was the fastest with 1 minute 38 4-5 seconds, being at the rate of 67.8 miles an hour. Derny, on a 3.1 by 7-inch Hispano-Suiza, was clocked in 1:57 1-5, the other winners in their respective classes being: Leduc on S. P. A., 2:10 4-5; Rigal on 3-liter Sunbeam, 2:25 2-5; Jean Crouy, on 3.1 by 5.1 Hispano-Suiza 2:34 1-5; Morel on Motobloc, 3:56 2-5; Manfait on Delage, 4:19 2-5, and Violet on single-cylinder Violette, 4:08.

Flying Trial Shows Slower Time

For the 7 kilometers, flying start, the nearest approach to Boillot's record performance of 101.53 miles an hour, was by Guyot in 4:17 2-5, being equal to 60.7 miles an hour. The car was a 3-liter model weighing fully equipped 1,700 pounds, which had been built by Guyot and Picker to the order of a leading French factory, but which was not completed in time to take part in the Grand Prix; this was its first appearance in public. Ramel on Gregoire put up 4:55 3-5 and Antony on Cohendet 7:13. Among the tourists, Joerns was again the fastest with 3:24 3-5 for the 7 kilometers, this equalling 76.5 miles an hour. He was followed by Derny on the two-seater standard Hispano-Suiza in 4:08 3-5, the other class winners being Leduc on S. P. A., 4:40 4-5; Rigal on Sunbeam 5:18; Jean Crouy on Hispano-Suiza, 6:19 3-5; Lavie on S. P. A., 6:22 1-5; Morel on Motobloc, 9:38 4-5; Manfait on Delage, 9:23 2-5; Violet on Violette, 10:09 2-5.

The mile hill-climb at Baincthum, with an average gradient of 10 per cent., was romped up by Boillot, from a standing start, at 58.44 miles an hour; Guyot came second in the racing section with an average of 36.3 miles an hour, his time being faster than that of the cars in the higher class. Crespelle's one-lunger went up in 1:39 4-5 and Ramel's Gregoire in 2:15 4-5.

As the result of the various races Derny on Hispano-Suiza won the Franchomme Cup with 257 points, being followed by Joerns on Opel with 177 points; the same driver also won the Caraman-Chimay cup, with Joerns as his second; Joerns won the Imperial Pavillion cup outright, and Rigal on Sunbeam won the Crespel cup with 73 points, followed by Jean Crouy on Hispano-Suiza with 59 points and Jouglet on Hispano-Suiza with 41 points.

Panhard Wins Prize for Style

The meeting closed with a 500 meters race, standing start and finish, when Joerns and Rigal showed the greatest amount of skill. The time at the finish was not taken until the car was standing on the line. In most cases it was necessary to use the reverse gear in order to come to a stop on the line, but a few adopted the plan of applying all brakes and swinging round facing the direction of the starting line. The results of the elegance competition gave first place to a closed Panhard.

Electric Vehicle Association Formed

New York Dealers Combine to Foster and Stimulate Trade in That Branch of the Industry

Suitable Building, Centrally Located, Has Been Selected to House All Members of the Society

THERE are 1,800 electric vehicles in service in New York, divided on the lines of pleasure and commercial cars as follows: Pleasure cars, 400; commercials, 1,400. The growth of the pleasure car industry is measured by a very few years, while that represented by the trucks and delivery wagons is as old as the industry itself.

New York, up to the present, has never been regarded as a first rate market for electric pleasure vehicles. Only ten out of a score of manufacturers are represented in the metropolis by agencies or branch houses, while the makers of business wagons having New York representation number thirteen out of a possible eighteen.

The pleasure vehicles range from light runabouts to the most massive and impressive styles of limousines and the commercials run from wagons having a carrying capacity of 1,000 pounds to big trucks in brewery and similar service which carry rated loads of 7 1-2 tons.

The pleasure cars are largely of the enclosed type, including broughams, coupé, and a few limousines and landaulets, making up fully 80 per cent. of the total.

Heretofore, save for the efforts of about three concerns, the marketing of electric pleasure cars has been unsystematic, fitful and periodic, but despite that condition the total sale in New York has reached material figures.

In Philadelphia there are more electrics in use proportionate to population than there are in New York. In Chicago and St. Louis there are many more pleasure vehicles driven by electric power than there are in New York, but the truck figures are smaller.

The New York dealers have reached the conclusion that the time is ripe for extending the business locally and with that idea in view they completed an organizatiton last Thursday that is entirely unique in the industry.

Includes Both Trade Branches

Including both branches of the trade, the local representatives came together on Thursday and formed a corporation to be known as the New York Electric Vehicle Association, which has for its avowed objects not only the usual declared intention of fostering and stimulating the trade and for protection of its members in all the usual ways, but also the definite intention of the association is to secure a building which will house many, if not all, of the local representation.

Announcement has been made that a suitable building for the purpose has been found and that the owners have agreed to enter into a lease on a 5 per cent. basis of rental. This building is several stories high, centrally located and according to the intention of the association it will be divided among the trade as follows:

The first, or ground, floor will be used as a co-operative garage, where electric cars of all descriptions will be cared for at moderate rates. The second floor will be used as a showroom; third as a salesroom and the upper floors as offices for the various companies.

The deal is still open, but it is understood that options have been given to insure its consummation at the convenience of the new association. The project of a motor mart and co-operative garage has been long considered and the idea has been worked out to some extent in the past, but until now the auspices have never appeared to be so favorable.

The list includes the following: Anderson Electric Car Company, Detroit Electric, passenger and commercial; Atlantic Vehicle Company, commercial; Babcock Electric, passenger; Baker Vehicle Company, passenger and commercial; Champion Electric Vehicle Company, commercial; Commercial Truck Company of America, commercial; Couple Gear Company, commercial; Electric Omnibus Corporation, commercial; Flanders Manufacturing Company, passenger: General Motors Truck Company, commercial; General Vehicle Company, commercial; Healey and Company, passenger; Hupp-Yeats Electric Company, passenger and commercial; International Fritchle Company, passenger; Lansden and Company, commercial; Rauch and Lang, passenger; Studebaker Brothers Company, of New York, passenger and commercial; Walker Vehicle Company, commercial and Ward Motor Vehicle Company, commercial.

The following officers were selected to perfect the organization on a permanent basis and to start it under auspicious circumstances: Arthur Williams, president; William P. Kennedy, vice-president. The secretary and treasurer were not chosen at the meeting as it is intended to combine the offices and place their administration in the hands of a paid official of wide experience. The selection will be made by the president or executive committee.

The following board of directors was selected: E. W. Curtis, Jr., General Vehicle Company; S. W. Menefee, Anderson Electric Car Company; Nathaniel Platt, Baker Vehicle Company; C. Y. Kenworthy, Rauch and Lang; M. G. Macdonald, Hupp-Yeats; W. R. Chandler, Flanders; George H. Phelps, Studebaker; V. A. Villar, Champion; John H. Kennard, Couple Gear; W. L. Case, Lansden; Charles A. Ward, Ward, and A. B. Roeder, International Fritchle.

The executive committee consists of the following: Nathaniel Platt, C. Y. Kenworthy, S. W. Menefee and V. A. Villar.

Calendar of Coming Events

Shows, Conventions, Etc.

Sept. 5-15........San Jose, Cal., Automobile Show, San Jose Automobile Dealers' Association.
Sept. 14-21.......Chicago, Ill., Annual Fall Festival and Show, Chicago Automobile Trade Association.
Sept. 17-20.......Denver, Col., Convention International Association of Fire Engineers.
Sept. 23-Oct. 3....New York City, Rubber Show, Grand Central Palace.
Dec. 7-22.........Paris, France, Paris Automobile Show, Grand Palais.
Jan. 4-11.........Cleveland, O., Annual Automobile Show.
Jan. 11-25........New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25........Philadelphia, Pa., Annual Automobile Show.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Automobile Association of Scranton.
Feb. 1-8..........Chicago, Ill., Annual Automobile Show.
Feb. 10-15........Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22........Kansas City, Kan., Annual Automobile Show.
Feb. 24-Mar. 1.....Omaha, Neb. Annual Automobile Show.
Feb. 24-Mar. 1.....St. Louis, Mo., Annual Automobile Show.
March 3-8.........Pittsburgh, Pa., Annual Automobile Show.
March 8-15........Boston, Mass., Annual Automobile Show.
March 17-22.......Buffalo, N. Y., Annual Automobile Show.
March 19-26.......Boston, Mass., Annual Truck Show.
March 24-29.......Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Sept. 11-14.......Buffalo, N. Y., Third Annual Reliability Tour, Automobile Club of Buffalo.
Sept. 17..........Milwaukee, Wis., Grand Prize Race.
Sept. 20..........Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.
Sept. 21..........Milwaukee, Wis., Vanderbilt Cup Race.
Sept. 29-30.......St. Louis, Mo., Track Races, Universal Exposition Company.
Sept. ....Washington, D. C., Reliability Run, Automobile Club of Washington.
Oct. 7-20.........Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 21...........National Tour American Automobile Association.

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Decreasing Accidents

THE fatal grade crossing has claimed over a score of victims during the past week. Whole parties have been hurled into eternity, in other cases one or two have been spared from a load to disclose the sorrowful tale of failure to hear the whistle, failure to hear any warning, or inadequate roadside warning of the concealed crossing. **So numerous are automobiles becoming that the ringing bell by day and the bell and red light by night are becoming imperative in many places.** The conventional railroad crossing sign erected by the railroad company but a few feet from the track is hopelessly inadequate as a warning to automobiles.

Modern inventions and improvements call for modern guardian factors, and while the present railroad sign a few feet from the metal rails was sufficient in the days of horse vehicles it is not sufficient today, and the legislatures or the federal government should insist on railroad companies putting up crossing signs that are adequate for the modern means of locomotion.

It is not to be expected that railroad companies will without request, without persuasion or perhaps without legislation go ahead with these necessary improvements, and it is imperative that the motorists band together and properly present their demands and secure the desired legislation. In the end the railroads would find it cheaper.

A Transcontinental Road

Discarding Swaddling Garments

AMERICA has become accustomed to the automobile people doing things. The spirit of the century is reflected in the activities of the industry. Factories have been built, equipped and started within a few short months; concerns have grown from a capacity of a few hundred cars per year to as many thousands per annum within a 3-year span; other factories have started in the thousand scale and have mounted rapidly. Selling organizations have been developed and spread over the entire country in a few months; and so throughout the industry it has been that spirit of progress that has characterized every department of the automobile field.

There remains one great field in which the automobile is vitally concerned and one in which despatch is imperative, and while this field will by some be only indirectly connected with the industry, yet to him who lifts the veil and beholds the real factors that are propelling them industry onwards with such phenomenal strides, good roads are placed high.

The plea for good roads is very much of a threadbare argument: This subject suggests the old-time convention, the table-pounding, cross-roads orator and the sleeping auditors. **Never before has the time been more opportune for road improvement than today. Where improvements have been made cars have sold as a direct result.** A new stretch of road in Florida along the east coast was directly responsible, according to local authorities, for the sale of over 100 cars. What happened in Florida has happened in Iowa and will happen in Texas, in New Mexico, in Oregon and in the Dakotas.

The good-roads movement needs more than anything else today the spirit of "Do something. Stop talking and act." Robert G. Ingersoll once remarked: "The hands that help are better far than lips that pray." The helping hand is needed more today than ever before. Every month a car starts out surveying a new transcontinental highway; the daily papers carry despatches of going through bridges; getting lost on the desert; being held up by bridge washouts; being delayed by rain on the gumbo roads, and a score of other delays, but we never read of actual road improvements, although undoubtedly local enterprise along the line of route must be operating, yet these local activities have not yet been united into a tangible whole. Help is what is needed.

There have been enough of routes, enough of getting lost, enough of delays, but not enough actual work. What is needed is stone—crushed stone, along the roadside so that it can be put on the road. Stone is needed from the Atlantic to the Pacific, and if the automobile world expects to get this ribbon of stone from ocean to ocean within the next decade it is imperative that it take up the white man's burden and provide the stone.

Already an embryonic movement in this direction has been started, but it is yet uncertain as to the actual materialization of the scheme. **Conceived in In-**

diana is the plan of raising $10,000,000 from the automobile makers, dealers, owners and accessory manufacturers. Each maker and dealer is asked to give one-third of one per cent. of his gross receipts each year for 3 successive years. An owner may give $5, $100, $1,000 or any other sum. **In this way over $10,000,000 can be raised. This is enough money to buy crushed rock to cover a 3,300-mile road from New York to San Francisco and to deliver this rock at the railroad siding nearest to the point of use.** This is all that is proposed to be done by automobilists. The counties and states must sign contracts to do the road building under engineering supervision. The money is to be raised in 3 years and the road completed in that length of time.

This is one of the best good roads suggestions that has occurred. It is to be hoped that it goes through. It will, if the automobile manufacturers are awake to the signs of the times and if the men at the helms of of the big industries realize, and have properly weighed, the big factors that go to make up the successes of the industry.

If a stone road could be built from ocean to ocean in 3 years on these lines it would be the greatest incentive to good roads that America ever witnessed. It would advertise the automobile industry as no other movement has done since the inception of the industry. It would interest the farmer in the motor car and would bring home to him the value of good roads to such an extent that other transcontinental routes would be started, feeders to these lines would be opened, etc. In a word, road building would throw off its swaddling garments and take on the attributes of an adult.

Country's Crops Show Big Gain

Wheat Is Expected to Total Over 700,000,000 Bushels While Corn Will Certainly Make 3,000,000,000

THERE will be over a bushel of potatoes, more than there was last year for every man, woman and child in the United States, according to the September crop report issued by the government covering, not only potatoes, but all other crops.

Final figures will probably show a gain over the official figures, as ideal crop weather has been enjoyed since the tabulations were made. Corn will certainly go over the 3,000,000,000 bushel mark, and, while wheat is made as a harvest, it is expected that the official figures of 690,000,000 bushels will be raised to a full, round 700,000,000 by the fine threshing weather and its tendency to keep down waste.

It was estimated in THE AUTOMOBILE last month that the total revenue of the farmers this season would be $1,200,000,000 greater that it was in 1911. **These figures are below the mark** indicated by the latest report. Based upon current prices, the increase over last year should be in the neighborhood of $1,500,000,000. The figures are as follows:

	Sept., 1912.	1911.
Winter Wheat—		
Bushels	390,000,000	430,656,000
Acreage	25,744,000	29,162,000
Spring Wheat—		
Bushels	300,000,000	190,682,000
Acreage	19,201,000	20,381,000
Total Wheat—		
Bushels	690,000,000	621,338,000
Acreage	44,945,000	49,543,000
Corn—		
Bushels	2,995,000,000	2,531,488,000
Acreage	108,110,000	105,825,000
Oats—		
Bushels	1,290,000,000	922,298,000
Acreage	37,844,000	37,763,000
Rye—		
Bushels	36,000,000	33,119,000
Acreage	2,097,000	2,127,000
Barley—		
Bushels	209,000,000	160,240,000
Acreage	7,754,000	7,627,000
Buckwheat—		
Bushels	18,000,000	17,549,000
Acreage	835,000	833,000
Potatoes—		
Bushels	398,000,000	292,737,000
Acreage	3,689,000	3,619,000
Tobacco—		
Pounds	976,000,000	905,109,000
Acreage	1,194,200	1,012,000
Flaxseed—		
Bushels	29,000,000	19,370,000
Acreage	2,992,000	2,757,000
Rice—		
Bushels	23,000,000	22,934,000
Acreage	710,000	696,000
Hay—		
Tons	72,000,000	55,000,000
Acreage	49,209,000	43,017,000

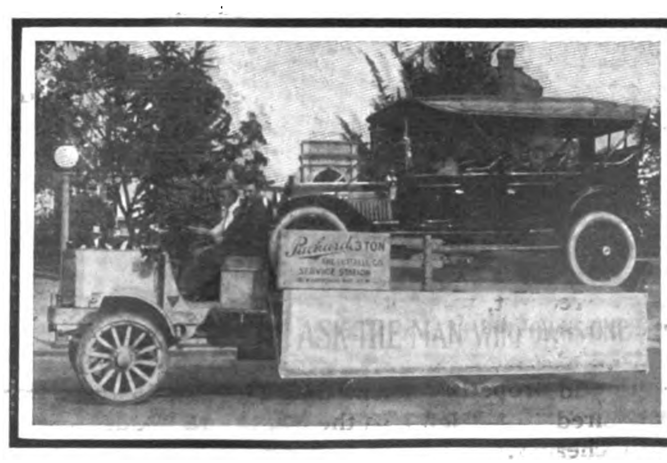
Washington Has Truck Parade

More Than 300 Cars Were in Line—Great Enthusiam Was Displayed By the Large Crowds of Spectators

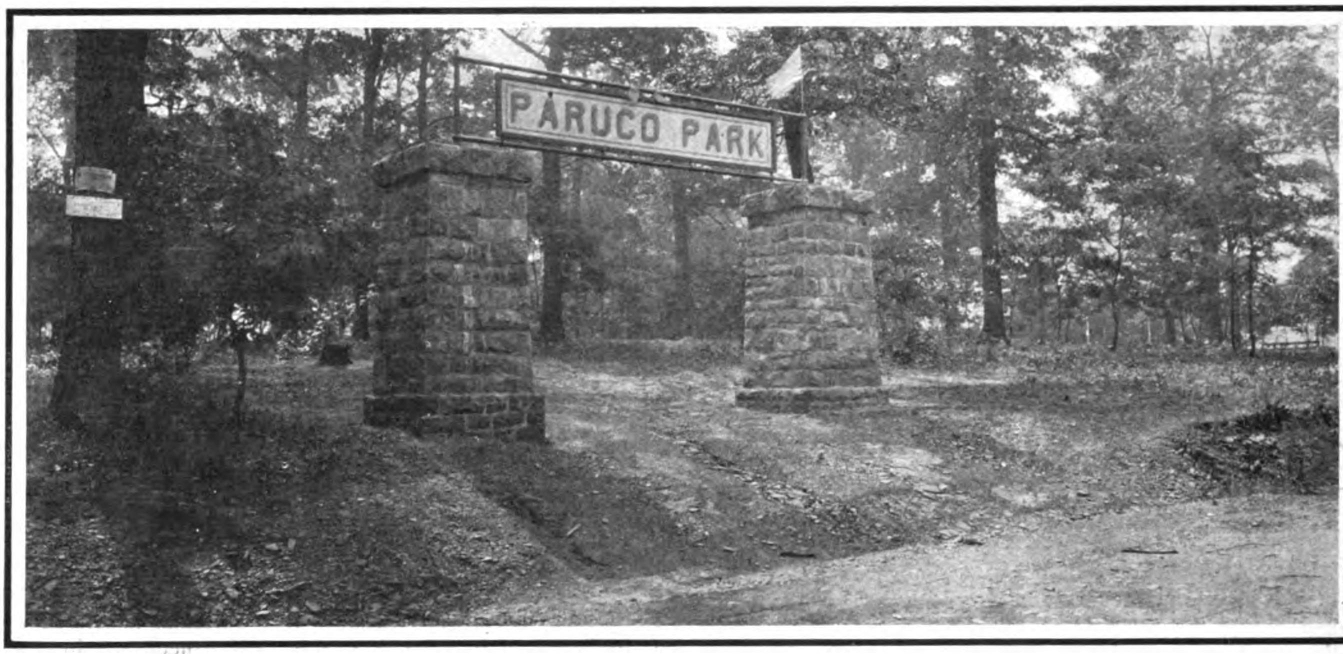
WASHINGTON, D. C., Sept. 7—Washington Labor Day in automobile circles was made conspicuous by the truck parade given under the auspices of the automobile department of the Washington *Post*, which brought out such an array of machines as has seldom, if ever, been seen in the East. The streets of Washington were crowded with on-lookers before the parade started and as the procession wound its way along the route selected, the enthusiasm was contagious. In local motoring circles the pageant was given the heartiest possible indorsement. More than 300 cars formed the line of the parade and the decorations were of such a character as to indicate much trouble and expense on the part of the participants. Prizes had been offered for two classes, one for the decorated division, the other for the non-decorated division. S. S. Grogan acted as official scorer and there were five judges.

Practically all the manufacturing companies were represented by one or more cars in line. The Wilcox Trux Company won a handsome silver loving cup offered by the Washington *Post* to the company having the greatest number of cars in line. The Wilcox people entered thirty-seven machines.

The Studebaker Corporation of America was second, with twenty-one cars in line. The Ford people had sixteen entries, coming third.



Packard display in Washington truck parade



Entrance to Paruco Park, pleasure ground recently opened for the use of employees of the Pennsylvania Rubber Company, Jeannette, Pa.

PENNSYLVANIA Rubber's Park Opened—Paruco Park, the pleasure ground for the employees of the Pennsylvania Rubber Company, Jeannette, Pa. Over 1,000 of the rubber company's men and their friends were present to inspect the new park and listen to the entertainments of the afternoon. The above photograph gives a view of entrance to Paruco Park.

Ferguson with Carter Car—Don Ferguson has severed his connection with the Studebaker Corporation to accept the position of chief engineer with the Carter Car Company of Pontiac, Mich.

Betts on Buffalo Club's Board—C. Walter Betts has been elected member of the board of directors of the Automobile Club of Buffalo, Buffalo, N. Y., succeeding E. R. Thomas, who has resigned.

Currier Joins American—R. B. Currier, who was formerly connected with the Interstate Sales Agency of Columbus, O. has accepted the position of chief inspector for the American Motor Car Company, Indianapolis, Ind.

Outdoor Show at St. Louis—There are in St. Louis eighty-three automobile manufacturers and dealers and all but two of these will have exhibits at the out-door show which will be held here at one of the summer gardens the week of October 7.

Stockfisch with Texas Oil—John M. Stockfisch, formerly with the Havoline Oil Company as New York division manager, has resigned to accept a position in a like capacity with the Texas Oil Company, 17 Battery Place, New York City, manufacturers of Texaco Oils.

Lu Lu Sociability Run—The second annual sociability run of the Lu Lu Temple Automobile Club, a motor car organization born in July of last year, will be held on September 21 to Atlantic City, N. J. Sterling silver prizes will be awarded the four participants finishing nearest the secretly computed time.

Chauffeur Tax Amounts to $1,000,000—According to statistics just made public by Secretary of State Lazansky, of Albany, N. Y., the tax levied on chauffeurs and motor vehicles for the fiscal year ending on September 30 will total $1,000,000 The greatest gain in any one year in the tax receipts was last year owing to introduction of motor trucks into business but last year's figures will be surpassed by this year's tax.

Atlanta Show Space Taken—At a meeting of the Atlanta Automobile and Accessory Association, Atlanta, Ga., held recently 19,850 square feet of floor space in the Atlanta Automobile show of November 16-23, was engaged and checks for 25 per cent. of the amount due were paid in. This means that more space has already been subscribed for than was used last year and that the financial success of the show is assured.

Advocates Motor Truck Service—Delegated by Mayor Blankenburg of Philadelphia, Pa., to study the high cost of living problem and make suggestions for amelioration of present conditions, Professor Clyde L. King, of the University of Pennsylvania, advocated the encouragement of motor truck service between the source of supply and consumer as one of the avenues of economy, high transportation charges figuring as one of the chief items of expense.

Chase at N. Y. State Fair—At the New York State Fair at Syracuse, N. Y., the Chase Motor Truck Company will have an exhibit of its machines and will also entertain its district managers that week, including F. B. Porter of New York, C. K. Thomas of St. Louis, E. F. Howell of Philadelphia and E. B. Curtiss of Cleveland. W. C. Van Sant, for several years western salesman, has been made district manager for the Pacific Coast with headquarters in Los Angeles.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Akron, O.	R-C-H	The Akron Auto Garage Co.
Albany, N. Y.	Jackson	Preston's Garage.
Atlanta, Ga.	Pullman	E. D. Crane & Co.
Boston, Mass.	Flanders	John S. Harrington & Co.
Boston, Mass.	Pullman	Boston Motor Co.
Buffalo, N. Y.	Studebaker	A. W. Haile Motor Co.
Buffalo, N. Y.	Mighty Michigan	Progressive Motor Car Co.
Burlington, N. J.	R-C-H	Cortland L. Fort
Charlotte, N. C.	R-C-H	Piedmont Motor Car Co.
Chicago, Ill.	Nyberg	John W. Hayden
Cincinnati, O.	Pullman	R. W. Pagels
Colborne, Ont.	Ohio	The Canadian Ohio Motor Car Co.
Columbus, O.	Pratt—40	B. C. Ausel
Crisfield, Md.	Detroiter	L. S. Nock
Denver, Colo.	Cartercar	Colorado Cartercar Co.
Detroit, Mich.	Rambler	Geo. H. Wahl
Havana, Cuba	Pullman	American Vulcanizing Co.
Hubbard, Iowa	Henderson	The Elmer S Maine Co.
Huntington, N. Y.	R-C-H	Walter H. Flessel
Indianapolis, Ind.	Krit	The State Automobile Co.
Indianapolis, Ind.	Marathon	The State Automobile Co.
Indianapolis, Ind.	Marion	A. & M. Service & Sales Co.
Kankakee, Ill.	R-C-H	Lincoln Garage & Repr. Co.
LaSalle, Ill.	R-C-H	F. W. Koenig
Lancaster, Pa.	Pullman	B. F. Futer
Leamington, Ont.	Cadillac	R. H. Ellis
Lebanon, Pa.	R-C-H	Commercial Garage
Live Oak, Cal.	R-C-H	Henricksen & Smith
Louisville, Ky.	Hupp-Yeats	W. L. Lyons
Louisville, Ky.	Franklin	The Younger Auto Co.
Marshall, Ind.	R-C-H	Thompson & Walther
Mechanicville, N. Y.	Franklin	G. M. Fort & Son
Menomonie, Wis.	R-C-H	Menomonie-Auto Co.
Newark, N. J.	Pullman	Van Deman & Wainwright
Newman, Ill.	R-C-H	Henley Eversole
Pittsfield, Mass.	Pullman	Arthur LaMott
Port Colborne, Ont.	Metz	Guiding Star Bicycle Store
Portland, Ore.	Buick	Buick Auto Co.
Portland, Ore.	Cole	Neate & McCarthy
Portland, Ore.	Detroiter	H. L. Keats Auto Co.
Portland, Ore.	Stutz	Finger & Mann
Portland, Ore.	Warren	The Gerlinger Auto Co.
Portsmouth, Va.	Detroiter	A. E. Harmon
Quebec, Can.	Pullman	J. E. Paulin
Rochester, N. Y.	R-C-H	A. Elliott
Rochester, N. Y.	Velie	Ferdinand Crosby
Salem, O.	Krit	H. L. Slagle & Co.
Saskatchewan, Can.	White	Imperial Garage
Seattle, Wash.	R-C-H	Ira D. Lundy
Sisterville, W. Va.	Pullman	Tyler Motor Co.
Spokane, Wash.	Pierce-Arrow	H. J. Banta
Syracuse, N. Y.	Hupmobile	Jefferson Garage Co.
Syracuse, N. Y.	National	Jefferson Garage Co.
Toledo, O.	Krit	Ford Bros. Co.
Toronto, Can.	King	Matheson Automobile Co.
Troy, N. Y.	R-C-H	Conway & Bussey
Windsor, Ont.	King	F. S. Evans
Winnipeg, Can.	Reo	Percy Plewes

COMMERCIAL VEHICLES

Place	Car	Agent
Syracuse, N. Y.	Federal	A. J. Jackson
Toledo, O.	Moore	Fred Kopf

Has Stutz Cleveland Branch—Harry S. Moore has been appointed special factory representative and general manager of the Stutz Motor Car Company, Indianapolis, Ind., in Cleveland, O.

Locomobile Makes New Record—The Locomobile broke the record for an automobile trip from Denver to Chicago, a distance of over 1,200 miles, Leo Galitzke driving. The actual running time was only 39 hours and 25 minutes.

Champion Manager Louisville Diamond—Henry Champion is the new manager of the Louisville, Ky., office of the Diamond Rubber Company. He succeeds L. G. Haskell, who has joined the sales force of the Leyman Motor Company.

Zilio Agency in Louisville—The Zilio Sales Company, Louisville, Ky., has acquired the general agency for the Zilio tire filler in Kentucky, Southern Indiana and North and South Carolina. This concern has opened an office in the Courier-Journal building in Louisville.

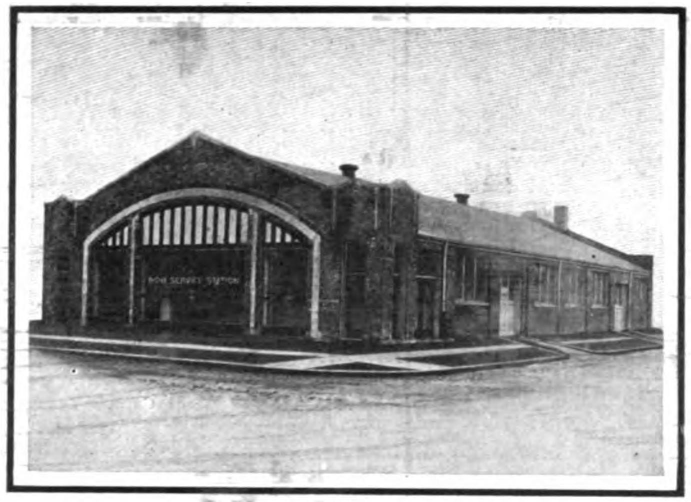
Hunting in Africa with an R-C-H—Big game tracking over the brush grown veldt of Africa is an exhilarating sport according to D. C. Morrison of the Rewika Ranch, Kyambu, British East Africa. The accompanying photograph shows him hunting in almost shoulder high grass with his R-C-H.

Tennant to Enter Own Business—W. G. Tennant, a pioneer in Gotham automobile circles and well known as head of the Peerless Motor Car Company of New York City, has resigned to assume active management of the Tennant Motor Limited, Chicago, Ill., distributors of The Henderson.

Henshaw Resigns from Thomas—It is announced that C. S. Henshaw has resigned as manager of the Thomas Motor Company of New York to take effect in the near future. It is not known at the present time what course Mr. Henshaw is to follow. He has been prominently identified with the automobile industry since the very inception, his name having been linked with well-known concerns, particularly the Thomas, for years. His permanent residence is Belmont, Mass.

Wolverine Club After Members—President Porter of the Wolverine Automobile Club states that the taking in of the club by the Automobile Association of America is assured. The latter body has made the Wolverine Club a proposition which will be voted on and accepted at the latter's next meeting the last Thursday in the present month. The new club house proposition is also assuming a favorable aspect. To date 560 members have been enrolled under the new arrangement which exacts that each take $100 worth of stock in the new house. From now on a systematic canvass for members will be instituted and the club members feel assured that by the first of the year the necessary 1,500 membership will have been secured. Many representative figures here in the industry have already been added to the membership list.

D. C. Morrison, of the Rewika Ranch, Kyambu, British East Africa, uses his R-C-H runabout for hunting big game



R-C-H service station recently opened in Detroit, Mich.

R-C-H Detroit Service Station—The new service station of the R-C-H Corporation, Detroit, Mich., is shown in the accompanying photograph. It will be used to supply replacements and the storing of cars on order. Each district manager will have his headquarters in the service building and from this point the road men will make trips through the territory.

VortKamp Sales Manager Mayer—Mr. H. F. VortKamp has joined the Mayer Carbureter Company, Buffalo, N. Y., in the capacity of sales manager. His offices will be in Detroit, Mich.

Oakland Philadelphia Branch—The Oakland Motor Car Company, Pontiac, Mich., will establish a branch in Philadelphia to succeed the Oakland Company of Pennsylvania. The branch will be in charge of Edward K. Leech.

Ruckert Spokane Goodyear Manager—W. C. Ruckert has been appointed Spokane, Wash., manager of the Goodyear Tire & Rubber Company, succeeding C. B. Clement, who has joined the Studebaker agency in Portland, Ore.

Abbott-Detroit's Heavy Load—An Abbott-Detroit recently in Byers, Tex., pulled three heavy farm wagons, a surrey and two buggies linked together. In the vehicles were 78 persons. The total weight pulled was nearly 14,000 pounds.

Jurgewitz Is Portland Manager—H. A. Jurgewitz has been appointed Portland, Ore., manager of the Goodyear Tire Company. He succeeds W. T. Powell, who has been made Pacific Coast district manager for the Goodyear people with headquarters in San Francisco.

Indiana State Fair's Show—The automobile show held in connection with the Indiana State Fair in Indianapolis, September 2 to 6, proved quite successful, a satisfactory number of sales being reported. About 140,000 people visited the fair during the week.

Wilkie to Manage Buick—Edward Wilkie has been appointed manager of the Buick Motor Company's branch in Washington, D. C., succeeding T. S. Johnston, who resigned to accept the position of Southern sales manager for the Republic Motor Company.

Many Cars Entered—The Portland-Astoria-Gearhart automobile tour of September 1-2, the official run of the Portland Automobile Club to boost the proposed Portland to the Sea highway is attracting much attention and upwards of 100 machines have signed for the run.

Gibbons Consulting Engineer—Mr. N. B. Gibbons, A.M.I. Mechanical Engineer, has commenced business on his own account as consulting engineer in Montreal, Canada. In addition to engineering practice Mr. Gibbons will specialize in automoble and motor boat work.

Wilmington Patrol Economical—An interesting statement was issued recently showing where the police department of Wilmington, Del., saved $655.20 during the past year in its patrol operation due to the substitution of an automobile for two horse-drawn vehicles and four horses.

Willman Sales Manager Warren—G. L. Willman has been promoted to the office of sales manager for the Warren Motor Car Company, Detroit, Mich. He succeeds George D. Wilson, who has gone to New York City as eastern representative of the Warren Company.

Bull Moose Squadron Starts—A flying squadron of automobiles equipped with a street piano, a printing press and other novel features, started from the Progressive State Headquarters in New York City recently for Syracuse, N. Y., where the State Bull Moose Convention is to be held in the Arena.

Forms Owners' League—The Automobile Owners' Protective League is the name of an organization now being formed in Dallas, Tex. More than 400 automobile owners have already joined the organization. The object of this league as outlined by O. H. Bettes, manager, will be co-operative.

New British Truck Company—The British Business Motors, Ltd., Coventry, England, has just been formed to manufacture the Cunard commercial vehicles. Mr. H. G. Burford is managing director and his co-directors are S. F. Edge and H. T. Vane, general manager of S. F. Edge, Ltd.

Taxpayers Want Good Roads—Taxpayers of Baltimore county filed a bill in the Circuit Court of Towson against the Maryland State Roads Commission asking that the commission be required to expend in Baltimore county $300,000 of the $3,170,000 road loan authorized by the last Legislature.

Want to Build Cars—Joseph E. and August J. Hoffweber, of La Crosse, Wis., are negotiating with capital in several industrial centers of Wisconsin for the financing of a company which has been incorporated under the style of Hoff Motor Car Company, capital $500,000, to manufacture a line of pleasure cars.

Moorhead Run Success—Nineteen automobiles participated in the annual sociability run of the Moorhead, Minn., Automobile Club recently. The run was from Moorhead, south along the Minnesota side of the Red River of the North to Breckenridge and then to Wahpeton, N. D. The roads encountered on the trip were excellent.

Automobile Incorporations

AUTOMOBILES AND PARTS

BALDWIN, N. Y.—Acme Motor Rental Company; capital $5,000; to conduct an automobile livery business. Incorporators: George Wintjen, Adam Weiselbach, Allen C. Ewing.

BUFFALO, N. Y.—International Motor League, Inc.; capital, $1,000; to deal in motorcycles, automobiles, motor vehicles. Incorporators: Julius J. Eyring, Frederick A. Hipp, Henry C. Aman.

COLUMBUS, OHIO.—The Pharis Tire & Rubber Company; capital, $25,000; to manufacture and sell automobile and motorcycle tires. Incorporators: Carl Pharis, Roy W. Pharis, Emma W. Pharis, Mabel A. Pharis, Clara Weiler.

DUNKIRK, N. Y.—Dunkirk Specialty Company; capital, $5,000; to manufacture and sell gasoline, oil tools, implements, etc. Incorporators: P. C. Candee, Seth B. Culver, Justus M. Henderson.

FORT WORTH, TEX.—Tire Filler Company; capital, $110,000; to manufacture tire filling material. Incorporators: J. A. Reynolds, N. M. Pressley, H. B. Lyne.

SKANEATELES, N. Y.—The Skaneateles Garage Company; capital, $6,000: to carry on a garage business. Incorporators: George D. Cuddeback, Edward J. Scott, Florence K. Scott.

NEW YORK CITY, N. Y.—United Tire Sales Company; capital, $500; to sell tires. Incorporators: A. G. Thaantım, Joseph T. Weed, Max Greenberg.

NEW YORK CITY, N. Y.—S. Whyle Merritt Company; capital, $10,000; to deal in motors, engines, etc. Incorporators: S. W. Merritt, Clyde V. Morse, Paul Thamm.

PORT CHESTER, N. Y.—Lowden & Flint's City Garage, Inc.; capital, $3,000; to carry on a garage business. Incorporators: Clifford H. Flint, Grace M. Flint, Arthur B. Lowden.

Dahl Tire's New Headquarters—The Dahl Punctureless Tire Company of America will, on or about September 1, have its headquarters at 246 West Fifty-ninth street, New York City.

Franklin Taxicabs in Texas—A fleet of four Franklin taxicabs has just been purchased by the Franklin Taxicab Company, San Antonio, Texas, and will be put into active service within the next two weeks.

Too Many Road Signs—The Motor Club of Harrisburg will shortly take up the question of having certain signs along different highways eliminated. In the opinion of many autoists there are too many signs in some sections.

Ford Quick Lunch Counter—Zack Benn of Anacortes, Wash., has recently transformed his Ford touring car into a traveling quick lunch counter, and has equipped it with electric lights, refrigerator and all other necessaries.

Road Improvement in Maryland—Contractors have begun work on improvement of the Frederick road from Irvington to Bishop's Lane, Catonsville, Md., the improvements to be of macadam. This stretch of road is three miles and will cost $20,000.

Odd Use of Studebaker Car—The accompanying picture shows a Studebaker car used by J. W. Kain of Chicago, Ill., who is in the saw filing business. Though very novel in design, still it is very practicable as it covers more than twice the amount of territory of a horse.

Dallas Leading Texan Automobile City—The four thousandth automobile license to be issued from Dallas, Texas, will be given out next week. This ranks Dallas as the leading automobile city in the state, and gives over a thousand licenses more than any other city in Texas.

Denby with Federal Motor Truck Company—Garvin Denby, brother of Senator Edwin Denby, has resigned his position as assistant to the president of the Solvay Process Company to assume the position of sales manager of the Federal Motor Truck Company, Detroit, Mich.

Ford Company Buys Block—The Ford Motor Car Company of Chicago, Ill., has completed the purchase of an entire block of land in that city. The company will build a five-story building on this site, which will be used as a warehouse, garage and assembling plant and will contain the show and salesrooms.

New Dahl Tire Company—The Dahl Punctureless Tire Company of America has been incorporated under the laws of South Dakota. It will take over the business which has been established and organized by the Dahl Punctureless

J. W. Kain, of Chicago, uses his Studebaker in business

Tire Company of Minnesota and will carry on and extend the business throughout the world.

Wilby on Across-Canada Tour—Thomas W. Wilby recently started from Halifax, N. S., on an auto trip which he plans to end at the western coast of Vancouver Island. In making this across-Canada trip Mr. Wilby aims to demonstrate the feasibility of a Canadian highway. He is traveling under the auspices of the Canadian Highway Association.

San Francisco Garage Opened—The Pioneer Automobile Company of San Francisco opened its new branch in Oakland during the past week. The new building is a spacious structure with a large frontage on Twenty-fourth street, well lighted and affording plenty of room for service department. C. A. Penfield is manager of the Oakland branch.

Cutting Pathfinder Chicago Tour—A Cutting, 1913 model, has been selected as the pathfinding car for the Chicago reliability run, which will start October 7 and end October 11. The car left Chicago Wednesday, September 4, and has 1,000 miles of northern Illinois and eastern Iowa to cover. L. J. De Broux, of the Dan Dodge Company, distributors for Cutting cars in Illinois, is driving the pathfinder.

British Columbia's Large Registration—Figures supplied by the provincial police of Vancouver, B. C., who handle automobile licenses for the province, show that 3,568 machines have been registered in British Columbia. Of these it is estimated that about 1,800, or a little more than half, are issued from the Vancouver office, covering the city of Vancouver, New Westminster, North and South Vancouver and all the adjoining municipalities.

Franklin Sales Increase—The record of Franklin dealers during the past selling year which closed on August 31 shows a steady increase according to a report from the office of the Franklin Automobile Company. For January, 1912, sales were 86 per cent. over sales for the corresponding month last year; for February 100 per cent., etc. July and August, the dull summer months showed an increase of 435 per cent. and 330 per cent. respectively.

A Mighty Michigan's California Branch—The distribution of the Mighty Michigan cars for 1913 in California, Nevada, the Hawaiian Islands and the Orient will be made by the Michigan Motor Car Company's California branch, a $1,000,000 corporation just organized. The organization and its big enterprise is the result of a visit to the East by C. P. Kiel. The following officers were elected for the new concern: V. L. Palmer, president; F. B. Lay, Jr., first vice-president; W. H. Cameron, second vice-president; G. H. Daugherty, third vice-president; C. P. Kiel, treasurer and general manager; C. C. Boob, secretary. The above with the son of C. P. Kiel constitute the board of directors.

Automobile Incorporations

RICHMOND HILL, N. Y.—Dillman-Melin Motor Company; capital, $20,000; to manufacture motors. Incorporators: William C. Dillman, Richard A. Dillman, Bero W. Melin, W. J. Bissell, Fred J. Hoerlein.

VANCOUVER, B. C.—Pacific Auto Company; capital, $500,000; to engage in the taxicab business. Incorporators: Noel Humphreys, G. M. Gibbs, A. S. French, J. L. Langan.

ACCESSORIES AND GARAGES

BUFFALO, N. Y.—Continental Motors Corporation; capital, $100,000; to manufacture motors. Incorporators: Gordon F. Matthews, Frank V. Whyland, Allen E. Choate.

CINCINNATI, O.—The Ideal Steel Wheel Company; capital, $500,000; to manufacture a patented automobile wheel. Incorporators: J. B. Fitch, E. H. Maffey.

FORT WAYNE, IND.—Drage-Harris Motor Truck Sales Company; capital, $10,000; to manufacture motors. Incorporators: Frank A. Drage, D. H. Harris, Herbert L. Somers.

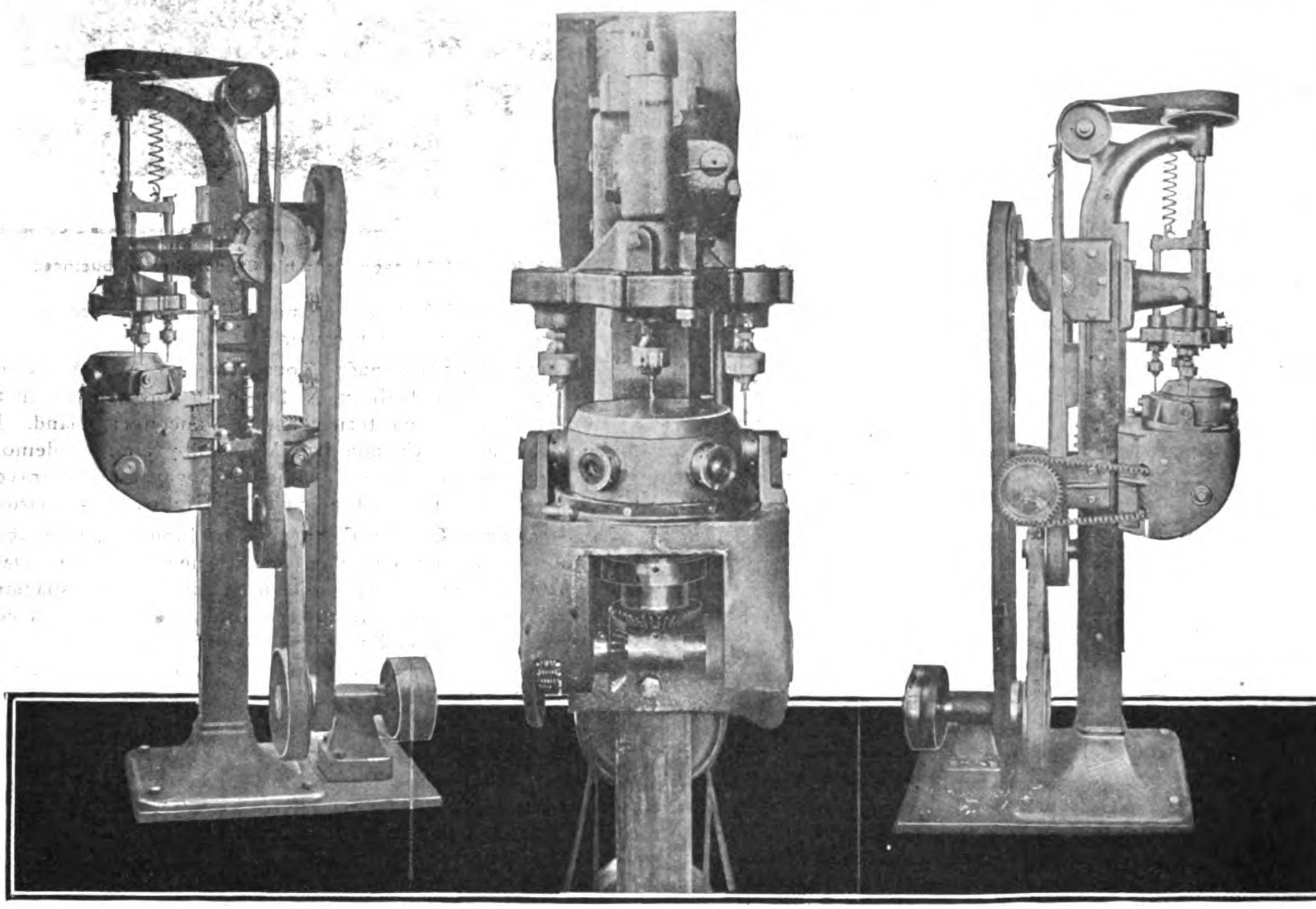
LA CROSSE, WIS.—Hoff Motor Car Company; capital, $500,000; to manufacture automobiles and motor vehicles. Incorporators: Joseph E. and August J. Hoffweber.

NEW YORK CITY, N. Y.—The Salvini Electrical Horn Manufacturing Company; capital, $50,000; to manufacture automobile horns and supplies. Incorporators: Edwin Salomon, Godfrey S. Salomon, Salvatore Salvini.

SOUTH BEND, IND.—Manufacturers' Plant & Power Company; capital, $20,000; to manufacture auto bodies. Incorporators: S. W. Nicholson, J. C. Paxson, V. E. Paxson.

CHICAGO, ILL.—The German American Car Company; increase of capital from $500,000 to $700,000.

Factory Miscellany



Automobile cap screw drilling machine recently perfected by the H. H. Franklin Manufacturing Company, Syracuse, N. Y.

The above illustration shows a machine that allows one man to do the work of four. Its purpose is to drill holes in cap screws and it can drill 2,000 of these in a working day. The machine was designed and constructed entirely within the Franklin company's tool department. Formerly it took four machines to drill a cap screw. Each of these machines drilled but one hole at a time and it took 2 minutes to drill the holes in one cap screw. The new machine drills three cap screws at one time and will turn out more than three in a minute. This one machine is capable of taking care of all the cap screw drilling for the entire Franklin output. The turret holding the cap screws which is plainly shown in the illustration is capable of holding five at one time. There are three drills and each one drills a hole through the cap screw. After the hole has been drilled, the drill is automatically drawn out, the turret turns, bringing the cap screw into position for the next hole to be drilled. In this way the cap screw finally has a hole drilled by each of the three drills. After the third drill has been used the turret again turns and the cap screw is ejected automatically from the machine. All that the man who attends to the machine has to do is to insert a new cap screw in the hole after each one has been ejected. The turret revolves through an arc of 72 degrees each time to bring the cap screw into the correct position for the next drill. The cap screw itself turns through an arc of 120 degrees around its own axis as the three holes are spaced equally about its circumference. The turret is turned about by a cam which gives an entirely automatic motion to both the turret and to the cap screw. The ejection of the finished piece is effected by an automatic spring plunger. At the back of the turret there is a guide which holds the three cap screws in position.

CHALMERS Factory Addition—The cut on page 557 shows the site of the new Chalmers building, which will be a four-story reinforced structure. This building, which will take care of the inspection department and part of the final assembly, was commenced on August 1. It is expected that it will be ready for occupancy by November 15. It will have a floor space of 55,000 square feet.

American Capital Foreign Knight—American enterprise, capital, designs and manufacturing details, combined with foreign financial support, are to be big factors in the production of a new Knight-engined automobile in a modernly equipped factory at Turin, Italy. With cylinders cast en bloc, worm-driven rear axle, wire wheels, chain-driven gear box, electric lighting and electric self-starting systems, the Knight car made in Turin will feature innovations that are expected to make a big stir abroad.

New R-C-H Coupé Announced—The R-C-H Corporation announces a new coupé, built to accommodate three persons, the body being very roomy and handsomely finished. The standard R-C-H color scheme, red and black, is continued in the exterior finish, while the interior upholstering is a dark gray whipcord. Each window is provded with silk shades to match the upholstering. The body is mounted on the regular R-C-H 110-inch wheelbase chassis as in the touring car and long wheelbase roadster. The equipment includes five electric lights with 100-ampere hour Exide storage battery, 32 by 3½ non-skid tires, all around, Warner Autometer and demountable rims. On the rear deck is mounted a 26-gallon gasoline tank and a large trunk with a slip cover. With each car a patented locking tire holder and extra demountable rim is also furnished. Taken all in all, the new model is a car which, for both finish and performance, can be relied upon to give consistent service and distinguished appearance under all sorts of conditions.

Canadian Top Manufacturer—Richiss & Paterson have commenced the manufacture of automobile tops at Saskatoon, Canada.

Rubber Company Builds Addition—The American Hard Rubber Co., College Point, N. Y., contemplates erection to its plant of a three-story brick addition costing $30,000.

To Manufacture Parts—The Columbus Auto Parts Company has located in Columbus, Ind. The purpose of the company is to manufacture automobile parts. Its capital is $250,000 and the principal members are F. H. Penfield, F. Goodwell, B. S. Dean and J. I. Handley.

Niagara Now Ready to Move—The Niagara Gasoline Motor Company has raised the remaining $4,000 which were necessary last week to provide the amount of $50,000 needed by the company for removing its plant. The factory is at present at Buffalo, but will soon be transferred to Dunkirk, N. Y.

New St. John Factory—A St. John, Canada, factory may be turning out automobiles by March 1. The Maritime Car Company has awarded the contract for the erection of the three large concrete buildings which will comprise this factory at Coldbrook, and the work is to be completed by the first of next February.

Detroit Steel Company's Addition—The Detroit Pressed Steel Company will soon commence operations on an addition to its plant, which is to be one story in height and measure 100 by 200 feet. The increased factory space will allow the concern to triple its output, which is said to be necessary, due to the rapidly increasing business.

Castings Company Erects Foundries—The erection of a foundry has been begun at Pontiac, Mich., by the Pontiac Auto Castings Company, composed of men from Detroit and Muncie, Ind. The company will engage in the manufacture of brass castings for automobiles and later iron and aluminum work will be added to the output. The company is capitalized at $15,000.

Indianapolis Improving Roads to Plant—In keeping with a promise made the company some time ago, the city of Indianapolis is improving the Crawfordsville road from Indiana avenue to the Emrichsville bridge across Fall Creek in order to provide a passable highway for the Prest-O-Lite Company on the way to the company's new plant near the Indianapolis Motor Speedway.

Jackson Canadian Factory Branch—The Jackson Automobile Company, Jackson, Mich., is reported to be considering the location of a Canadian branch of its factory in Bartonville, Ont. Peter Christopher, the Jackson agent in Hamilton, states he has heard talk of the possibility of this firm locating in Bartonville, but has had nothing definite from the company at Jackson, Mich.

Addition to Fire Engine Company—Plans have been completed and work is to begin at once on the new addition to the American-LaFrance Fire Engine Company, Elmira, N. Y. The annex is to be 100 feet long by 25 feet in width, total cost to be $10,000. Contract for the structure has been awarded the Johnson Concrete Co., Sayre, Pa. Orders have been issued to rush work on the building and have it completed in 60 days from date.

Sterling Automobile Company Organized—The Sterling Automobile Company, Pontiac, Mich., has been organized to manufacture six-cylinder automobile engines. The initial output will be taken by the Little Motor Car Company of Pontiac, Mich., which is preparing to place a six-cylinder machine upon the market next January. The new plant will be equipped with modern machinery made especially for the company. Local capital is invested in the enterprise and W. C. Durant is heavily interested. It is expected the company will be able to begin operations before the close of the present year.

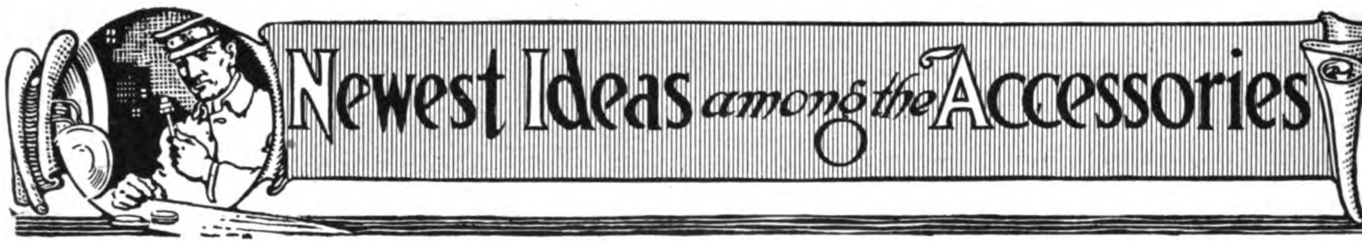
Spring Company's Factory Additions—The Hess-Pontiac Spring & Axle Company, Pontiac, Mich., is constructing additions to its factory which will double the output. It is expected ultimately to arrange the factory so that the steel may come into it at one end and emerge as finished product at the other. At present the company enjoys the distinction of being probably the greatest manufacturer of automobile springs exclusively in the world.

Nine-Hour Working Day—The Aluminum Castings Co.'s two local plants in Niagara street and Elmwood avenue, Buffalo, N. Y., commencing on October 1 will put its entire business on a 9-hour basis. The original intention of the concern, according to Manager Adams, was to put the nine-hour day into effect on May 1, but the strike of the molders and coremakers in the plants prevented this. The company will continue to maintain a strictly open shop, as the officials believe this is the ideal way to pay high wages, thus giving every man opportunity to be remunerated according to ability and not to be paid stipulated salaries.

Overland's Fire Alarm System—What is claimed by fire insurance underwriters to be the most complete fire alarm system to be found in any manufacturing plant in this country is that recently installed throughout the Willys-Overland plant at Toledo, O. The installation of this system cost the organization $12,000. There are 82 alarm stations throughout the factory and offices. Over 25,000 feet of copper wire was necessary to complete the system and all of the wire was run through conduits. In connection with the fire alarm system is a well trained fire brigade composed of employees of the company. The headquarters of the system is in the new transformer building recently constructed inside the plant and by colored incandescent lights the location of any fire is immediately flashed on the lighting board.

Stegeman in New Plant—The Stegeman Motor Car Company, Milwaukee, Wis., manufacturing a line of commercial vehicles in 1 to 6-ton sizes, is now comfortably located in its new works in Bay View, Milwaukee. The general offices are at 606 Linus street. The new works give the company an annual capacity of 500 trucks, including motor fire and police apparatus, in which line the company has made remarkable progress. A campaign for new agencies has been started by President Oscar Stegeman. The company has been in business 3 years and until now was located at 1148-1172 Holton street.

Recent addition to the Chalmers factory in Detroit



Wear-Compensating Casing; Small and Very Useful Tool; New Toilet Case for Tourists; Construction of Klaxet; Double Insulation Plug; Oil Gauge for Fords; Applas Curtains

M and M Tire Casing

ANTICIPATING the wear a casing is bound to undergo, the M and M Tire Company, Inc., Trenton, N. J., has designed a casing, Fig. 1, in which the inner surface section of the tread portion is shaped convex. This form of the casing compensates for the wear in the following manner: As the tread wears off, the convex section is pressed outward by the inflated inner tube and gradually assumes a flat and then a concave surface. The convex side portions of the casing are so designed in order to counteract flexure, which is very great along the side of the casing. The tire casing is made, according to its manufacturer, of the best grades of rubber and cotton fabric, and is guaranteed to last and serve for from 5,000 to 8,000 miles.

Morgan Combination Tool

B. Morgan, Newport, R. I., has devised a combination utility tool which is as simple in construction as it is manifold in possibilities of application. It consists of few, strong parts; a foot, an upright secured to it, a nut turning on the latter and located within a yoke which is a part of a movable clamp. This clamp and the foot are slotted. The nut is operated by a ratchet lever which works within an arc of 240 degrees. All parts except the nut, which is of brass, are made of hard steel. Among the numerous applications to which this tool may be put are those of a hand vise, drill jig, vulcanizing clamp, valve lifter, wrench or light jack. It is being manufactured in two sizes to fit the toolboxes on various cars.

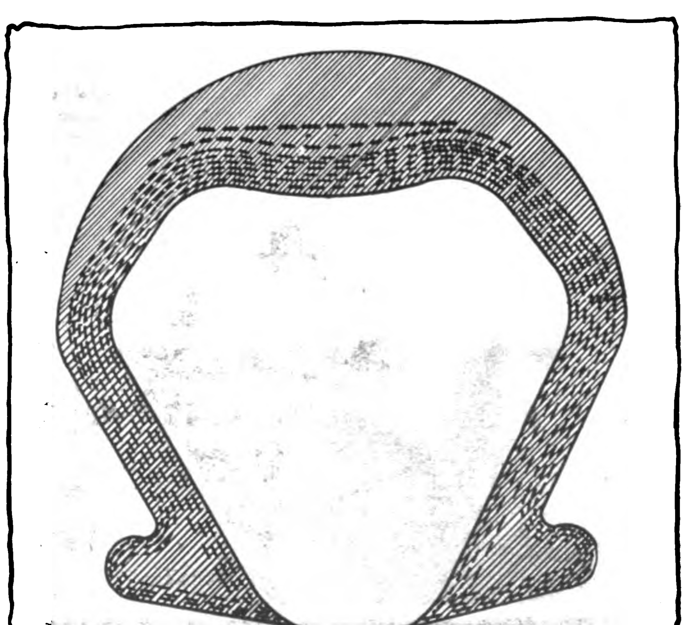


Fig. 1—Sectional view of wear-compensating casing

Bussert Automobile Toilet Case

To provide increased comfort for automobile tourists, T. J. Bussert, 5433 Russell avenue, Los Angeles, Cal., has constructed a portable toilet case, Fig. 4, which is attached to the running board of the automobile and contains whatever small articles are required by automobilists going on a tour lasting for several days. The case is a box which has a door hinged to one side of it, and when this door is opened a mirror hinged to the top front edge of the case becomes available. The latter may be locked in place by a screw moving in a guide. The back wall of the box has two interior extensions dividing it into three compartments, the upper and lower of which provide spaces for useful small accessories. The middle compartment is filled by a water tank W from which the water is taken through a small cock. To the wall of the lower compartment a board is so hinged that it may be put in place horizontally to provide a base for the washbasin B which, when the case is not in use, is secured to the tank by hooks.

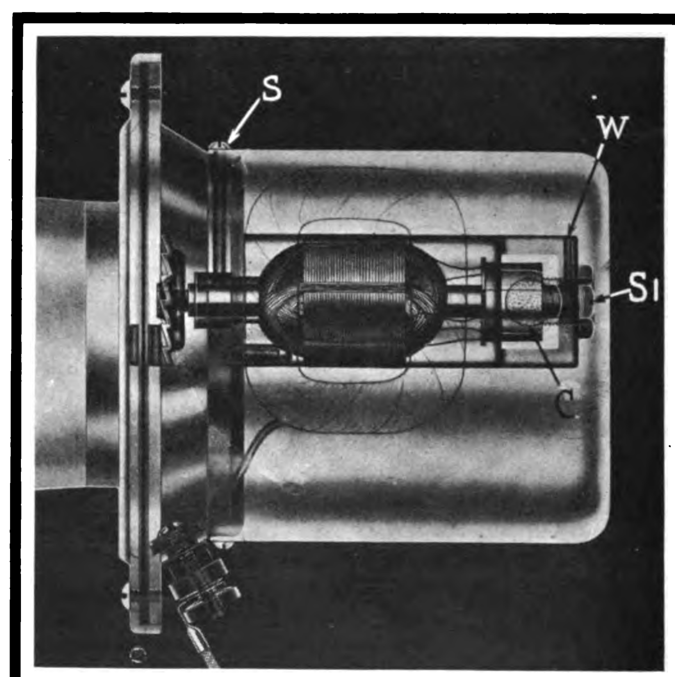


Fig. 2—Phantom view of new Klaxet electric signal

Details of Klaxet Horn

In the July 4 issue of THE AUTOMOBILE we announced the latest type of electric horn of the Lovell-McConnell Manufacturing Company, Newark, N. J., which has since been named the Klaxet, to indicate its relationship to Klaxon and Klaxonet. The Klaxet is somewhat smaller than either of these horns, but works on the same principle, viz., the motor-driven ratchet wheel striking a steel button while rotating at high speed. The accompanying ghost view of the Klaxet, Fig. 2, brings out the principal points of difference between it and the other types. The motor is practically identical with that of the Klaxonet, but while in the latter it is mounted under an angle of 30 degrees to the horizontal, the Klaxet motor has its axis disposed horizontally in the casing, which is thereby made lower. The other changes are minor and along the line of simplification, a number of details and refinements of the larger types having been modified to that extent. In Fig. 2 C is the motor commutator and S1 the screws by means of which the pitch of the sound is adjusted. The oil wells for lubricating the mechanism are shown at W, Fig. 2, and the shell at S. The

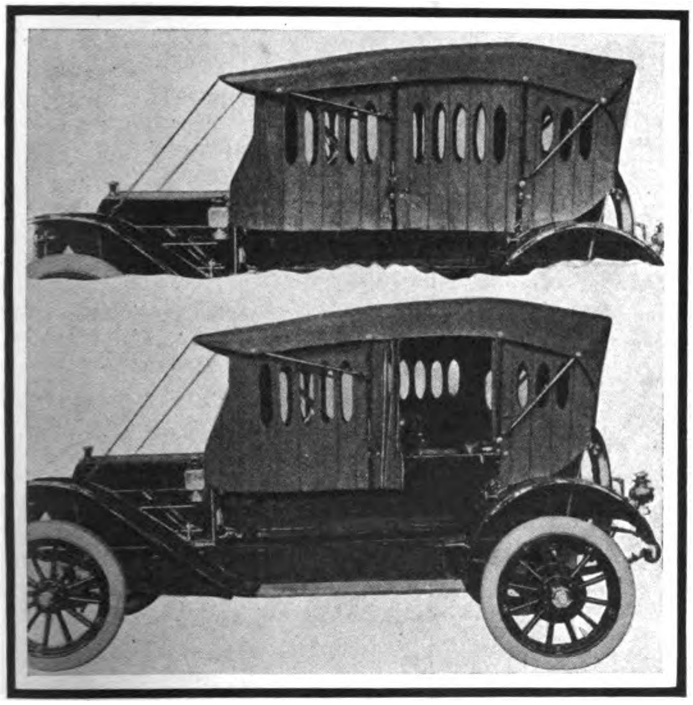


Fig. 3—Applas automobile curtain operated from inside

casing is attached to the collar surrounding the diaphragm by a series of screws indicated in white in the illustration. The binding posts are also shown in the figure.

Short-Circuit-Proof Plug

The H. W. Johns-Manville Company, Madison avenue and Forty-first street, New York City, has just brought out a new spark-plug which, judging from its construction, appears to be absolutely proof against short-circuits. It is the J-M plug, which consists of a sheet-steel shell, a platinum-iridium alloy electrode and a double insulation. Around the electrode seven sheets of mica are arranged and these again are encased in a layer of porcelain to insure double insulation. To provide non-leaking joints asbestos rings are used for packings.

Eclipse Gauge for Ford Cars

Owners of Ford cars who desire to install a glass gauge on the crankcases of their cars, to enable them to tell at a glance the level of the oil in the base chamber, can now obtain an accessory suited to their requirements. This device is the Eclipse gauge of the Emil Grossman Company, 250 West Fifty-fourth street, New York City, shown in Fig. 5. It is 3 1-2 inches long and 1 inch thick and consists of a thick glass tube held in a brass cup at each end. The lower cup is threaded for 1-4-inch pipe at two diagonally opposite points; the upper cup is bored with a small vent and both cups are held together by a long screw. In installing the gauge the lower petcock is removed from the crankcase and a short piece of 1-4-inch

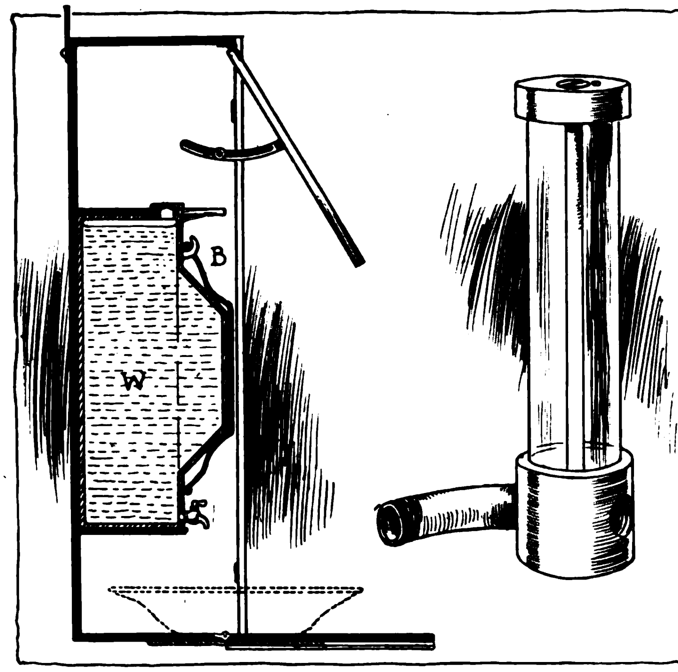


Fig. 4—Bussert automobile tourists' toilet case. Fig. 5—Eclipse oil gauge for Ford car crankcases

pipe, which is furnished with the gauge, is inserted in its place, while the petcock is screwed into the opposite thread of the lower cup which in turn is screwed onto the short piece of pipe. The level of the oil in the crankcase should be such that the lubricant stands 1 inch high in the gauge.

Applas Automobile Curtains

A new type of side curtain which may be opened and closed from inside the car while it is running is the design made by the Applas Curtain Company, 601 Ford Building, Detroit, Mich. This curtain consists of a series of accordion pleats of waterproof material, each of which is provided with a vertical celluloid window. The tops of these pleats slide on nickel-plated rods, one of which is fastened to each side of the top, and when the curtains are to be put out of use the pleats are shoved together, the rods are snapped to them and the whole equipment is attached under the flat portion of the bow of the car top. The bottom ends of the curtain pleats are secured to the inside of the body by knobs.

Electro Auto Duster

Under the name of Electro Dust-Absorbing Duster the Consolidated Sales Company, of Glens Falls, N. Y., sells a fabric which is said to be adapted for cleaning the surface of the automobile of dust and like impurities as quickly as it is brought in touch with them. The duster consists of a fine grade of cloth impregnated with a dust-absorbing chemical not only collecting but also holding the dust, so that in using this cloth one need not dirty one's hands as when an ordinary dust-cloth is used. The same cloth may be used for cleaning all portions of the car, although the maker recommends that one cloth be applied in cleaning the body and another for the very dirty parts, such as the wheels, mudguards, etc.

Auto Vacuum Suction Cleaner

The Auto Vacuum Cleaner Company, Milwaukee, Wis., has devised a very practical device for cleaning the upholstery, etc., of the automobile with the exertion of any power. The apparatus is a vacuum cleaner which consists of a suction nozzle adapted to be clamped to the muffler. The pressure of the gases rushing out of the muffler and passing through the nozzle produces a suction and exhaust the air surrounding it, which in turn exhausts a hose through which the dust from the upholstery is ejected.

AUTOMOBILE Tire Tread Grip—Being of the anti-skid chain type.

This patent relates to a tire grip. Fig. 1, which is composed of two parallel chains encircling the tread and supporting its two sides. The chain links are twisted to the right and left sides, respectively, and spaced by rigid links connecting opposite chain links. The length of the chains is adjustable by lengthening or shortening the sectional side chains which are arranged on the sides of the tire to hold the grip chains.

No. 1,035,586—to Carlton L. Hoff, York, Pa. Granted August 13, 1912; filed June 15, 1910.

Sleeve-Valve Two-Cycle Motor—In which a rotating sleeve opens and closes the cylinder ports.

The subject matter of this patent a two-cycle sleeve valve motor, is shown in Fig. 2. It consists of a cylinder C, bolted to a crankcase C1, and forming with the latter a gastight chamber which may be made to communicate with the interior of the cylinder through the passage P. The cylinder has ports Q1 and Q2 for inlet and exhaust, respectively, which may be placed in or out of communication with the combustion chamber by the sleeve valve S. The latter is carried inside the cylinder and does not move up or down, but it is rotated by a worm W carried by the piston P1 and engaging a nut member formed on the sleeve.

No. 1,035,600—to Charles C. Keyser, Pensacola, Pa. Granted August 13, 1912; filed December 22, 1911.

Process of Making Artificial Rubber—Which consists in heating certain organic compounds in the presence of inorganic condensing agents.

This patent describes a process for making artificial rubber by heating a drying oil, for instance, wood oil, with amido derivatives of aromatic hydrocarbons together with a condensing agent, such as chloride of zinc.

No. 1,037,158—to Leon Lilienfeld, Vienna, Austria. Granted August 27, 1912; filed June 17, 1910.

Transmission Mechanism—In which the driving gears are carried by sleeve which may be locked on or left out of engagement with the shaft on which it is mounted.

In the transmission, Fig. 3, the gears are carried by a driving shaft D and a driven shaft D1 and incased in a housing C. The driving gears are carried by a sleeve S, slideable on the shaft and capable of frictionally engaging the same by the operation of a clutch C1. The driven gears may be selectively brought to mesh with the driving ones. Shifting of gears as well as engagement and disengagement of the clutch are brought about by the operation of a set of rocker arms.

No. 1,035,152—to Leon J. Campbell, Chicago, Ill. Granted August 13, 1912; filed January 23, 1911.

Automobile Suspension Design—By means of which extremely low placing of the center of gravity may be obtained.

In this patent an automobile, Fig. 4, comprises a body and running gear. The lower portion of the body has sills S, secured to it, each of which carries a pair of upright guides U, between which the axle A is adapted to travel, the uprights having their upper ends connected to the upper series of a set of elliptic springs S1. Near its end the axle is fitted with clamps supporting rods; the ends of the rods carry rollers which contact with the inner, opposing faces of uprights U and permit the axle to vertically reciprocate between them and remaining in alignment with the guides.

No. 1,035,461—to Alva Montel, Claypool, Ind. Granted August 31, 1912; filed March 21, 1912.

Tire Carrying Device—In which open annular brackets are revolubly mounted on supports.

This patent relates to a tire holder, Fig. 5, which consists of two depending members D, which are mounted on a supporting frame and in which adjustable brackets B are carried. The latter are provided with tubular portions which horizontally project from it and through which arc-shaped members A extend; the latter are revoluble in the tubular projections so that they may carry the tire not in alignment with the brackets B, but at an angle thereto.

No. 1,036,020—to Andreas M. Sonnichsen, Milwaukee, assignor to Auto Parts Manufacturing Company, Milwaukee, Wis. Granted August 20 1912; filed August 31, 1911.

Correction—In the July 18 issue of THE AUTOMOBILE, the address of Elmo L. Wright and Thomas M. Biossat, inventors of the differential gearing described in patent No. 1,032,261 was given as Lafayette, Ind., due to an error. The correct address is Lafayette, La.

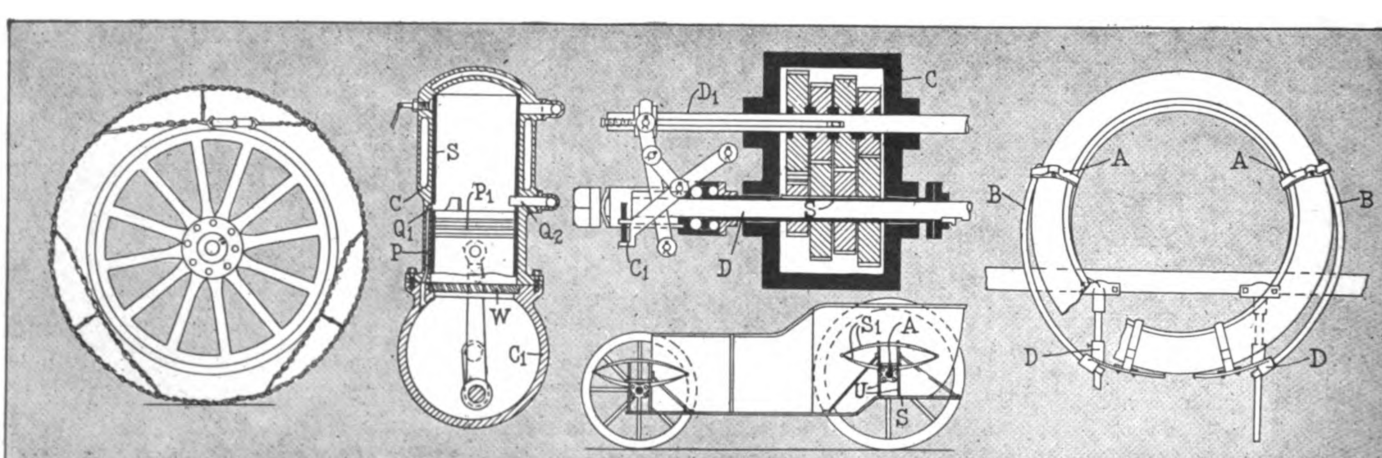
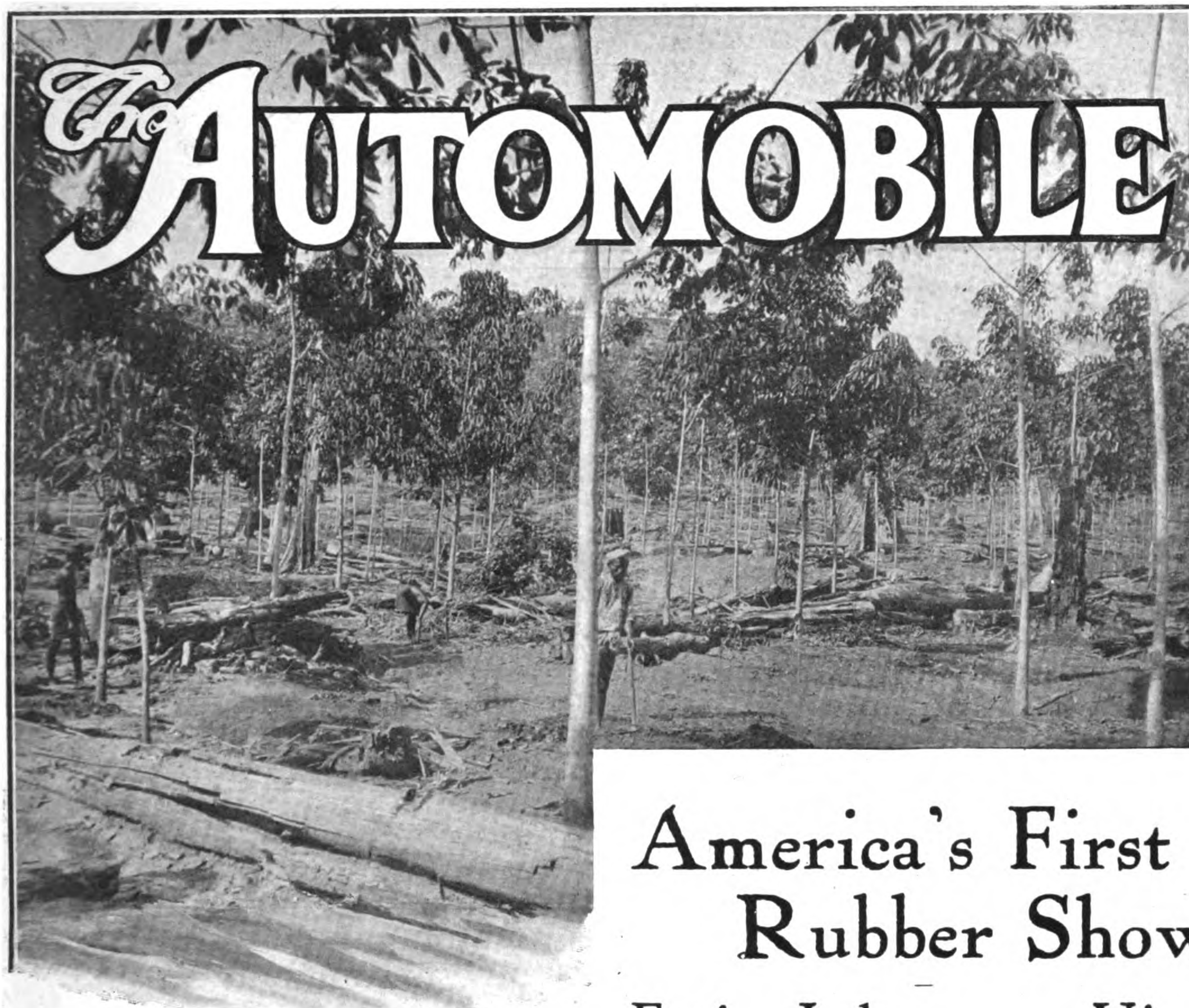


Fig. 1—Hoff tire chain. Fig. 2—Keyser motor. Fig. 3—Campbell gearset. Fig. 4—Montel suspension. Fig. 5—Sonnichsen tire carrier

The AUTOMOBILE



How a typical 2-year old plantation of hevea rubber trees appears in the Straits Settlements where a vast acreage is cultivated

America's First Rubber Show

Entire Industry on View

Brazil Is By Far the World's Heaviest Producer of Automobile Crude Rubber

MOST complete in the history of the rubber industry will be the Third International Exhibition of Rubber and the Allied Trades, which will be formally opened next Monday at the Grand Central Palace.

There will be shown samples and stocks of crude rubber of every commercial grade representing all the rubber-producing countries of the world and several in which rubber raising is still in the experimental stages.

There will be a whole floor devoted to crude rubber, another to chemical processes, reclaiming and other secondary subjects and still another to machinery, appliances, manufacturing and tools used in all branches of the industry.

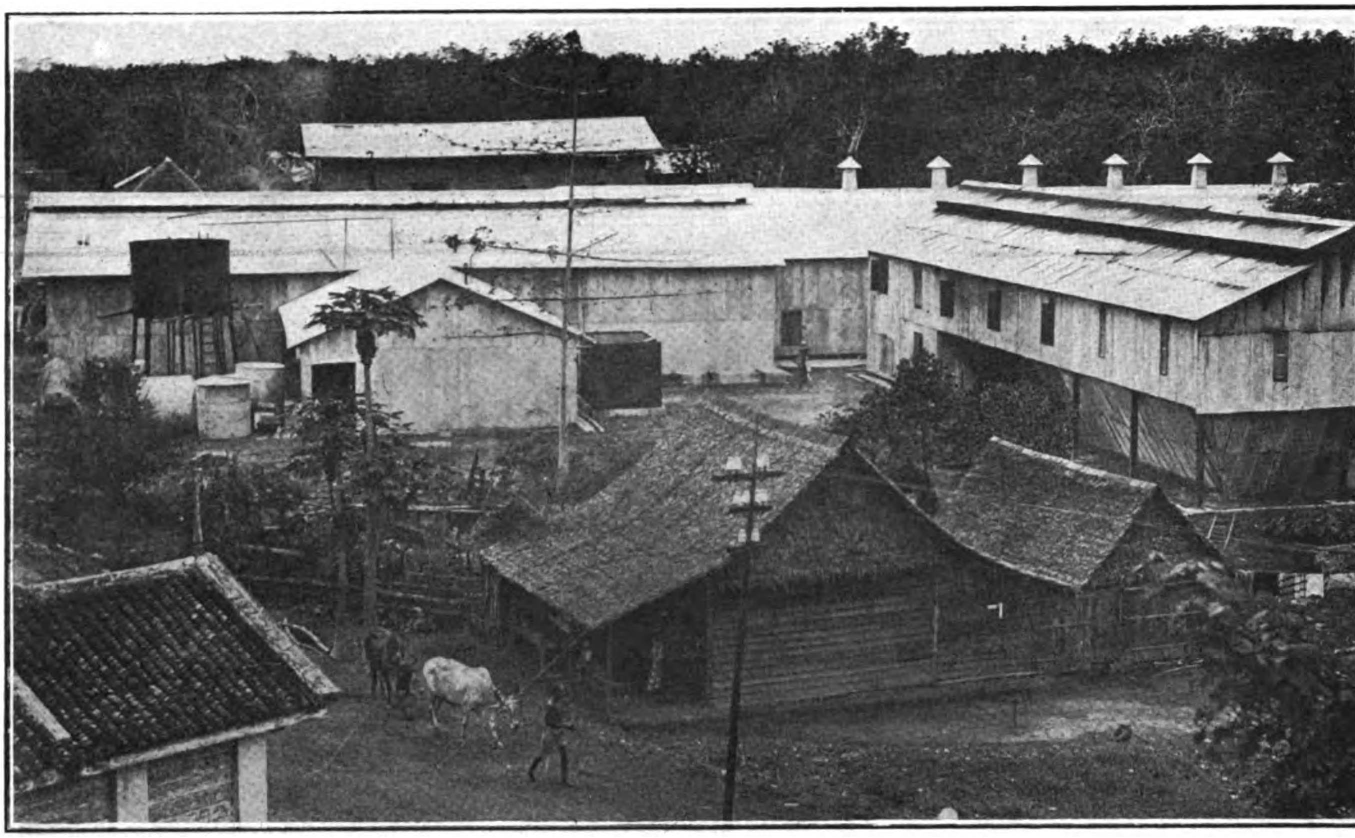
During the exhibition, which will extend from September 23 to October 3, a formal conference of the allied trades with the representatives of the rubber industry will be held.

To the general public the show of crude rubber will probably prove the most attractive section of the exhibition. This is housed on the balcony floor of the building, designated as the third floor. There are two grand divisions, geographically, that produce rubber from the automobile viewpoint. South America and the Amazon Valley is first and the East Indies and Southern Asia, second. Roughly speaking, the bulk of the indigenous rubber comes from the Amazon valley and the bulk of the cultivated rubber from Malaya, Ceylon, and the Asiatic countries. Africa and Central America also raise some of both kinds. There is some cultivated rubber marketed from Brazil and some indigenous varieties produced in the East.

Brazil, by all odds, is the heaviest producer of crude rubber at present. In consequence, its show space is impressive and the exhibits go into much detail. The Brazilian show occupies nearly half of the floor. Malaya, Ceylon, Hawaii and a score of other producing sections are represented with magnificent exhibits. All told it is estimated that there are in the neighborhood 190 varieties and grades of crude rubber shown, the whole mass weighing over 150 long tons and worth probably $350,000.

The setting of the Brazilian exhibit is artistic and effective. On the walls surrounding the displays of the various states are mural paintings showing in panorama scenes along the Amazon from its mouth to the Peruvian Andes and the Bolivian frontier. They depict in pictorial form the country where the rubber grows, and spread out before the pictures are great heaps of the actual rubber that was grown in the territory shown in the pictures.

One pile of rubber from Manaos, representing the product of the State of Amazonas and shown on the north side of the



Type of factory for making rubber for shipment to market of the type conducted in British Malaya by hundreds of great estates

hall, weighs 30 long tons. The most striking element of the exhibit is one biscuit that was specially made for the exposition, weighing 1,450 pounds.

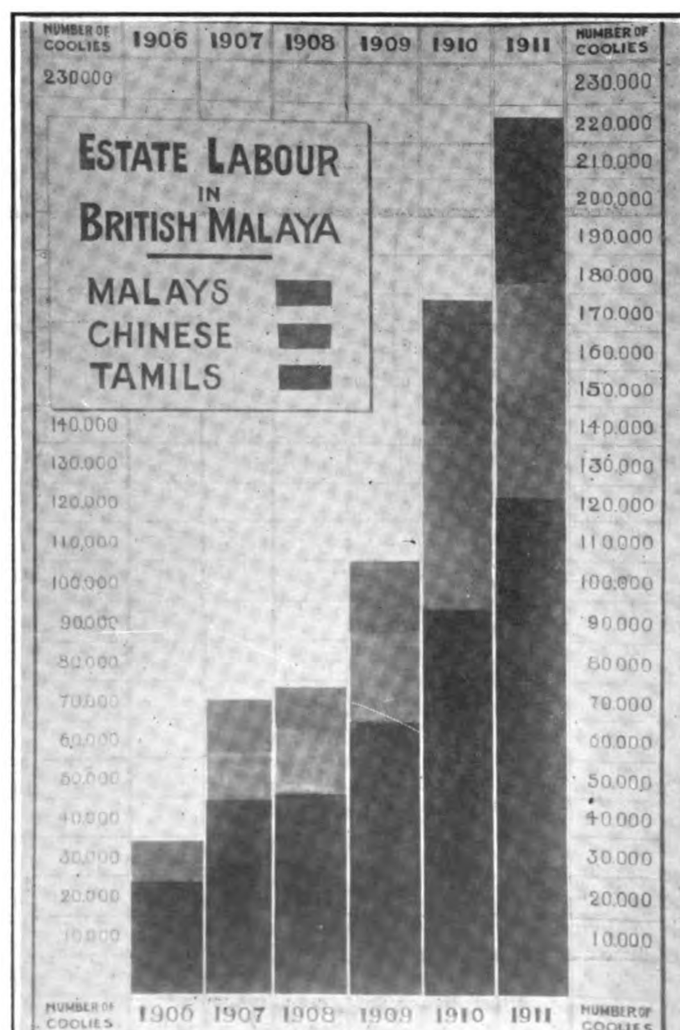
The Brazilian exhibit is under the special patronage of the Minister of Agriculture, Pedro de Toledo, and the government is represented by Rear Admiral José Carlos de Carvallos, Count Candido Mendes de Almeida, Dr. Eugenio Dahne, representative of Dr. de Toledo's department in the United States; Manoel Lebato, delegate from Amazonas; Argollo Fillio, delegate from Bahia; Oscar S. Moraes, Commercial Museum, Rio de Janeiro, and a number of others.

The chief elements shown in the Brazilian exhibit are lots of up-river fine, which in reality comes in large units; up-river coarse, which is mostly in smaller parcels; islands fine, and islands coarse, in flattened pieces that look something like a muskmelon that has been stepped on by an elephant; Caucho, the product of the castilloa tree, in slabs and balls; Madeira, in large biscuits and diversified forms, and numerous other types of crude.

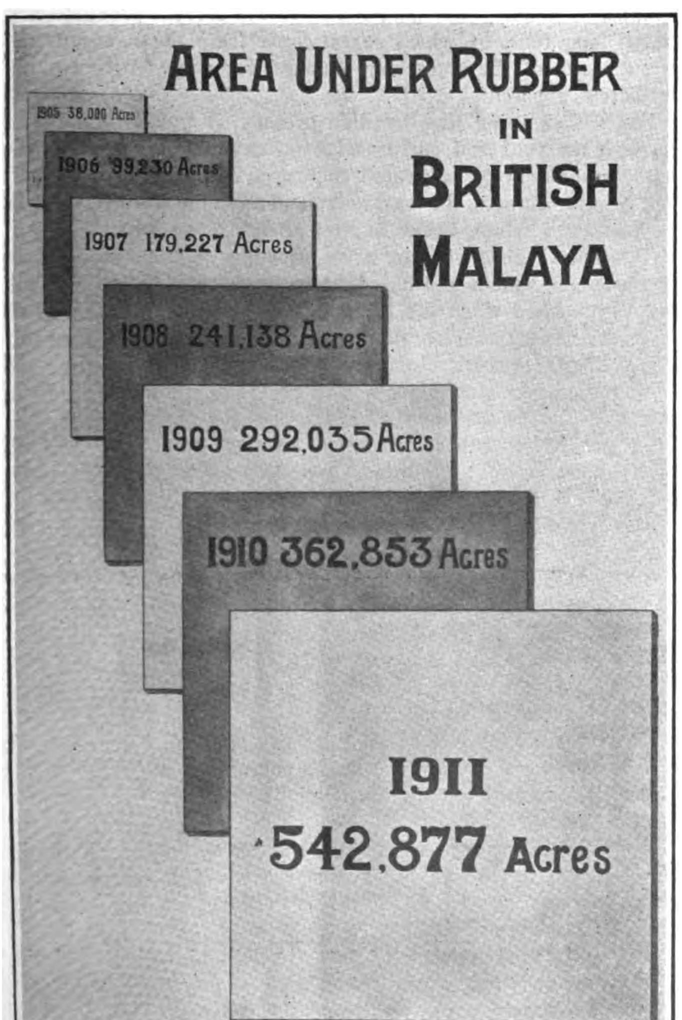
There will be seen a rubber forest and specimens of trees of all the important types of rubber producers. Tapping, gathering, coagulating and smoking by all the processes in use will be displayed. Dr. Chequeira Pinto, inventor of the Pinto process of coagulating without smoke, will show the details of his system and its possible effect upon the future of the industry.

In the section devoted to cultivated rubber, the exhibits of Malaya, or the Federated Malay States on the Siam peninsula, and those of Ceylon are the largest and most important. The product of these two countries is marketed in London under the general trade designation of Ceylons. The rubber men of Malaya protest against this practice and state that there is a considerable difference between their rubber and that grown in Ceylon. They hold that the rubber of Malaya is better than that of Ceylon and the Ceylon growers take an obviously opposite view.

The recent fortnightly auction at London disposed of 1,000 long tons of plantation rubber, setting a new mark for activity that will surely be excelled long before the first of the year as



Packing the crepe according to method used in Perak—Note the difference between this plan and the crudeness of the jungle method



shipments are constantly growing heavier. Last year Malaya produced 23,914,263 pounds of rubber for export, which is about twenty-three times the amount exported in 1906. For 1912 it is estimated that the export total will reach 40,000,000 pounds. This, of course, includes wild rubber as well as the plantation grades.

The stock from which the cultivated Malaya rubber is grown is identical with that in which the Ceylon product had its source. All the cultivated rubber of the Asiatic fields originated from the seeds secretly taken from Brazil by Mr. Wickham nearly 40 years ago.

The main difference between the indigenous and the plantation rubbers may be found in the method of preparing them for market. The wild rubber of Brazil from which up-river fine Para is produced is smoked over fires in which palm nuts are burned. This imparts certain qualities to the Para rubbers that makes them different from the latex treated in any other way.

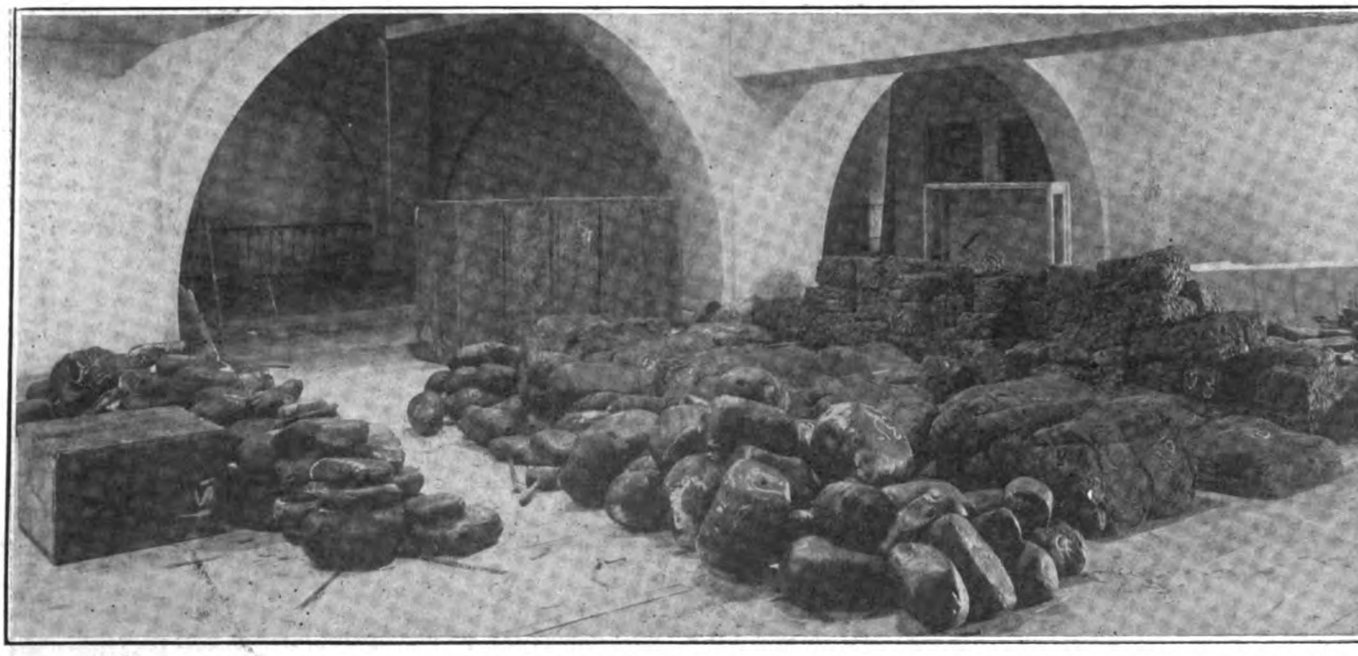
The plantation rubber is not smoked in biscuit form. The regular process involves smoking, but it is different in many respects from that followed by the seringueiros of Brazil. After coagulation, which is produced by chemical action in many cases, the crepe is hung on racks and smoke from almost any kind of green wood is used to give it the finishing touches.

Opinions differ radically as to details in the methods to be used in producing plantation rubbers and to that fact alone may be charged the lack of uniformity in the product itself. But good progress is being made each season to reach such a stage of production that the grades of plantation rubber will be uniform.

At the forthcoming conference this subject is scheduled for intimate discussion.

As it affects the automobile industry, the rubber trade is of prime importance.

Tires form the chief element of expense in motor car operation. If the price level of the market should reach a basis of $5 a pound for up-river fine, which would mean at least that amount for pale crepe from the plantations, the cost of auto-



In the foreground are heaps of up-river fine, which is coarse, and in the background heaps of up-river coarse, which is fine

mobile tires would boom. If there is an average of 7 pounds of first-grade rubber in an automobile tire, the cost of the tire to the public would advance tremendously and might reach an average of $75 per tire, including tube.

This would mean an inevitable and crushing check on the use of automobiles, as the cost of operation would then run up to 8 cents a mile for tires alone.

Such an eventuality as $5 a pound for rubber seems improbable in the present view of things, but it should be remembered that in the spring of 1910 the price stood for a time at $3.10 a pound and the situation was exceedingly tense.

The heads of the various big plantation exhibits claim that the introduction of the plantation factor in the rubber industry has saved the automobile business as a broad, general and commercial element in civilization. Their reasoning is as follows:

Leaving aside the question as to how much plantation rubber is used for tire making, the mere fact that the supply of plantation rubber is available for many of the purposes to which Para was formerly put releases a big demand from the Amazon rubber.

Prior to the time the plantations came into commercial bearing on a large scale, the price of rubber advanced under the insistent demand from the automobile industry. Today that demand is represented by the annual consumption of 70,000,000 pounds, or about 31,000 long tons. If the current production is 90,000 long tons, of which 40,000 come from the Amazon valley, the size of the automobile demand for rubber becomes immediately apparent.

Exerted alone on the Brazilian product, it would send prices through the roof and put a period on automobile use. But the immense amount of cultivated rubber now coming on the market counterbalances the extra demand and the result is to be seen in Para selling below $1.20 a pound.

Plantation rubber is increasing steadily at the rate of 100 per cent. per annum and has done so since 1906. The limit will only be reached when the labor supply is fully employed to its economic capacity. Plantation men state that this will probably happen in the measurable future, but that in the meantime the system of checks and balances born of the plantations will force the price of rubber somewhat lower than the current level.

They state that rubber can be grown at 50 cents a pound with profit under present conditions and that when the labor problem is ultimately solved, the cost will only advance a trifle.

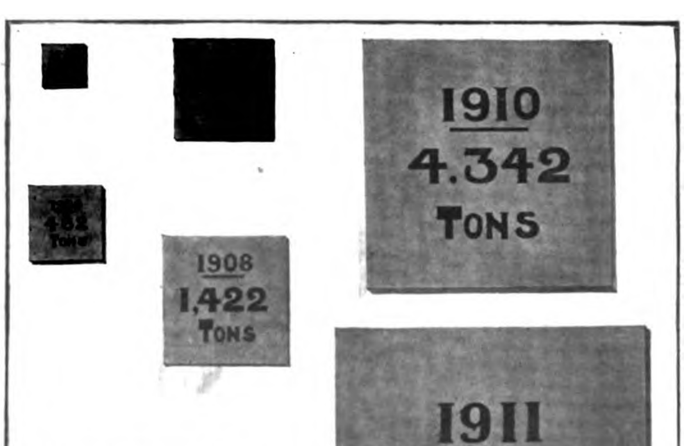
In the meantime the Brazilian government is working vigorously to increase production by cultivating the different varieties of rubber trees and by a gigantic system of subsidies. Mexico, already a factor in the world's problem of rubber, will certainly swell the total stock; Central America is being exploited in this regard also and in the tropical forests of Africa the brains and energy of nations are centered in the single object of increased production.

The cumulative effect of all this energy, pointed at one goal, will be a tremendous advance in the amount of rubber grown.

In that view of the situation it might seem that the price was due for a severe fall.

Right there, however, enters still another element of the problem. If the world's rubber production reached 200,000 tons a year, the new uses to which rubber will be put will keep the price steady, even if it be at a lower level.

Rubber is used universally by all civilized nations and the only reason it is not in use in hundreds of new ways at present is that the supply is too small and the price too high for economic service.



How the shipments of Malaya have increased

If the supply becomes greater and the price lower, the uses will spread like a prairie fire.

This must have the effect of steadying prices and make for a broad general market.

From the viewpoint of the automobile industry the aspect of rubber is reassuring.

While exact figures are exceedingly difficult to get, the approximate production of the world in 1912 may be estimated about as follows:

	Long tons
Amazon valley	40,000
Elsewhere in South America	2,000
Central America	5,000
Africa	10,000
Plantations	20,000
Elsewhere	5,000
Miscellaneous, low grades	8,000
Total	90,000

The American tire industry alone accounts for over 16,000 tons this year.

Among the most interesting things to be seen in the crude rubber exhibit is the pictorial display. Each section has a wealth of photographic beauty and utility. In the Brazilian section, aside from the mural paintings, there are hundreds of photographs to show conditions in the jungle, at the collecting centers, shipping points and at various stages from the wilderness to civilization.

In the Malaya and Ceylon exhibits it is safe to say that next to the remarkable showing of the cultivated rubber in all stages, the display of pictures will be most attractive. Leonard Wray, who is in charge of the Malaya exhibit, shipped in sixteen big packing boxes of photographs showing every imaginable phase of the rubber industry in his country. Many of the accompanying pictures for this article were reproduced from the originals that hang in the section over which Mr. Wray presides.

As will be seen from this article, they are different from other tropical pictures. They seem to carry with them the mysterious air of the Straits Settlements, but they are all new, having been taken only a short time before shipment, and show actual conditions in that wonderful land.

According to official reports of 1911 there were 542,000 acres in Malaya devoted to the raising of rubber. This year it is expected that the total acreage in cultivated rubber will be about 1,000 square miles. As the trees average rather more than 200 to the acre, the total number of trees in Malaya would be in excess of 14,000,000. When those trees are all in mature bearing, the product of Malaya will reach a stupendous figure, even without additional acreage.

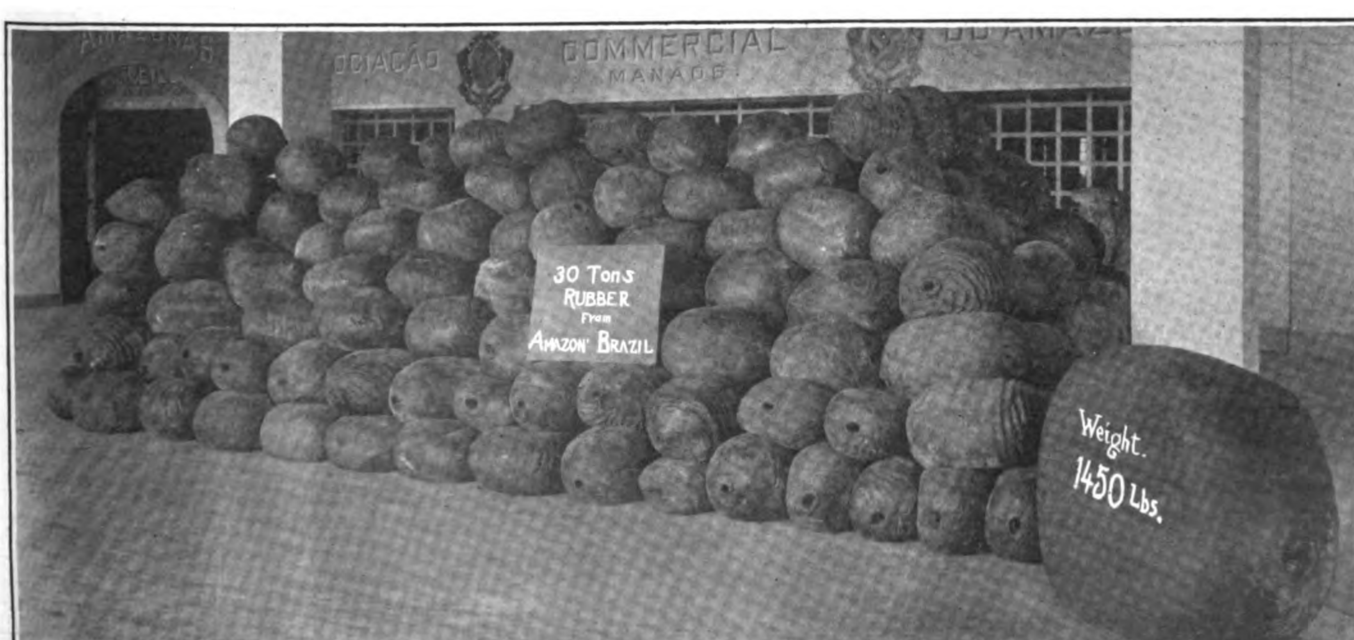
Exhibits of crude rubber in one of the Brazilian Sections

In the pictures an idea is conveyed of selected phases of the industry, showing the young plantations, the jungle, road conditions, mature fields and many other interesting points.

As far as Africa, Mexico and Central America are concerned, the showing at the exposition is representative, although these countries are not so important from the automobile viewpoint.

Dr. Walter Strong presides over the Hawaiian and Philippine exhibits. Rubber cultivation in Hawaii is of recent date, but it is said that conditions are ideal for it in a considerable territory of the archipelago. The trees planted in Hawaii are of Brazilian stock and the crude rubber exhibited is similar in structure to the specimens shown from Malaya and Ceylon. The form of the product is different, as the crepe is pressed into

(Continued on page 590)



Impressive show of Commercial Association of Manaos, 30 tons of high-grade crude in giant bescuits as they came from the jungle

United States Motor Company Awaits Action of Its Creditors

Court Has Adjudicated Parent and Constitutent Companies as Bankrupts—No Court Action Against Sales Offices

Factories Continue Operating as During the Past 90 Days—Brush and Thomas Units Closed—Many Bankers Among Creditors—$5,000,000 Cash Required to Rehabilitate the Company

SINCE the establishment of the receivership of the United States Motor Company the affairs of the concern appear about as follows: No plan of reorganization has been formulated and adopted so far. Until such a plan is agreed upon there will be nothing to present to any underwriter. The terms of the agreement will be arranged as quickly as possible, as all the factors in the problem realize that if anything is to be done it must be done without loss of time.

While the total indebtedness of the company is $12,200,000, nobody in trade circles looks for the dissolution of the company piecemeal as a result of the present action. To continue the business of the company will require additional capital to the amount of $5,000,000, to be raised by either assessment on the stock or by the issue of additional securities. The alternative is a sale under the order of the court.

All of the manufacturing units, with the exception of the Brush company, are continuing in operation practically the same as they have been for the last 90 days and the various retail selling organizations throughout the different cities are also continuing in operation, although the question of ancillary receiverships for them is being considered.

Indebtedness Exceeds $12,000,000

The situation so far as reorganization is concerned is developing slowly. There are two classes of creditors and each class is susceptible to division into several subordinate headings. The real question of reorganization will undoubtedly turn on the agreement or disagreement of the creditors as to participation. Summarized, the liabilities of the company may be divided as follows:

Due to banks	$4,200,000
Due to merchants	2,000,000
Due on debentures	6,000,000
Total	$12,200,000

The total indebtedness is divided into two classes, the first of which is represented by commercial paper bearing two indorsements. The other class has paper with only one indorsement. As an instance, it may be cited that the debentures bear only the signature of the parent company. Another example of the one-signature paper is where one of the constituent companies of the United States Motor Company issued a note to secure payment for money advanced or goods purchased for its use.

The two-signature paper consists of notes issued by the parent company and indorsed by one of the constituent units, or that issued by the constituent company and indorsed by the parent organization.

Practically all of the claims of the merchandise creditors are based upon more or less of the one-signature paper.

In case agreement among the interested parties cannot be reached as to the status of the different grades of paper, the matter will undoubtedly come within the view of the court for definite construction of the claims of each side. At present the single major question that must be settled is with regard to agreement among the creditors themselves.

Under the receivership action there are two courses open to the company. The first is reorganization under some plan that will take care of the creditors and allow the company sufficient working capital to manufacture and sell its product. The other is a sale under order of the court.

Regarding the first course it may be said that the company requires about $5,000,000 additional capital with which to satisfy the claims and to furnish working capital. This may be raised in two ways, the one by assessment of the present stock and the other by the sale of additional securities either to the present creditors in payment of their claims or on the open market. In the latter case the proceeds could be used to take up the paper.

The committee which is formulating plans for reorganization has not finished its drafting of the proposed plan. Anything that has been said so far about the amount of the assessment or the method proposed for levying it is branded as premature by the committee, nevertheless, the report has been circulated throughout the industry and in the financial district that the favored plan is for an assessment of from $20 to $25 a share.

According to recent statements coming from the United States Motor Company and the brokers who have made a specialty of handling its stock issues in the market, fully half of the stock of the company is alleged to be held by the following list of stockholders:

Anthony N. Brady, James C. Brady, J. S. Bache, Caroline W. Astor, Benjamin Briscoe, Samuel P. Colt, Frank Briscoe, H. Holbrook Curtis, Eugene Meyers, Jr., Thomas F. Ryan, Herbert L. Satterlee, Harry Payne Whitney, Richard Irvin, John Jacob Astor's estate and Charles G. Stoddard.

If the holdings of this group represents half the outstanding stock they would be required to put up $2,300,000 on a basis of $20 a share. The complete amount that could be raised would be about $4,600,000. If the rate of assessment were $25 a share the total proceeds would be $5,750,000. The latter amount would be sufficient, in the opinion of those most intimately connected with the company, to place it on a sound footing. Naturally, there may be some difficulty in executing such a plan as was prematurely announced.

The alternative proposition of issuing new securities for sale on the market or in payment of creditors involves a court adjustment as a condition precedent, or a continuance of the company as at present, depending upon the terms of the ultimate agreement.

The holders of the two-signature paper feel that they have some claim to seniority, but that claim is sharply at issue with the position taken by the holders of the one-signature paper. They insist that if there is to be another stock issue that a certain proportion of cash shall be paid to them. The smaller faction among the creditors is unwilling to take that view of the situation unless the same terms apply to them as well.

If no agreement is reached before the court sale, there are still several plans that may be followed to reach a reorganization. The assets may be bid in by a purchaser at auction; composition of the debts might be accomplished on a variety of bases, or in the last analysis, the individual assets of the company might be disposed of on the block.

Some form of reorganization is the only result that is seriously considered, but what it will be depends on a multitude of factors.

W. E. S. Strong and Robert Walker, who were named receivers, have also been named as ancillary receivers in each of the states where the company operated manufacturing plants. There are about forty retail selling companies, located in various cities and states, all of which belong to the parent company by stock ownership or otherwise and the question of ancillary receiverships in all those states is being considered at the present time.

The Providence Engine Company, manufacturer of steam engines and automobile parts, specifically running gears, crankshafts and machined parts, has been petitioned in involuntary bankruptcy on behalf of local creditors at Providence. The company is owned through its stock issues by the United States Motor Company. The preliminary hearing of the matter is set for September 18 in the United States District Court at Providence and if the matter takes its usual course Messrs. Strong and Walker will be named as receivers. As an individual corporation, the Providence company is said to be in excellent financial shape.

Except the Brush Runabout Company all the manufacturing plants of the United States Motor Company continue in operation to about the extent that they have for the past 90 days. The receivers obtained an order of court to advance money for the payrolls of the various plants from the general funds of the company and to make provision for administration. There is little activity, however, in any of the plants and there has been much less since the last of the 1912 product was completed and marketed.

In last week's issue of THE AUTOMOBILE a citation from the report made by Percy Martin on the various companies stated that in Mr. Martin's opinion the greatest necessity prevailed for active operation of the plants, so that their organizations might be retained and preserved. Now, it is stated by those most closely allied with the project of reorganization, that the arrangements will have to be made with the utmost speed in order to protect all the interests. They are united on the proposition that if reorganization is to be effected on favorable terms it must be made within 90 days.

The relations of the United States Motor Company with the E. R. Thomas Motor Company, of Buffalo, have been shrouded in more or less mystery for over a year. The facts in the case are that the United States Motor Company acquired practically the whole of the Thomas stock about a year ago, exchanging its own securities for the certificates of the Buffalo company and furnishing some other consideration.

The ownership of the Thomas company was kept a sort of state secret and officially it was denied repeatedly by officers of the United States Motor Company during the past year.

The Thomas company went into the hands of a receiver last month after F. R. Humpage, president at that time, failed to exercise an option to purchase the company from the United States Motor Company. The reason for the failure of Mr. Humpage to take over the Thomas was that he was unable to float his new securities in the condition of the money market or could not obtain the services of an underwriting house to handle the transaction.

The capitalization of the Thomas company is $2,400,000, of which $400,000 is 7 per cent. cumulative preferred. The remainder is common. There is no bonded debt. It is understood that Mr. Humpage succeeded in getting all the support required except $400,000.

As the Thomas company is now in bankruptcy court, the matter of considering it as in any way affecting the affairs of the United States Motor Company has not been pressed.

E. R. Thomas, founder of the company, is a creditor to a material amount.

At the time Judge Charles M. Hough received the bill of complaint filed on behalf of the Brown & Sharpe Manufacturing Company which resulted in the receivership, he noted the fact that the main questions involved in the bankruptcy action would require the utmost care in unraveling.

The court commented on the fact that the problems presented in the bill of complaint were exceedingly complex and charged the receivers to use great pains in reaching the exact facts. Hence, all the official statements made to the public have been couched in what might be termed glittering generalities.

No schedules of assets and liabilities have been filed so far, but work is being done on their preparation. The banking debts of the embarrassed company amount to about $4,200,000, and, as is well known, the Central Trust Company figures as the heaviest creditor. But the mere fact that it heads the list with claims of about $1,400,000 does not mean that it stands to lose that amount because each of the aggregate amounts owing to the various creditors may represent a large proportion of paper bearing two signatures, worth approximately its face value. Thus, the lists of creditors that have been published fail to tell the real story because they do not show the equities applying to any case.

In the specific case of the Central Trust Company, the proportion of two-signature paper involved is very high and the same might be said for other banking creditors who require the indorsement of one of the solvent constituent companies on the paper of the parent company, or vice versa, before entertaining it as a discount proposition.

The largest merchandise creditors also adopted this precaution to a considerable extent, and while the concerns that head the list appear to be involved for material sums, the actual fact is that they are protected almost as well as the bankers.

Complete Order of Court

The formal action of the court is outlined in the appended order which declares that the companies are bankrupt, in that that they are unable to meet their maturing obligations. The order authorizes the receivers to proceed on broad lines to conserve the property and make detailed report to the court.

The following order has been entered in the United States District Court, Southern District of New York, by Judge Hough:

And now, on this 12th day of September, 1912, this cause came on to be heard upon the bill of complaint and the answer of the defendants this day filed, admitting the allegations of the said bill, and joining in the prayer thereof; upon consideration whereof,

Now, upon motion of the solicitors for the complainant, and the defendants by their solicitors consenting thereto, it is

Adjudged and decreed that the defendant companies and all of them are now unable to meet their respective maturing indebtedness and that none of the said defendants are or will be able to meet same or any substantial part thereof at the maturity of the said indebtedness, or for a considerable time thereafter; that the complainant and the other creditors of the defendants are without adequate remedy at law and that said complainant is now entitled to the relief granted hereby, and that it is necessary for the protection and preservation of the respective rights and equities of the complainant and all other creditors of the defendants and each of them that the properties and business of all of the said defendants should be administered as an entirety in this suit through receivers to be appointed by this Court, in order that the rights and equities of all of the said creditors may be preserved, determined and adjudicated in this suit and the property of said defendants and each of them applied to the payment of the claims and equities of their respective creditors, pursuant to such adjudication as may hereafter be made herein; and that it is necessary that receivers of all of the defendants herein and of their respective properties should be appointed forthwith, with the powers herein granted. It is further

ORDERED, ADJUDGED AND DECREED AS FOLLOWS:

That William E. S. Strong and Roberts Walker be and they hereby are appointed receivers of the defendants, United States Motor Company, Alden-Sampson Manufacturing Company, Brush Runabout Company, Columbia Motor Car Company, Dayton Motor Car Company, and Maxwell-Briscoe Motor Company, and each of them, and of all of the properties owned or controlled by or in which the said defendants or any of them have any ownership or interest whether such property be real, personal, or mixed, of whatsoever kind and description and wheresoever situated, including all lands, real estate, buildings, premises, property and appurtenances owned, controlled, leased or operated by the said defendants or any of them, and all offices, furniture, fixtures, materials and supplies, finished product and product in the course of manufacture, books of account, records and other books, papers and accounts, cash on hand or in bank or on deposit, things in action, credits, stocks, bonds, securities, shares of stock in the corporations described in said bill of complaint as "selling companies" and all shares of stock, certificates of equitable interest and other certificates representing any interest in any property and all other securities of whatsoever character owned by the defendant companies or any of them on or in which they or any of them have any interest or which they or any of them control directly or in directly, deeds, leases, contracts, muniments of title, bills and accounts receivable, rents, issues, profits, tolls and income accruing and to accrue, as well as all interest, easements, privileges, franchises and appurtenances, and all assets and property of every kind, character and description whatsoever; with full authority immediately to take possession of and, until the further order of this Court, to carry on, manage and operate the said properties and to continue the business of the said defendant companies, in their discretion, until the further order of this Court, and to exercise the authority and franchises of the said defendants, to preserve and protect their properties in proper condition and repair, and to perfect the title and possession in and to said properties, and in their discretion to employ and discharge and fix the compensation of all such officers, managers, agents and employees as may be necessary for the proper discharge of their duties as such receivers and to make such payments and disbursements as may be needful or proper in so doing; to purchase, for cash or credit, such supplies, materials or other property as may be necessary or advisable in connection with the administration of the property and assets of the defendant companies; to sell the product or properties of the defendant companies either for cash or on credit, as may be usual or advisable in the business of the said companies or otherwise; to collect and receive rents, income, tolls and profits of the property of all the defendant companies; to make, subject to and upon the granting of further orders of this Court, such appropriate payments for and on account of accruing taxes, assessments, interest on mortgages, insurance, ground rents or other necessary charges as may be expedient or requisite to preserve the properties and assets of the defendant companies or any of them, and subject to and upon the granting of such orders, to pay and discharge any current obligations for labor and like charges as may be decreed by this Court to be entitled to priority. It is further

Ordered that said receivers be and they hereby are authorized and empowered to institute and prosecute, defend, compromise or adjust, intervene in or become parties to such suits, actions and proceedings, at law or in equity, including ancillary proceedings in state or federal courts, as may in their judgment be necessary or proper for the protection, maintenance and preservation of the property and assets of the defendant companies, and likewise to defend all suits, actions and proceedings instituted against them as receivers or against said companies or any of them, and also to appear in and conduct the prosecution or defense of any suits or adjust or compromise actions or proceedings now pending in any court by or against the said defendants or any of them, the prosecution, compromise or defense of which will in the judgment of said receivers be advisable and proper for the protection of the property placed in their charge or of the interests and rights of creditors and stockholders connected therewith; and generally to do all acts and things necessary or proper to be done to protect, maintain and preserve the properties of which they are hereby appointed receivers for the benefit of the creditors and stockholders of the defendant companies, with leave to apply from time to time, whenever necessary and as they may be advised, for further orders from this Court touching all and singular their rights and duties in the premises. Said receivers are further authorized to settle with, compromise or adjust, collect from or make allowance to debtors of the defendant companies and generally to do such things and enter into such arrangements, compositions, extensions or otherwise with debtors of the defendants as they, the said receivers, may deem advisable. And said receivers are authorized to enter into such arrangements with or take any such action in reference to the affairs of the companies described in the bill of complaint as "selling companies" as they, the said receivers, may deem advisable, including the power to said receivers to bring actions at law or in equity, whether original or ancillary, or otherwise against such "selling companies," and further including the power to said receivers to continue to operate or liquidate such "selling companies" in whole or in part and generally to incur such expenses, make such disbursements and do such actions in connection with said "selling companies" as they may deem advisable. It is further

Ordered that the said receivers keep and maintain all the properties and assets of each and every of the defendant companies separate and distinct from those of the other defendant companies, and to do such things and preserve and keep such records as shall maintain and preserve separately at all times the identities of the respective properties of the respective defendant companies and to open and keep separate books of account and records for each and every of the defendant companies so as to show at all times the separate business transactions of the separate defendant companies, and to take and preserve proper vouchers for all payments made by them in connection with the discharge of their duties as such receivers. It is further

Ordered, that the several bonds of each of the said receivers in the sum of one hundred and fifty thousand ($150,000.00) dollars, conditioned that he will well and truly perform the duties of his office and duly account for all moneys and property which may come into his hands, and abide by and perform all things which they shall be directed to do, with sufficient sureties to be approved by a Judge of this Court, be forthwith filed with the Clerk of this Court. It is further

Ordered and Decreed, that each and every of the defendant companies and each and every of their officers, directors, agents and employees, and all other persons, including creditors and stockholders of any of the defendent companies be and they hereby are required and commanded forthwith upon demand of the said receivers, or their duly authorized agent or agents, to turn over and deliver, to said receivers, or their duly constituted representatives, any and all books of aocount, vouchers, papers, deeds, leases, contracts, bills, notes, accounts, moneys and all other properties of or controlled by any of the defendant companies, real or personal, in his or their possession or control. It is further.

Ordered and Decreed, that the said defendant companies and each and every of them and each and every of their officers, directors, agents and employees, and all other persons claiming to act by, through, under or for said defendants, or any of them, and all other persons, firms and corporations, including creditors and stockholders of each and all of the defendant companies and including all sheriffs, marshals, constables and their agents and deputies, and all other officers are hereby adjoined and restrained from removing, transferring, disposing of or attempting in any way to remove, transfer or dispose of or in any way interfere with any of the properties, assets or effects owned by or in the possession of any of the said defendants, and all said persons, firms and corporations are hereby enjoined from doing any act whatsoever to interfere with the possession and management by said receivers of any of the properties of any of the said defendants or from in any way interfering with said receivers in the discharge of their duties or from doing any act to interfere with the administration and disposition in this proceeding of the affairs and assets of the defendants or any of them, and all creditors and stockholders of each and every of the said defendant companies, and all other persons, firms and corporations are hereby adjoined from instituting or prosecuting or continuing the prosecution of any pending actions, suits or proceedings at law or in equity against any of the said defendant companies and from levying any attachments, executions or other process upon or against any of the properties of any of said defendant companies, or from taking or attempting to take into their possession any of the said properties of any of the said defendant companies, and from issuing or causing the execution or issuance out of any court of any writ, process, summons, replevin or any other proceedings for the purpose of impounding or taking possession of any of the property of any of the said defendant companies. It is further

Ordered that the said receivers be and they hereby are directed within ten days from the date hereof, to mail to each and every creditor and stockholder of the defendant companies as the same may appear upon the books of the said defendant companies, a copy of this order and of the bill of complaint herein; such mailing to be in a securely sealed envelope, postage prepaid, and to be addressed to the said stockholders and creditors of the defendant companies at the last post office address known to said receivers and such service by mail is hereby decreed to be due, timely, sufficient and complete service of notice of this proceeding upon all such creditors and stockholders for all purposes. And it is further

Ordered that all such creditors of the said defendant companies and each and every of them be and they hereby are directed to file with the receivers at their office and place of business, Broadway and Sixty-first street, Manhattan, New York City, within sixty days from the date of this order, a duly sworn statement of all and any such claims they may have or assert against the defendant companies or any of them. Such statement shall be verified before any officer authorized to administer oaths by the law of the state where said claim is verified, and such statement of claim shall, where the same is evidenced by any written instrument, have the same attached to it. And it is further

Ordered that the said receivers shall on the 28th day of October, 1912, at 11 o'clock in the forenoon report in the Post Office Building, Borough of Manhattan, City of New York, to the undersigned Judge of this Court as to the affairs, assets, debts and business of the defendants and at such hearing all and any such matters as to the administration, disposition and sale of the assets and the affairs of the defendants, or any of them, and as to the continuance of the receivership, and as to the continuance of the business of the defendants and as to all or any of the matters alleged and as to any of the relief prayed for in said bill of complaint as may be presented by any parties in interest will be considered, and such further orders will be made in respect to any of the said matters, at such hearing or any adjournments thereof, as to this Court shall seem proper and equitable.

St. Louis Tire Factory

J. A. Swinehart Interested with St. Louis Capitalists in $500,000 Concern to Make Automobile Tires

Stock of the Company Is Entirely Subscribed and Factory Arrangements Practically Completed

ST. LOUIS, MO., Sept. 16—A factory and distributing station for automobile tires is to be established in this city. The capital of $500,000 for the new enterprise was raised among St. Louisans, except that supplied by J. A. Swinehart, of Akron, O. The stock is completely subscribed and the company will probably be incorporated sometime this week. It is stated that arrangements practically have been completed for a building in the central part of the city near to automobile row.

The value of the annual output of the new factory is to be $1,000,000, according to the promoters who also stated that raw materials can be brought to St. Louis as cheaply as they could to Akron and that when the Panama Canal is opened St. Louis will enjoy an advantage over any eastern location. Rubber comes from South America for the most part and Africa and with the opening of the canal could be laid down in St. Louis on attractive terms. The new company will feature two products, besides making the full line of solid and pneumatic tires and inner tubes. The Krots, a solid tire for light delivery wagons and electric broughams, will be one of the tires featured. The other feature is a new method of making pneumatic tires on a hollow car mold, instead of solid car mold with an internal expansion of steam to make every thread of the fabric receive the same uniform tension. The new St. Louis factory will be the sixth to manufacture solid tires in the United States.

Favor Truck Warranty

Fourteen Members of N. A. A. M. Formally Adopt 90-Day Guarantee—Few to Accept Stipulations

1 Year Considered Too Long—Defects Will Show Themselves in the Course of 3 Months

WHEN the uniform truck warranty was framed last spring and presented to the trade for acceptance, modification or denial, it was expected that the response would be immediate and practically unanimous in favor of adopting it as a whole. As has been outlined, the chief provision of the warranty was the specification that its terms covered only 90 days of service, or 90 days of ownership in the hands of purchasers.

There has been some delay on the part of the industry to take up the proposition and according to an announcement made public last week by the National Association of Automobile Manufacturers, fourteen of its members have actually adopted the standard warranty. There are thirty-three members of the association devoted to automobile truck making, thus leaving nineteen to take affirmative action.

Of the nineteen, five companies have declined to adopt the form as recommended, alleging that they do not consider it sufficiently liberal in its terms. A few companies want the limit taken off as far as time is concerned.

Outside the association the standard warranty has met with a good reception. Fourteen companies have adopted it and nine have agreed to adopt it in case a majority favor it.

The opinion of those who want the 90-day guarantee is that 1 year is too long, because if proper material or workmanship is lacking in a particular truck the defects will show within 90 days and that they should be protected from ignorant and careless operation.

The following tabulation shows the companies that favor the warranty as presented:

Members N. A. A. M.	Non-members
Baker Motor Vehicle Co.	Auglaize Motor Car Co.
Federal Motor Truck Co.	Brown Commercial Car Co.
Gramm Motor Truck Co.	Chase Motor Truck Co.
Kelly Motor Truck Co.	Champion Wagon Co.
Knox Automobile Co.	Dorris Motor Car Co.
Locomobile Co. of America.	Geneva Wagon Co.
Packard Motor Car Co.	Gramm-Bernstein Co.
Peerless Motor Car Co.	Harwood-Barley Mfg. Co.
Pope Mfg. Co.	Hatfield Auto Truck Co.
Reo Motor Car Co.	Kearns Motor Car Co.
Selden Motor Vehicle Co.	Sanford Motor Truck Co.
United States Motor Co.	Stewart Motor Corp.
The Waverley Co.	U. S. Motor Truck Co.
The White Company	Veerac Motor Truck Co.

In addition to these twenty-eight companies there are four members and nine non-members who approve the warranty just as it is written and will adopt it if a majority of truck makers do so. They are:

Members	Non-members
Nordyke & Marmon Co.	C. L. Barker
Ohio Electric Car Co.	Bowling Green Motor Car Co.
Walter Motor Truck Co.	Chicago Pneumatic Tool Co.
Willys-Overland Co.	Dayton Auto Truck Co.
	Marathon Motor Works
	Moreland Motor Truck Co.
	Poss Motor Co.
	Sandusky Auto Parts & Motor Truck Co.
	H. E. Wilcox Motor Car Co.

Only Motors Shown to Fire Chiefs

DENVER, COLO., Sept. 18—That gasoline and electric motors have almost supplanted the horse as means of propulsion for fire-fighting equipment is emphasized more strongly than ever at the fortieth annual convention of the International Association of Fire Engineers, which opened here yesterday. For the first time in history of fire apparatus exhibitions held in connection with these conventions, there is not one single piece of horse-drawn apparatus shown at exhibit at auditorium.

Motor equipment has crowded out the horse. Of the $100,000 worth of motor apparatus on exhibition most interest among 500 fire chiefs was created by the monster Gorham pump shown by the Seagrave company. It is claimed that it will deliver 1,000 gallons per minute at 20 pounds pump pressure. It has a multiple stage centrifugal turbine pump with 165-horsepower, six-cylinder motor, Ahrens-Fox combined steam and electric pump regulator, steamer on battery front truck. The American La France 65-foot aerial gasoline electric four-wheel drive. The Webb aerial truck raises the ladder in 4 seconds. It is a four-wheel drive gas-electric.

ALBANY, N. Y., Sept. 16—According to an opinion rendered here by Attorney-General Carmody, justices of the peace throughout the state must turn over to the state treasurer the full amount of fines collected for criminal violations of the law in relation to the use of public highways by motor vehicles.

The question was raised by State Treasurer Kennedy, who received the residue of a fine, after deduction had been made for statutory fees by Justice Isaac Allen, of Southport, Chemung County.

Canadians to Make Tires

MONTREAL, QUE., Sept. 16—So great has been the growth of the automobile tire market that it is now stated on good authority that the Canadian Rubber Company contemplates erecting a large factory for the exclusive manufacture of tires. The factory, which, according to the report, is to be built across the border, will be equipped with all the modern improvements for the manufacture of rubber tires of all sizes.

The factory of the Canadian Rubber Company in Montreal has been found insufficient to supply the demand, and for a short time has not been turning out tires in such large quantities as formerly. However, with the erection of a fine new plant on the American side, the Canadian Rubber Company intend to make a special line of automobile tires and market them in the United States.

Nyberg Seeks Hoosier Site

INDIANAPOLIS, IND., Sept. 16—Henry Nyberg, president of the Nyberg Motor Works, Anderson, has confirmed a report that the company is negotiating for a factory site in this city, with a view to moving its manufacturing plant to Indianapolis. The company manufactures the Nyberg line of pleasure and commercial cars.

Since locating in Anderson some time ago, the company has found the need for expansion, not possible in its present location. For several days negotiations have been under way for a site here. It is understood several prospective sites have been visited and are under consideration.

Bankrupt Wins Agency Suit

ELMIRA, N. Y., Sept. 16—In the action of the Foreman Brothers Electric Company, of Paducah, Ky., which concern recently went into bankruptcy, against the American Motor Sales Company, of Elmira, N. Y., for $25,000 damages for alleged breach of contract in that the Elmira motor concern refused to allow the Kentucky company to handle its automobiles after the insolvent condition of the latter was ascertained, Judge John R. Hazel in United States District Court convening in Canandaigua, N. Y., last Saturday, directed the jury to return a verdict of $1,250 for the Kentucky corporation, which amount was deposited at the time the arrangement was made. The Elmira automobile firm consented that judgment against it be made for the amount of the deposit.

Trade News of the Week

Sales and Advertising Convention Plans Are Being Formulated for Big Session at Indianapolis

Crude Rubber Lower as Result of Heavy Offerings at Recent Auction—Other News of the Industry

INDIANAPOLIS, IND., Sept. 16—The convention of salesmen and advertising men to be held here October 8-9 will attract a big attendance, according to all indications. The movement has been endorsed by the manufacturers and arrangements are being shaped up for the affair on a major scale.

A tentative program was outlined at a meeting at the Columbia Club, of a committee composed of Homer McKee, advertising manager of the Cole Motor Car Company; Paul Richie, representing the Marmon; D. B. Williams, advertising manager of the American Motor Car Company, and Guy Simon, vice-president of the Pathfinder company.

Representatives from each of the automobile factories in Indianapolis are meeting every night at the Columbia Club to appoint permanent committees and to perfect arrangements for the convention.

W. D. Nesbit, of Chicago, will preside over the convention as permanent chairman, according to present plans. An address of welcome will be delivered by Charles A. Bookwalter. Among the prominent advertising men who will make addresses on salesmanship will be Elbert Hubbard, of East Aurora, President Sheldon, of the Sheldon School of Salesmanship, John Lee Mahin, of the Mahin Advertising Company, Leroy Pelletier, Detroit, director of advertising for the Flanders; Martin Kelley, of the Fuller Advertising Agency, General Manager Deeds, of the National Cash Register Company, and General Manager Laskar, of Lord & Thomas.

Those who are promoting the convention believe that 1,000 automobile salesmen will attend.

Harry L. Archey, of the Archey-Atkins Company will have charge of the automobile parade to be held on Tuesday morning, October 8. The addresses by the several speakers on the science of salesmanship will be delivered at the afternoon sessions of the convention. A "Speedway" dinner, to be served in "laps," will be held Tuesday evening. The Wednesday morning program will be given at the Indianapolis Motor Speedway. A novelty will be an automobile masquerade, the machines being disguised with floral decorations. Demonstrations in skillful driving will be given on the Speedway track by representatives of local factories.

Crude Rubber Trifle Lower

Crude rubber sagged again during the past week, the movement being of small proportions. The immense amount of rubber marketed at the last fortnightly auction was offered at a time when the demand was a trifle slacker than it has been and the result was a small decline all along the line. Since then the receipts have been up to the average and the whole list has followed the downward trend of plantations. Locally the trade was quiet but of good size. Manufacturers bought little at first hand. The current level is on a basis of $1.16 a pound for upriver fine.

Jonz-Advance Merger Planned

LOUISVILLE, KY., Sept. 16—At a meeting of the stockholders of the American Automobile Corporation, of New Albany, Ind., which recently took over the plant of the American Automobile Manufacturing Company, a proposition to merge with the Advance Power Company, an automobile manufacturing concern of Chicago, was considered this week. The board of directors was authorized to do what it thinks best. It is understood that the merger will be consummated within the next month and the capital stock will be increased from $150,000 to $1,000,000.

The new concern will be known as the Advance Motor Car Company. It is planned to move the Chicago concern to New Albany where a 1,000-pound truck with a double friction drive to sell for about $400 will be manufactured. A salesroom will be maintained at Chicago. It is understood that C. D. Morris, of Chicago, president of the Advance Power Company, will hold the same position in the new concern.

At the meeting J. W. Baxter, of New Albany, Ind., was elected director in the American Automobile Company, to succeed L. A. Boli, Jr., retired.

Gotham's Motor Fire Apparatus

Fire Commissioner Joseph Johnson, of the New York Fire Department, includes in his tentative budget for 1913, an item of $46,504, for maintenance of the motor equipment of the department. He notes the fact that the department now has fifty-nine motor vehicles in service and that eighty-seven more will be installed early in 1913.

The motorization of the New York department so far exceeds that of any other city in the world and its completion to the last fire-fighting unit will ultimately be accomplished according to the commissioner.

Oakland Host to Its Managers

DETROIT, Sept. 16—The Oakland Motor Car Company entertained 125 branch managers, distributors and representatives at

Automobile Securities Quotations

Movements in the market for automobile and accessory securities were irregular during the past week. The feature of course was the sharp drop in the prices of U. S. Motor common and preferred just before and after the receivership was announced. The common broke down under small offerings to 50 cents a share bid but little stock changed hands at the bottom. The preferred sold for $2 a share for a few minutes. Since then, there has been a gradual improvement in both issues. The standard shares moved within a limited range, the general tone being steady. General Motors yielded a fraction in each issue.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	150	175
Ajax-Grieb Rubber Co., pfd	..	..	95	100
Aluminum Castings, preferred	..	..	100	102
American Locomotive, common	38	39	43½	44½
American Locomotive, preferred	106	107	108	109½
Chalmers Motor Company	..	..	148	155
Consolidated R. T. Co., com	5	10	13	16
Consolidated R. T. Co., pfd	10	20	50	60
Diamond Rubber Company	..	..	..	..
Firestone Tire & Rubber, com	179	181	275	280
Firestone Tire & Rubber, pfd	105	107	107½	108½
Garford Company, pfd	..	..	99	100
General Motors Co., common	42	43	38	39
General Motors Co., preferred	80	82	79¾	81
B. F. Goodrich Co., common (old)	243	245	78	79
B. F. Goodrich Co., preferred (old)	118¾	119¾	109¼	109¾
Goodyear Tire & Rubber, com	230	240	333	337
Goodyear Tire & Rubber, pfd	105	107	107	108
Hayes Manufacturing Company	..	..	..	93
International Motor Co., com	..	..	26	27½
International Motor Co., pfd	..	..	83¼	84¼
Lozier Motor Company	..	..	43	50
Miller Rubber Company	..	..	135	150
Packard Motor Company, pfd	..	..	105½	107
Peerless Motor Company	..	..	115	120
Pope Manufacturing Co., com	42	46	36½	38
Pope Manufacturing Co., pfd	72	77	72	74
Reo Motor Truck Company	8½	10	9½	10½
Reo Motor Car Company	23½	25	22	24
Studebaker Company, common	..	..	42¼	42¾
Studebaker Company, preferred	..	..	94½	96½
Swinehart Tire Company	..	..	98	100
Rubber Goods Company, com	85	95	100	105
Rubber Goods Company, pfd	100	105	107	110
U. S. Motor Company, common	30	32	1	1½
U. S. Motor Company, preferred	70	71	6	7
White Company, preferred	..	..	107	109

the factory last week. A banquet was tendered the visitors on Saturday evening at the Pontchartrain while in the afternoon the factory was inspected and plans for the coming season were discussed.

The following were among those present:

J. W. Martin, Minneapolis; H. L. Hornberger, San Antonio, Texas; H. L. Leech, Philadelphia; L. F. Smith, Atlanta, Ga.; M. D. Stone, Nashville, Tenn.; J. G. Kreig, Oskaloosa, Ia.; C. L. Barnes, Birmingham, Ala.; H. G. Sperring, St. Louis, Mo.; W. H. Head, Omaha, Neb.; W. J. Sutcliffe, Waterloo, Ia; T. N. Shambaugh, Kansas City, Neb.; Theodore Brinkman, Kansas City, Mo.; R. R. Hall, New York City; C. Briggs, East Orange, N. J.; V. N. Weidman, Jersey City, N. J.; R. J. Henderson, Toronto, Ont.; G. O. Wildhack, Indianapolis, Ind.; C. W. Tremain, Fort Dodge, Ia.; H. C. Turner, New York City; Dean Schooler, Des Moines, Ia.; S. L. Stone, Buffalo, N. Y.; L. W. Smith, New Haven, Conn.; C. E. Hoffman, Buffalo, N. Y.; Frank O'Dell, Pittsburgh, Pa.; W. L. Cameron, Dallas, Tex.; Will Tracey, Detroit; J. F. Montgomery, Detroit; F. C. Wood, Cleveland, O.; R. A. Wadsworth, Chicago, Ill.; J. F. Walsh, Boston, Mass.; W. C. Gray, Buffalo, N. Y.; Frederic Eaton, Pittsburgh, Pa.; R. A. Creek, Milwaukee, Wis.; H. L. Bunting, Cedar Rapids, Ia.; Frank Remsen, Atlanta, Ga. President Thomas Neal, General Motors Company, G. E. Daniels, J. B. Eccleston, F. H. Berger, E. H. Tinsman, J. H. Newmark, T. W. Wilson, L. P. Stone, H. H. Thatcher, H. A. Bauer, J. S. Hull, T. D. Culberhouse, A. N. Greene, H. R. Voit, N. E. Wahlberg, F. O. Ronk and K. B. Alexander.

Price as Bar to Synthetic Rubber

Dr. Carl Duisberg, director general of the Farbenfabriken Company, of Elberfeld, was one of the principal speakers at the session of the Eighth International Congress of Applied Chemistry in New York, Monday, and in treating the subject of synthetic rubber, stated that in his opinion while the production of synthetic rubber has been attained from the viewpoint of chemistry, it is still a long way in the future as a commercial possibility.

He has used automobile tires made of the substance and said that he had traveled 4,000 miles upon them. Price and other factors as well are the main reasons for the delay in synthetic rubber reaching a commercial level, according to Dr. Duisberg.

Market Changes for the Week

Few materials changed their prices during the past week despite the fact that a satisfactory degree of activity prevailed throughout the market. Tin rose $.12 per 100 pounds. Steel, copper and lead remained at their old quotations, that of beams and channels being nominal during the latter half of the week. Cottonseed oil declined $.20, gradually decreasing in price throughout the week and closing at $6.16. Up-river declined during the week $.02 owing to lack of trade.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.	.07½	.07½	.07½	.07½	.07½	.07½	....
Beams and Channels, 100 lbs.	.....	.....	.....	1.51½	1.51½	1.51½	....
Bessemer Steel, Pittsburgh, ton	24.00	24.00	24.00	24.00	24.00	24.00	....
Copper, Elec., lb.	.17 11/20	.17½	.17½	.17½	.17 11/20	.17 11/20	....
Copper, Lake, lb.	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	....
Cottonseed Oil, August, bbl.	6.46	6.45	6.45	6.42	6.36	6.16	— .20
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	....
Fish Oil (Menhaden)	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime	.85	.85	.85	.85	.85	.85	....
Lead, 100 lbs.	5.125	5.05	5.05	5.05	5.05	5.10	— .02½
Linseed Oil	.69	.69	.69	.69	.69	.69	....
Open-Hearth Steel, ton	25.00	25.00	25.00	25.00	25.00	25.00	....
Petroleum, bbl., Kansas crude	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl. Pa. crude	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine Up-river Para	1.17	1.16	1.16	1.16	....	1.15	— .02
Silk, raw Ital	......	4.15	....	....	4.15	....	....
Silk, raw Japan	....	3.77½	....	....	3.77½	....	....
Sulphuric Acid, 60 Beaumé	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs.	48.50	48.88	49.25	49.25	49.75	48.62½	+ .12½
Tire, scrap	.09⅛	.09⅛	.09⅛	.09⅛	.09⅛	.09⅛	....

Britons Planning Reprisals

Consider $25,000,000 Company to Check American Invasion of England and a Protective Tariff

Alco Truck Scales Sierras and is Now on Last Leg of Tour to Pacific Under Capacity Load

LONDON, Sept. 18—Representatives of nearly a score of British motor car makers determined at a meeting held here to form a manufacturing company capitalized at $25,000,000 to manufacture low-priced cars in the United Kingdom to compete with the present cars of American manufacture. S. F. Edge, Lord Montagu, of Beaulieu, and the Duke of Westminster took leading parts in the discussion which grew out of the invasion of British territory by the American manufacturers.

The concrete purpose of the company will be to make cars that can be sold for from $1,000 to $1,250 that will compare with present American cars of like prices in service and appearance.

In addition, the manufacturers under the leadership of the Duke of Westminster will ask the British government to impose a prohibitive tariff on American automobiles.

In urging protective action, Lord Montagu said that he could not denounce the American cars as cheap and bad, because he knew them to be cheap and good.

The conclusions of the meeting were that the formation of a great British company might check the sale of American cars in Britain and that the right kind of a tariff would stop importation.

Alco Truck Mounts Sierras

SACRAMENTO, CAL., Sept. 18—The Alco transcontinental truck, bearing a 3-ton load from Philadelphia to a consignee at Petaluma, arrived at the capital of California yesterday after crossing the crest of the Sierra-Nevada mountains. The final climb over the continental backbone required the surmounting of a grade that averaged 20 per cent. for over 2 miles. The crew presented a letter from the Governor of Pennsylvania to Governor Johnson and the arrival in Sacramento was marked by numerous official functions and celebrations.

The schedule calls for the truck to make the run to San Francisco today and the final stage of the journey to Petaluma, which lies north of that city and across the Golden Gate will be made on Friday.

At San Francisco a big demonstration has been prepared and the crew will be tendered a typical San Francisco welcome. The detailed facts and figures covering the whole run are to be prepared immediately showing, in addition to the usual facts, the cost per motion minute of operation from end to end.

Ward Bids $40,000 for King Assets

According to announcement made by Sidney S. Meyers, attorney for the merchandise creditors of the King Motor Car Company, of Detroit, Artemus Ward, one of the heaviest creditors of the embarrassed concern; has made a formal offer of $40,000 for the property of the company. Mr. Meyers says that he will recommend that the offer be accepted. In case such a basis of settlement is reached the dividend to the creditors will amount to about 17 per cent.

Should the deal be consummated on the basis of Mr. Ward's offer, it is not certain about the future activities of the company. It has been suggested that the work undertaken by the factory shall be continued under the new order of things as heretofore conducted.

Milwaukee's New Course

Promoters Have Had to Rush Preparations for the Big Races But Track Is Rapidly Rounding Into Shape

Compares Very Favorably With the Savannah Course on Which the Contests Were Staged Last Year

MILWAUKEE, WIS., Sept. 16—For the first time away from their native heaths, the grand prix of the Automobile Club of American and the William K. Vanderbilt, J., cup will be contested for in the Middle West next week over a brand new 8-mile road circuit in the town of Wauwatosa, Milwaukee County, Wis., provided by the Milwaukee Automobile Dealers' Association. In keeping with custom, the M. A. D. A. has hung up two additional trophies which are bound to become of international note, the Col. Gustave Pabst trophy and the Wisconsin Challenge cup, deeded by Milwaukeeans for the light and medium car events. The program of this great cup competition will be:

Friday, September 20—The first race for the Col. Gustave Pabst trophy at a distance of approximately 205 miles, and the first race for the Wisconsin Challenge trophy at a distance of 164 miles.

Saturday, September 21—The eighth annual competition for the William K. Vanderbilt, Jr., cup at a distance of 287 miles.

Monday, September 23—The fourth race for the Automobile Club of America's gold cup, the grand prix, at a distance of 402 miles.

For this, the first international racing competition in the very heart of the American continent, as convenient of approach from the Pacific as of the Atlantic Coast and intervening territory, the promoter, the M. A. D. A., has hung up $20,250 in gold coin to supplement the valuable gold cups as prizes. The grand prix alone will be accompanied by a purse of $10,000 in gold, one-half of this going to the winner. The winning of the Vanderbilt will bring to the victorious car and driver a purse of $3,000, given by the association, while $1,000 is offered to the winner of both Pabst and Wisconsin Challenge cups. The M. A. D. A. has gone previous promoters one better by offering a fourth cash prize in every event, and has in addition tacked a fifth prize in the grand prix competition.

Unlimited Speed Possibilities

Approximately $25,000 has been distributed over a little more than 8 miles of the finest country highways to be found in the vicinity of Milwaukee, forming a cup race course which, although entirely new, should have unlimited possibilities of speed, at the same time offering opportunity for spectacular work to satiate the hunger of the thousands of newly-made road racing enthusiasts whose knowledge of cup competition has been gained from reading the accounts of the Long Island and Savannah races of past years.

Friday was set as the day for the opening of the course to the drivers for first practice. This leaves but four days of practice running, but the crack pilots already here believe this sufficient, as all who run in the last three events will have two additional days for tuning up.

The M. A. D. A. was obliged to go at break-neck speed to complete the course in the desired shape by Friday of last week.

The measures of protection and safeguarding are better than at any previous road racing carnival. Thirteen companies of militia, taken from the First, Second and Third Wisconsin Infantry, National Guard, will alternate in police duties on the 3 days of racing. Sheriff Arnold, in whose police jurisdiction the town of Wauwatosa lies, will be on hand with 100 special sworn deputies, while Chief of Police John T. Janssen, of Milwaukee, has provided a squad of 100 uniformed policemen taken from the regular city patrol force. The militiamen will be clothed and equipped as for actual warfare, and will bivouac on the infield of the course during the period from Friday until Tuesday. They will number 1,050 men, divided into three squads, one for each day.

There will be accommodations for all who come, even if the crowds outnumber 150,000. The Milwaukee Automobile Club, which will act in one of the principal rôles of entertainers, is prepared to provide board and room for several thousand visitors on its 4-acre clubhouse grounds, 4 miles from the center of the city. Invitations have been issued to every member of the A. A. A. to partake of its hospitality during race week.

Construction of the grandstands, judges' stands, press tower, bleachers, the pit sections, and other building work was begun Sunday morning. The start and finish line is on Burleigh street, midway between the North and South Fond du Lac roads. The grandstands will be on the south side of the homestretch, the pits being directly in front of the box sections, on the right-hand side of the drivers. The judges', press and administration buildings will be on the north side.

Four Straightaways Form Course

The Wauwatosa course, on which the races will be run, is a quadrangle lying within the township of Wauwatosa, Milwaukee County, Wis. Four straightaways, each pair approximately parallel, all of them as straight as an arrow, have been selected to form the cup course. While most of the road racing courses of America and Europe have either touched or passed through a town or city, the Milwaukee course is the first which actually touches, at any point, the city limits of a large metropolis, such as Milwaukee is with its 410,000 inhabitants.

The course runs due northwest from City Limits turn for a distance of approximately 3 miles along North Fond du Lac road, an old military trail which formed the principal exit from the settlement of Milwaukee 75 years ago.

The turn from Town Line into South Fondy is a hairpin, the inside of the round before it was touched being a bare 45 degrees. This was considerably increased by cutting away a triangle of 45 feet, but with the improvement it will form the most difficult curve of all to be negotiated.

In comparison with the Savannah course, over which the grand prix has been run several times, and the Vanderbilt cup for the first time on Thanksgiving Day of 1911, the Milwaukee course looks very good. It is only one-half as long, or 8 miles against 17. Instead of winding about in a tortuous circuit, as the Savannah course does, Milwaukee has a four-legged speedway that is almost a parallelogram, all sides of which are straight. The famous Waters road straightaway at Savannah offers nothing better than the North Fond du Lac road stretch at Milwaukee.

In reconstructing the roads used for the Vanderbilt course the Milwaukee Automobile Dealers' Association called upon the Wisconsin State Highway Commission for the services of its engineering staff and experts. In this manner it has been possible to build approximately 8 miles of uniform highway—uniform as to width and uniform as to construction. The two long straightaways have been good macadam roads for years. The two short stretches were plain dirt roads.

The Milwaukee course was constructed with a view to the holding of the international road races upon it for a period of 3 years, beginning with 1912. The contracts between the property owners and the M. A. D. A. are for that length of time.

CHICAGO, Sept. 16—The Chicago Motor Club has undertaken the promotion of the most sensational reliability ever carded in this country—a trip around Lake Michigan, a journey which has been made only by a few cars and which is expected to produce interesting results. Part of the way is through almost virgin territory, and especially in the wilds of Michigan and the northern part of Wisconsin the going will be far from easy.

Painting the 1913 Car

Improved Systems of Putting Machines Through the Shop More Quickly—New Colors in Vogue

Drying Room Is Now An Important Factor in the Up-to-date Automobile Paint Shop

UNLESS all signs fail, the automobile painter is to be the man of the hour during the coming year. His importance as a factor in the automobile industry has of late increased enormously. His services have become indispensable. He is recognized as both an artist and as an artisan. In handling the new styles and designs of automobiles which the coming year promises to disclose, his work will be more critically examined and studied than ever before.

Finer colors are to be employed in larger variety. New surface treatment, therefore, must follow. A higher grade of finishing will be called for. Other details scarcely less important will demand attention, so that, taken all in all, the selling value of the 1913 car is largely in the hands of the painter.

Quicker systems of putting the car through the paint shop—speaking now of both new and old work—are now in vogue. Pure raw linseed oil and white lead were for many years pronounced the invincible mediums through which the best and finest class of painting could be developed. Oil was pronounced by no less an authority than Dr. Dudley, late chemist of the Pennsylvania Railroad, as the life of the paint. It is largely, and with reason, so regarded today. But there has been a readjustment of the quantity used. A new order of pigment and oil combination has come into being. It has been found that with a reduced quantity of both oil and lead, the demand for quicker results, without sacrificing a necessary measure of durability, may be well satisfied.

Less Oil Is Used As a Binder

The use of metal bodies for automobiles has served to develop quick ways of painting and finishing such surfaces. Less oil as a binder for the primary coatings is one of the time-saving items connected with the painting of the aluminum or sheet steel body. The oven, or drying room, which is coming to be an important adjunct of the automobile paint shop, is also serving to facilitate and quicken the system of painting. These rooms need not be classed as ovens or hot rooms. Correctly they are drying rooms. They are, first, close rooms from which, except during periods of ventilation, the outside air is excluded, and into which it is possible to introduce a volume of dry, hot air sufficient to hasten the drying of all paint and varnish mediums. This is the main mission of the drying room. There are heating or drying ovens in use which at a temperature varying from 125 degrees to 300 degrees practically bake the paints and varnishes onto the surface.

With the simple heating or drying room, conditions and results are so modified that no doubt need be entertained as to the outcome of the work produced by the quicker method The drying room merely expels the major portion of the naturally prevailing moisture through the introduction of the dry, warm air, making it possible to get any part of a coat of paint or varnish dry in a comparatively short time.

In the automobile paint shop efficiency has been increased and will doubtless be further increased by making specialists of the men employed. In other words, a certain man or number of men do the varnishing of the car bodies; still other men attend to the chassis; certain men put on color and create color combinations; others work up the surface, putting on the rough coats, sandpapering, rubbing roughstuff, etc. By thus specializing a given amount of work is produced at less cost. Of course, this specializing plan can only be worked out where the business is large enough to employ several men and to permit of a systematic and uniform daily output of work.

For roadsters and the lighter-weight touring cars the lakes of dark, rich shades are to be popular. What may be known as Manhattan red promises to be a favorite. It is a vivid but beautiful red and is produced by first mixing 2 parts Indian red with one part English vermilion, reducing with pure turpentine, and applying to the surface. Over this ground apply two coats of No. 40 carmine, using for the second coat 1-2 ounce of carmine in a full pint of elastic rubbing varnish. Empire State red is produced by mixing one part No. 40 carmine with two parts English vermilion. Lay this combination over a peachblow color. For the second coat of the red mix 3-4 ounce of the pigment in one pint of varnish. Either one of the above colors appear to fine advantage if striped with lines of gold and black, or simply with lines of black.

Motor car red may be made by glazing the Empire State red with No. 40 carmine, which heightens and intensifies the effect. Of the lakes pure and simple, there are three or four which are about certain to get the popular vote. These are purple, scarlet, crimson and Munich lake. They require fine surfaces and perfect ground or preparatory colors.

Colors Should All Be Durable

Car buyers and owners who are particular about the colors employed should get assurance from the builder or painter as to the quality of the colors, both preparatory and final, used. These wonderfully handsome lakes are of little value unless durable. The scarlet lake is seen best over a ground of English vermilion. Munich lake may be used over a deep wine color, and crimson lake needs a deep red ground color. A plain black ground is about right for purple lake. All the lakes require a delicacy of treatment not usually applied to the less transparent pigments. Surfaces cannot well be too nice for them, and the greatest care must be exercised in bringing the colors along until they are finally safe under varnish.

Deep, rich greens and blues are to lead during the coming year as panel colors for the heavier type of car. In this prolific family of colors the old favorites remain sure and steadfast in the affections of the car users. Brewster, Merrimac, Quaker and olive green are really as beautiful as any of the greens can well be. They are strong and permanent colors and under attractive striping colors, such as gold, black, ivory white and carmine, they are unsurpassed. Automobile buyers at the coming New York shows may with profit, and a promise of future satisfaction, give these dark, noble green colors due consideration. Likewise the blues are to be seen in all their glory during next winter and the season following.

Ultramarine blue, transparent, but rich in color, requires a very good ground for best display. Dark brown or plain black are, in fact, exceedingly good colors over which to coat the ultramarine blue. Blues are colors hard to develop in the full purity of their original shade. Clear rubbing varnish applied over blue practically ruins its color purity. Over the blue, as developed on the surface, apply two coats of rubbing varnish, for good work, using a couple of ounces of blue to each pint of varnish. By this practice the tone and purity of the color are maintained. Rub these coats with flour pumicestone and water and put the finishing coat of varnish directly over this. In this way magnificent blue surfaces have been turned out of New York, Philadelphia and Boston paint shops for some time past.

Automobile buyers may also with profit study the charms of Richelieu, automobile, Twentieth Century, and cobalt and royal blue. Russian body blue offers something unusually fine for touring car panels.

Then there are the grays—automobile, battleship, cadet, Howard and Hudson gray—all strikingly handsome and all cool and clean and remarkably effective.

Advanced Type of Hydraulic Drive, With Important Improvements, When Applied To a Motor Truck By Noted Designer Results in Radical Departures Exemplifying Practical Difficulties—German Automobile Finance

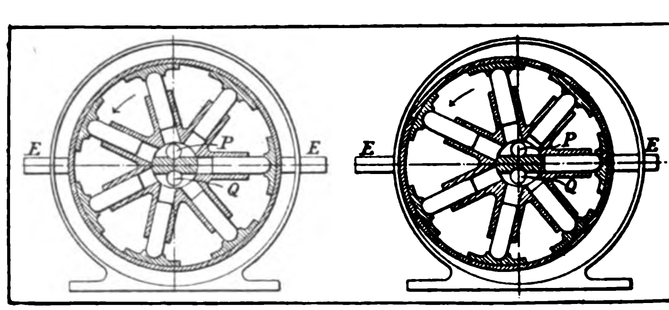
HYDRAULIC Motor Truck Transmission—Dr. Hele-Shaw, of England, well known from his connection with the development of British steam trucks and gasoline motor trucks since the inception of the industry relating to this class of vehicles and more widely known as identified with the multiple disk clutch bearing his name, has devised an hydraulic transmission mechanism which has been used successfully for operating the steering gear of ships, particularly in the case of the Diesel motor ship Selandia, and also for actuating the working elements in cranes, presses and machine tools with intermittent action. For training guns on shipboard this mechanism has also been found useful. It has been applied to the driving of motor trucks, and for this purpose the relations between its various parts have taken the forms shown in the accompanying illustrations which are reproduced after *Engineering* of London.

The principal elements are (1) a pump transforming the rotation of the gasoline motor shaft into a movement of fluid under pressure in one channel and a return movement of fluid under suction in another channel; (2) conduits taking the fluid to the driving wheels of the vehicle and back to the pump; (3) an hydraulic motor in each of the driving wheels transforming fluid pressure into rotation of the wheel and sending the fluid back to the pump; (4) a system comprising an oil tank, pipes and valves and an auxiliary pump for gathering the fluid which leaks from the mechanism and returning it to the latter and (5) a control mechanism for varying the pump stroke and thereby starting, reversing, braking the vehicle, or changing the gear ratio of the transmission.

Figs. 1 and 2 are diagrams indicating the principle of the pump. A disk-like body with seven radial cylinder bores can be rotated directly from the motor shaft and turns upon a fixed shaft which is placed in continuation of the motor shaft and is formed with two lengthwise bores P and Q connecting with an upper and a lower port cut crosswise into the shaft just in line with the middle of the cylinder disk where short ducts lead to the bottoms of the cylinder bores. Pistons for the cylinders are pivoted each in a so-called slipper block, all of which blocks are formed with relatively long curved sliding surfaces and placed in a ring-shaped guide, spaced apart in this ring by the pistons being held in alignment with their respective cylinders. The guide ring itself is free to revolve, being mounted upon roller bearings in a frame, and the frame can be moved horizontally to either side within the casing which encloses the whole mechanism, being mounted between parallel guide bars formed upon the interior walls of this casing. The diagrams, Figs. 1 and 2, do not show the roller bearings or the sliding frame, but the handles EE symbolize the horizontal lateral motion which can be given to the ring-shaped guide. When the latter is held concentrically with the cylinder disk, as in Fig. 1, it is evident that cylinders, pistons and guide ring can all be revolved together without causing the pistons to move in the cylinders, and the fluid in the bottom portions of the cylinders, as well as in the ports and the conduits P and Q, remains at rest. This is thus the neutral position of the gear. But, when the ring-shaped guide is pushed to one side, as in Fig. 2, some of the pistons are pulled outward in their cylinders while others are pushed in. When now the cylinder disk is rotated in the direction of the arrow, the cylinders will draw fluid from conduit P while they are filling up and will force fluid into conduit Q while they are discharging. They will be drawing when passing above the line EE and discharging below this line, and it is evident that the cylinders must be in connection with the upper port in the fixed shaft all the time while they are causing suction, as well as with the lower port when expelling the fluid, and both these ports must, therefore, be large enough to be in connection at the same time with one-half of the total number of cylinders. As the cylinders are not free to work while passing the bridge of metal separating the two ports, and a certain excess resistance is set up under this condition, an odd number of cylinders is preferable to an even number which would bring two cylinders opposite the bridge at the same time.

It is notable that the pumping action remains the same whether the ring-shaped guide revolves in its roller bearings or the blocks in which the ends of the pistons are pivoted revolve slidingly in the ring-shaped guide. Tests of the efficiency of the mechanism in two different forms have shown, however, that the freedom of the guide ring to revolve greatly assists the blocks to move with those speed variations which are forced upon them by the equable speed of the cylinders in conjunction with the eccentric arrangement of the piston pivots. In other words, in practice, the guide ring revolves and the blocks move a little forward and then a little backward in the guide ring at each revolution.

The exact arrangement of the mechanical parts mentioned is shown in Fig. 3, which represents a vertical cross-section through the axis of the motor shaft, and of the fixed shaft as well. The sliding frame shows only at TTTT. RR and RR are the two roller bearings mounted in it and in which in turn is mounted the ring-shaped guide U marked in full black. It will be noticed that this guide is made in two halves bolted together, and is provided with flanges affording complete guidance for the blocks S in which the piston pivot pins D are journaled. The motor shaft A, it is seen, is coupled to one end of the hub of the cylinder



Figs. 1 and 2—Diagrams of the general working principle in Hele-Shaw rotary pump body C by a conical joint secured by a nut and is separated by a small interval, which is utilized as a lubrication channel, from the fixed shaft, with the bores P and Q, which is hardened and ground to a close tunning fit in the rest of the hub of the cylinder body.

It is also noticed that the cylinder body is formed with extensions between the cylinder bores, as indicated in the lower part of the drawing, and that these extensions serve to limit the possible motion of the blocks S, so that after all in the practical construction provision is made for compelling the guide ring to revolve in its roller bearings rather than having the blocks free to slide around in the guide ring. Two slots in the outer portion of cylinder walls, in conjunction with suitable shaping of the blocks S allow the pivot pins to get nearer to the center of the mechanism than would be possible without them, thus making for compact design as well as improved guidance of the blocks in the guide ring.

The rear of the exterior casing is screwed upon the fixed shaft, with a simple washer separating it from the cylinder body, and at its front the casing is formed to receive a ball-bearing G in which the hub of the cylinder body revolves, and protection against leakage of fluid from this ball-bearing is sought by means of a conical flange clasping the motor shaft in a packed joint, which seems to be the only joint of this kind in the pump mechanism.

When the sliding frame is pushed over to one of the side walls

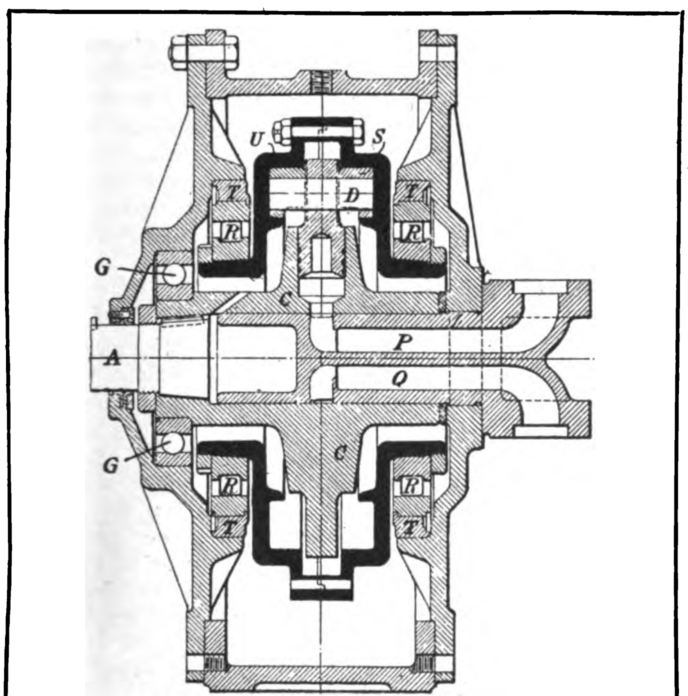


Fig. 3—Axial cross-section of a Hele-Shaw rotary pump as applied to the driving of motor trucks

of the casing, giving the guide ring its maximum of eccentricity, the pump will of course be in adjustment for working with full stroke. Any intermediate position of the sliding frame gives a shortened stroke and therefore a slower circulation of the fluid and a lower gear ratio. By pushing the sliding frame across to the other side of the casing, the direction of the fluid movement is reversed. Q becomes the suction channel and P the pressure channel. The pump is then in adjustment for reverse driving. In practice the reverse is limited to a low gear ratio by limiting the movement of the control lever, Fig. 7.

It has been found that when a pump of this construction works at high speed and full stroke a noise is produced which is caused by hydraulic shock taking place each time a cylinder is put in communication with the discharge port at the beginning of the inward stroke of the piston. The sudden variation in pressure, especially if air is entrained with the oil used as fluid, is likely

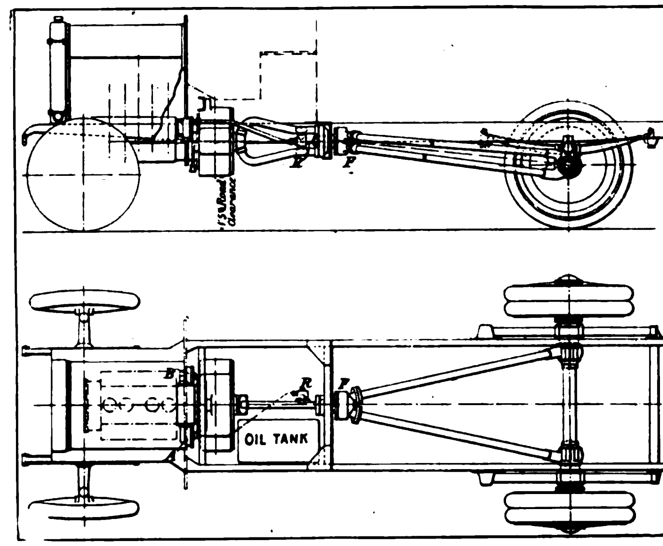


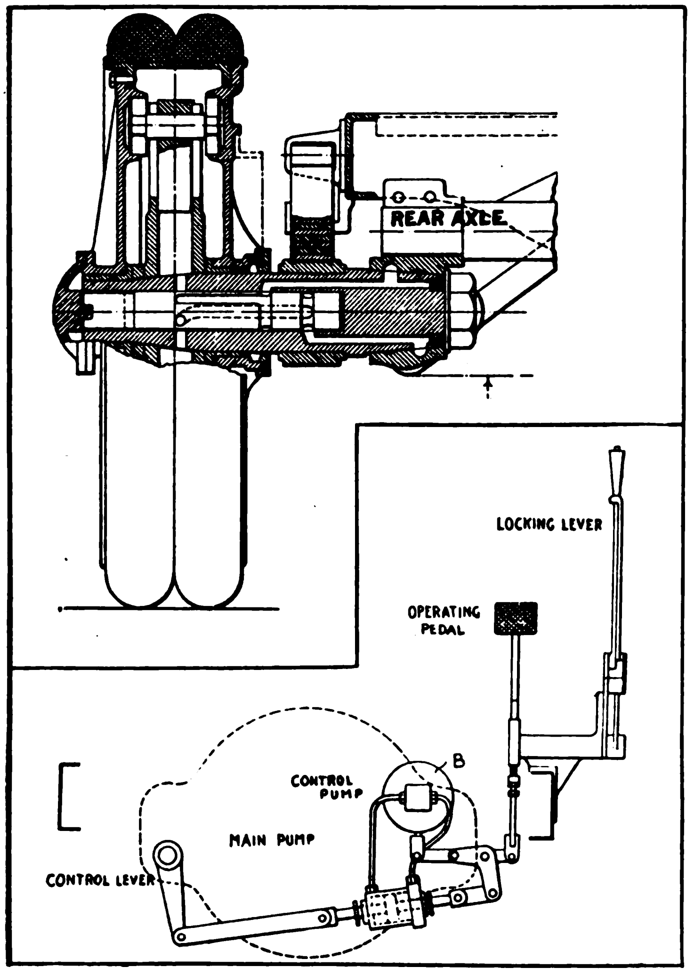
Fig. 4 and 5—Side and top views of truck chassis equipped with Hele-Shaw hydraulic drive

to cause an inrush from the pressure channel into the cylinder, with the result referred to. To remedy this evil, the bridge of metal separating the two ports is increased in thickness, so as to raise the pressure in the incoming cylinder while it passes the bridge and before it is put in communication with the discharge conduit, and to limit the pressure so created a small auxiliary port is formed in the extended portion of the bridge and this port is provided with a relief valve, and in addition a small hole is bored from the auxiliary to the main port admitting of a gradual equalizing of pressures.

These difficulties, though overcome in this instance, as it seems, illustrate the intricacies incidental to hydraulic transmissions, and they seem to have something to do with the choice of cylinders of increased length rather than increased diameter at the driven end of the Hele-Shaw mechanism—a choice which in turn may have dictated the use of the rear vehicle wheels as casings for the hydraulic motors at this point despite the mechanical and commercial complications which such a use of vehicle wheels necessarily involves. In this respect and also with regard to the strength and durability of the tubular connections from the pump to the fluid channels in the rear axle of the vehicle, the construction seems to be still in the experimental stage, viewed as part and parcel of motor truck construction.

Figs. 4 and 5 show the main features of the fluid conducts leading to the rear from the channels P and Q of the pump. The fluid is first taken in two pipes to a universal pipe joint F, which is rigidly suspended from the chassis, and in this joint suitable ports are provided for connecting the oil circuit from the pump to two pairs of pipes, each pair comprising a pressure and a suction channel and leading to a driven motor in one of the driving wheels by way of two bores in each end portion of the rear axle, which is of special design, as shown in Fig. 6. The two pairs of pipes also serve as torsion rods and the oil flow distributes itself automatically between the two pairs according to the driving resistance at the two wheel rims, so that the arrangement takes the place of the differential gear in gear-driven motor vehicles.

The motors in the rear wheels are similar to the pump, operating on the same general principle. But the guide ring has a fixed eccentricity, and is formed in the wheel sides, making the piston stroke and the gear reduction at this end a constant factor, and the cylinders are relatively long, having a larger capacity than those in the pump, thereby giving a gear reduction corresponding to that obtained by driving a large bevel gear crown from a small bevel gear pinion. While in the pump the rotation of the cylinder body drives the oil, the oil flow drives the cylinder body in the rear wheels. The valve shaft which corresponds to the fixed shaft in the pump is inserted in the bored-out axle and is ro-



Figs. 6 and 7—One of the driving wheels and part of the rear axle with hydraulic motor built into the wheel—Below, rear view of control mechanism for Hele-Shaw hydraulic transmission for trucks

tated from the hub cap of the wheel, receiving the oil from the conduits farther back in the rear axle by means of two ports extending around the circumference of the valve shaft, one connecting with the pressure conduit in this shaft and the other with the suction conduit. The cylinder body is fixed upon the axle, and the wheel, or motor casing, revolves upon gun metal bearings upon the axle, being rotated by the alternating pressure and suction on the pistons produced by the rotating valve shaft.

The method by which leakage of the fluid and the lubrication of the working parts is taken care of is more practically interesting. In the case of the wheel motor the casing constituting the wheel body is oiltight, and oil leaking from the interior of the cylinders past the pistons is drawn from the circumference of the casing by means of a pipe projecting radially from the cylinder body and connected by a circumferential groove on the axle with an auxiliary passage in the latter whence it is piped to the universal joint F, Figs. 4 and 5. From this joint, it is stated, a pipe is taken to an auxiliary pump, A in Fig. 5, which is driven from the camshaft of the gasoline motor and drives the oil back to the main oil system through the relief valves R. This motor also takes care of the leakage from the pump. In both cases a closed oil tank, shown in Fig. 5, is the intermediate link. It receives the drainage from the pump casing, after it has served to lubricate the guide ring, and the auxiliary pump creates a pressure in the tank, driving the surplus oil contained in it at any given time back to the main pressure and suction conduits through pipes fitted with non-return valves. The description is not explicit upon the details, as applied to the motor truck construction.

In connection with the speed control a second auxiliary pump is used, as indicated at B in Fig. 7. The necessity for using a pump to operate the adjustment of the sliding frame in the main pump seems to arise from the fact that such adjustment, when going from low to high speed, meets with considerable resistance, since it involves the turning of the cylinder body to some extent and consequently the creation of pressure and suction in the cylinders. On the other hand, this peculiarity seems to be utilized in the little control pump, as no other means are indicated for operating it than pressure of the foot on the control pedal. It is stated that "the pedal is connected with the floating ring of this auxiliary pump by a system of levers, so that by raising or depressing the pedal the flow of oil can be regulated as desired," and all the flow required is a sufficient displacement of the oil to drive the double-acting plunger, shown in Fig. 7, to one side or the other, this movement actuating the control lever of the main pump. When the plunger has traveled to the position giving the desired adjustment, the floating ring of the auxiliary pump is replaced in its neutral position and remains in that position until a further operation of the pedal occurs, and this automatic action is said to be effected by the "overtaking gear" indicated in Fig. 7. Probably the action is one locking the oil in the plunger cylinder, and in the two small pipes leading to it by separating it from that in the auxiliary pump, supplemented by passing the latter and by a spring action returning the pedal to its neutral position.

The locking lever is ingeniously arranged to operate a cam which maintains the pedal in its neutral position when the car is at rest and which also controls the amount of movement which can be given to the pedal in either direction.

Efficiency tests with this hydraulic transmission have naturally shown that the losses in its operation are much greater at half and quarter stroke adjustment than when full stroke is used. Working pressures of 1,000 pounds per square inch and higher are used with it. In connection with an experimental motor vehicle with a 15-horsepower engine a transmission efficiency of up to 75 per cent. is recorded and this is said to have been bettered in another vehicle equipped with a 30-horsepower engine. —From illustrated description in *Engineering*, June 21.

GERMAN Automobile Finance—According to the latest public accounting giving the commercial status of Benz & Company, of Mannheim, Germany, which firm is said to possess now the largest automobile works in Europe, the business year ending April 30, 1912, has been one of increasing prosperity. After writing off about $500,000 for the regular sinking fund and about $300,000 to special sinking fund or depreciation, $20,000 to workingmen's aid society and carrying forward to next year's account $250,000 (as against $45,000 under this item at the beginning of the year) a dividend of $300,000, or 10 per cent. on the capital stock, was declared, subject to the approval of the stockholders at the annual meeting. The receipts from the sale of goods during the year are given as $3,000,000 and the combined cost of production and sale as about $1,400,000, the net profits being consequently $1,600,000. These figures practically double those of the previous year, though with a slight proportionate increase in the cost of handling the business. The cost of production for the year 1910-1911 was given as $250,000 and the cost of the business department as $425,000. The tool and machine tool account has been charged with $167,000 for new purchases during the past year, which is the same amount as for the previous year, and after writing off for depreciation the sum of $140,000 on this account it remains charged in the books with more than $250,000. After the taking over of the Gaggenay motor truck works, the liabilities of the concern reach about $5,000,000, while the assets include $3,500,000 on bills receivable, $585,000 on note account, $2,350,000 estimated value of finished and half-finished goods on hand, $1,480,000 in raw material, $620,000 in goods on consignment; in all about $8,550,000 assets, counting furniture and cash on hand. The business of the concern comprises the making of pleasure cars at its old and new factories, of motor trucks at the Gaggenay works and the building of Diesel ship motors under Hesselmann patents. In addition the building of aviation motors has been resumed.—From *Automobil-Welt*, August 11.

Detroit S. A. E. Meets

Besides Routine Business, Two Papers Were Read, One Treating of a Special Type of Lamp and the Other of Pressed Steel Bodies

DETROIT, MICH., Sept. 14—The Detroit section of the Society of Automobile Engineers held its monthly meeting recently at which two papers were presented, one by Mr. Parkinson, of the Esterline company, on Golden Glow Lamps, the other by Mr. Millington, Western representative of the E. G. Budd Manufacturing Company, on pressed steel bodies, in addition to the ordinary routine business.

Mr. Parkinson stated that this new lamp, although of inestimable value, would not create a new era in the lamp industry, nor would it put any lamp companies out of business. There has been a big demand for an artificial light that would contain an element of sunlight and that would appear almost as a natural light.

The Glow Worm lamp gives this much desired result by using a reflection of special design and composition. The material used is a plate glass, the formula of which is a secret possessed by the glass company which makes the reflectors. The composition is such that the reflected light has the same spectrum as sunlight.

The design of the reflection is in general a parabola. This may be varied to suit a number of conditions. The thickness of the reflection is practically the same all over. The surfaces are highly polished and the back is silvered. The peculiar property of light given out by a Golden Glow lamp is that of fog penetration. By actual experiment a 16-candlepower Golden Glow light can be seen 2,300 feet through a fog where a 2,000-candlepower arc light was invisible at 200 to 300 feet only.

When used on automobiles, the usual glare of the headlights is not found. Holes and bumps appear in the natural state and even colors can be very distinctly seen. Mr. Parkinson stated that the Detroit United Railways has ordered Golden Glow lamps for all new cars and all replacements. These lamps are not now on the market to the automobile trade but will be by fall.

The paper was then open for discussion by members of the society.

Mr. Hinkley: Can you see 2,300 feet by this light?

Mr. Parkinson: It cannot be used as a searchlight. It may be seen very readily at 2,300 feet but will not illuminate an object at that distance.

Mr. Cox: How far will it illuminate by actual experiment?

Mr. Parkinson: We have not made any accurate experiments as yet. The Detroit United Railways found that a 16-candlepower lamp would show up the track for about 610 feet in a fog, where the ordinary lamps were of no avail. After a few more questions, Mr. Parkinson volunteered to supply the society with a set of lamps for experimental purposes, if the society would do the experimenting. His offer was accepted.

The second paper of the evening was read by Mr. Millington. It ran as follows:

Buyers Are Discriminating

The automobile buying public is now very discriminating and demands style, comfort and luxurious equipment and at the same time popular prices. These conditions force the car builder to look around for a body that has the desired qualities and at a cost to him that will be allowable. The old style of heavy wood frame construction and wooden panels is practically obsolete; the panels are hard to obtain and the time allowed for finishing is too short to permit of turning out a job that will stand up. The wooden frame construction with metal panels is now fairly popular and certainly has many good points, but a new body era is awakening, the era of the all-steel, rivetless and jointless body. This type of body is made with a great degree of accuracy. All parts are die-made and jig-assembled. Panels are made in one piece and gas-welded together. The whole is then spot-welded to the pressed-steel frame. All doors are die-made, jig-assembled and are consequently absolutely interchangeable. They are even painted before being placed on the bodies.

The cost of an all-steel body constructed along the above pattern is high unless made in very large quantities. The several distinct advantages claimed for this style of body may be summed up as follows:

1—Greater strength for the same weight, being a jointless, rivetless, and solderless unit.

2—It is more flexible.

3—It holds the joint much better than any other type as the paint is baked on; three or four coats exclusive of the varnish coats thus applied will give as good a finish as the usual fifteen coats, varnish coats or finishing coats excepted.

4—It can be produced cheaper than the other types, provided sufficient quantities are ordered.

5—It is impervious to atmosphere changes.

6—It is absolutely silent and will not rumble nor squeak.

British Fear American Invasion

AUTOMOBILE invasion of Great Britain and more particularly of Great Britain's colonies by the American industry, is seriously on the nerves of the British press and public and repeated calls are being made on the commercial organizations of Great Britain to stem the tide toward American automobiles by building cars that will be able to compete with the imported machines on a basis of price as well as service and quality.

It was recently stated by Lord Montagu that the American factories having enormous outputs and being operated with economy on the basis of quantity production would redouble their efforts to submerge the British market in 1913.

When the low-priced American automobile was put on the English market for the first time the general public was very skeptical as to the quality of its material and workmanship, but now this prejudice has entirely worn away and the American car sells on its merits.

In the low-price class the American cars are almost as popular in England as they are at home and it is admitted by numerous correspondents of the London *Express* that the situation is serious from the British point of view.

The main question that rises before the eyes of Great Britain is this: "If the American manufacturer can market a car in England for $750 why can not we do the same?"

Under the tariff as it is at present, wages are higher to the skilled mechanics who are employed by the American factories and the same rule applies to the commoner varieties of labor. Materials are mostly domestic in the low-priced American cars.

With these things ranged against the American manufacturer in the British market, as far as the selling price in competition is concerned, the American cars find a ready outlet.

According to the correspondents of the *Express* the main reason for this condition is that the American is giving best value, which of course means that on an even basis of price the American cars are better and on even basis of quality the American cars are cheaper.

Some of the correspondents deny that the $750 car would never have made its appearance at all save for the enterprise of the American manufacturers and set up the plea that if Great Britain had a tariff, somewhat similar to the one at present protecting the American industry, the British manufacturer and workman would have a chance in their domestic market and would dump their surplus abroad, even as their Yankee cousins are doing at present.

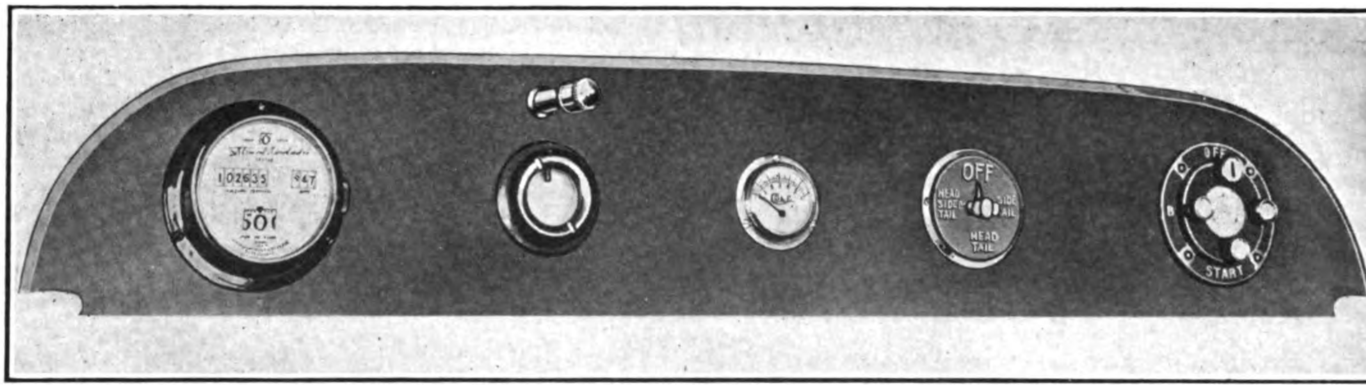


Fig. 1—Cowl board carrying dash equipment which is a feature of the Cole series eight

New Cole Series Has Electric Starter

Three Chassis on the Market for the 1913 Season—Pressure Feed Gasoline Tank Adopted in Place of Gravity—Other Changes of a Minor Nature Made —Cowl Board Adopted for Mounting of Dash Fixtures

SERIES eight of Cole cars will be equipped with the Delco starting and lighting system. This announcement brings to light another firm which has pinned its faith to the electric starting and lighting equipment. It is also the principal change in the Cole line of cars for the coming season barring a few minor refinements which were made merely for the sake of appearance in all but one case where the gasoline feed has been changed from gravity to pressure.

There are three models on the market. They are known as the 40, 50 and 60. The first two are four cylinders, while the 60 is a six-cylinder car. All models have the cylinders cast in pairs and have motors with the same general features of construction, although the bores and strokes vary considerably. The cylinder dimensions of the three models for 1913 follow:

Model	40	50	60
Bore	4 1-8 inches	4 1-2 inches	4 1-8 inches
Stroke	4 3-4 inches	5 1-4 inches	4 3-4 inches

The power plant as a whole is of the unit type suspended at three points. The cylinders are of the L-head type with integral water-jackets of large size which are specially designed to permit of an easy flow of the cooling water about the cylinder walls. The motor is set on a slight inclination to the horizontal plane in order to secure a straight line drive to the rear axle when the car is traveling under its designed load. This angle approximates 2 1-2 degrees.

The pistons are soft gray iron castings. They are fitted with

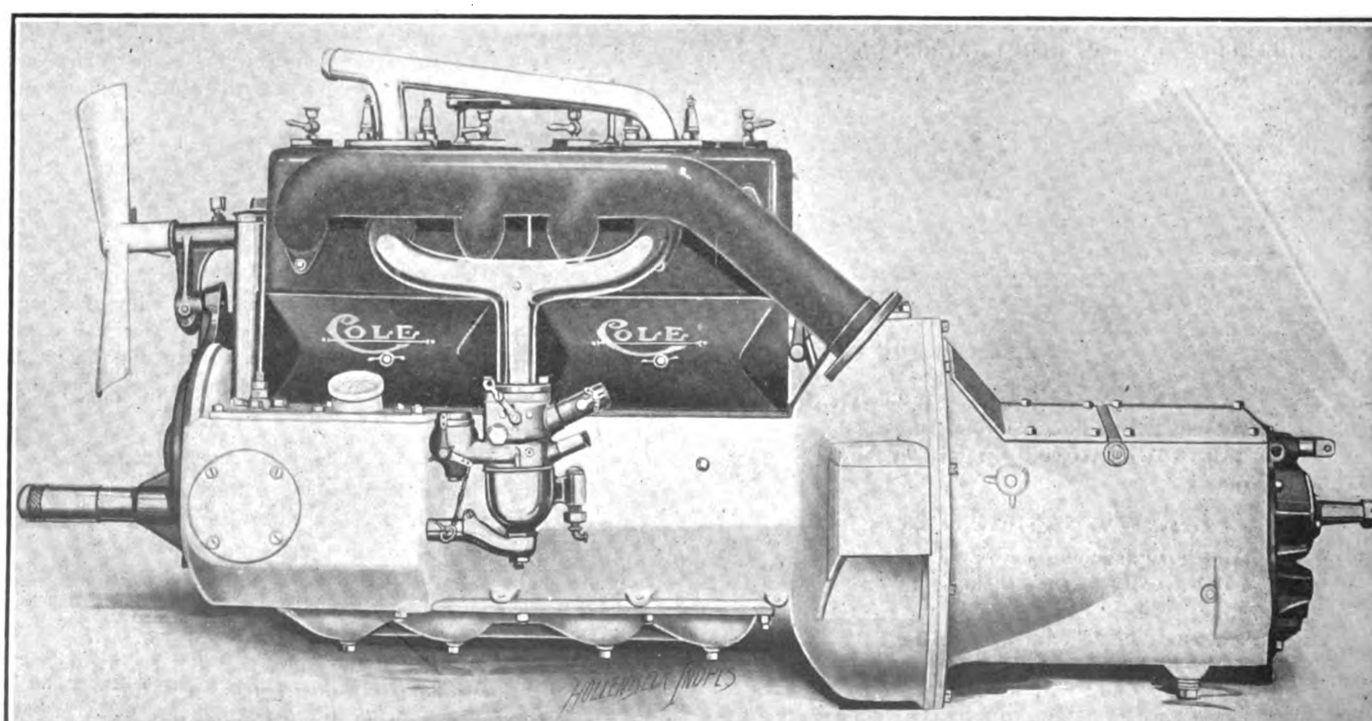


Fig. 2—Left side of Cole model 40; note oil reservoir on side of crankcase and the entirely inclosed valve action

three 1-4-inch rings, all located above the wristpin. There are two oil grooves in the piston, one below the lowest piston ring and the other at the lowest extremity of the piston. The purpose of these rings is to distribute the oil evenly over the surface of the cylinder and in case of the upper one to bring oil up to the wristpin bearing bushing for the purpose of lubricating the oscillating bearing at this point.

The connecting-rods are of I-beam section and are made with extra long bearing surface. The lower bearing is grooved to distribute the oil about this important bearing. The two ducts or grooves pass each other in X form. Besides the grooves there is an oil hole through the bushing by means of which the oil is permitted to enter the bushing and become distributed about the bearing. The lower connecting-rod bearing is bushed with babbitt and the bearing cap is held in place by two large bolts which are castellated to prevent them from working loose and wearing excessively on account of lost motion in the bearing. The connecting-rod is fitted with a scoop on the bottom which is a factor in the oiling system of the car and which will be touched upon later.

The crankshaft is a solid chrome nickel steel drop forging having three bearings in the four-cylinder models and four in the six-cylinder models. The bearings are carried on bridges located in the upper half of the crankcase casting and are situated between each pair of cylinders. In order that it will not be possible for the oil to work along the crankshaft and through the crankcase at the end bearing there is a special device fitted on the end of the crankshaft. This consists of a ring which will catch the oil as it flows along the crankshaft. When the oil reaches the outer diameter of this ring it will be thrown off by the added centrifugal force due to the fact that the diameter of the ring is much greater than that of the crankshaft. The oil so thrown off is caught in a duct in the bearing bushing and thus finds its way to the crankcase. In order that the oil which works its way to the periphery of the ring will be more certainly thrown off, the outside of the ring tapers to a sharp edge around its circumference. No oil will be splashed against the crankshaft beyond the ring as it is placed just at the point where the crankshaft leaves the crankcase. At the rear end of the crankshaft there is a flange which is forged integrally. Its purpose is to sustain the flywheel and it is pierced by six equally spaced holes which take the bolts for attaching the flywheel to the end of the crankshaft.

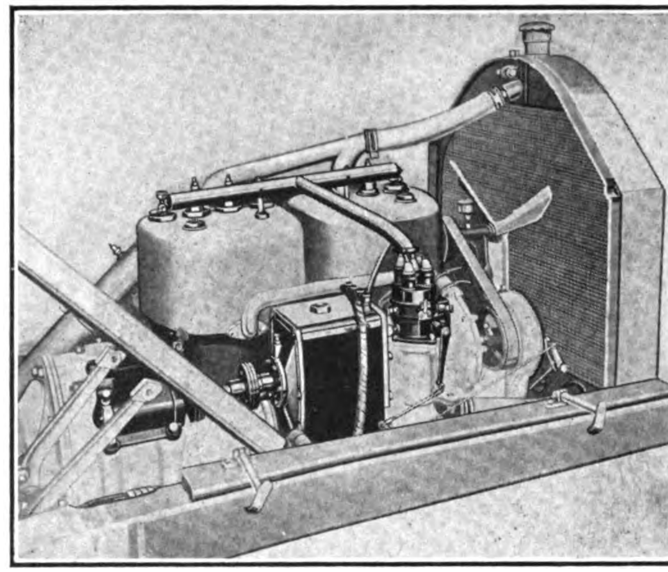


Fig. 4—Mounting of the Delco system on Cole motor

The Cole cooling system has been carefully thought out. The water is circulated by means of an ingeniously mounted water pump located on the right side of the motor, which incidentally is the side opposite the valves. The water-pump casing is firmly bracketed to the crankcase near the forward end of the motor. An extra gear at the extreme right of the timing set drives the shaft for the water pump as well as the fan pulley and the magneto. The pump is separate from the magneto, however, so that if it is desired to remove either it is a mere matter of loosening an Oldham coupling on the shaft. The water inlet is at the lower side of the pump permitting a direct connection with the radiator by passing the pipe under the slight projection in the gearcase formed by the housing for the gear that drives the pump and magneto shaft. The water is discharged at the top at a point very close to the water-jacketing of the

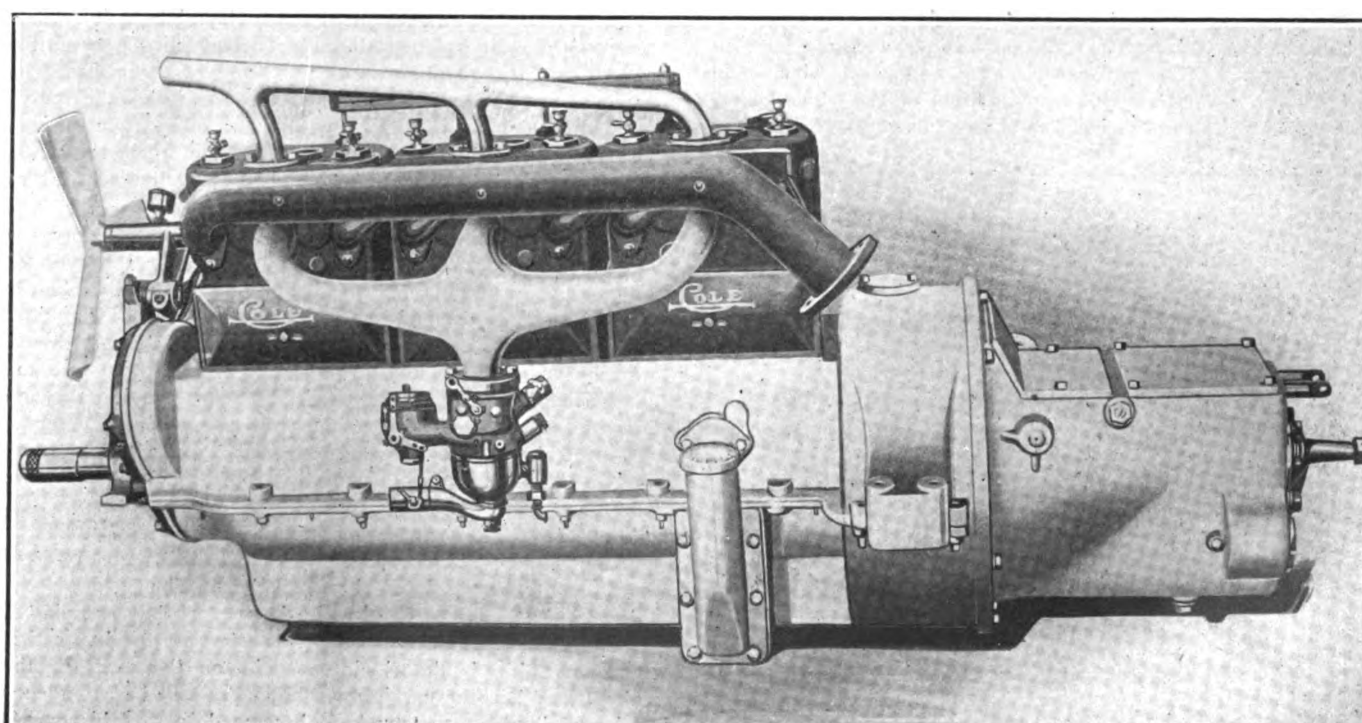


Fig. 3—Left side of the six-cylinder Cole motor, showing unit construction and the mounting of the new Schebler carbureter

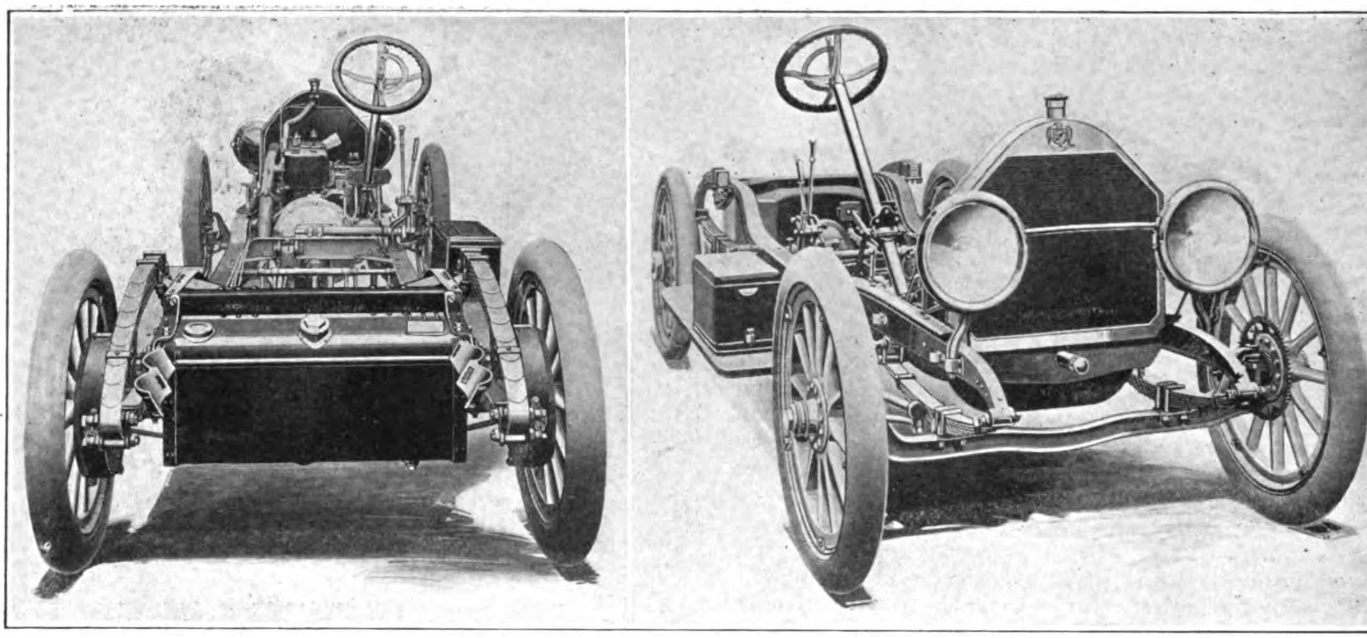


Fig. 5—Rear and front view of the standard series eight Cole chassis with pressure tank

cylinders. The water returns to the radiator through a very straight manifold located on the top of the cylinders outside the valves. The position of this manifold is such that the water must pass around the valves before it can enter the manifold. The radiator is a Mayo honeycomb.

One of the distinctive features of Cole design is the fan. The fan has three blades. It is a solid aluminum casting. It is mounted upon a bracket arm which can be turned about its bottom support, thus putting more or less tension on the fan belt according to the requirements. Should the belt become stretched through long use, the stretch can be compensated for by turning the bracket arm slightly and then tightening the nut at the bottom which holds it in place. The fan bearing is a plain bearing of extra length and is lubricated by a grease cup mounted upon it.

Silence has been made an aim throughout the motor. The timing gears have been given special attention in this direction, as have also the valve springs and push-rods, which are inclosed by heavy plates. The gear wheels have six spokes which tend to break up the noises due to vibration. They have helical teeth which are carefully ribbed to secure silent engagement, and the gears are pinned and keyed carefully to their respective shafts in order that there will be no rattle due to loosely connected gears.

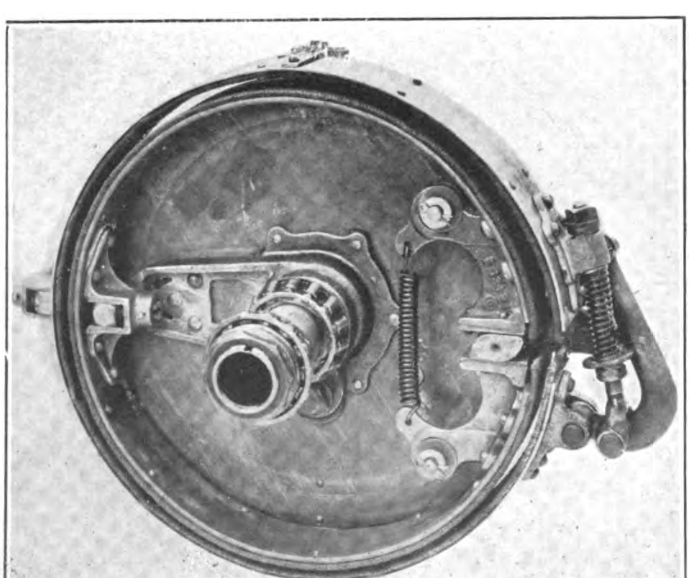


Fig. 6—Interior of the Cole internal and external brakes

The lubricating system employed on the Cole cars is the constant level splash system. In this system the oil is carried in the reservoir in the crankcase. The oil capacities of the different models are as follows: Model 40, 2 1-2 gallons; model 50, 1 1-2 gallons; model 60, 2 gallons. The reservoir is located on the left side of the crankcase in the model 40, and as may be seen in Fig. 2 it can be detected by the box-like projection on the side of the crankcase. The larger four-cylinder model carries the oil in a special compartment located in the bottom of the crankcase, but the method of lubricating the motor is exactly the same in all models.

The oil pump, which is driven by a worm gear from the camshaft, is of the plunger type and is contained directly within the oil reservoir so that on account of the copious lubrication which it receives the wear is practically nil. The reduction between the camshaft and the oil pump is 25 to 1, and as the camshaft is running at but one-half the speed of the crankshaft the reduction to the oil pump is 50 to 1 with the crankshaft taken as a basis. There is an adjustable nut by means of which the stroke of the pump and hence the amount of oil delivered at each stroke may be governed.

The oil pump takes the oil from the reservoir and forces it to a sight feed located on the dash. In this way the operator sees every drop of oil that enters the crankcase and he knows when the supply is running short by the behavior of the sight feed. The oil is sucked into the pump from the bottom on the up stroke and then on the down stroke is forced up into the lead which takes it to the sight feed. After passing through the sight feed the oil is led to the crankcase where it enters a series of troughs which are located one below each connecting rod. On the bottom of the connecting-rod there is a scoop that catches the oil and throws it up into the cylinders, where it is picked up by the oil wiper rings on the piston and distributed about the cylinder walls. The troughs into which the connecting rods dip are curved so that there will be no danger of all the oil leaving one of the troughs should the car be ascending a steep hill. Another feature which takes care of the lubricating system on a hill is the sloping troughs on the walls of the crankcase. When the car is on a hill there will be a tendency for the oil in the rear trough to become deeper. This excess oil will be thrown by the connecting-rods against the walls of the crankcase from where it will drain into a series of sloping troughs which lead the oil back to the front end of the crankcase. The slopes of these troughs are so great that in spite of the gradient there will always be a gravity flow of the oil back to the forward end of the crankcase. These sloping troughs keep the oil in circulation even on a level road. There is no return of the oil to the reservoir, the pump feeding fresh oil continuously as it is used up by the motor.

The entire electrical apparatus is taken care of by the Delco equipment. In the series 7 a separate dynamo was provided for the lighting current; this has been entirely supplanted by the new system which not only takes care of the lighting of the cars, but the starting and ignition. In applying the Delco system to the Cole Northway unit power plant it was only necessary to cut teeth in the periphery of the flywheel to take the reduction gearing on the electric starting motor. No complications were found in doing this work and there had to be no changes in the motor design to make the installation. In placing the Delco system in their cars the Cole company took the opportunity of mounting all their dash equipment in a very unique and ingenious manner. Across the top of the deep cowl, the board which is shown in Fig. 1 was mounted. This board is of highly polished walnut and carries the ignition and lighting switches, the oil sight feed, gasoline tank pressure gauge and speedometer. A cowl light which illuminates the board is also mounted here and is connected in series with the tail light, thus acting to some degree as a telltale besides making the dash fixtures visible.

The Delco system consists of two principal units, a motor-generator and a storage battery. These are so arranged that the generator part of the motor-generator keeps the battery charged when the motor is running and the battery in its turn supplies the current for the motor when the motor-generator takes that rôle for the purpose of starting the motor.

The motor-generator is geared to the flywheel through a train of reduction gears. It is mounted on the side of the crankcase. When the ignition switch is put in the starting position the storage battery furnishes a current of 24 volts which turns and starts the motor-generator, thus turning over the engine by means of the flywheel. When the motor picks up and starts to go under its own power the gearing of the starter is automatically disconnected from the flywheel and thrown into engagement with magneto shaft by means of a ratchet clutch. When driven through this shaft the machine becomes a shunt-wound generator and starts to recharge the storage battery giving it sufficient current to take care of the ignition and lighting. The storage battery starts to be charged at 300 revolutions per minute. From this point up to about 1,000 revolutions per minute the current increases to 12 or 14 amperes. At higher revolutions than this the current does not materially increase. The lamps used with the system have a voltage of 6 1-2; the 6-volt lamps which have been used with the system have exceptional brilliancy but a short life.

The carbureter to be used on the series eight Cole cars is the new Schebler model O. This is a double-jet design with one of the jets concentric and the other located in such a position that it comes into action with the auxiliary air. A feature in connection with this carbureter is the control of the air from the steering post. The gasoline pressure tank on the model 40 has a capacity of 18 gallons and on models 50 and 60 20 gallons. The tank is located in the rear just below the after cross-member of the chassis frame.

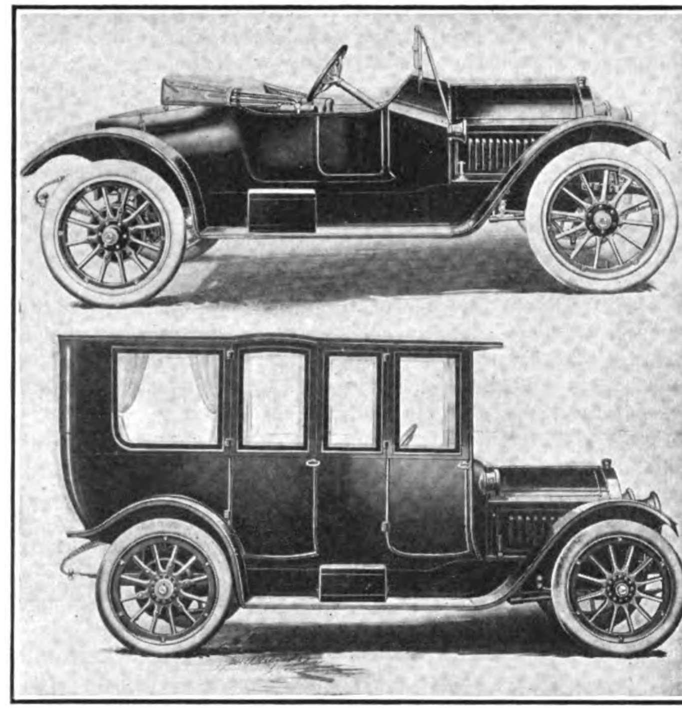


Fig. 8—Model 40 roadster and 50 limousine, series eight

The clutch is of the leather-faced cone type. The engaging stress has been distributed among six smaller springs instead of the former single spring. The object of this to secure an easier engagement than would be possible with the single spring. The springs are distributed equally about the clutch so that an equal engagement is assured. The clutch spider is of aluminum and is of very light construction throughout, not being a solid piece but having ribs which make up in strength what is lost in weight. The clutch spring has a large diameter for its strength, thus securing a maximum flexibility. It is placed on the outside of the clutch hub and is very accessible. The adjustment of the clutch spring is made by turning three nuts which compress the spring, thus increasing the strength of engagement. There is an opening provided in the clutch housing for making the adjustment just mentioned as well as for reaching the grease cups on the clutch yoke which can be turned down or filled through this opening. The disengaging yoke is a solid piece bearing against a flat collar or flange on the clutch shaft just behind the large clutch spring. The yoke is circular in form and of such shape that it bears practically against the whole col-

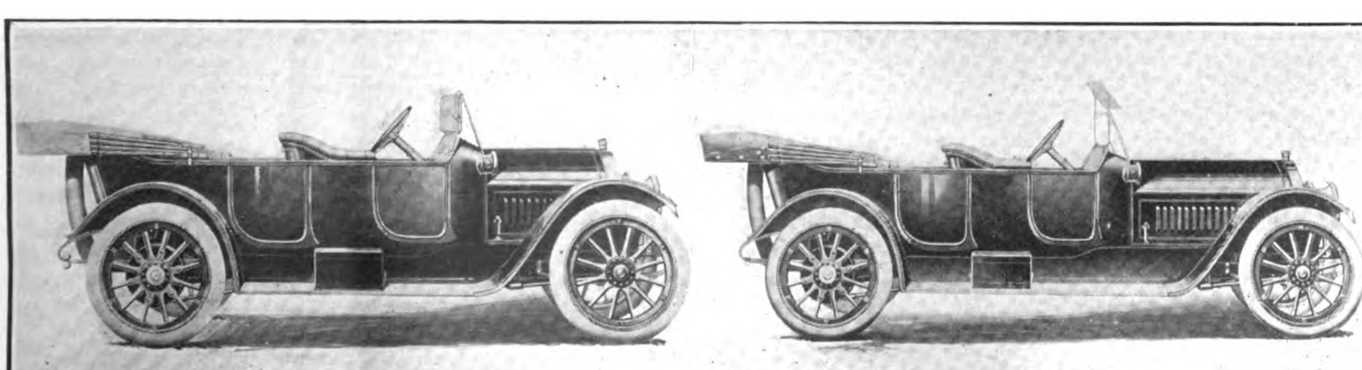


Fig. 7—Cole model 50 with 122-inch wheelbase; 132-inch wheelbase model 60 touring car

lar on the back end of the clutch. The yoke is bolted up in very much the same manner as the two halves of a main bearing and carries a liberal supply of oil in a self-contained well which lubricates the bearing surfaces at the point where the yoke presses against the collar when the clutch pedal is depressed for changing gears or in coasting. The clutch shaft which takes the drive has four splines permitting of a free axial movement, but with a good torque absorption. On the rear end of this shaft is the gearset drive pinion.

The gearset is of the three-speed and reverse type controlled by a lever through an H quadrant. The gearset housing is attached directly to the rear of the motor crankcase giving the unit construction which may be noted in Fig. 3. The housing is of the barrel type, having no joints except the rear removable cover plate which is protected by an oil-tight gasket to prevent the leakage of the transmission lubricant. The shafts of the gearset are all carried on heavy-duty annular ball bearings. Four-spline shafts are used permitting the gears to slide longitudinally, but to be relatively fixed to the axle. The material used in the gears and shafts is chrome nickel steel.

The drive is taken up by a chrome nickel-steel propeller shaft which has a universal joint at either end. This shaft delivers the power to a Timken floating rear axle mounted throughout on Timken roller bearings. The housing of the axle is of pressed steel, and is continuous throughout the whole axle width with the exception of the differential cover plate, which is removable for inspection purposes. The housing has been reinforced at the ends, where it becomes tubular in form by a 3 1-2 per cent. nickel-steel tube. The reinforcement extends from the ends toward the the center of housing past the spring pads. It is welded to the main housing. The drive shafts are of chrome nickel steel, machine finished. They have squared ends, as is usual in the floating type of axle, and are capable of being removed by merely taking off the hub caps and drawing them out.

Rear Axle Bearings Adjustable

Bearings are adjustable in this axle. It is possible to see through a peep hole in the differential casing if the gears are properly in mesh, and if not, the proper adjustments to compensate for wear can be made by external adjusting means which can be reached by removing the plate covering the differential. The torque members are of triangular-sectioned tubing. There are two of these arms connected to the top and bottom of the differential housing in sockets connected to a hardened pin which takes all the thrust. The pin fits into ground bushings and is lubricated by means of an accessible grease cup.

There are two sets of brakes acting on the same drum, one set being of the external contracting type, while the other is of the internal expanding type. The brake dimensions of the four models are as follows:

Model	40	50	60
Diameter	14 inches	15 1-2 inches	15 1-2 inches
Width	2 inches	2 1-2 inches	2 1-2 inches

The lining on the brake is of asbestos fabric interwoven with copper wire to give a high frictional coefficient without burning.

The front axle is of I-beam construction. It is of Timken manufacture with nickel-steel steering knuckles with roller-bearing mountings. A speedometer mounting is provided on the steering arm by a hole drilled through a special box. Careful fitting is made a point in the construction of the steering knuckles and spindles. The grinding work in these parts has limits of tolerance of one thousandth of an inch and less.

The wheels are all of second-growth hickory. They are made on the artillery plan and fitted with Firestone demountable rims. The size of the tires adapted to each model is as follows:

Model	40	50	60
Tire Size	36x4 inch	36x4 inch	37x4 1-2 inch

Firestone or Goodrich tires are furnished as regular equipment.

The spring suspension is half elliptic front and three-quarter elliptic rear. The spring dimensions are the same on all three models, the front being 2 inches wide by 40 inches long, and the rear 2 inches by 51 inches. The steering gear is the Gemmer type with 18-inch steering wheel. The control levers are of solid German silver. Special attention has been given to body design this year. A drop of two inches has been given the frame just behind the dash, giving more sprawl room in the tonneau. The driver has a lower seat also which gives greater comfort. The fenders curve more abruptly around the wheels, giving a long, racy running board. The extra tire is now carried on the rear. The starting crank will be carried in the tool box where it will be handy in case of an emergency.

The equipment consists of an extra demountable rim, speedometer, grade-indicator, Delco starter, electric headlights, side, cowl and tail lights, silk mohair top with side curtains and top cover, clear rain vision wind shield; pump, jack and tool kit under front seat; robe rail and foot rail, rear tire carrier, electric horn, all dash equipment being mounted on the highly finished cowl board.

Harking Back a Decade

What the Motoring Publications of 10 Years Ago Had to Say on Live Matters of the Day

FROM *The Automobile and Motor Review*, September 13, 1902:

Jacob Ruppert, the New York brewer, has installed a 7-ton electric truck made by the Fischer Motor Vehicle Company for use in the delivery department. The current is generated by a four-cylinder, four-cycle gasoline motor, the cylinders of which measure 5 1-2 by 6 inches.

The Hon. Charles Stuart Rolls is coming to the front as a leading race driver in England. Montague Grahame-White is likewise becoming very prominent in the speed world on account of his brilliant skill and fearlessness.

In the early days of automobile construction, in this country at least, the problem of compensating for road inequalities as affecting the means of transmission, was generally accomplished by adopting the principle of the three-point support in the running gear and carrying the machinery on a rigid framework. This has been proved to be unsatisfactory and the next step was to lighten the reaches and strengthen the springs that carry the body. It has come to be accepted practice at present to recognize that flexibility and not rigidity is the proper condition for both frame and transmission mechanism.

John Farson, Jr., in his Winton touring car, won the two 5-mile dash races staged at the Rockford, Ill., county fair. The track is an oval 1-3 mile in circumference with turns unbanked. The best time made was 11:57 1-5.

The Fournier-Searchmont Automobile Company, of Philadelphia, will be moved to a new factory location recently secured near Chester, Pa. The station is now known as Trainer but an effort is being made to have the postal authorities rename it Searchmont. The company expects to move in October.

The name of the Robinson Motor Vehicle Company, of Hyde Park, Mass., has been changed to Pope-Robinson Company. The capital stock has been increased from $100,000 to double that amount. Edward W. Pope has been elected secretary and treasurer.

The Austin Automobile Company has been incorporated under the laws of Michigan to manufacture gasoline automobiles at Grand Rapids. The car will be of the French type, 16-horsepower with detachable tonneau.

Gasoline has advanced in price in New York City from 18 to 20 cents a gallon and 15 cents a gallon by the barrel. There is a scarcity of the 76-degree gasoline.

New Acetylene Starter

Niagara Compressor Mounted on Steering Column Controls Starting of Car and Gas Headlights

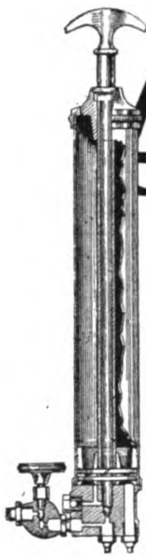


Fig. 1—Part section of compressor

AN ACETYLENE motor starter of very novel construction is the Niagara. The principle upon which it operates is the placing of acetylene and air in the cylinders of the motor thus forming an explosive mixture. The firing of this mixture is effected by the ignition system of the car. The principal feature of the starter is that the mixing of the air and acetylene is done within the motor cylinder and not outside. Another prominent feature is that the acetylene headlights on the car can be regulated by the driver from his seat.

In appearance the starter is a long cylindrical plunger pump a part section of which is shown in Fig. 1. It is attached to the steering post as indicated in the view of the installation, Fig. 2. It is thus within easy reach of the hand at all times. At the bottom of the cylindrical pump there are three copper tubes one of which passes to the acetylene tank and is the source of supply both for the starting apparatus and the lamps, another goes directly to the headlights and supplies them with pure acetylene gas, the third pipe is for the purpose of starting and takes the gas directly to the cylinders. When the plunger is lifted, a measured amount of acetylene is drawn into the barrel of the pump and the correct amount of air for making an explosive mixture with this gas is also taken in through the intake side of the pump. A downward thrust on the plunger sends this gas through the copper lead into the cylinders which it enters and becomes thoroughly mixed in the process so that it is readily combustible.

The connection of the starter lead with the cylinders is T-shaped except in the case of the foremost cylinder where it is an L. The connection to the acetylene tank consists of a regular tube which replaces the valve ordinarily found at this point. The valve control is located at the foot of the pump and it is from this point that the pressure of the feed is regulated. The headlights are thus under perfect control without the necessity of the driver having to leave his seat. The latter valve may be seen in Fig. 1 which shows a section through the lower part of the pump. The other valves are automatic and are of the steel ball type.

The passage of the acetylene gas for the lamps in the illustration is that located nearest to the pressure control valve; it passes out through the base of the pump directly into the copper lead for the headlights. The operation of the headlights by means of this valve does not in any way interfere with the action of the starting device which is altogether independent of the lamp control although contained within the same housing.

Best of Materials Are Used

The barrel of the compressor mounted against the steering column is of mandrel drawn steel tubing. The plunger is cast iron and is made exactly like the piston in a motor with two piston rings. The iron used in the casting is the same style of soft gray iron that is used in the pistons and cylinders of nearly all gasoline motors. This combination of soft gray iron with the two cast iron piston rings working against the steel tube should give an arrangement that will wear as long as the car. Another feature of the construction of the pump which is also of interest is the cover plate over the top of the starter. This forms both the cover to the barrel and the upper bearing of the plunger stem. The bearing is an integral part of the cover which is made entirely of steel to guard against wear through excessive use. The length of the bearing provided for the stem at this point is 1 1-2 inches. Through the cover there is a small vent hole to prevent any compression in the upper part of the compress or barrel when the plunger is lifted up. This vent is small in order that no dust can possibly pass down into the barrel and score the same after it has collected in sufficient quantities to work down past the piston at the same time it is large enough to allow of the free reciprocating motion of the plunger. The vent hole will also act as an oil hole for the introduction of an occasional drop of oil to lubricate the action of the metal plunger and cylinder contact.

The handle of the pump is of such shape that it affords a good grip and is at the same time ornamental. It is connected directly to the hollow steel plunger stem which is screwed at its lowest extremity into the boss in the center of the piston or plunger making a firm connection to the latter so that it cannot possibly work loose.

The piston is of the inverted bucket type with the two rings located at the bottom. The piston seats firmly against the base of the pump around its entire circumference, it is grooved, however, above the air intake and the mixture outlet ports. The base contains the air intake which is governed by a ball check valve held in place by a spring. The lifting of the piston draws the air in through this valve and allows it to enter in the correct proportion to the amount of acetylene that is taken into the cylinder of the pump.

Device Is Easily Installed

The installation of the device does not offer any difficulties on any make of car as it consists in simply clamping the plunger to the steering column and then cutting holes in the footboard to allow the piping to pass to the cylinders and to the acetylene tank. These holes are approximately 1-2 inch in diameter and allow the tubing to pass through without difficulty. The third tube which conducts the mixture to the cylinders will be passed through the dash as it is required to bring the lead directly over the cylinder heads. In installing this part of the device the regular compression cups and release cocks in the cylinder heads are removed and the T connections screwed in the three rear cylinders and the L connection in the forward cylinder. The pipe is then connected to these as shown in Fig. 2 so that there is a straight flow from the dash directly through on a straight line to the end cylinder. The ignition apparatus does not have to be touched unless the car is only equipped with the high tension magneto. In the latter case a battery and coil set for starting purposes can be readily added. In most cases, however, the battery starting set will be found on the car and the matter of installation will not take longer than 2 hours.

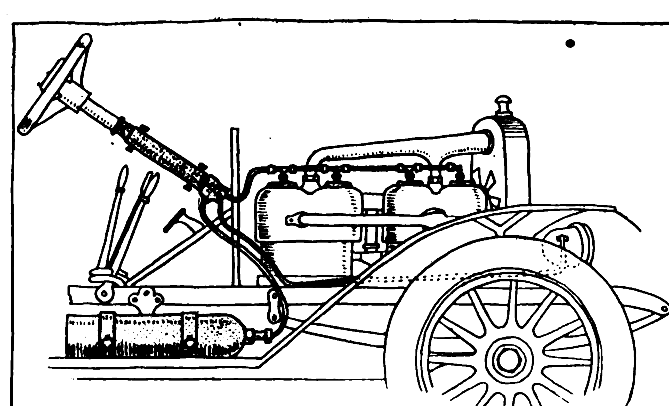


Fig. 2—A view of the installation of the Niagara starter on a four-cylinder motor

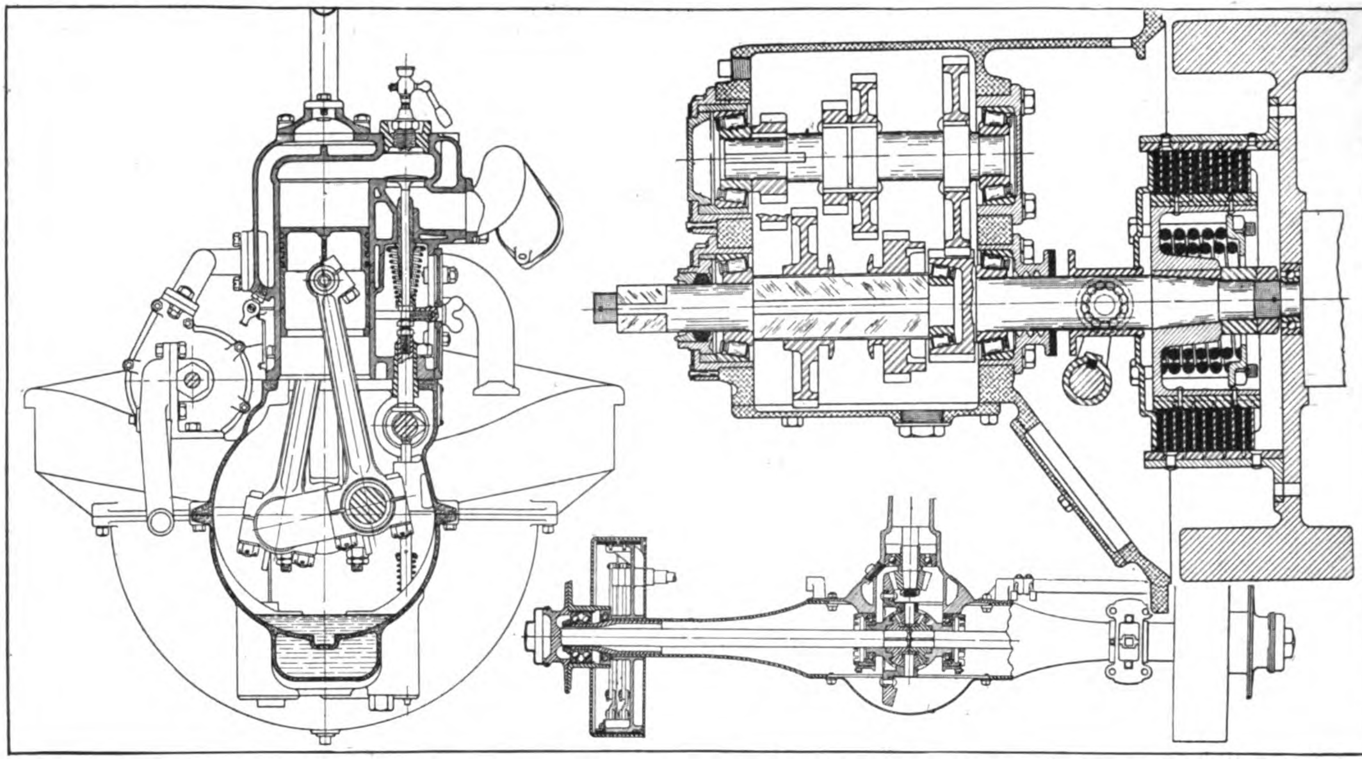


Fig. 1—Showing cross-sections through the new Glide motor, clutch, gearset and rear axle

Glide 1913 Cars Ready

Entirely New Model on the Market for The Coming Season Built on Lines Similar to Former Model

Longer Wheelbase, Increased Bore, Longer Springs and Heavier Parts Some of the Improvements

AN entirely new model Glide car will be put upon the market for the season of 1913. This car, which is to be known as the 36-42 will be built along similar lines to its predecessor, the model 3, which was introduced last year. Aside from the fact that the new car will have a wheelbase of 118 inches, which is 4 inches longer than the model 36 had, and that the new car on account of its higher power and larger dimensions will be built more heavily in the parts subjected to additional strain, the new model is throughout a larger edition of the successful 36.

The motor in the new model is rated at from 38 to 42 horsepower on the actual brake test and is guaranteed by the makers to actually deliver this power. The bore of the motor is 4 1-8 inches and the stroke 5 1-4 inches. The four cylinders are a monobloc casting and have the intake manifold and the valve chambers cast integrally. In the process of construction each block is first bored roughly to center. The casting is then set aside and allowed to age so that any of the internal strains which would be apt to develop in a complicated casting of this nature would be sure to be detected. After this test has been consummated another test by water under high pressure is given to make the soundness of the casting absolutely certain. After this test the cylinders are finish bored and then ground to a mirror finish. The exterior parts of the cylinder castings are given two coats of air drying enamel providing them with a handsome and permanent finish.

The entire valve mechanism, including tappets, valves and springs, is entirely inclosed, keeping them free from dust and moisture and eliminating tappet sounds entirely. The valves have nickel steel heads electrically welded to carbon steel stems providing against burning and warping of the head and wearing of the stems by tappet action. The valves have both seats and stems and are ground to exact size. By removing cast-iron cover plates, the valve springs and tappets are readily accessible for inspection or adjustment.

The pistons are made of the same soft gray iron as used in the cylinders. They are ground to size and each fitted with four diagonally-cut rings. The rings are made of special iron of great elasticity and toughness so as to retain their expansion at high temperatures and under continued use. They are ground on the outside and on both faces and are carefully fitted to the ring grooves in the pistons and to the inside bore of the cylinder. The pistons are also supplied with five oil grooves turned on the outer face and so spaced as to carry the oil to all parts of the cylinder. The piston pin holes are bored and then reamed in special machine tools, insuring alignment. The piston pins are made of seamless drawn steel, hardened and ground to size. The pin is clamped rigidly in the upper end of the connecting-rod and has its bearings in the piston-pin bosses. This provides for a large bearing area and also for lubrication of the pins.

The connecting-rods are of I-section drop forged from high carbon steel and heat treated to secure rigidity. The piston-pin eye and crankpin bearings are bored and reamed in perfect alignment and are tested on gauges for exact center distance. The bearing caps are held in place by means of 3 1-2 per cent. nickel bolts secured by castellated and pined nuts. The bearings are of nickel babbitt, expanded into place, reamed and hand scraped. Sheet steel shims of from .003 to .008 are supplied for affording adjustment of the bearings to take up wear. The cam tappets are of hardened and ground chrome nickel steel and are easily removed for inspection. The crankshaft is of the three-bearing type and is forged from high carbon steel and is heat treated to secure the utmost rigidity and shock-resisting qualities. All bearing surfaces are ground accurately to size. These are of exceptionally liberal dimensions. The flywheel is secured to the crankshaft flange by six large bolts provided with castellated and pined nuts. The crankshaft bearings are of nickel babbitt expanded into place, reamed and carefully hand scraped. They are supplied with thin sheet steel liners like the connecting-rod bearings, making adjustment a quick and simple operation.

The crankcase and flywheel housing is cast of nickel aluminum alloy is made in two pieces, being split on the center of the crankshaft. The upper half carries all mainshaft bearings so that by dropping the lower part these are readily accessible for adjustment. The lower half contains the oil pan and oil reservoir. The flywheel is totally inclosed. The upper half of the crankcase incloses the camshaft and bearings. The lower half contains the oil reservoir pumps, float chambers and screen. The camshaft is a one-piece forging specially heat treated and hardened before being ground to exact size. It is supplied with three liberal nickel babbitt bearings and is readily removed from the motor by removing the gearcase cover.

The two oil pumps situated in the lower oil reservoir are of the plunger type and have their inlet openings below the level of the oil in the reservoir and they cannot become "starved" even when the car is on a grade of 45 degrees. This provides lubrication at all times. The oil is pumped through copper tubes to the timing gearcase and to the rear main bearing, from which points it overflows into the crankcase providing supply for a constant level splash system for the pistons, connecting-rod bearings and crankshaft bearings. The oil may be drained from the reservoir by removing suitable plugs at the bottom of the reservoir. In a similar way the oil screen and pump foot valves may be removed from the outside for inspection and cleaning. The timing gears are all helically cut to reduce gear sound to a minimum and run in oil. They are accurately cut to run without noise, at all speeds. The crank, cam and pump shaft gears are of soft steel, the idler gear of cast iron. This provides a steel and cast-iron contact at all points of engagement.

Water circulation is afforded by means of a centrifugal pump mounted on the right-hand side of the motor. The pump is of bronze throughout and is supplied with two large bearings and two stuffing boxes. A drain cock is provided at the lowest point to drain all water from the housing in freezing weather. The motor is regularly equipped with the Remy dual magneto and a Stromberg model 4 B carbureter.

A multiple disk dry plate clutch is used. It has fourteen steel plates, alternate plates being faced with Raybestos. The clutch throw-out clevis is provided with two annular ball bearings which reduce wear at this point. These bearings rotate only at the instant of release of the clutch and will, therefore, wear indefinitely. The clutch is also supplied with a brake for stopping the spinning of the plates when disengaged. The clutch housing within the flywheel is of pressed steel and is bolted in place after which the bolts are wired, absolutely preventing rattling or misalignment. The plates are provided with square slots which engage hardened steel dogs on the inside of the housing. This reduces wear with consequent noise. The clutch pilot shaft is provided with imported annular ball bearings.

The gearset is of the three-speed selective type. The shafts are of 3 1-2 per cent. nickel steel heat treated and the gears are of chrome nickel steel oil treated. The bearings are Timken roller throughout. The gearset and clutch housings are cast in one piece of nickel aluminum alloy and this unit is bolted rigidly to the flywheel housing on the motor. This provides unit power plant construction and assures perfect alignment of motor, clutch and transmission shafts. The gear shift rods are provided with an automatic lock, making the selection of two speeds at the same time impossible.

The rear axle is of the floating type with drive flange and axle shaft forged in one piece. Both axle shafts and propeller shaft are of 1 3-8-inch diameter heat treated chrome nickel steel. The entire weight of the rear end of the car is supported by the wheel carriers, which are made integral with the pressed steel axle housing. The wheel carriers are of nickel steel tubing ground to accommodate the wheel bearings. The axle housing is virtually of one piece pressed from 3-16-inch sheet steel. The axle is supplied with torsion tube inclosing the propeller shaft. The pinion gear is of 3 1-2 per cent. nickel steel oil treated.

The steering gear is of the screw and nut type and is irreversible. The threads on the operating screw are cut right and left handed and the two half nuts, one right and one left handed, connected through a suitable linkage to the steering crank. The steering is on the left side with center control. The wheels are wood and take 34 by 4-inch tires.

There are two styles of body; a five-passenger touring and a two-passenger roadster. They are both fully equipped with acetylene starter, Ward-Leonard lighting system, motor driven tire pumps, top cover, tire carriers, lamps, horn, complete tool equipment, etc.

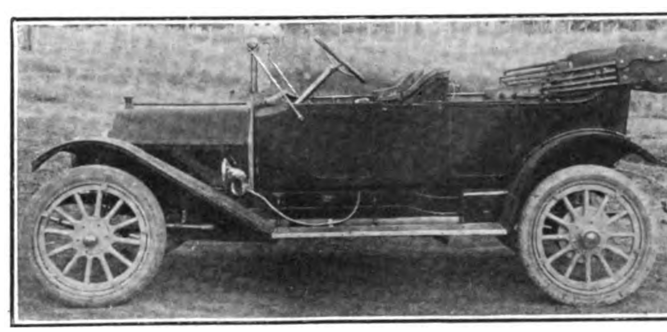


Fig. 2—The Glide five-passenger touring car for 1913

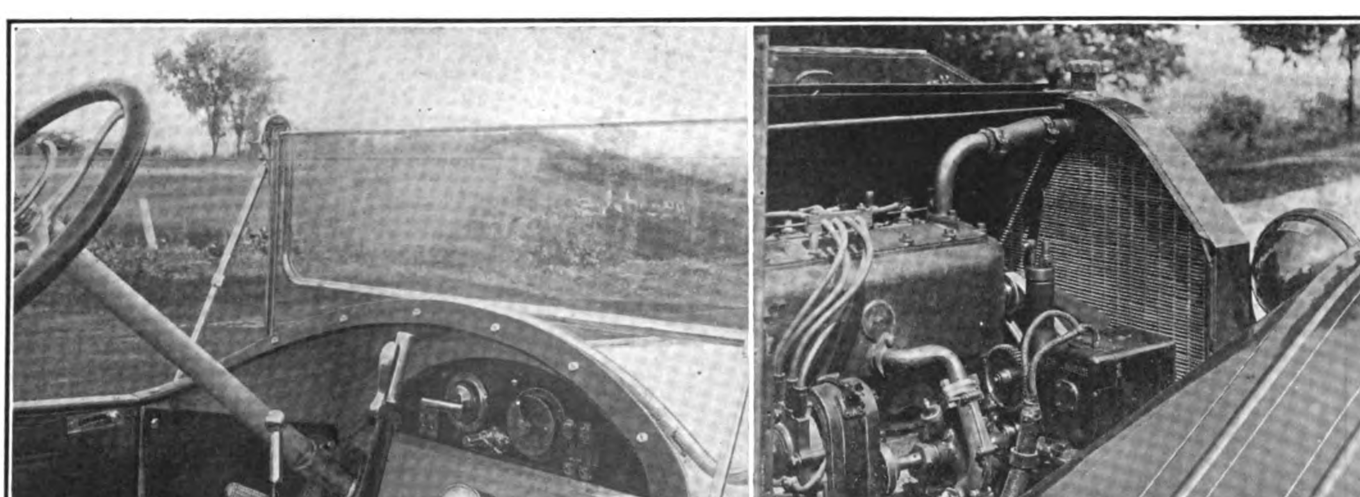


Fig. 3—A view of the dash arrangement and one of the power plants in the latest Glide cars

Garage Man Complains of Ill Treatment; Installing a Platform Spring; Current for Ignition Purposes; How to Set a Splitdorf Magneto Properly; The Four-Speed Discussion

Robbed by Rich Hotel Patrons

EDITOR THE AUTOMOBILE:—As a garage superintendent in New York handling a portion of the automobile trade of the high-class up-town hotels, I have not infrequently come in contact with patrons of the following sort: They are parties who stop at high-grade hotels and leave their car in my place for several days, after which they take it away, for a ride through the town, as they say, without returning again. I have in several cases traced these people by the lists of license-holders which are published by the various secretaries of state, and while in some instances I have been successful in being paid what these parties owed me either with or without the assistance of the court, there are a good many cases where I have no chance of recovering the money due to me unless these doubtful patrons stop at my place once more.

Such losses of money are bound to increase the overhead expense of a garage very considerably, and a garageman brought face to face with this problem must do either of two things. He may bear the loss himself or, what is very much preferred by the great number of men, make the public at large pay for the dishonesty of a few by raising his charges. Of course, the garageman is blamed if he resorts to such a course. However, it is not blaming what he needs, but help and organization. If the garagemen could see their way to combine and inform one another of their cases of meeting fraudulent patrons, they would render themselves and the public a benefit. A general organization would also bring other similar benefits. A list of stolen cars could be circulated among the garagemen and a large percentage of automobile thiefs be exposed. The more orderly the garage business is conducted, the more profitable must it prove and the more service may it render to the public at large.

I would like to know how other garagemen meet this situation, as I believe in New York, at least, it is frequent enough to be serious. In the smaller towns I do not believe that garagemen have to cope with such things.

New York City. A. C. VILLARD.

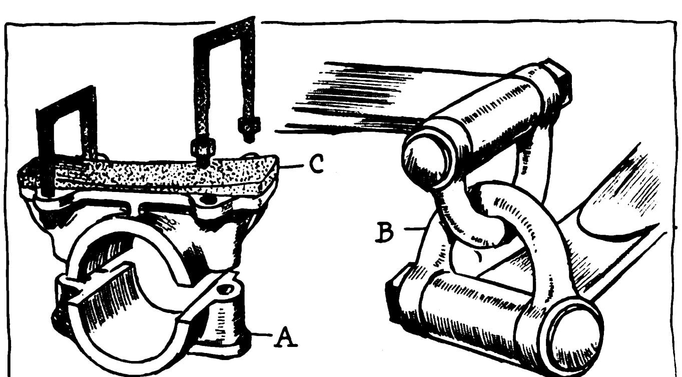


Fig. 1—Fixtures for spring installation; A, spring pad; B, double shackle; C, fiber block filed to shape

Altering the Car's Suspension

Editor THE AUTOMOBILE:—Will you kindly answer the following:

1. How could a platform spring be fastened under the rear end of a Ford T car?

2. How can the oiling system on a Ford T car be adjusted so as to limit its feed to the cylinders?

Berwick, N. D. H. W. ARNOLD.

—If you are bent on altering what is now a perfectly good and satisfactory suspension for a light car, it is a job that will call for a shop equipped with tools for sawing channel iron, riveting, drilling and tapping. In order that the propeller shaft and the distance rods will not have to be altered the wheelbase will be left the same, although the overall length of the car will be materially increased.

The two side members of the car are sawed through as in Fig. 3. The spring is disconnected in the rear from the shackles which hold it to the rear axle. The purpose is now to insert in the blank left by sawing off the rear end of the T-shaped piece which will connect the end of the frame and also for the forward support for the platform rear spring. The details of the job may best be seen in the accompanying sketches, Figs. 1 and 3. It will be seen that the same cross spring that you now have on the car will be used for the cross-members of the platform rear springs. There will be two semi-elliptic members inserted in the system, one on each side. The spring pad in the rear axle to take the semi-elliptic member may be purchased of any concern handling forgings. They come of the correct size to fasten to the rear axle and have a flat, smooth pad to take the spring. As long as the pad is flat there is a chance that it will be difficult to keep the U-clips tight on account of the fact that the spring touches only at one point. If a fiber piece is taken and filed out to conform to the curvature of the spring it will be much easier to keep these clips tight.

At the front end of the new spring an ordinary shackle will be used. This will be attached to the cross-member which is inserted for the sake of strength and safety, by a forging which will be of the correct shape to hold the shackle properly. If it is found that the installation fouls the distance rods, short torque members could be inserted between the cross-piece and the rear axle. These would have to be strong and situated as far from the axis of symmetry of the car as possible. Some of the special parts which it would be necessary to purchase are shown in Fig. 1. Altogether, this would be a costly job, although it probably could be done satisfactorily along the lines laid out. The spring suspension of the Ford car as it stands at present has been the result of many years' work by competent engineers and it is difficult to see why it should be changed in any one special case.

The level of the oil in the Ford lubricating system is controlled by two try cocks, shown at A and B, Fig. 2. The upper cock A marks the level above which there should never be any oil. The lower cock is the danger level. When the oil gets below this there is an insufficient quantity. Open the upper cock and let all the oil flow from the crankcase that is above this point and then open the lower cock until the level is about half way between the two cocks. Now try the motor and if it smokes the cause is probably worn piston rings. These cost 15 cents apiece.

Using Too Much Current

Editor The Automobile:—Would you kindly inform me what is the right number of dry cells to use for ignition purposes for a four-cylinder Winton car, equipped with a Splitdorf coil?

At present I am using eight cells, which will give good service until they become as low as 10 amperes. Then the engine will begin to miss. How can I get more service from these cells? Will changing the mixture do any good? Also, is there anything that will dry rubber that has been remelted? I mean the kind that has been previously used in the manufacture of tires.

Hoods Mill, Md. C. W. Cauthorn.

—You are using entirely too many cells if you have them connected in series. The ignition system on your car is designed for 6 volts and you are using at least 10. Do not use any more than five cells if they are new or six cells if the current is weaker. On account of using such a high voltage there is no doubt that the vibrator points on the coil are worn; these should be dressed down with a file and adjusted so that the correct intensity of spark will be given at the plugs. Examine the vibrator points and see if they are flat and clean. Turn on the switch and gradually turn over the motor; if the vibrator does not buzz at once, turn until it does. Now turn the vibrator adjustment screw until the clear humming sound indicates that the vibrator is working as it should. There will be no mistaking the correct sound when it is heard.

When the coil has been adjusted properly and is known to be in good working order it would be well to clean the contact points in the spark-plugs so that the ignition system will not be faulty owing to neglect at such a point as this. Remove the wires from the plugs and take them entirely out of the cylinders, soak them well in gasoline, taking off all the carbon that may be located around the electrodes. After the plugs have been thoroughly cleaned they can be reconnected to the wires, but should not be put back in the cylinders until they have been tested. To test the plugs lay them on their sides on the cylinders, open the compression cocks and turn the motor over slowly, noticing the spark in each plug. If it is found that the spark is good in one and not in other plugs, the chances are that the plugs showing the weak sparks have the gap too wide. The fact that you have been compelled to use such a high voltage to get satisfaction makes it very possible that the gaps in one or more of the plugs are too far apart. After making these simple adjustments, if the coil will not work satisfactorily return it to the makers. Do not attempt to take it apart yourself.

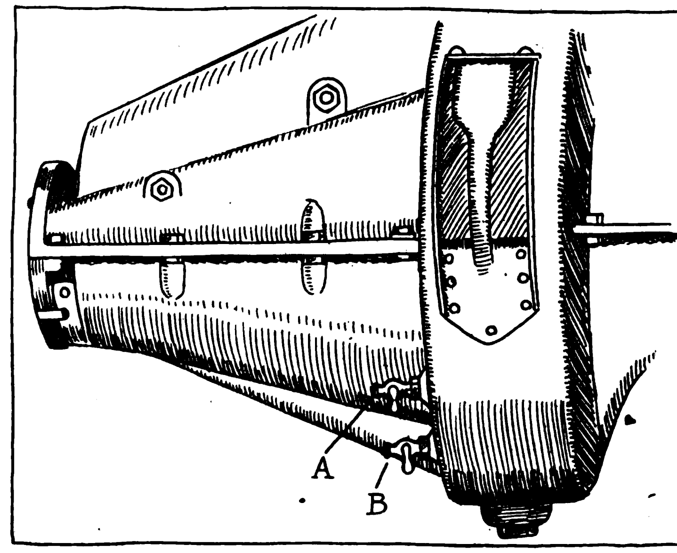


Fig. 2—Trycocks for oil level on the Ford flywheel housing

Do not attempt to change the mixture until after you are sure that the ignition system is working correctly. This will be determined by the test of laying the plugs on the cylinders and turning over the motor. If the ignition is as it should be and you still do not get good results, it is then time to make carbureter adjustments. It is hardly likely that you will need any.

Rubber that has once been melted will be destroyed structurally and will be of no practical use for any purpose that requires strength. Exposure to the atmosphere will eventually dry out the rubber that has been melted.

Setting a Splitdorf Magneto

Editor The Automobile:—I have an E. M. F. 30, and would like to know if you could publish a diagram showing how to time a Splitdorf timer for heavy pulling, showing how the piston should set ready to fire. I would also like to know whether the differential sings when the Timken roller bearing on the main shaft is worn? If not, is there any way to stop it from singing?

Inverness, Fla. E. M. F. 30.

—Assuming that the magneto is in place on the motor, turn the starting crank with the pet cocks on the cylinders open until the number one, or foremost, cylinder is on upper dead center, that is, when the piston is at its highest point. You will be able to ascertain this by looking at the flywheel which is marked to show its position when the number one cylinder is in this position. The motor should be kept in this position throughout the entire operation.

First retard the spark advance mechanism at the steering

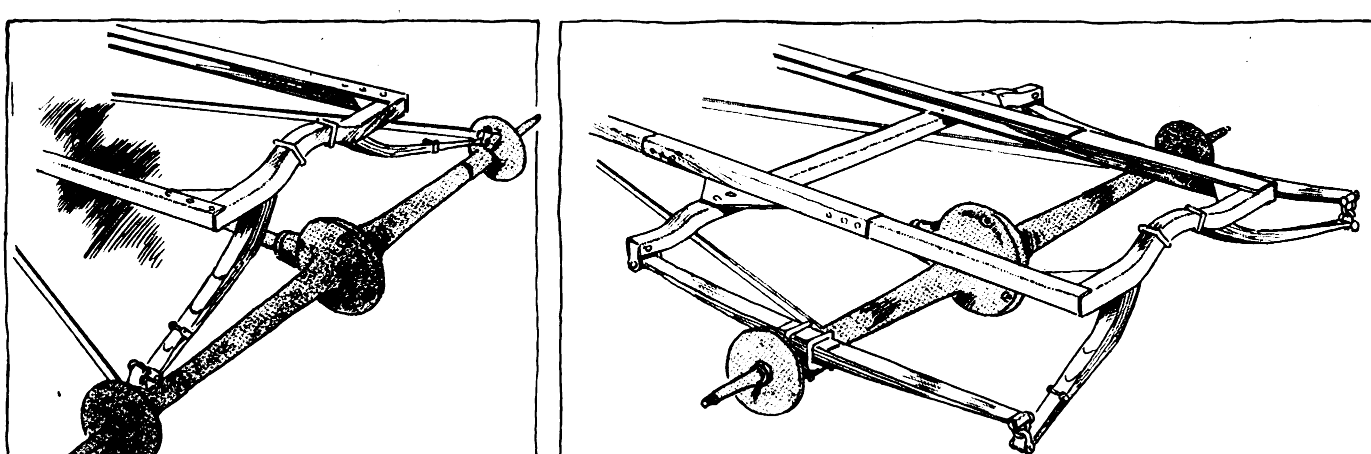


Fig. 3—Original suspension of the car and appearance after platform spring has been installed

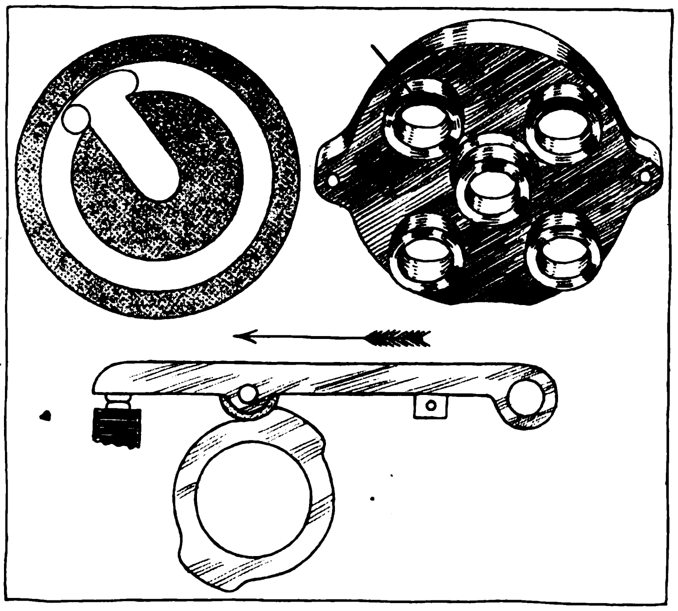


Fig. 4—Position of distributor and opening in cover to which the wire from number one cylinder is connected; a view of the circuit breaker

wheel to its limit and connect it to the spark advance lever on the breaker box of the magneto, so that if the magneto shaft revolves in a clockwise direction looking at the driving end, the breaker box lever will be at its topmost position. If the shaft revolves left-handed the lever should be at the bottom limit and advance upward.

As all four-cylinder, four-cycle models run at crankshaft speed it is customary to drive either geared direct to the crankshaft or by means of a universal coupling known as the "Oldham" coupling. The latter method is very much to be preferred

TABLE I.—VARIOUS TRANSMISSION RATIOS IN TERMS OF PERCENTAGES OF THE DIRECT

		Four Speed, Direct on Fourth				
Name	C	B	1	2	3	4
Alco	4 & 6	3.0	29	48	72	100
American	4	3.0	23	50	75	100
Berkshire	6	2.8	29	51	68	100
Chalmers	4 & 6	3.8	29	54	75	100
Fiat	(4) & 6	3.5	28	43	64	100
Locomobile	(4) & 6	3.2	25	53	72	100
Matheson	4	3.4	21	34	67	100
Noon	4	3.1	25	40	62	100
Oldsmobile	4 & 6	3.5	31	44	62	100
Palmer-Singer	6	3.9	34	55	75	100
Peerless	4 & 6	3.2	28	52	73	100
Pierce-Arrow	6	3.3	28	50	75	100
Simplex 38	4	2.4	34	51	75	100
White	6	3.1	29	46	69	100
Average above 14 makes			28	48	69	100

TABLE II.—FOREIGN CARS—FOUR SPEED, DIRECT ON FOURTH

Name	C	B	1	2	3	4
Alldays	6	2.8	25	50	83	100
Argyll	4	3.7	22	46	67	100
Armstrong-Whitworth	6	3.3	28	41	65	100
Arrol-Johnston	6	3.5	22	43	64	100
Austin	6	2.2	30	50	71	100
Berlier	4	3.0	34	48	67	100
De Dion-Bouton	8	3.7	24	39	59	100
Delaunay-Belleville	6	3.1	26	41	65	100
Hotchkiss	6	2.9	24	44	66	100
Daimler	(4) & 6	3.8	24	49	75	100
Lancia	4	3.1	25	42	61	100
Mercedes	4	3.0	23	44	70	100
Opel	4	3.0	27	46	75	100
Panhard-Knight	4	..	29	50	79	100
Peugeot	4	3.0	25	43	75	100
Pilain	4	2.4	22	39	71	100
Renault	6	2.2	26	51	71	100
Wolseley	(4) & 6	3.6	28	46	67	100
Average of above 18 makes		3.1	26	45	70	100

to the former, because the accurate setting and alignment absolutely necessary with the direct gear on the armature shaft is not essential with the latter method. There is another drive possible, the chain, but on account of the many wearing points, back slack, etc., this should only be used where gear drive is impossible on account of inaccessibility, or where a large number of gears are objectionable.

If the "Oldham" drive is employed the driving flange is first slotted to fit the Woodruff key supplied with the magneto and then fitted. The other flange of the coupling is left loose on the end of the pump shaft or other shaft used to drive the magneto and the cross block is slid into place.

Now revolve the armature shaft in its direction of rotation until the oval breaker cam comes in contact with the roller in the breaker bar and just begins to separate the platinum contacts, Fig. 4.

The flange of the coupling can then be drilled and reamed for a taper pin and the timing of the magneto is then permanently effected.

After ascertaining the position of the bronze sector of the distributer, Fig. 5, connect the cup directly, shown in the same illustration, over it to the spark-plug in cylinder No. 1. Since the direction of rotation of the distributor is always opposite to that of the armature shaft, the wire from the cup next in rotation goes to the next cylinder in sequence of firing and so

TABLE III.—VARIOUS TRANSMISSION RATIOS

		Four Speed, Direct on Third				
Name	C	B	1	2	3	4
Chadwick	6	3.0	33	66	100	130
Garford	4 & 6	3.5	27	57	100	117
Interstate	4	3.0	33	50	100	120
KisselKar	4 & 6	3.8	39	59	100	131
Lozier	4 & 6	3.1	34	63	100	120
Marquette	4	3.5	29	50	100	113
Morse	4	3.4	36	64	100	122
Palmer Singer	6	3.6	38	74	100	144
Pope Toledo XV.	4	...	26	64	100	125
Stuyvesant	4	3.5	40	58	100	130
Winton	6	3.4	32	69	100	126
Average of above 11			33	60	100	125
FOREIGN CARS						
		Four Speed, Direct on Third				
Name	C	B	1	2	3	4
Ariel	4	3.9	30	60	100	122
Enfield	4	4.1	29	60	100	120
Average of above 2			30	60	100	121

on until all four are connected. Four-cylinder, four-cycle motors always fire either 1, 2, 4, 3 or 1, 3, 4, 2, the latter being the most general rule.

Anent the Four-Speed Discussion

Editor THE AUTOMOBILE:—There have been some interesting and some amusing opinions aired in the current four-speed transmission discussion. Personally, the worm must turn with my failure to appreciate the correctness of the method of determining gear ratio steps as introduced by S. I. Fekete in your issue of August 15.

I learn that "the gears in a transmission should progress in a geometrical ratio because the resistance increases in the velocity interval in a hyperbolic curve." Without discussing the truth of the latter clause, I fail to see why it is a rule or reason for the hypothesis preceding it.

Mr. Fekete gives two equations for forces acting when a car is in motion:

$$\text{resistance} = \text{tractive force}$$

for that case where the velocity is uniform, and

$$\text{force to cause acceleration} + \text{resistance} = \text{tractive force}$$

for that case in which the car is being accelerated. While Mr. Fekete's Fig. 1 seems to distinguish between road resistance and air resistance, his formulas do not; yet the two resistances are of quite different nature, the former probably varying directly with the speed, while the latter varies more nearly with the cube of the speed.

Let us introduce still another equation which will represent more nearly the general case:

delivered HP = tractive effort = force to cause acceleration + road resistance + air resistance + work of lifting.

It is understood that in this equation the sign of the first term will become minus if deceleration be substituted for acceleration, and similarly the sign of the last term will become minus if a grade be descended instead of ascended.

It is true that in this equation there appear terms which have a bearing upon the question of proper transmission gear ratios, but air resistance is not one of them, as Mr. Fekete would have us suppose. Rather do road resistance and work of lifting give the true clue to the situation, and if these terms can be expressed as functions of car velocity I should be interested to learn how.

TABLE V.—PERCENTAGE ERRORS IN ARRANGEMENT BY ARITHMETICAL PROGRESSION AND BY GEOMETRICAL PROGRESSION ASSUMING AVERAGES IN TABLE I AS STANDARDS

Class	1	2	3	4	Algebraic Mean	Max.
Arithmetical Progression						
(1) Four speeds, direct on 4th.	−11	+4	+7	......	0	−11
(2) Four speeds, foreign practice	−4	+11	+7	......	+5	+11
(3) Four speeds, direct on 3d.	0	+11	......	+6	+6	+11
(4) Four speeds, foreign practice	+14	+11	......	+10	+12	+14
(5) Three speeds	+3	+14	......	......	+9	+14
(A) Mean of above	+0.6	+10	+7	+8		
Arith. Mean of (A) = 6.4						
Geometrical Progression						
(1) Four speeds, direct on 4th.	−36	−31	−19	......	−29	−36
(2) Four speeds, foreign practice	−31	−27	−19	......	−26	−31
(3) Four speeds, direct on 3d.	−33	−23	......	+72	+5	+72
(4) Four speeds, foreign practice	−24	−23	......	+78	+10	+78
(5) Three speeds	−30	−22	......	......	−26	−30
(B) Mean of above	−31	−25	−19	−75		
Arith. Mean of (B) = 38						

And, again, assuming the resistance to bear a known relation to the velocity, I am still unable to see how it follows that the correct increments of progression are thus determined. Velocity-resistance laws involve a consideration of the manner in which required power increases with speed; transmission gear ratios involve a consideration of various speeds and torques at a constant power. To consider the two as interdependent seems like adding quinces and apples to get pears.

Taking current practice as a criterion I am still unable to justify the method of geometrical progression. In the appended Table I (some of the data of which has been transposed from an article by D. S. Hatch in *Motor Age* for July 18) are given the gear ratios of some conventional transmissions in which the steps are given in terms of percentages of the direct gear. This form of tabulation is, I believe, more comprehensive for analytical study than that which deals with total reductions. The fact that manufacturers almost invariably offer an option on final reduction ratios makes tables or diagrams of total reduction unfit for purposes of comparison. In column "B" of Table I is given the final drive ratios, and by means of this the total reduction on any gear may be readily found. Column "C" shows the number of cylinders of cars listed.

Table 2 shows at a glance the mistake of assuming a division according to a geometrical progression. In each type considered this method is found to be greatly in error. On the other hand, the arithmetical progression is always reasonably close to the average standard practice, and in the case of four-speed transmissions—which, incidentally, seem to have started this controversy—it seems to be an excellent standard to go by.

As Mr. Fekete says, it is not probable that the ratios of any accepted standard can be duplicated in practice due to the necessity of maintaining a constant center distance and the use

TABLE IV.—VARIOUS TRANSMISSION RATIOS

Name	C	B	Three Speed, Direct on Third 1	2	3
American	4	4.1	39	64	100
American	4	3.2	31	58	100
Amplex	4	3.0	31	64	100
Bergdoll 30	4	...	30	61	100
Berkshire	4	3.0	30	66	100
Brown-Lipe	.	...	33	53	100
Cameron	4	3.5	37	78	100
Cameron	6	3.5	29	65	100
Cadillac	4	3.4	27	55	100
Chalmers	4	3.8	30	62	100
Dorris	4	3.6	30	53	100
Driggs-Seabury	.	...	43	64	100
Everitt	4 & 6	3.5	27	50	100
Fellows "Typical"	.	...	35	57	100
Herreshoff	4	4.0	27	57	100
Hupmobile	4	3.6	28	55	100
Inter-State	4	3.0	30	50	100
Jackson	4	3.5	29	58	100
Marmon	4	...	33	60	100
Maxwell	4	3.5	30	37 ( )	100
Midland	4	3.0	27	59	100
Midland	4	3.0	30	52	100
Moon	4	3.5	37	66	100
Ohio	4	4.0	27	50	100
R. C. H	4	4.0	36	66	100
Reo	4	3.7	32	59	100
Selden	4	3.5	31	49	100
Standard Roller	.	...	28	60	100
Stearns-Knight	4	3.9	33	65	100
Stevens-Duryea	6	3.5	29	52	100
Stoddard-Dayton	(4) & 6	3.1	28	60	100
Stutz	4	3.5	44	78	100
Average of above 32			32	59	100.

of reasonable pitches. However, if a standard be chosen, the acceptance of it should be justified, and the method introduced by Mr. Fekete may very well be misleading.

Forty-Fort, Pa. N. S. SEELEY.

Trouble with Electric Lights

Editor THE AUTOMOBILE:—I have installed an electric attachment in a Ford car, to be run from the Ford magneto. I am using a 2-candlepower, 6-volt lamp, but am having trouble in the lamps burning out after having been run for a few minutes.

Kindly state what voltage, amperage and candlepower lamps should be used in connection with the Ford magneto.

Wilton Junction, Iowa. H. AMUNDSEN.

—You do not mention what particular lighting outfit you are using, so it is impossible to tell the exact nature of the trouble. It is probable that the trouble lies in the wiring. The correct method of wiring the headlights is shown in the accompanying diagram, Fig. 5. You should use two lights of 10 or 12 candlepower connected in series. The voltage used with these lamps is six and the reflectors are generally of 9-inch diameter.

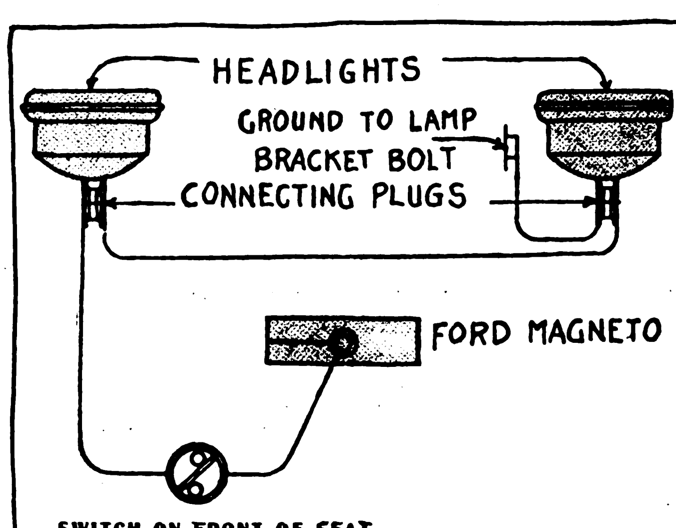
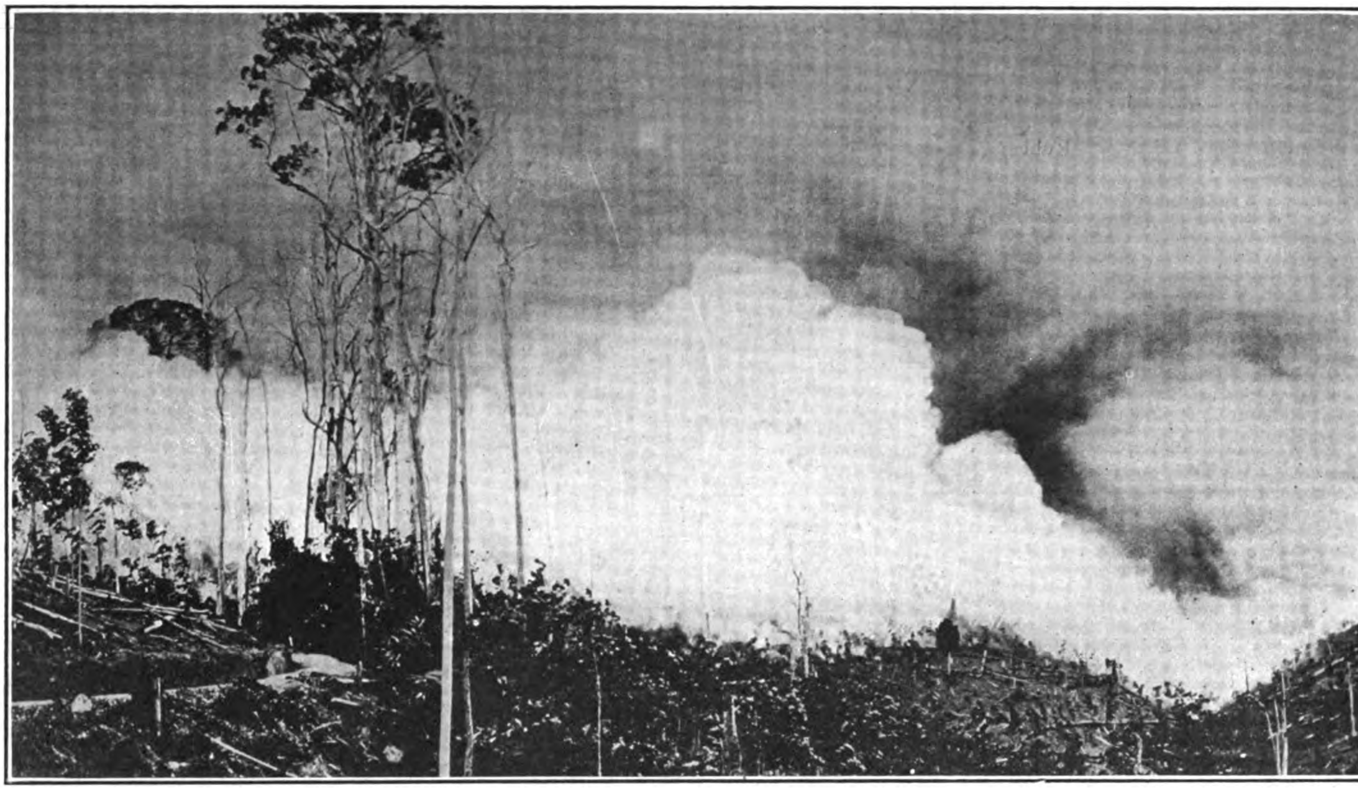


Fig. 5—Wiring diagram of the Ford headlights as it should be when system is operated from the fly wheel magneto



Before the land is planted with little rubber trees, the jungle is burned away and the ashes are used for fertilizer

(*Continued from page 565*)

bale-like packages. Experiments are being made in Hawaii with the castilloa tree. It is estimated that several thousand acres could be devoted to rubber culture in the Hawaiian archipelago.

The Philippine Islands are represented by a small exhibit, showing the progress that has been made in that archipelago since the American occupation. The climate of both of the Pacific island territories of the United States is suitable for rubber culture, but so far the results attained are merely promises for future performance. In Hawaii this progress has been swifter than it has in the Philippines.

The program of the conference is as follows:

Tuesday, September 24, at 2 p. m.—An address of welcome by the president, Mr. Henry C. Pearson. The topic for discussion will be "Crude Rubber." Special papers:

"Rubber Contracts," by Mr. Arthur W. Stedman.

"The Plantation Industry," by Cyril E. S. Baxendale, Esq., of the Federated Malay States.

"Various Manihots Producing Rubber in the Central States of Brazil," by Dr. J. Santiago Cardwell-Quinn, commissioner.

"Possible Rubber Producers in the Temperate Zone," by Mr. Charles P. Fox, Akron.

"Some Effects of Acclimatization Upon Guayule. Parthenium Argentatum," by Francis E. Lloyd, Montreal, Canada.

Wednesday, September 25, at 10 a. m.:

"Problems in Vacuum Drying," by Mr. J. P. Devine.

"Manufacture of Dipped Goods," by Mr. T. W. Miller.

"Physical Methods of Testing Rubber and Rubber Products," by Mr. P. L. Wormeley, Bureau of Standards, Washington.

"Factory Management and Organization Methods," by Mr. J. C. Jurgensen (president of the Institute of Operating Engineers), and Mr. Frederic Dannerth (consulting chemist).

Thursday, September 26, at 10 a. m.:

"A Brief History of Fire Hose Specifications," by E. A. Barrier.

Topical discussion on specifications (mechanical rubber goods for railroads, federal and municipal governments), including as sub-topics: Air-brake hose, railroad steam hose, fire hose, etc.

"The Commercial Possibilities of Synthetic Rubber," by Mr. L. E. Weber, Boston, Mass.

Friday, September 27, at 10 a. m.—A report of the transactions of the Navy Conference at Washington, December, 1911, by Mr. E. S. Land, U. S. N. Topical discussion on specifications: (a) Materials for insulated wire; (b) textile materials (sheeting, duck and yarns).

A preliminary report of activity by the "Railroad Committee" on "Standard Methods of Testing Rubber Products."

At 7 p. m.—Informal dinner for rubber chemists and engineers. (Place to be announced Friday morning.)

Saturday, September 28, at 10 a. m.—Meeting for the presentation of resolutions and recommendation of official methods for physical testing and chemical analysis of crude gum and manufactured rubber goods.

Discussions—A considerable number of topics for discussions have been forwarded to the secretary by manufacturers as well as consumers of rubber goods. These will be presented on the appropriate days.

The following societies will be represented by official delegates:

American Chemical Society.
American Society for Testing Materials.
Society of Chemical Industry.
American Institute of Chemical Engineers.
German-American Technical Society.
Institute of Operating Engineers.

The following governments will be represented by official delegates: Federal Government of Brazil, Federated Malay States and Straits Settlement, Ceylon, Hawaiian Islands, Province of Moro, Philippine Islands, Burma (India).

The State of Amazonas (Brazil), The State of Matto Grosso (Brazil), The State of Para (Brazil), The State of Acre (Brazil), The State of Minas Gereas (Brazil), Bolivia, Republic of Honduras, State of Bahia (Brazil).

President of Conference—Henry C. Pearson, New York City.

Honorary Secretary—Frederic Dannerth, Ph.D.

Executive Committee—E. S. Land, U. S. N., Washington, D. C.; D. A. Cutler, New York; Dr. Lothar Weber, Boston, Mass.; Dr. W. C. Geer, Akron, O.; Dr. S. P. Sharples, Boston, Mass.; Dr. Eugenio Dahne, Brazil; C. E. S. Baxendale, Esq., Federated Malay States; F. Crosbie-Roles. Esq., Ceylon; A. Staines Manders, London.

The list of exhibitors includes the following:

The United States Rubber Company, Broadway, New York City—all descriptions of manufactured rubber goods.

The Swinehart Tire & Rubber Company, Akron, O.—tires and other rubber goods.

The Home Rubber Company, Trenton, N. J.—all kinds of hose, packings, tires, etc.

Manhattan Rubber Company, Passaic, N. J.—a circular loom weaving fire hose jackets, ornamental rubber flooring, conveyor belt in action, moulded goods, etc.

Victoria Balata & Textile Belting Company, New York City.

Dutch Guiana Culture Company—a plantation showing hevea trees at different ages—method of tapping, samples of rubber; also coffee plants and coffee, used as a catch crop.

New York Commercial Company—samples of crude rubber from wild trees and from planted trees.

Henderson & Korn—samples of standard grades of rubbers.

United Malaysian Rubber Company—samples of rubber grown on their estate in the Federated Malay States.

Meyer & Brown—samples of crude rubber.

Rubber Trading Company—samples of crude rubber.

Raw Products Company—samples of crude rubber.

Highlands & Lowlands Para Rubber Company—samples of plantation rubber.

Kalisyndikat—rubber trees, tropical fruits, etc., showing the beneficial effects of manuring with potash.

Buffalo Foundry & Machine Company—vacuum dryers—one very large dryer weighing 20 tons—vacuum pumps, steam hammers, etc.

United Shoe Machinery Company—eyeletting and grometting machine in operation.

The Turner, Vaughn & Taylor Company—motor-driven experimental outfit—washer, mixing mill, etc.

John Royle & Sons—perfected tubing machines.

Farrel Foundry & Machine Company—experimental calender, grinder and washer.

Werner & Pfleiderer—kneading machines, washers, presses, etc.

J. P. Devine Company—vacuum dryers, deresinating and solvent apparatus.

The Curtis & Marble Machine Company—brushing machine for cleaning goods and liners, sewing machine, etc.

The Adamson Machine Company—automobile tire moulds and cores and models.

Hoggson & Pettis Manufacturing Company—moulds of all descriptions, dies, etc.

The Philadelphia Rubber Works Company—reclaimed rubber.

E. H. Clapp Company—reclaimed rubber.

American Rubber Reclaiming Company—reclaimed rubber.

Rubber Regenerating Company—reclaimed rubber.

United States Rubber Reclaiming Works—reclaimed rubber.

New Jersey Rubber Company—hard rubber goods and mechanical rubber goods made from reclaimed rubber.

Monatiquot Rubber Works Company—"Naturised" rubber.

American Wax Company—mineral rubber.

J. W. Coulston & Company—chemicals and colors.

American Asphaltum & Rubber Company—compounding ingredients.

George A. Alden & Company—M. R. for strengthening and preserving rubber.

The Loewenthal Company—reclaimed rubber.

The New Jersey Zinc Company—reclaimed rubber.

H. Muehlstein & Company—scrap rubber.

Electric Rubber Reclaiming Company.

Tyson Brothers, Inc.—rubber substitutes.

The Essex Rubber Company—sheet rubber soling, automobile accessories, asbestos and rubber engineering specialities, etc.

The Diebold Safe Company.

Boston & Bolivia Rubber Company—crude rubber.

Edward Maurer—samples of various grades of rubber.

The Electric Rubber Reclaiming Company—reclaimed rubber.

Charles T. Wilson—rubber broker, New York City.

La Favorite Rubber Manufacturing Company, Paterson, N. J.

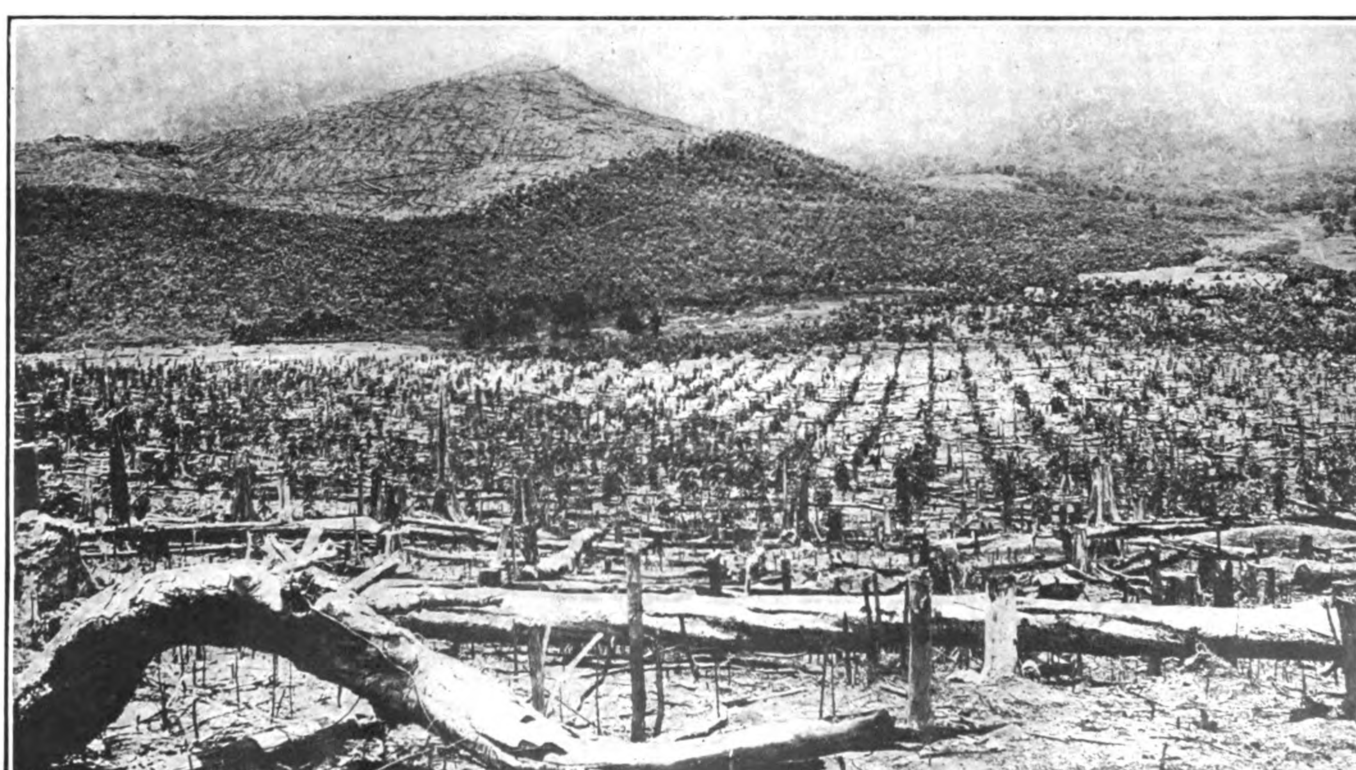
General Rubber Company, New York City.

Bartica Crude Rubber Company.

Acushnet Process Company, New Bedford, Mass.

Boston-Bolivia Rubber Company, Boston, Mass.

Lehmann & Voss, Hamburg, Germany—chemicals.



Malayan rubber plantation with trees 1 year old—Such a plantation may be expected to yield in 4 years' time

View of straightaway on North Fond du Lac road

Long straightaway stretch on Town Line road

All Eyes On Milwaukee

Despite Postponement of Grand Prize Until Monday—Races Center Attention of Motordom

Promoters Display Much Energy in Belated Effort to Get Course in Shape for Speed Trials

MILWAUKEE, Sept. 17—(*Special Telegram*)—Rain during the last 72 hours interfered with practice on the course today to such an extent that DePalma, in his Mercedes, was the only one to make an effort for time. He accomplished the fastest time so far recorded in the practice; covering the 7.8 miles in 7 minutes and 15.03 seconds, averaging 64.7 miles an hour. During the 2 hours of practice today the best laps made were as follows:

Car	Driver	Time min.	sec.	Average speed miles per hour
Mercedes	DePalma	7	15.03	64.7
Knox Six	Mulford	7	30	63.2
Lozier	Nelson	8	15	57.5
Mercedes	Wishart	8	12	57.6
Fiat	Bruce-Brown	9		52.7
Mercedes	Bragg	9		52.7
Fiat	Tetzlaff	10	14	46.7
Case	Nikrant	11	55	41.0

DePalma's lap was the only one timed by the Warner electric timing instrument which was not ready during the earlier laps. There was but 2 hours' practice, the time being extended to 4 hours for Wednesday.

A new entry, a Bergdoll car, has been entered. The lists will not close until Thursday. The driver of this car has not been named. By fast work the promotors hope to have the track fully restored to condition by the opening race.

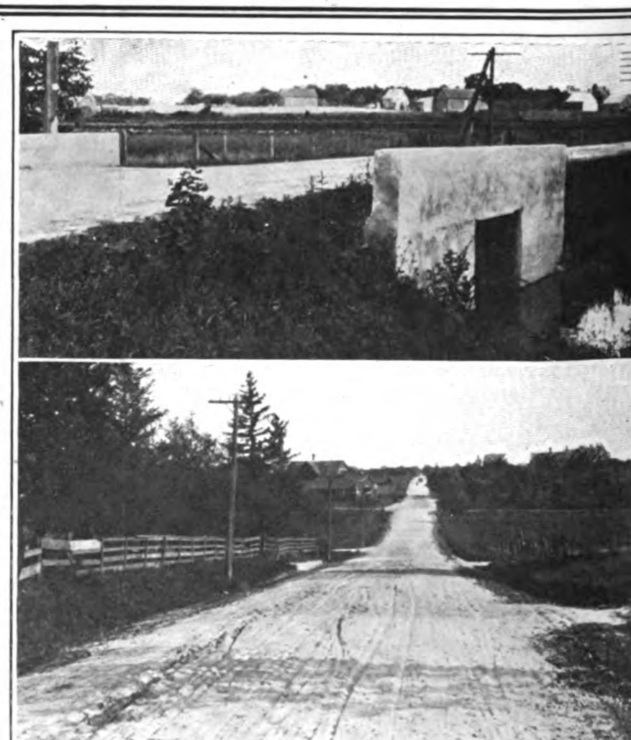
Milwaukee's big road racing carnival will open on Friday noon with the first running of the races for the Pabst Blue Ribbon trophy and the Wisconsin Challenge trophy, the big event scheduled as the curtain-raiser, the fourth contest for the Grand Prix of the Automobile Club of America having been changed to the wind-up, which will take place on Monday, September 23, following the Vanderbilt on Saturday, September 21.

The necessity of a change in the program so that the first events would be set back to give the Milwaukee Automobile Dealers' Association the better part of an additional week to get their course in shape, was anticipated by the inner circle for some days in advance of Thursday, September 12.

The action temporarily staggered the promoters, but all realized the absolute necessity of the change, and then started out to make good. The road construction contractor and his assistants were fired on the spot and some new and fresh blood infused into the thing. Friday morning the dealers cast off their blue spectacles when they saw a half dozen gangs of workmen driven at top speed by the new bosses, actually accomplishing something worth while. The course fairly grew while one looked and the fast work was carried on throughout the night by the light of torches and headlights focused to the best advantage. Monday night, the last drop of oil was on the roads and the final coating of sand was being applied. Starter Wagner announced that official practice would positively start at 11 o'clock Tuesday morning—which, by the way, is the hour at which the Grand Prix was to have been started on that day.

The new arrangement gives the light car drivers two full days of practice; the Vanderbilt contestants four days, and the competitors in the Grand Prix six whole days in which to tune up their cars and make that close acquaintance with the roads which is so necessary to make the best speed possible. Only an insane driver would attempt to start a race of the importance of the Grand Prix or the Vanderbilt without having an intimate knowledge of every inch of the course.

The change in the program carried over the closing of entries



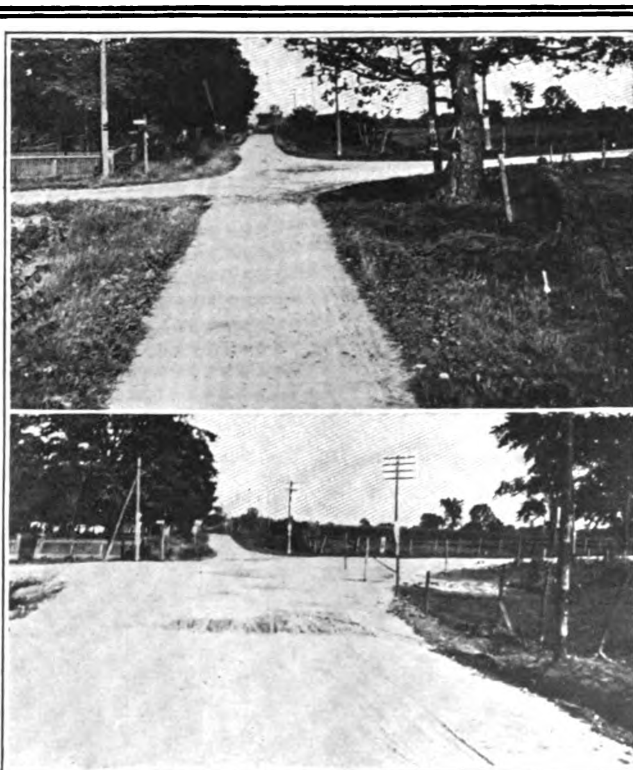
Upper—One of the 19 new culverts on the course
Lower—Heaviest grade on the Vanderbilt course

Curve from Burleigh street to Fond du Lac road

Hairpin turn at Somerville surfaced with concrete

for the Grand Prix to Wednesday night. Twelve cars have already been nominated, and it is possible that two or three more will come in, as it is planned to give any entrant in the other three events a chance to be booked for the final race up to Sunday morning. A few of the Vanderbilters have held off because they desire to get through the Saturday race before taking a chance on the Monday race.

The Pabst and Wisconsin Challenge races show only a fair-sized entry list, but both will bring out classy fields. In the Pabst, for 231 to 300 cubic inch cars, there are three Mercers, one Mason, two Falcars and a Case. Judging from past performance, the calibre of the men behind the wheels should make this a most interesting race, for Hughey Hughes and Spencer Wishart will pit themselves against Mortimer Roberts, Hastings and Trussel, Ed Pullen of their own camp, and Joe Jagersberger, who intends to "come back" after being out of the speed game for nearly a year, and with one good leg, at that. The other limb he lost at Columbia, S. C. last November in a bad spill on a dirt track only a short time before the international races at Savannah. If the "Flying Dutchman" cannot stand the 220-mile gaff, Louis Disbrow or Joe Nikrent will help him out, with "Farmer Bill" Endicott as a third substitute.



Upper—Northeast corner of course before improvement
Lower—Same curve after the improvements were made

The Wisconsin Challenge, a 173-mile contest for the little fellows of 161 to 300 cubic inches, will be a three-cornered fight between the Ford, E-M-F and Mason. It is likely this event will be a duel between Frank Kulick and Harry Endicott, as the other three drivers, Cramer and Roy Snyder, of the Mason team and John Heber of the E-M-F, are lesser lights. Heber is a Milwaukee man and will drive a Milwaukee-owned car, an E-M-F of the type used by Frank Witt in all of his races, the property of Dr. Irving H. Fowle, of Milwaukee. The doctor bought the car only a few days ago and after looking high and low for a competent driver, he found Heber, who has done a lot of track work in Buicks but is new on the road.

The line-up in the Vanderbilt will be similar to that in the Elgin National, although there will be seen at Milwaukee such stars as Teddy Tetzlaff, holder of the world's road racing record for average speed, and Louis Disbrow of the Case team.

VANDERBILT CUP

Saturday, September 21, 1912, at 11 a. m.
298.5 miles, or 38 laps

1	Knox Six	Ralph K. Mulford	Mulford	4¾	5½
2	Mercedes	W. H. Bertrand	Clark	5⅛	7⅛
3	Mercer 35C	Mercer Auto Co.	Wishart	4.39	5
4	Mercer 35T	Mercer Auto Co.	Hughes	4⅜	5
5	Fiat	E. E. Hewlett	Tetzlatf	5¼	7½
6	Stutz	Ideal Motor Car Co.	Anderson	4¾	5½
7	Stutz	Ideal Motor Car Co.	Merz	4¾	5½
8	Lozier Six	Richard H. Knowles	Nelson	4⅝	5½
9	Mercedes	E. J. Schroeder	DePalma	5.2	7.06
10	Fal	Fal Auto Co.	Trussel or Hastings	4⅛	5¼
11	Case	J. I. Case T. M. Co.	Disbrow		

PABST BLUE RIBBON TROPHY

Friday, September 20, 1912, at 12 m.
220.6 miles, or 28 laps

1	Mercer 35T	Mercer Auto Co.	Hughes	4⅜	5
2	Mercer 35C	Mercer Auto Co.	Wishart	4.39	5
3	Mercer 35T	Mercer Auto Co.	Pullen	4⅜	5
4	Mason Special	F. H. Dussenberg	Roberts	3⅞	5
5	Fal	Fal Auto Co.	Wilbur or Hastings	4⅛	5¼
6	Fal	Fal Auto Co.	Trussel	4⅛	5¼
7	Case	J. I. Case T. M. Co.	Jagersberger	4⅜	5

GRAND PRIX

Monday, September 23, 1912, at 10 a. m.
409.86 miles, or 52 laps

1	Benz 1911 racer	Erwin Bergdoll	Bergdoll	6.2	6.3
2	Benz	E. A. Moross	Burman		
3	Benz	Benz Import Co.	Not named		
4	Fiat 70	E. E. Howlett	Tetzlaff	5¼	7½
5	Fiat 90	F.I.A.T.	Bruce-Brown	5.9	7.87
6	Fiat	F.I.A.T.	Bragg	5¼	7⅛
7	Mercedes	E. J. Schroeder	DePalma	5.2	7.06
8	Mercedes	Spencer Wichart	Wishart	5.2	7.06
9	Mercedes	W. H. Bertrand	Clark	5.2	7.06
10	Mercer 35T	Mercer Auto Co.	Hughes	4⅜	5
11	Knox Six	Ralph K. Mulford	Mulford	4¾	5½
12	Lozier Six	Richard H. Knowles	Nelson	4⅝	5½

WISCONSIN CHALLENGE TROPHY

Friday, September 20, 1912, at 12 m.
173.4 miles, or 22 laps

1	Ford	I. C. Hickman	Kulick	3¾	4
2	Mason	F. H. Dussenberg	H. Endicott	3 13/16	5
3	Mason	F. H. Dussenberg	Cramer	3⅞	5
4	Mason	F. H. Dussenberg	Roy Snyder	3⅞	5
5	E-M-F	Dr. Irving H. Fowle	John Heber	4	4½

Maxwell contender coming into control on the last day's run

Warren finishing third day's run through the hill country

Two Clean in Bison Run

Warren and Maxwell Tied for Sweepstakes Trophies on Face of Observers' Reports—Official Ruling Ordered

Tremendous Truck Parade Marks Chicago Association's Fall Opening—Toronto Has Record Show

BUFFALO, N. Y., Sept. 16—In the third annual 800-mile reliability tour of the Automobile Club, of Buffalo, which closed Saturday night at 6 o'clock, two cars completed the 4-day grind with clean scores—the Warren-Detroit entered by the Poppenberg Motor Car Company, of Buffalo and the Maxwell entry 25, driven by A. G. Schoenthal.

The winner of division 2, was the Maxwell, entry 25, runabout class, with the Paige-Detroit, entry 16, second, a Krit, entry 9, third. In division 3, runabout class, the Warren-Detroit, entry 19, was the winner, with the Maxwell, entry 7, second. The winner in division 2, touring car class, was the Hupmobile, entry 8, with the R-C-H, entry 22, second.

The run covered 838 miles. The rules of the contest provided penalties for taking on gasoline, oil or water short of 100 miles of travel; for late arrivals at noon controls, and for all repairing done on machines. No penalties were to be imposed on work done on tires with the motor in operation, but time consumed on tire repairing was to be added to running time of cars.

A slight accident marred the second day's run, when the McFarlan "6" overturned between Ripley and Findlay Lake, a distance of 75 miles from Buffalo. Although the occupants of the car including the driver, Winfield Graham, escaped with slight bruises, for a time it looked as if the car was out of the contest for the day but the car was righted and the motor resumed operation in about 1 minute and the car finished the run, only 10 points being chalked against it for the accident. The second day's run was marked by fine weather and beautiful scenery.

The third day was the most trying of the tour as many formidable hills were encountered as well as dangerous curves and miles of unimproved highways.

On the concluding day 198 miles were made among steep winding hills and long stretches of rough dirt roads.

Charles F. Monroe, of Monroe Motor Car Company, which concern entered Maxwell No. 25 and the Poppenberg Motor Company, which entered Warren-Detroit, No. 19, both of which cars went through the entire 4 days of the third annual reliability tour of the Automobile Club, of Buffalo, without being penalized, have filed protest with A. W. Kreinheder, official referee of the tour, in the matter of who is entitled to the Laurens Enos and Vars trophies.

Before rendering his decision, Referee Kreinheder will communicate with the contest board of the American Automobile Association and he expects to announce the winners of trophies on Friday night. Referee Kreinheder declares there are several delicate technicalities in the matter and as he is desirous of making an impartial decision, he will await official sanction from the A. A. A.

700 Trucks In Chicago Parade

CHICAGO, Sept. 14—Ushered in by a parade of 700 motor trucks in a parade 10 miles long, moving at the rate of 10 miles per hour, and taking 1 hour and 10 minutes to pass a given point, the Chicago Automobile Trade Association heralded the second annual fall opening tonight. Chicago's motor row on Michigan avenue, which is 3 miles long, has been garlanded with autumn decorations, and at night is illuminated by the brilliant illumination of the showrooms and electrically lighted columns, extending along both sides of the street in a classic colonade of mock marble and leaded glass, strung with webs of electric lights.

The truck parade was made up of machines privately owned and exhibited, being entered in fleets by the dealers in the respective makes, who recruited cars, pairs and triplets of cars and squadrons from among their customers.

Perhaps the most notable feature of the exhibition was the silence of the large majority of the cars. This applied not only to the shaft-driven and pneumatically tired gasoline machines and

OFFICIAL SCORES OF RELIABILITY RUN OF AUTOMOBILE CLUB OF BUFFALO, N. Y.

No.	CAR	DRIVER	Division	Hour	First Day		Second Day		Third Day		Fourth Day		Total		Total Penalties
					Time	Work	Time	Work	Time	Work	Time	Work	Time	Work	
7	Maxwell	G. Morton Wolfe	3	18	0	4	0	0	0	0	0	0	0	4	4
8	Hupmobile	C. C. Almendinger	2	18	0	6	0	0	0	0	0	0	0	6	6
9	K.R.I.T.	Roy Langham	2	18	0	0	0	0	0	0	0	37	0	37	37
10	McFarlan "6"	Winfield Graham	5	20	0	0	0	10	0	16	52	98	52	124	176
16	Paige-Detroit	Bruce Malcolm	2	18	0	0	0	3	0	0	0	0	0	3	3
19	Warren-Detroit	Harry Holcombe	3	18	0	0	0	0	0	0	0	0	0	0	0
22	R.C.H	W. G. Schroeder	2	18	0	3	0	3	0	3	0	0	0	9	9
25	Maxwell	A. G. Schoenthal	2	18	0	0	0	0	0	0	0	0	0	0	0
31.	Amplex	J. G. Barclay Roy Stains	7	20	0	0	0	0	0	0	Withdrawn				

electrics, but to the prevalent type of solid-tired, chain-driven trucks. Many trucks carried full loads, a 5-ton lumber truck being loaded with a large load of lumber; and a truck owned by a cooperage concern being piled high with barrels.

Of the 700 machines in line, fifty-seven were electric. The prevailing type among the gasoline cars was of from 1 to 2 tons capacity, chain-driven, with the motor under the seat, and solid tires. A large contingent, however, were of radically different type, as 115 were shaft-driven, and 201 were of the so-called European type, with the motor under the hood, as in pleasure car practice; this type being prevalent in the very small and the largest classes. One hundred and six of the total number were under 1 ton capacity, a large number of high-wheeled wagons being shown. Very few of the big fellows appeared, but seven 5-tonners and eight of greater than that capacity were entered. Of especial significance is the growth of the left-hand steer idea, fully 25 per cent. of the trucks being so driven. Most of these, however, had the levers on the left side, although a few were noticed with center control, in both right and left hand steer types. Block or sectional tires were not much in evidence, even in the larger sizes, the wide tread dual tires seeming to have the preference. Fully 100 of the machines used pneumatics.

Toronto Show Sets New Mark

TORONTO, ONT., Sept. 16—What is claimed to be the greatest display of automobile ever shown in the Dominion of Canada was the exhibition in the Transportation Building at the Canadian National Exhibition where more than fifty dealers were exhibiting at least a half million dollars' worth of pleasure and commercial motor cars, including trucks and automobile fire wagons. The applications for space by the various factories and automobile dealers in Canada and several from the States far exceeded accommodations and it was necessary to press into service a tent, 100 by 50 feet, to the west of the Transportation Building to care for the overflow exhibitors.

At the exhibition many new cars never before seen in Canada were on display, some of these being of Canadian design while others were of English, French and American make. Unusually active business was done at the exhibition in the matter of sales, hundreds of thousands of visitors to the Toronto fair having viewed the automobiles, among whom were many buyers.

The exhibition indicates the great automobile business that the Canadian factories and dealers have had during the past year, over 15,000 licenses being granted to owners of machines alone in the province of Ontario. The greatest demand for automobiles came from the vicinity of Toronto. However, the great surprise in the automobile line this past year was Hamilton, Ont., which factories have had great difficulty in keeping up with the constant demand.

Calendar of Coming Events

What the Months Ahead Have in Store for the Automobilist—Shows, Conventions, Race Meets, Etc.

American and Foreign Fixtures of Importance Set Down in Chronological Order

Shows, Conventions, Etc.

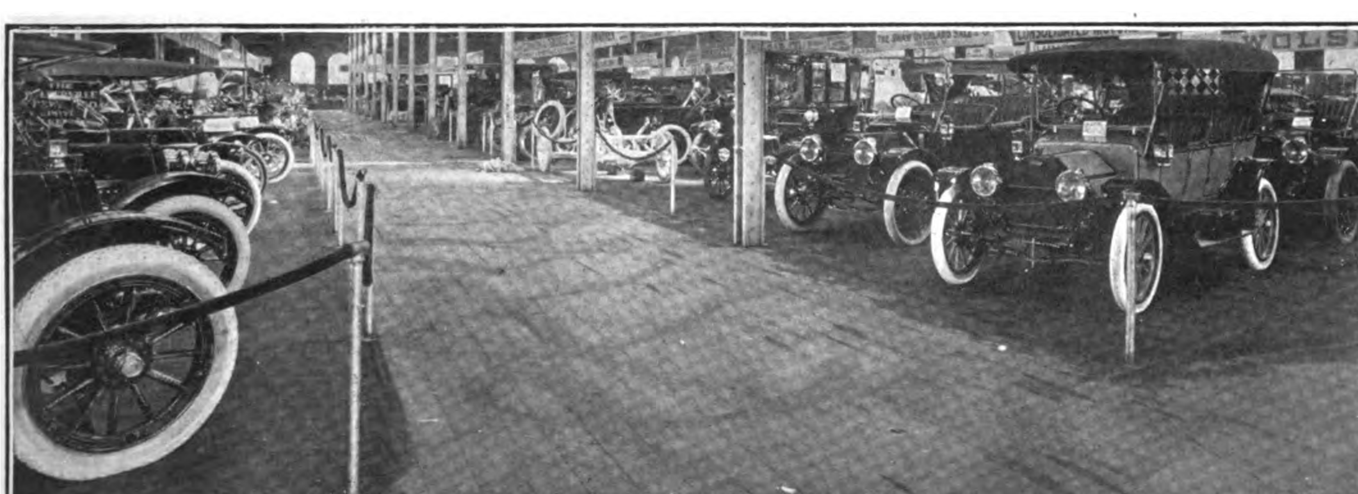
Sept. 14-21	Chicago, Ill., Annual Fall Festival and Show, Chicago Automobile Trade Association.
Sept. 17-20	Denver, Col., Convention International Association of Fire Engineers.
Sept. 23-Oct. 3	New York City, Rubber Show, Grand Central Palace.
Sept. 30-Oct. 1	New York City, Sales Managers' Convention, Automobile Board of Trade.
Dec. 7-22	Paris, France, Paris Automobile Show, Grand Palais.
Jan. 4-11	Cleveland, O., Annual Automobile Show.
Jan. 11-25	New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25	Philadelphia, Pa., Annual Automobile Show.
Jan. 25-Feb. 1	Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1	Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1	Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8	Chicago, Ill., Annual Automobile Show.
Feb. 10-15	Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22	Kansas City, Kan., Annual Automobile Show.
Feb. 24-Mar. 1	Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1	St. Louis, Mo., Annual Automobile Show.
March 3-8	Pittsburgh, Pa., Annual Automobile Show.
March 8-15	Boston, Mass., Annual Automobile Show.
March 17-22	Buffalo, N. Y., Annual Automobile Show.
March 19-26	Boston, Mass., Annual Truck Show.
March 24-29	Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Sept. 20	Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.
Sept. 21	Milwaukee, Wis., Vanderbilt Cup Race.
Sept. 23	Milwaukee, Wis., Grand Prize Race.
Sept. 29-30	St. Louis, Mo., Track Races, Universal Exposition Company.
Sept.	Washington, D. C., Reliability Run, Automobile Club of Washington.
Oct. 7-20	Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 21	National Tour American Automobile Association.

Proposed Contests

Sept. 21	Detroit, Mich., Track Races, E. A. Moross.
Sept. 21	Pittsburgh, Pa., Track Races, Michigan State Agricultural Society.
Sept. 28	Indianapolis, Ind., Track Races, E. A. Moross.
Sept. 28	Kalamazoo, Mich., Track Races, Inter-State Fair.
Oct. 4-5	Sioux City, Ia., S. C. Auto Club and Speedway Association.
Oct. 4-5-6	Peoria, Ill., Track Races, J. A. Sloan.
Oct. 12	Springfield, Ill., Illinois State Board of Agriculture.
Oct. 12	Salem, N. H., Track Meet, Rockingham Park.
Nov. 6	Shreveport, La., Track Meet, Shreveport Automobile Club.



How the exhibited cars appeared as lined up during the recent record-making show held in the Transportation Building, Toronto

The AUTOMOBILE

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To Meet America

ENGLAND has just become generally aware of the fact that there are enough people living in the British Isles and British possessions to support a factory building a car that will sell below or at the $1,000 mark. Heretofore the English refused to believe it, they were told so very often, but with characteristic obstinacy they still held out. Today they believe it, they believe it because Ford, Overland, Maxwell, Studebaker and several of the other American makers have sold them in large quantities in England, Scotland, Ireland and Wales.

Now that an awakening has arrived it is expected that the question will be taken up with real commendable English tenacity. The motor car movement was at first very slow through the British Isles due to unreasonable road laws, etc., but once the wheels started moving there was a long certain march and today in the high-priced and medium-priced car field the English product outbalances many of the continental productions which were much earlier in the field. England, which banks on its export trade, realizes that Canada, the Argentine, Australia and South Africa are calling for small cars and to hold her export prestige it is essential that she fill the breach and fill it as speedily as possible.

THE TIME *is today opportune for the development of the export field all around the world by the small-priced American builder.*

Wholesale Financing

LOADING onto the shoulders of one or two healthy units the burden of three or four weaker factories and simultaneously reorganizing the engineering and production methods and utilities, coupled with the problems of financing such an enterprise and carrying out the executive program consequent upon such a unification of factories, proved too stupendous a task for the United States Motor Company, which was placed in receivership a week ago by court order.

The problem of industrial enterprises today is that of securing competent men; the secret of the success underlying some of the biggest individual automobile factories has been one of business executive rather than pioneering in design. Not a few of our factories that have reached the zenith of production success have attained such heights by the calibre of the men who have manned the financing, production and merchandising ends of the business rather than the engineering end. This does not presuppose that a pigmy at the helm of the engineering board would insure success; rather that a medium-calibre engineering department, displaying that good sense of imitating accepted designs and keeping close in touch with public demands, would be more certain of success than an Atlas in command of the engineering forces with secondary financing and production executives.

This is essentially a commercial age; an age characterized by unprecedented demand in the automobile industry; an era of transportation reform in which mental cataclysms with the buyer have been frequent; an age in which ability to deliver has often meant safety and delayed shipments certain destruction; an age in which the ability to quickly make good has been pedestaled by the manufacturers themselves; and an age in which the capacity of a factory has been the measure of its executives to finance the enterprise and the measure of its production and merchandising forces to carry out their part of the program. The concern that could not live up to these stipulations has had to call in the aid of special pilots on many occasions to steer clear of the rocks and shoals.

The entire industry looks to a speedy reorganization of the United States Motor Company, either as a rejuvenated holding company or as a series of reorganized factory units. It will have to be speedy, because of it occurring at the opening of the 1913 manufacturing year, otherwise the wares will be too late on the market and the difficulties of the task will be increased.

What the dynamic results to the industry of this receivership will be cannot at this moment be forecast, but owing to Wall street being so mercilessly bitten it is questionable if the strong movement of banking interests into the manufacture of motor vehicles will not be set back for some time to come. If so, it will be welcomed by some and regretted by others. Talks of enormous combinations of manufacturing units by banking capitalists has been frequent of late; in fact, this seemed the only possible source from which such holding organizations could emanate. The present precipitation will ward off such a situation, which will naturally be welcomed by the small healthy manufacturer, although some of the weaker centers of the industry would naturally be

Hoosiers Pledge $330,000 for Stone Road Project

Indianapolis Automobile Manufacturers Boost Movement by Substantial Contribution—Not Only Car and Accessory Makers Interested in the Work But Also Other Concerns—Great Enthusiasm for Good Roads Found Throughout the Western States Promotes Undertaking

BY the automobile manufacturers of Indianapolis, Ind., agreeing in one evening last week to subscribe $330,000 to the project of buying crushed rock for a transcontinental highway from New York to San Francisco, the movement for practical road construction by the automobile industry has advanced one step further into the realm of the practical. The plan of securing from each automobile or accessory manufacturer one-third of 1 per cent. of his gross business for 3 successive years gives promise of becoming feasible. This has been demonstrated by the attitude of Indianapolis and the motor interests of that city have agreed that there is another $150,000 coming. In the first meeting all but three of the automobile concerns agreed to the proposition and signed the documents. The three not ready to sign are heartily in favor of the movement but due to the holiday season could not close the matter.

The movement in the Hoosier capital has not been confined solely to manufacturers of gasoline machines, electric machines, and accessories. One sporting goods house agreed to give its percentage on the sporting department of its business. Another enterprise with one department only devoted to the automobile trade signed the original document. Many of the dealers were particularly anxious to enter into the proposition and to become one of the many working for practical good roads.

Toward the end of last week the field of activities was centered in Detroit, where the matter was before the consideration of S. D. Waldon, R. D. Chapin, and James Couzzens, who are the good roads leaders in the Detroit automobile industry. A meeting is scheduled for the end of this week, when it is expected somthing definite on Detroit's attitude will be announced. Much of the ultimate success of the movement is dependent on the attitude of Detroit, Cleveland, and Buffalo, and should these three centers act in unity on the proposition there is no doubt that America's first great road across the country will be assured.

Once the manufacturers have subscribed the necessary $10,000,000 to furnish road-building material, the good roads movement will have injected into it a spirit of the practical that has up to the present been unknown in the good roads field. This action should serve as a precipitation in the entire movement, the value of which will not be confined to one transcontinental highway but to all transcontinental highways and to highways linking the North with the South and others in various parts of the country.

S. D. Waldon, of the Packard company, recently returned from a 6,000-mile automobile trip in the western states, was wonderfully impressed with the spirit of road improvement in Nevada and Wyoming, in each of which states much practical work has been done during the last year. "There are only 100 miles of what might be designated really bad roads in the transcontinental trip west of Denver," said Mr. Waldon. "There is a 20-mile stretch at Fallon in southwestern Nevada, extending from 16 miles before reaching this village to 4 miles beyond; there is also an 80-mile stretch in the region of Montello. Generally speaking, Nevada has good gravel for road construction, and, while it is 340 miles across the state by the transcontinental trails, there are really but 50 miles of this bad road. These 50 miles are made up of the district at Fallon and a portion of that at Montello, the major part of the Montello stretch being in the state of Utah. Two-thirds of the way across Wyoming it is possible to travel at 30 or 40 miles per hour, although in parts of this state the roads are bad. The mud flats of Utah are very bad and will call for considerable energy. The garagemen along the line of transcontinetal highways are already wide awake to the possibilities of developing their business and today there are better garages along the transcontinental routes in these states than along many of the routes of Massachusetts. To those who have not traveled West it is almost impossible to picture the beauties of the landscape, and if the public was aware of the advantages of touring through this section on improved highways there would not be any difficulty in securing the funds for building such a roadway."

Although the original plan of this motor highway was a stone road many manufacturers are already talking in favor of brick or cement. The sentiment is general that a highway of this nature should be free from maintenance costs for at least 10 years, and the only road materials considered in this class would be cement and brick. It is not known exactly what materials of this nature would cost but it is undoubtedly true that both the brick and cement interests would be quick to revise their price schedules when the opportunity for such an enormous national undertaking presented itself.

The practical spirit of do-something voiced in this latest road movement has struck a responsive chord practically from one side of the country to the other. This practical aspect of road-building stands out strongly in relief as compared with the oratorical methods so generally used up to the present. The roads movement has gone through a long educational campaign, and everybody is watching for a precipitation of the practical régime. The people owning cars today have a desire to tour over the western states before they are too old to enjoy it, and there is only one way to accomplish this and that is by some precipitation planned such as the present one.

Response to the publication of the first outline of the plans has been received from various communities located along the present lines of transcontinental travel. Without exception, particularly in the western part of the country, every town thinks it has some prime reason for being on the proposed highway and its Chamber of Commerce or Board of Trade has been active in urging that it be not left off the route.

In connection with the main idea, it is now proposed to urge such cities as can not be located on the route to head movements looking to connections with the main artery.

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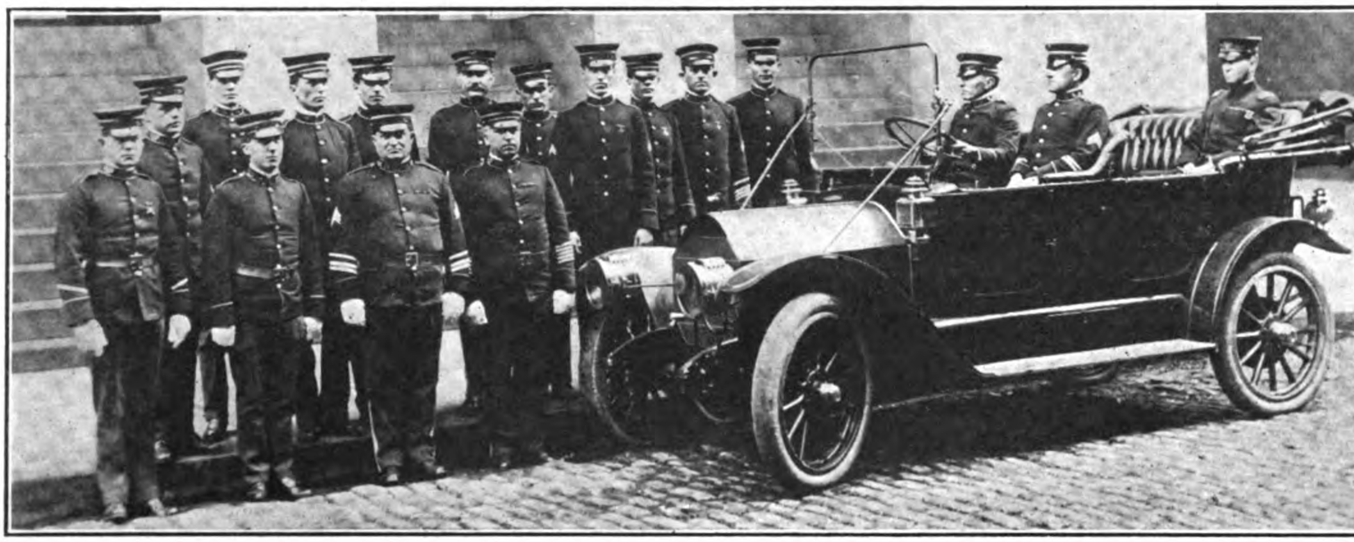
interested in any combination in which they had an opportunity of unloading a non-productive white elephant, as has been the case in the formation of both of the present large holding organizations in the automobile field. The present situation should prove a stimulus to the healthy factories of today, it should impress on them the one great fact that to build up an enormous composite organization calls for men of calibre equal to the task and the securing of such men is the most difficult aspect of the undertaking.



Major F. R. Lang, U. S. A., stationed at St. Louis, Mo., who was recently awarded a gold medal by the 50,000-Mile Maxwell Club

ARMY Officer Gets Maxwell Medal—Major F. R. Lang, U. S. A., recruiting officer at St. Louis, Mo., has been awarded a gold medal by the 50,000 Mile Maxwell Club for driving a Maxwell car 50,000 miles. The above picture shows his car occupied by him in front of the Old Custom House, St. Louis, Mo.

Norwalk Distributor for Canada—The Norwalk Motor Car Company of Toronto, Canada, a branch of the parent company at Martinsville, W. Va., is distributor for the Dominion of Canada.

Hadley KisselKar Manager—L. J. Hadley, vehicle division for the Studebaker Corporation of Minnesota, has become manager of the truck sales for the Northwest KisselKar branch, Minneapolis, Minn.

Wheelock Assistant Manager Pioneer—A. C. Wheelock has been appointed assistant manager of the Pioneer Automobile Company, San Francisco, Cal., distributors of the Chalmers and Flanders electric.

Kroha in Milwaukee Truck Firm—John J. Kroha, formerly contracting freight agent for the Wabash system in Milwaukee, has been appointed Milwaukee representative of the motor truck division of the A. O. Smith Company, of Milwaukee, Wis.

Montreal's New Traffic Law—Automobile owners of Montreal, Can., must regard the by-law requiring them to stop 10 feet behind a stationary street car. Should they break it, they must do so only when to do otherwise would jeopardize life.

Harrison Manager 'Frisco Woods—J. W. Harrison, formerly connected with the Woods Electric Company in Chicago, has been appointed manager of the Woods electric department of the Pacific Motor Car Company, San Francisco, Cal., distributors of the Woods and the Stevens-Duryea in Northern California.

Matheson's New 'Frisco Building—The Matheson Sales Company, San Francisco, Cal., distributors of the Warren and Matheson cars, which heretofore has made its headquarters across the bay in Oakland, has now centered all its energies in a handsome new building on Van Ness avenue, near Pine street.

Richardson Distributor Punctureless Tire—C. S. Richardson, for several years manager of the Reliance Automobile Company, San Francisco, Cal., distributors of the Knox pleasure cars and trucks and the Detroit Electric in this territory, recently resigned to take over the distribution of Punctureless in California.

Alberta Automobile Famine—According to the reports of prominent American motorists who have been touring Canada, there is an automobile famine in Alberta. With the enormous strides that the city of Moncton has been making during the past dozen years it has been found impossible to keep pace with the demand for automobiles.

Carroll 'Frisco Goodyear Manager—Frank E. Carroll has been appointed manager of the San Francisco, Cal., branch of the Goodyear Rubber and Tire Company. Carroll has been associated with the sale of Goodyear tires on the Pacific Coast for several years. For some time past he has been manager of city sales in the local branch.

New Chase District Manager—Mr. Royal B. Curtiss, who up to September 1 was sales manager of the Royal Equipment Company, resigned his position to accept a district managership of the Chase Motor Truck Company, with headquarters in Cleveland, O. Mr. Curtiss will have jurisdiction over the following territories: Ohio, West Virginia, Kentucky, Indiana (except the vicinity of Chicago), Michigan and Western Pennsylvania.

Bonnheim-Moore's New Quarters—The Bonnheim-Moore Motor Car Company, San Francisco, Cal., which has secured the Henderson agency for Northern California, Nevada and Hawaii, has taken handsome quarters in the big Goodyear Tire Building on Van Ness avenue, at the corner of Sutter street, which is apparently to be the new automobile center of San Francisco. Bonnheim is a wealthy California merchant, and Harry G. Moore comes to San Francisco from Chicago, where he was engaged in the automobile business.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Abberville, S. C.	Cole	Abberville Motor Car Co.
Abiline, Texas	Franklin	C. B. Manly
Albany, N. Y.	Fiat	W. M. Whitney Co.
Albany, N. Y.	Maxwell	W. M. Whitney Co.
Albany, N. Y.	Mercer	W. M. Whitney Co.
Amboy, Ill.	Franklin	Andrew Aschenbrenner.
Avondale, Colo.	R-C-H	A. E. Smith
Avondale, Pa.	R-C-H	M. F. Morris
Bay City, Mich.	Cole	Wolverine Auto Co.
Boston, Mass.	Adams	B. W. Atwood
Boston, Mass.	Garford	R. & L. Company
Boston, Mass.	Mora	B. W. Atwood
Boston, Mass.	R-C-H	Geo. Grow Auto Co.
Brockton, Mass.	Buick	Buick Motor Car Co.
Butte, Mont.	R-C-H	Montana Auto Service Co.
Canandaigua, N. Y.	R-C-H	Claude O. Hallenbeck
Chicago, Ill.	Nyberg	Kohn W. Hayden
Clinton, Ia.	Cole	Model Auto Co.
Columbus, O.	Cutting	Warren & Southwick Co.
Columbus, O.	Imperial	Warren & Southwick Co.
Columbus, O.	Krit	Cummins Auto Sales Co.
Columbus, O.	Rambler	Glancy & Sells
Columbus, Ga.	R-C-H	S. G. Brannon
Coshocton, O.	Ford	Charles W. Loos & Sons
Coshocton, O.	Overland	Charles W. Loos & Sons
Coshocton, O.	Rambler	Charles W. Loos & Sons
Coshocton, O.	R-C-H	W. E. Layman
Delta, Pa.	Buick	C. F. Ramsay
Delta, Pa.	Ford	C. F. Ramsay
Delta, Pa.	Overland	C. F. Ramsay
Demopolis, Ala.	R-C-H	Leon Morris
Detroit, Mich.	Alco	Thompson Auto Co.
Duluth, Minn.	Cole	Johnson Motor Co.
Erie, Pa.	Cole	Potter-Burgess Motor Co.
Ft. Wayne, Ind.	Cole	Fred H. McCullough
Galeton, Pa.	R-C-H	H. C. Shaw
Galesburg, Ill.	Cole	Galesburg Machine Works
Galveston, Texas	Cole	John Christienson & Co.
Grand Rapids, Mich.	Cole	Cowdin & Woodland
Hamilton, Ohio	Cole	F. H. Graf Motor Car Co.
Havana, Cuba	Alco	Villamil & Miller
Kansas City, Mo.	Alco	William Motor Car Co.
Kensington, Minn.	R-C-H	Oslerberg & Colmark
LaPorte, Ind.	R-C-H	Indiana Auto & Supply Co.
Larimore, N. D.	R-C-H	Larimore Auto Co.
Lima, Ohio	Cole	Thomas Motor Car Co.
Longmont, Colo.	R-C-H	Timmons Auto Co.
Low Point, Ill.	Cole	Banta Bros.
Lynn Center, Ill.	R-C-H	A. F. Anderson
Manistee, Mich.	Cole	National Garage & Sales Co.
Memphis, Tenn.	Cole	Jerome P. Parker-Harris Co.
Mendota, Ill.	R-C-H	P. F. Sondergroth
Meridian, Miss.	R-C-H	A. Y. Harvey
Milwaukee, Wis.	Marion	Edgar F. Sanger Co.
Milwaukee, Wis.	Moline	Moline Garage Co.
Milwaukee, Wis.	Paige	R. D. Rockstead
Milwaukee, Wis.	Stearns-Knight	Edgar F. Sanger Co.
Milwaukee, Wis.	Warren	R. D. Rockstead
Minneapolis, Minn.	Alco	Downs Co.
Monticello, Minn.	R-C-H	Henry Cain
Myersdale, Pa.	Cole	Myersdale-Overland Co.
Newburg, N. Y.	R-C-H	Mogul Auto Co.
Oakland, Cal.	Cole	J. C. Lewis Motor Co.
Odessa, Russia	Velie	Jacques Brodsky
Ottawa, Ill.	Cole	Ottawa Garage Co.
Ottawa, Ill.	R-C-H	Standard Garage
Pawtucket, R. I.	Cole	H. W. Bowen
Portland, Ore.	Cole	Neate & McCarthy
Railroad, Pa.	Overland	H. Schroeder
Reading, Pa.	Alco	Merchants Auto Service Co.
Remington, Va.	R-C-H	Remington Motor Car Co.
Rochester, N. Y.	Alco	Pawlik & McGuidwin
Rockyford, Colo.	R-C-H	Lewis Bros. & Johnson Co.
San Antonio, Tex.	Cole	Guarantee Motor Car Co.
Savannah, Ga.	Cole	J. C. Lewis Motor Co.
Sheboygan, Wis.	Cadillac	Sheboygan Auto & Supply Co.
Sheboygan, Wis.	Detroit	Rummele Garage Co.
St. Cloud, Minn.	R-C-H	Geo. E. Gulde
St. Johnsville, N. Y.	Cole	B. & C. Auto Co.
St. Louis, Mo.	Glide	Bond Automobile Co.
Stevens Point, Wis.	Apperson	P. F. Koshollek
Stevens Point, Wis.	Reo	P. F. Koshollek
Stewartstown, Pa.	Buick	August Neller
Stewartstown, Pa.	Ford	August Neller
Stewartstown, Pa.	Overland	August Neller
Syracuse, N. Y.	Alco	Jefferson Garage Co.
Syracuse, N. Y.	KisselKar	George Finck
Syracuse, N. Y.	White	George Finck
Toledo, O.	Cole	Bunnell Auto Sales Co.
Urbana, O.	Cole	Prince Motor Car Co.
Utica, N. Y.	Elmore	I. R. Gardiner
Utica, N. Y.	Krebb	I. R. Gardiner
Utica, N. Y.	Lozier	Westcott Garage Co.
Vancouver, N. C.	Cole	B. C. Automobile Co., Ltd.
Visalia, Cal.	R-C-H	Jas. L. Robertson
Washington, D. C.	Penn	Lippard-Stewart
Washington, D. C.	Speedwell	A. D. Loffler Co:
Waterloo, Ia.	Cole	Burd Auto & Supply Co.
Webb City, Mo.	R-C-H	C. H. Beck
Whittier, Cal.	R-C-H	H. L. Triplett
York, Pa.	Apperson	South Pennsylvania Auto Co.

ELECTRIC CARS

Place	Car	Agent
Lancaster, Pa.	Hupp-Yeats	H. M. Vondersmith
St. Louis, Mo.	Hupp-Yeats	R. C. Jones

COMMERCIAL CARS

Place	Car	Agent
Baltimore, Md.	Veerac	Norwood Bros., Inc.
Boston, Mass.	Detroit	Anderson Mfg. Co.
Boston, Mass.	Little	Tyler Motor Car Co.
Boston, Mass.	Westfield	Westfield Motor Truck Co.
Melbourne, Australia	Federal	American Motor Truck Co.
Portsmouth, O.	Federal	David Stahler
St. Louis, Mo.	Federal	Allen Baker
Vancouver Isle, B. C.	Federal	Vancouver Isle Motor Co.

Autocar School Reopens—The motor school which was opened last fall by the Boston, Mass., branch of the Autocar Company, has been reopened again this season and already a large number of drivers have been enrolled. A special representative of the factory is coming to Boston to take charge of it this year.

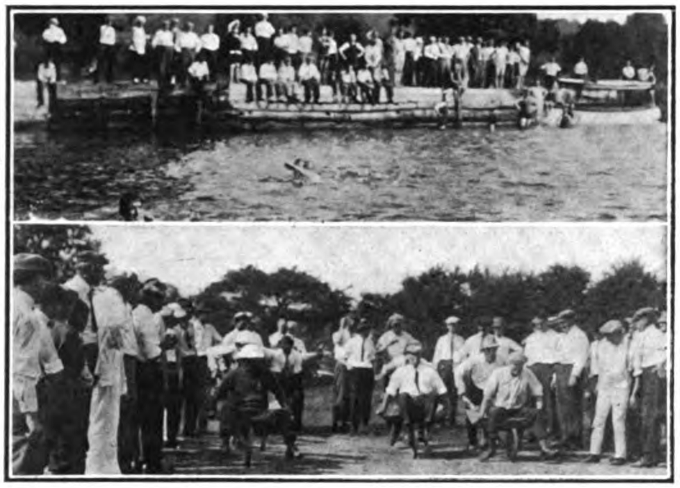
Richardson Handling Cleveland Cole—F. E. Richardson has withdrawn from the firm of Richardson-Neighbors Motor Company, Cleveland, O., distributors for the Cole and Hupmobile. He has organized the Richardson Motor Car Company and will be located next door to the old company. Mr. Richardson will handle the Cole lines exclusively, while Mr. Neighbors will look after the Hupmobile interests.

Baker Line Together—The Baker commercial and pleasure vehicles are now being handled under the same roof in Boston, though by distinct agencies, A. F. Neale, who has the pleasure cars, and Frank A. Phelps, who handles the commercial line, having moved their quarters to the former salesrooms of the King agency, corner of Boylston and Fairfield streets.

Lehigh Adopts Automobile Handcars—The adoption of motor cars for track work in place of the old-fashioned manpower handcars has been decided upon by the management of the Lehigh Valley Railroad. Forty-seven of the new cars, the first installment, have been ordered, and the substitution of gasoline for muscle for transporting repair men and tools over the line will eventually be applied to the whole Lehigh Valley system.

Readjustment of U. S. Motors in Columbus—A readjustment of the sales force of the United Motors-Columbus Company, Columbus, O., in a large portion of Ohio, Kentucky and West Virginia has been made. F. P. Corbett, who has been in charge of the Columbus distributing point for some time, will be district manager of the three States. The local agency in Columbus will be signed up soon. The wholesale and retail end of the business will continue in the same location, 246-248 North Fourth street. Manager Corbett is now busy signing up sub-agents in his territory.

New building of the Overland Automobile Company of Dallas, Tex.



Swimming and wheelbarrow races at the recent outing of the New York City Big Village Motor Boosters

Miller Atlanta Branch Store—The Chas. E. Miller Supply House, Atlanta, Ga., will move its branch store to 259 Peachtree street.

Motor Bus Line in Bay State—A motor bus line has been started between Pittsfield, Mass., and Troy, N. Y., and the volume of patronage has been very good since the line was started.

Meiser with Knipper-Kipp—John Meiser, superintendent of the Selden Motor Car Company, Rochester, N. Y., has resigned to become connected with the Knipper-Kipp Company in the Kondolf Garage, Monroe avenue.

Manager Sackett Resigns—Louis Sackett, recently appointed manager of the Boston, Mass., branch of the Oakland, has resigned and the branch is being conducted now by Fred Walsh, sales manager of the branch for some years.

Stearns Philadelphia Branch House—The F. B. Stearns Company, Cleveland, O., has opened a branch house in Philadelphia, Pa., located at 449-451 North Broad street. Mr. G. Hilton Gantert is manager, with Mr. Evans Church as sales manager.

New Service Station Manager—Walter Jones, for some years manager of the Whitten-Gilmore Company's service station, Boston, Mass., agents for Chalmers cars, has resigned, and Mason H. Kimball has been appointed to succeed him.

Morgan Severs Truck Connections—Ralph L. Morgan of Worcester, Mass., has severed his connections with the Morgan Motor Truck Company, Worcester, Mass. He has taken a suite of offices in the People's Bank Building, 452 Main street, Worcester, Mass.

Automobile Funeral Procession in District of Columbia—The first funeral procession composed exclusively of motor cars ever held in the District of Columbia was that of Paul Peck, the aviator, who was killed by a fall from his biplane in Chicago, Ill., September 11.

Mantell with Michigan Company—C. S. Mantell, formerly manager of the Portland Motor Car Company, Portland, Ore., has recently taken charge of the sales department of the Michigan Motors Company of Portland, handling the Havers Six as well as Lippard-Stewart trucks.

Stearns' New Trade Mark—The F. B. Stearns Company, Cleveland, O., has just copyrighted a new trade mark. It is a 3-inch metal figure of a knight fastened to the radiator of all Stearns-Knight cars, with the wording "Stearns-Knight" on the pedestal on which the knight stands.

Hauger 'Frisco Haynes Manager—Fred W. Hauger, for several years assistant manager of the Haynes Automobile Sales Company of San Francisco, Cal., has been named as manager of the Oakland branch of the Haynes. C. H. Haynes, a brother of Ellwood Haynes, has been appointed treasurer under the reorganization.

New Poppenberg Buffalo Home—Plans have been completed for the construction of the new home for the Poppenberg Motor Car Company at Main and Carlton streets, Buffalo, N. Y. The mansion on the site at present is being razed for the new structure, which will be seven stories in height and will extend from Main to Washington streets.

Lawrenceburg Automobile Club Organized—The Lawrenceburg Automobile Club has been organized at Lawrenceburg, Ind., with twenty-seven members, the officers being: President, John W. Oberting; vice-president, Robert E. Oberting, and secretary-treasurer, Edmund Bauer. An effort is being made to enlist every motor car owner in Dearborn County in the organization.

Watertown's Club Road Experiments—The Watertown Wis., Motor Club, organized three months ago with seventy-five members, has completed a sample stretch of road, the principal value of which is to illustrate the small cost of maintaining ordinary highways when proper methods are used. A stretch of 1 mile of dirt road between the western city limits and the village of Ixonia has been scraped, the stones removed and a split log drag applied after even the lightest shower and is today one of the finest pieces of highway in Wisconsin. The expense has been approximately $60 for three months' work.

Automobile Incorporations

AUTOMOBILES AND PARTS

Atlantic City, N. J.—Pierson-Harris Company; capital, $50,000; to manufacture automobiles. Incorporators: Gilbert Pierson, Edward G. Harris.

Buffalo, N. Y.—Niagara Devices Company; capital, $100,000; to manufacture transmission for automobiles, machines, devices and patented articles of all descriptions. Incorporators: Edward D. Matteson, George A. Cotton, George R. Volkmar.

GARAGES AND ACCESSORIES

Albany, N. Y.—Rondout Rubber Company; capital, $1,000,000; to deal in crude and reclaimed rubber. Incorporators: Calvin Tomkins, Harry C. Clews, Frederick E. Townley, William A. Bishop.

Brooklyn, N. Y.—Q.-C. Storage Battery Company; capital, $2,000; to manufacture storage batteries. Incorporators: Albert M. Friedenberg, Robert W. Vicarey, Leopold Friedenberg.

Brooklyn, N. Y.—Brooklyn Terminal Garage and Machine Company; capital, $10,000; to carry on a garage business. Incorporators: Donald B. Abbott, Charles E. McMahon, Joseph D. Fackenthal.

Brooklyn, N. Y.—Haas Garage Company; capital, $2,000; to carry on a garage business. Incorporators: Louis Haas, Emma Haas, Oscar Hauman.

Buffalo, N. Y.—Continental Motor Company; capital, $100,000; to deal in motors. Incorporators: Gordon F. Matthews, Frank V. Wayland, Allen E. Choate, Walter Schmieding, Reverdy L. Hurd.

Cincinnati, O.—Bond Hill Auto Service Company; capital, $20,000; to operate a freight and passenger service. Incorporators: Jacob Clos, John F. Ahlers, Joseph B. Arlinghaus, Arthur H. Pohlman, W. A. Earle.

Cincinnati, O.—Cincinnati Automobile Club Company; capital, $25,000; to operate a social club for the purpose of advancing the interests of motorists generally. Incorporators: D. McKim Cook, Louis J. Merkel, Gustav W. Drach, A. O. Streitman, Charles W. Ireland, L. S. Coltor.

Cincinnati, O.—Ideal Steel Wheel Company; capital, $500,000; to manufacture steel automobile wheels and automobile accessories. Incorporators: J. B. Fitch, J. E. Strietmeier, E. H. Maffrey, B. L. Mattox.

Cleveland, O.—Auto Electric Appliance Company; capital, $20,000; to manufacture electric automobile appliances. Incorporators: Paul T. Crampton, Charles R. Brown, Guy W. House, Frank B. Fults, Henrietta Davis.

Cleveland, O.—Northern Ohio Automobile Company; capital, $10,000; to conduct all kinds of races of motor-driven vehicles. Incorporators: Richard H. Lee, Florence Gawood, John A. Alburn, H. E. Weffler, Fred Hockley.

Davenport, Ia.—Overland Motor Car Company; capital $10,000; to deal in motor cars. Incorporators: G. H. Knowles, Henry Bierkamp, Henry Meyer, J. G. Foy.

Grafton, W. Va.—Grafton Motor Company; capital, $5,000; to repair and store automobiles, deal and hire same, etc. Incorporators: Henry J. Pracht, H. D. Comerford, J. Howard Reynolds, A. R. Huns, D. C. Peck.

Grand Rapids, Mich.—Hand Corporation; capital, $30,000; to manufacture and sell automobile and garage accessories. Incorporators: O. H. L. Wernicke, H. C. Cornelius, George H. Hand, J. A. Whitworth, L. A. Cornelius, George G. Whitworth.

Indianapolis, Ind.—Showalter Manufacturing Company; capital, $10,000; to manufacture motor car bodies. Incorporators: E. W. Showalter, William Small, H. G. Showalter.

Kingston, N. Y.—Taxicab Transportation Company; capital, $5,000; to carry on a taxicab transportation business. Incorporators: Wm. Hilterbrant, Elizabeth K. Hiltebrant, Elsa Hiltebrant.

Milwaukee, Wis.—New York Tire & Vulcanizing Company; capital, $10,000; to manufacture an inner liner for casings. Incorporators: Vivian Brownell, Bertrand Brownell.

Westfield Truck Branch—The Westfield Motor Truck Company, of Westfield, Mass., has opened a factory branch at Boston at 287-293 Northampton street with George L. Cooke in charge as manager.

Russell Company's New Quarters—The W. L. Russell Company, agents for the Haynes in Boston, Mass., and the Regal wholesale and retail for New England, has moved to the Motor Mart, still retaining the retail branch at 10 Park square.

Garford Now in Boston—The final arrangements were completed last week whereby the R. & L. Company, of New York, comprising J. T. and J. A. Rainier and Paul Lineberger, took control of the Garford business in Boston to operate in connection with the New York agency as a sub-branch.

New Company Formed—The Tyler Motor Car Company, Boston, Mass., formed by Frank J. Tyler and his brother, Lucius, has secured quarters in the Motor Mart and have taken on the Little Four roadster. The new company is making investigations of other propositions and will handle other cars and trucks.

Changed to a Branch—The Detroit Electric, formerly handled as an agency proposition by James A. Binney in Boston, has been changed over to a branch by the Anderson Electric Company, of Detroit, and Albert Weatherby has been sent to Boston as manager. A new service station has been opened at 25 Irvington street with Nicholas Rommefauger in charge. Mr. Binney has gone into the gasoline field, having taken on the Henderson.

Zimmerman and Brewer, old-time cyclists, renew ancient rivalry at the Big Village Motor Boosters Outing

Iowa Has 38,924 Automobiles—According to the latest reports from the office of the Secretary of State, there are now 38,924 automobiles in Iowa. There are 1,480 dealers and 3,890 motorcycle owners registered. During the present year up to August 31, $45,657.81 has been paid into the State Treasury for automobile registrations; $14,851.29 was paid in August.

Ohio Has 60,500 Automobiles—According to the latest report of State Registrar of Automobiles J. A. Shearer, Ohio now has 60,500 registered automobiles of all kinds. This number is far in excess of the total registered in 1911, and applications for registration are coming in at the rate of 60 per day. It is believed the number will exceed 70,000 before the year ends.

Wisconsin's Registration Large—The rank and wealth of Wisconsin as a motoring state is indicated by a compilation of statistics by A. J. Cobban, in charge of the motor registry and license department of the secretary of state's office at Madison. During the period from January 1 to July 1, 1912, there were licensed 23,505 motor cars and 3,816 motorcycles, a total of 27,321, or one motor vehicle to every eighty-five persons resident in Wisconsin, according to the given population of 2,333,860.

District of Columbia's 1912 Registration—The annual report of H. M. Woodward, permit clerk, reveals the fact that permits to operate motor cars in the District of Columbia were issued to 2,343 out of 2,393 applicants who were examined by the motor car board during the fiscal year that ended June 30 last. Of the permits granted 200 were for the operation of electric vehicles, 1,790 for gasoline machines, 22 for steam cars and 331 for motorcycles. The revenue derived amounted to $6,022. There were registered and paid for during the year 3,924 metal identification tags, which produced a revenue of $7,848. Two permits were revoked during the year because of charges filed and upon recommendation of Major Sylvester, superintendent of police.

California's Registration Increases 50 Per Cent.—California took delivery on 34,110 automobiles during the fiscal year, which closed August 31. These figures are issued by the Secretary of State, as the number of motor cars registered during the 12 months period, and places California near the top of the list. That the automobile industry is growing by leaps and bounds is attested by the fact that during the 1910-11 season but 15,905 machines were registered at Sacramento, giving the season just closed an increase of 8,205 cars. This is greatly in excess of 50 per cent. of the former total and represents the actual gain in a single year. Of all the makes of motor cars, the Studebaker 20 and 30 proved the most popular, 3,653 cars of these makes being registered. Next in point of popularity cames the Ford with 3,453.

Automobile Incorporations

MONTREAL, QUE.—Belleville Garage & Auto Company, Ltd.; capital, $90,000; to deal in motor cars, commercial trucks and doing a general repair business.

NASHVILLE, TENN.—Cumberland Motor Company; capital, $10,000; to deal in motors. Incorporators: W. D. Caldwell, J. H. Cheek, J. O. Cheek, Jr., D. M. Baver.

NEW YORK CITY, N. Y.—Simplex Carbureter Company; capital, $150,000; to manufacture carbureters. Incorporators: Albert L. Kull, Col. Cord Upton, Simon J. Mayer, Milton Mayer, John J. Welch.

NEW YORK CITY, N. Y.—Englebert Tyre Company; capital, $100,000; to deal in automobiles and other tires. Incorporators: Samuel K. Kellock, Clarence B. Campbell, Edward W. Elverson.

NEW YORK CITY, N. Y.—Zilio Sales Company; capital, $5,000; to deal in automobiles and accessories. Incorporators: Edward Moyse, Felix H. Moyse, Isaac J. Phelps.

NEW YORK CITY, N. Y.—Imperial Auto Renting Company; capital, $1,000; to carry on an automobile renting business. Incorporators: Abraham S. Gusson, David Abraham, Alexander Miller.

NEW YORK CITY, N. Y.—Knickerbocker Havers Company; capital $50,000; to deal in automobiles and motor vehicles. Incorporators: Erastus M. Cravath, Albert C. Hubbel, Burwell M. Crosthwaite.

NEW YORK CITY, N. Y.—Ames Automatic Shock Absorber Company; capital, $25,000; to manufacture shock absorbers. Incorporators: Louis E. Bomeisler, George H. Edwards, George Isaksen.

NEW YORK CITY, N. Y.—Commercial Delivery Company; capital, $500; to deal in automobile delivery cars, trucks, etc. Incorporators: Abraham Miller, Nathan Tarakan, Louis Tarakan.

ROCHESTER, N. Y.—Automobile Safety Fender Company; capital, $100,000; to manufacture automobile fenders. Incorporators: William A. Snyder, Abram Dewolf.

ST. JOSEPH, MICH.—Wizard Manufacturing Company; capital, $10,000; to manufacture and sell improved carbureters, and motor vehicle accessories. Incorporators: Frank A. Sharpneck, Thomas Robinson, Gerald C. McDowell.

TOLEDO, O.—Landman-Griffith Company; capital, $10,000; to deal in and repair automobiles of all kinds and handle parts and accessories. Incorporators: Charles P. Landman, Charles K. Friedman, Warren E. Griffith, Hattie Landman, Gertrude D. Griffith.

TOLEDO, O.—Rapp Manufacturing Company; capital, $15,000; to manufacture spark plug and automobile accessories. Incorporators: Fred Hummel, Clifford Stone.

WELLSBURG, W. VA.—Brooke Auto Company; capital, $10,000; to deal in automobiles. Incorporators: J. H. Scott, W. H. Scott, C. M. Magee, F. A. Chapman, E. A. Fegan.

WILMINGTON, DEL.—L-A-W Motor Truck Company; capital, $200,000; to engage in automobile truck business. Incorporator: G. G. Rheubym.

WILMINGTON, DEL.—Auto Service & Supply Company; capital, $15,000; to engage in automobile and accessory business. Incorporator: F. A. Webb.

CHANGES OF CAPITAL

BUFFALO, N. Y.—United Motor Buffalo Company; change of name to Monroe Motor Car Company.

DETROIT, MICH.—Ignition Starter Company; increase of capital to $500,000.

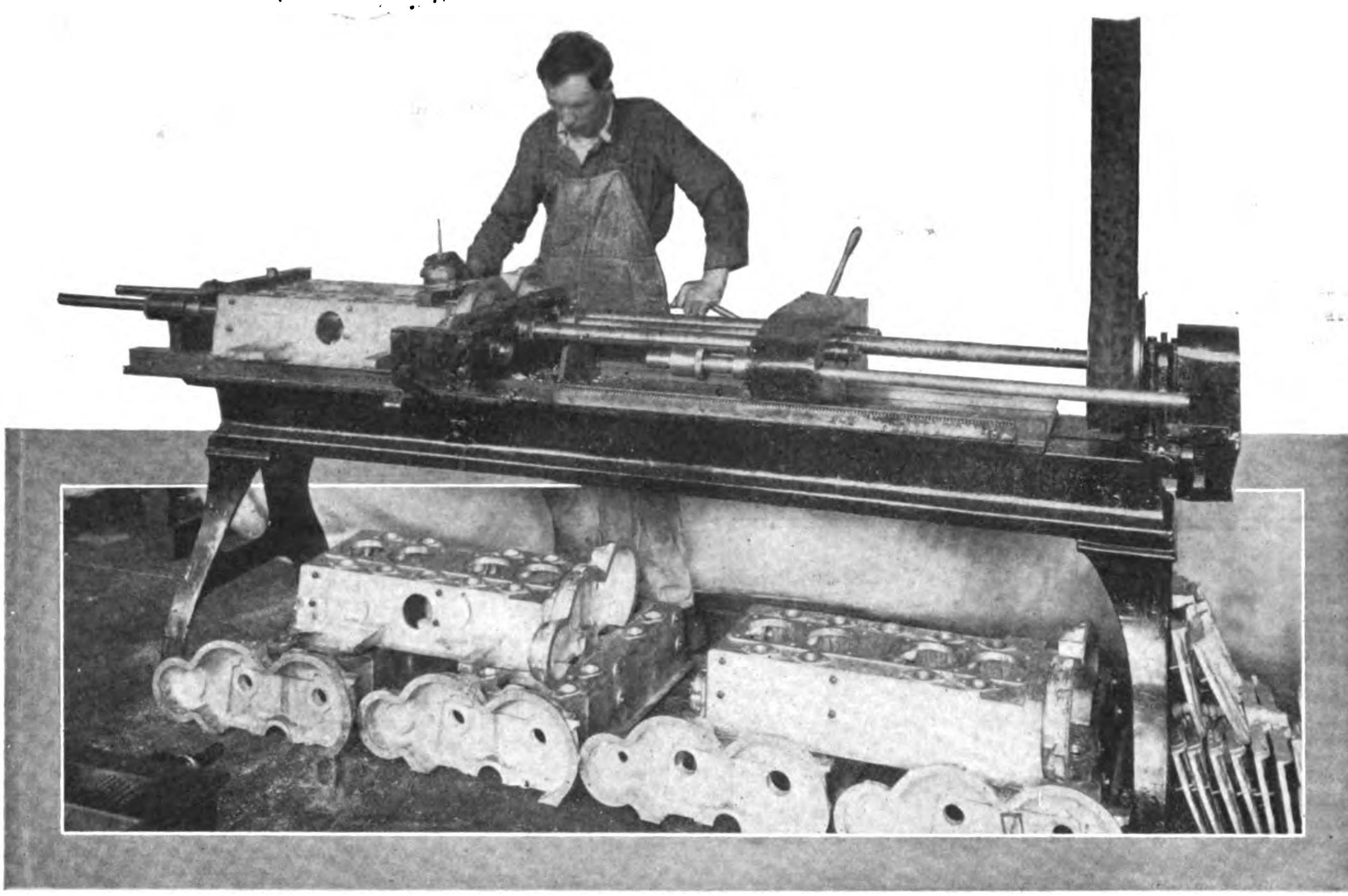
HOUSTON, TEXAS.—Stafford Illuminated Automobile Lamp and Number Company; increase of capital from $25,000 to $50,000.

INDIANAPOLIS, IND.—Marion Motor Car Company; increase of capital from $1,125,000 to $1,250,000.

PROVIDENCE, R. I.—A. W. Harris Oil Company; capital, $7,500; to succeed A. W. Harris Oil Company. Incorporators: Benjamin S. Terry, Arthur D. Greene, George F. Heywood.

MIDDLETOWN, O.—Middletown Buggy Company; change of name to Crescent Motor Truck Company; to manufacture motor trucks in the future.

Factory Miscellany



Camshaft boring machine made by the National Motor Vehicle Company for use in its factory at Indianapolis, Ind.

The object of this machine is to save time. It requires the attention of one man and can completely bore a crankcase and prepare it for the camshaft bearings in 30 minutes. It can work steadily at this rate for a working day, turning out twenty finished jobs in that time. The machine is so designed that the axis lines up with the axis of the crank shaft, thus securing parallelity between the latter and the crankshaft. The machine has a guide which passes through the center of the crankcase through the main bearings, that is, following the line of the crankshaft. The National motor, being of the T-head type, requires a set of camshaft bearings on each side of the crankcase. At the end of the machine carrying the driving gear train there is a wheel on either side of the main drive wheel. These two side wheels run at the same speed and each one carries a cutter allowing the boring on both sides of the crankcase to be carried on simultaneously. The former practice of boring both sides separately required practically double the time, while the parallelity of the shafts was not so well assured.

Lippard-Stewart Assembly Room—In the accompanying illustration is shown a part of the assembly room of the Lippard-Stewart Motor Car Company, Buffalo, N. Y., makers of light commercial cars. The entire factory is roomy, light and as well adapted to the work as is the section shown.

Battery Concern in Canada—The Hart Accumulator Company, of London, England, manufacturers of storage batteries, will establish a factory in western Canada. E. J. Clark, managing director of the company, who is one of the manufacturers touring the country, will recommend that a large plant be built at either Winnipeg or Fort William.

Ford's Memphis Assembling Plant—Contracts have been let for the erection of the assembling plant of the Ford Motor Company, Detroit, Mich., at Memphis, Tenn., and work will be commenced at once. The site is a triangular lot with 114 feet frontage. The entire plant when completed will represent an investment of $200,000.

Overland's Two-Story Addition—The list of contemplated additions to the Willys-Overland factory, Toledo, O., was increased Tuesday, when work was started on a two-story factory building to be used as an addition to the present plant. The addition will be 40 by 60 by 39 feet and will cost $8,000. The additions now planned for this mammoth concern will cost several hundred thousand dollars and work is being pushed as rapidly as possible so that the buildings may be completed before the arrival of winter. Four of the largest buildings are being made considerably larger. Additions are being made to the final assemblying room, the main factory building, the forging plant, the shipping rooms and the railroad docks. Railroad docks of this plant will be more than doubled in size and will be uniquely commodious and modern when completed. At present but three cars can be loaded in a day and as 200 cars are shipped each day the space required as railroad dockage is enormous. This improvement alone will cost an immense sum. The two new buildings, one to be occupied by the Overland proper, the other by the Kinsey Manufacturing Company, must be completed under the terms of the contract by November 1, which means some rapid building.

Republican Company's Flint Plant—The Republican Motor Company, Flint, Mich., contemplates erecting a $1,000,000 automobile plant at Flint.

Oakland's Factory Addition—The Oakland Motor Car Company, Pontiac, Mich., contemplates the erection of a large addition to its present plant at Pontiac to cost about $100,000.

Miller Company's New Building—The Miller Rubber Company, Akron, O., is erecting a new building at a cost of $5,000. It will be of steel construction and will be used as a mixing department.

Federal 1913 Output Large—The Federal Motor Truck Company, Detroit, Mich., will have a large output, according to the way rush and repeat orders are coming in. The output for 1913 has been raised to 2,500 cars.

Keeton Installing Machinery—The Keeton Motor Car Company, Detroit, Mich., is installing machinery at the Wyandotte plant, Wyandotte, Wis., and will start manufacturing this month and will give deliveries in October.

Gramm-Bernstein's New Plant—The new Gramm-Bernstein Company, Lima, O., started the manufacture and assemblying of motor trucks in the new factory. B. A. Gramm stated that 250 motor trucks will be turned out by the plant within the next six months.

Remy's Large Contracts—The largest orders ever obtained by one factory for magnetos was recently enacted by the Remy Electric Company, Anderson, Ind., with the Willys-Overland Company, Toledo, O., and the Buick Motor Company, Flint, Mich., for a total of 70,000 magnetos.

Rauch & Lang's Factory Addition—Rauch & Lang, builders of motor vehicles, are to build an addition to their factory, West Twenty-fifth street, to be four stories high. It will be 100 feet by 112 feet in size and made of brick with a concrete roof. George S. Rider & Company is drawing the plans.

Velie's Repair and Test Building—The Velie Motor Vehicle Company, Moline, Ill., is to erect a $15,000 road repair and test building. The new building, which will be erected south of the present shop, will be 80 feet by 200 feet in size. The contract has been let to Henry W. Horst, of Rock Island, Ill.

McLaughlin to Build Addition—The McLaughlin Carriage Company, Oshawa, Ont., has taken out a permit to build an addition to their factory, two stories high and 250 feet by 60 feet in size. Their present manufacturing facilities are inadequate to meet the increasing demand for McLaughlin Blick motors.

Visit Jeffery Plant—Fifty members of the Western Society of Engineers, Chicago, Ill., visited the Rambler factory recently and made a close inspection of the unit gasoline and electric motor with which the 1913 Cross Country is equipped. The engineers came to Kenosha, Ind., as the guests of the Thomas B. Jeffery Company.

Project Factory for Trucks—Phillip S. Longest, president of Longest Brothers, Louisville, Ky., announces that C. G. Stoddard and H. J. Edwards, of Long Island, N. Y., are negotiating with him for the expansion of his place into a factory for the manufacture of commercial cars. It is their desire to lease the place from the Longest Brothers.

Pierce Company's Machine Shop—The Pierce Motor Company, of Racine, Wis., the motor car division of the J. I. Case Threshing Machine Company and manufacturing Case cars, is building a new machine shop and assembling building, four stories high, 130 feet by 80 feet in size. The new building is situated between the present motor car works and the $1,000,000 foundry plant now under construction for the Case company at Lakeside, Racine.

Flames Sweep Martinsburg Plant—The Stewart Vehicle Works of Martinsburg, W. Va., employing 400 men, was completely destroyed by fire recently, entailing a loss of more than $150,000. The plant had been in operation less than a year and practically all of their stock, including hundreds of vehicles, were destroyed. A providential fall of rain prevented the destruction of the Norwalk Motor Company and hundreds of thousands of dollars worth of the best property in that city.

Pharis Tire Company Busy—The Pharis Tire & Rubber Company, of Columbus, O., recently incorporated, has been organized by the election of A. R. Lindorf, president; R. W. Pharis, secretary and treasurer, and Carl Pharis, general manager. The concern, which took over the plant of the Newark Tire & Rubber Company, of Newark, O., recently decided to keep the plant at that point. Additional machinery will be installed, including grinding apparatus. The capacity of the plant now is fifty tires daily, which will be doubled in the near future. In addition to making what is known as the Pharis tire, the company will make a 4,000 miles guaranteed tire called the Packard.

Krit's New Service Building—The Krit Motor Car Company, of Detroit, Mich., is erecting a new service building adjacent to its factory on the East Boulevard. This addition is to be used as a service stockroom and there will also be a showroom in connection. The construction is of brick, one story high, all sides are to be filled with Fenestra sash, giving a very light and airy storeroom. The roof is of the saw tooth construction, liberally fitted with glass. The building is 85 feet wide by 125 feet long of which 85 by 15 will be used for a showroom. In the center of the front is a large plate glass window in which will be shown the latest Krit models. It is expected that this addition will enable the Krit company to materially better its service department and enable repair parts to be shipped without delaying production of current models.

Further Extensions of Goodrich Plant—The extreme popularity of Goodrich tires has caused an era of factory expansion at the already extensive plant of the B. F. Goodrich Company, Akron, O. Although by far the largest rubber factory in the world, several more acres of floor-space will be added by the time the snow flies. Work is already begun on a six-story office building which, with a two-story addition to the present quarters, it is hoped will be adequate for handling the rapidly growing business interests of the concern. The structure will be of steel and concrete, faced with brick and finished in the most modern style. A new factory building, also six stories high, is rapidly nearing completion. This big addition is 270 feet long by 157 feet wide and contains 6 1-2 acres of floor-space.

Assembly room of the Lippard-Stuart Motor Car Company, Buffalo, N. Y.

Spark Plug With Double Connection; New Rear View Mirror; Heavy Duty Spark Plug; Device to Reduce Cylinder Compression; Punctureproof Automobile Tire; Gasoline Filter

Superior Double Spark-Plug

TESTS have shown, according to the Superior Motor Specialty Company, Philadelphia, Pa., that the use of two sparks on a single plug in a cylinder results in a considerable increase in fuel efficiency. The production of two simultaneous sparks furnishes more heat at the critical moment when the mixture is ignited, so that the process of combustion is started more rapidly and more dynamically. The plug, Fig. 1, consists of two positive electrodes contained in a double insulation, which may be wired either both to the magneto, or one to the magneto and the other to the battery, utilizing either a double or a dual ignition system. The timing of the ignition naturally is not disturbed or influenced in any way by the use of this plug. It is claimed by the maker that the increase in horsepower obtained by the use of this plug over the power output with a single-spark plug is 17 per cent.

Hoco Rear View Mirror

Hoeft & Company, Inc., Chicago, have designed a new type of rear view mirror, Fig. 2. The mirror itself consists of a beveled, oval-shaped plate, 6 by 8 inches, which is held in a brass frame mounted on a horizontal rod. The latter slides in a metal sleeve and is adjustable at any point along the length of the same, its maximum extension being 13 1-4 inches. The sleeve is attached to the windshield post by a clamp being held together by two bolts or by a screw plate. The mirror comes in nickel or brass finish. The device is of exceptional value in that it can not only be swung at any angle but may be given a longer arm at any time by simply loosening the connection and pulling out the slide.

In insurance statements it has been shown that a large percentage of the number of accidents from careless driving, have been caused by the driver turning to look at a car behind

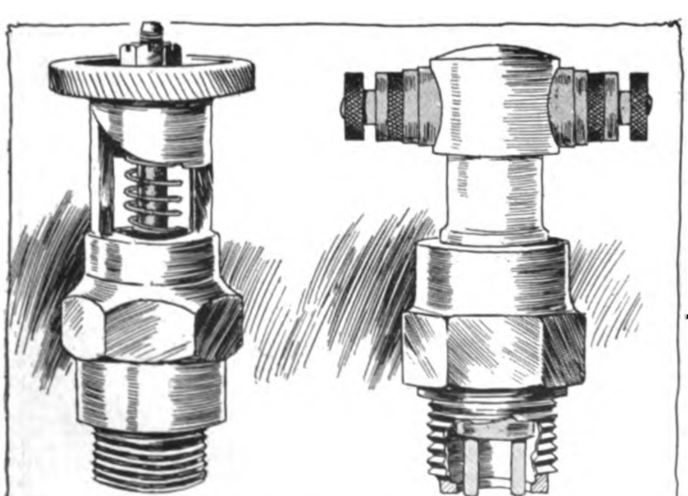


Fig. 1—Endrick motor decompressor and Superior double spark-plug

Hartford Heavy-Duty Plug

A spark-plug which is designed to withstand high heat and its accompanying influences is the Hartford plug, Fig. 3, made by the Hartford Suspension Company, Jersey City, N. J. This plug is so constructed that it may be easily cleaned, this feature being obtained by making the insulation practically in one piece with the bushing and nut, while the second piece of the plug is the shell. The nut may be easily screwed out of and withdrawn from the shell so as to permit of cleaning the electrodes from soot and oil deposits, which are the most frequent causes

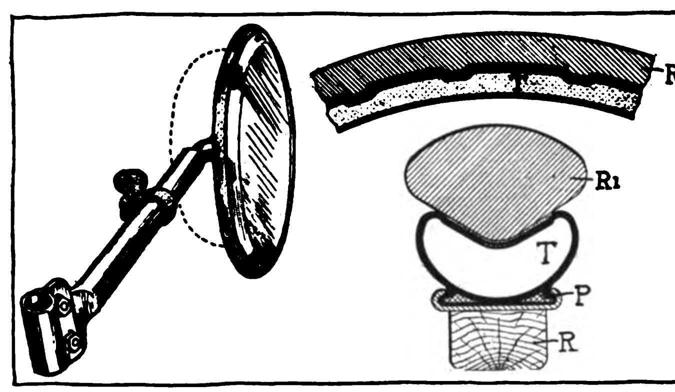


Fig. 2—Hoco rear view mirror and section of Montgomery tire

of trouble in the case of plugs capable of withstanding the pressure of a high-tension current. The illustration shows the plug in its two portions and attention is called to the peculiar construction of the negative electrode, which is formed as a long U-pin inserted in the base face of the bushing. The positive electrode is a straight heavy wire of such composition as enables it to remain solid at all temperatures encountered in spark-plug service. The porcelain insulation surrounding the central electrode is substantial but not cumbersome, and the whole plug has a pleasing appearance.

Endrick Motor Decompressor

Owners of automobiles with high compressions would in many cases gladly sacrifice a fraction of this feature if starting could thereby be made easier. To meet their wishes, the Endrick Engineering Company, Warwick Road, Olton, near Birmingham, England, has constructed a decompressor which may take the place of the priming cock, the latter being made obsolete by its use. The decompressor consists of a poppet valve shaped with a double face. The lower one is ordinarily pressed against its seat by a spring, while the upper one positively limits upward movement of the mushroom. The action of the decompressor, Fig. 1, is as follows: On the compression stroke the valve is slightly lifted and part of the compression is lost, and a slight leak is also encountered during the power stroke as well as the exhaust stroke. On the suction stroke the presence of the decompressor does not influence the operating conditions in any way, so that the ratio of gasoline and air laid down by the adjustment of the carbureter is not altered due to the use of the decompressor.

Montgomery Punctureproof Tire

One of the latest efforts to overcome punctures is the combination pneumatic and solid tire made by Harry B. Montgomery, Harrisburg, Pa. This tire, Fig. 2, consists of an inflatable tube of strong rubber, the inner portion of which is so shaped as to fit within the bead portion of the rim. Around the tube the solid rubber tread is arranged which bears in an annular depression of V-section. The thickness of the solid tread protects the inflated tube from punctures, while its rhomboidal cross-section insures the immunity of the tube against rim cutting, since practically all the pressure is applied along the V-shaped depression of the tube. If the tube is deflated the rim may be removed, its tight fit on the tube being but the result of the air pressure in the tube, forcing the outer wall of the same against the inner surface of the tread.

The tube is so far above the tread that the danger of its puncture is very slight as only a thrust from the side could reach it. This is almost impossible in regular running conditions. Owing to the enormous thickness of the casing it would be a long time before the wear from ordinary running began to show. It would be necessary to maintain the proper pressure in the inner tube in the same manner that it is required with the ordinary clincher type of tire. The solid rubber constituency of the outer shoe gives an added resiliency to the tire, it is claimed, and thus aids in absorbing a heavy shock without transmitting it to the body of the car and its occupants.

Bousman Fuel Autofilter

Impurities of the gasoline, consisting both of foreign matter and water, are detrimental both in decreasing the efficiency of the fuel and necessitating a relatively large consumption of the same by the motor, but they also cause such acute troubles as stopping up a lead in the carbureter or the formation of a water trap in the line. It is therefore essential that pure gasoline only be fed to the carbureter, and for this purpose the Bousman Manufacturing Company, 18 Plainfield avenue, Grand Rapids, Mich., has constructed the Autofilter, Fig. 4. This is

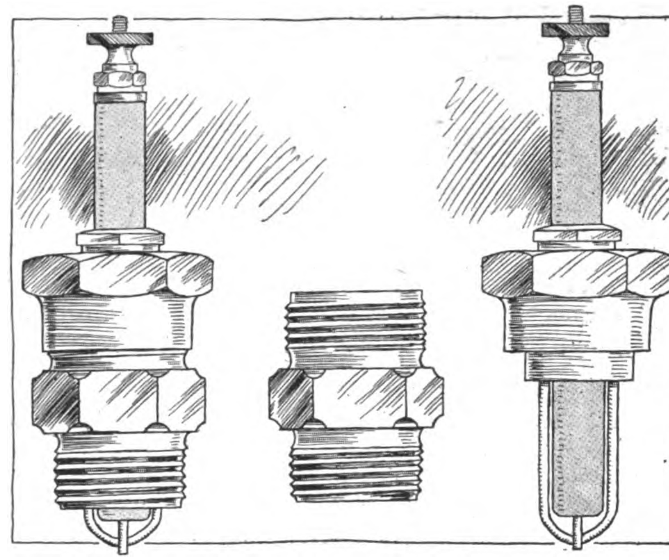


Fig. 3—Assembly of the Hartford heavy-duty spark plug

a highly polished bronze casing equipped with brass fittings and containing a fine wire gauze screen which is visible through a cylinder of heavy glass, making a tight fit with the bronze casing. The gasoline enters at a fitting which connects with the gasoline tank lead by a compression coupling and enters the space surrounding the filter cylinder. The pressure behind the gasoline forces it through the filter and out of the casing, while the water or foreign matter remains in the space which surrounds the filter, whence it may be drained by opening the cock. The view of the parts, Fig. 4, shows the construction of the details. The filter consists of a very fine mesh screen, inside of which a piece of filter fabric is placed. Inside this material there is another cylinder of wire screen, which, however, is coarser than the outside one. The fitting is on a level lower than the top of the filter cylinder, between which and the casing a tight fit is preserved through the sleeve, a highly machined and finished brass casing. The sleeve has eight small holes around its circumference, presenting passages between the interior and exterior of the cylinder and through which the pure gasoline which has passed through the filter may flow to the exit fitting. The bevel-shaped lower portion of the sleeve warrants an absolutely tight fit against the casing, while the same condition is obtained at the upper end of the sleeve by the contact with the interior of the cap. The filter may be attached at any suitable location by means of the plate which carries a clamp fitting around the casing that may be secured firmly in place by means of screws.

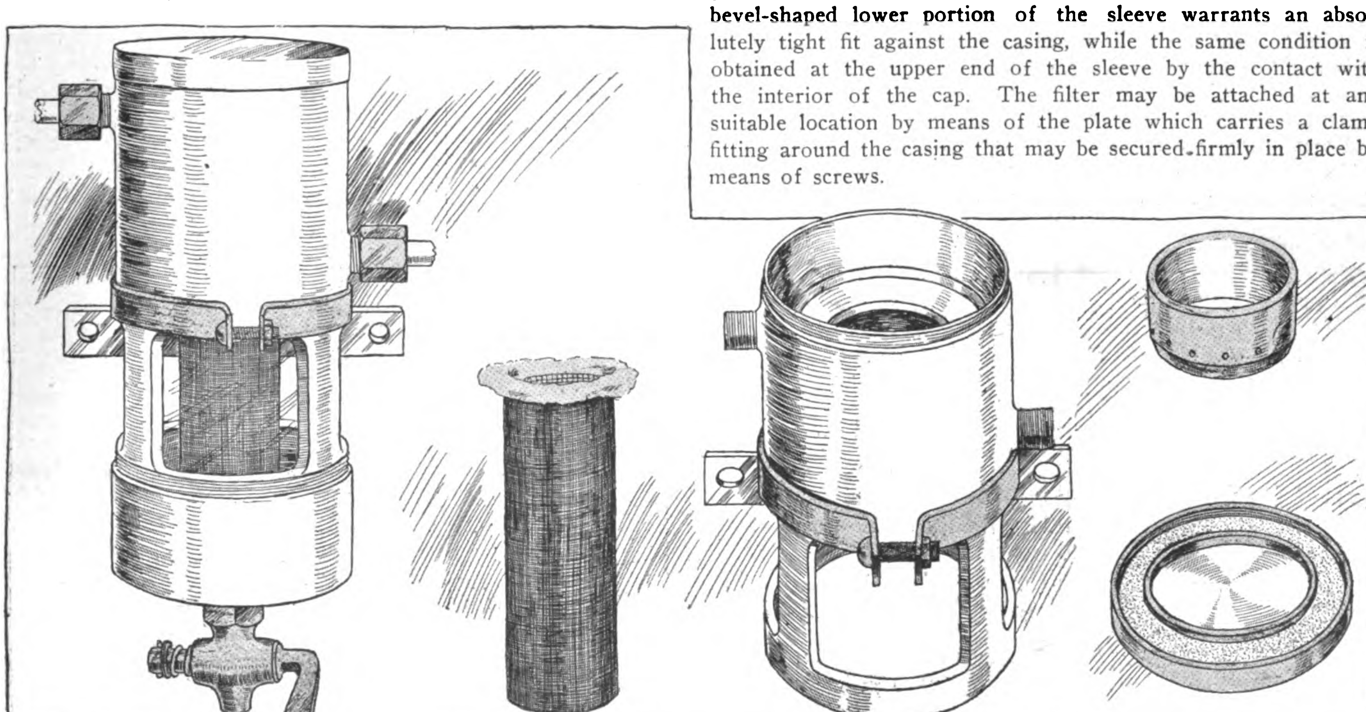


Fig. 4—The Bousman fuel Autofilter for removing foreign matter from the gasoline feed

ELECTRIC Automobile Signal—In which the sound is generated by a rotating ratchet and strengthened by an acoustic chamber.

Fig. 1 shows the subject matter of this patent, an electric signal. The sound is produced by a ratchet R engaging a projection of an acoustic chamber A which is inclosed in a casing C, provided with a resonator. The acoustic chamber A is not in direct contact with the casing.

No. 1,035,745—to Ernest Rubes, Brooklyn, N. Y. Granted August 13, 1912; filed January 11, 1911.

Anti-Creeping Tire Device—Which consists in a method of positively holding the inflating valve in a stationary position relative to the rim.

The patent refers to the combination of an inner tube having a strength-giving envelop on the inside, with a tube surrounding the first-mentioned tube and having a disk-like flange F, Fig. 2, which is positively held in place in the interior envelop. A portion of the flange is formed as a tube adapted to inclose an inflating valve V; this latter tube extends through the wheel rim and is threaded to receive a clamping nut N by means of which the valve can be securely held in position relative to the rim.

No. 1,036,085—to Clarence E. Falor, assignor to the Goodyear Tire & Rubber Company, Akron, O. Granted August 20, 1912; filed October 31, 1911.

Carbureter for Automobile Motors—In which two sleeve valves serve as auxiliary air inlets.

The carbureter described in this patent, Fig. 4, has a mixing chamber M in the lower part of which the nozzle N is located. The air entering through the primary inlet P and passing through the carbureter is regulated by the throttle T and the upper portion of the chamber M is formed with an annular port which, when the throttle is closed, is closed only by a sleeve S_1 connected to the throttle. A lower sleeve S_2 is connected to the first sleeve so as to be actuated in unison therewith and the lower end of S_2 is shaped with an outward flange to direct the incoming air toward the nozzle N. Therefore when the throttle is gradually opened more widely the sleeves come into action and a mixture of correct air-fuel proportion is produced.

No. 1,036,301—to Harry A. Miller, Los Angeles, Cal. Granted August 20, 1912; filed October 19, 1910.

Self-Inflating Pneumatic Tire—In which the inner tube is composed of a number of sections inflated by a pump plunger which is actuated by the flexure of the tread when running.

The subject-matter of this patent is shown in Fig. 3, where R is the rim and C the outer casing of a tire. The inner tube is composed of a number of sections, each one of which has two abutting end plates E. These rest on plates P separating them. In the channel formed between the two tube ends a helical spring S is placed, one end of which is secured to P and the other a pump plunger P_1 capable of reciprocating on a cylinder C_1. This cylinder is reciprocated when the plate P passes through its lowest position, whereby air is pumped into the cylinder whence it is forced into one of the two sections.

No. 1,035,283—to Frank F. Wear, San Francisco, Cal. Granted August 13, 1912; filed November 23, 1910.

Cushion Device for Automobiles—In which oil and air are used to absorb shocks by passing through a dashpot arrangement.

One of the principal claims of this patent refers to the combination of a packed sliding joint formed by two telescoping members, Form S. A constriction is provided about midway between the ends of the two members when fully extended. The chamber formed by the two telescoping parts contains a pump the inlet of which is in operative connection with the sliding joint and the discharge of which connects with the chamber, the constriction giving rise to the operation of the pump.

No. 1,036,043—to George Westinghouse, Pittsburgh, Pa. Granted August 20, 1912; filed September 28, 1909.

Internal Combustion Motor—Which compresses pure air in the crankchamber, the quantity of fuel being mixed with it depending on the suction created in the cylinder during the upstroke of the piston.

This patent relates to a two-cycle motor, of the following construction: The cylinder and crankcase are so connected as to form a gas-tight space in which air entering through a valve-controlled port is compressed, when the engine piston is on the out-stroke. At the end of this stroke the compressed air is forced through a passage and inlet port into the cylinder. On the up-stroke the port is closed and the evacuation of the crankchamber draws in fuel from the reservoir.

No. 1,035,513—to Gustav A. F. Ahlberg, Chicago, Ill. Granted August 13, 1912; filed November 28, 1910.

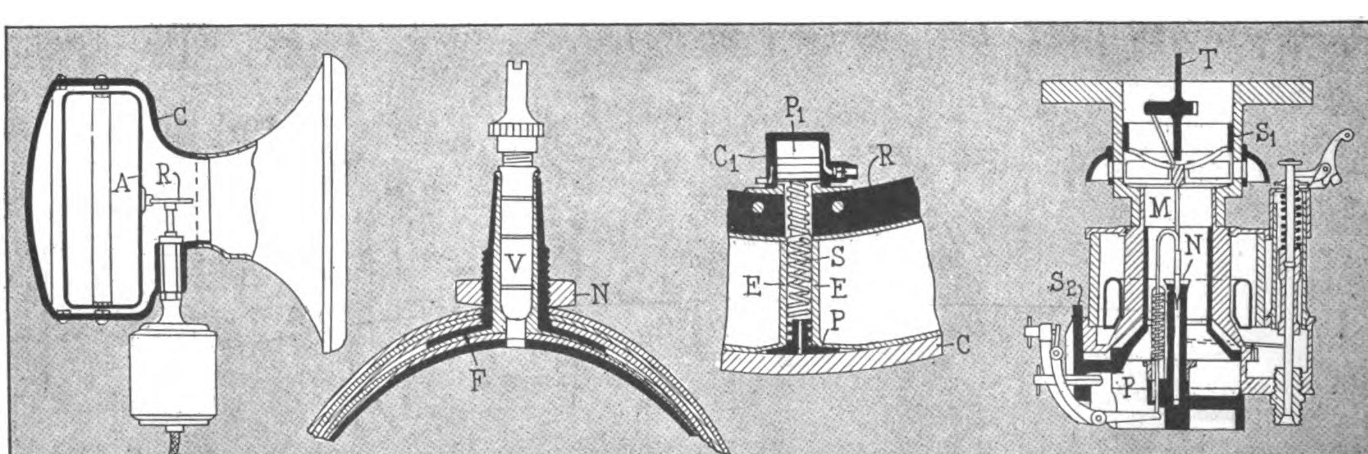


Fig. 1—Rubes electric horn. Fig. 2—Falor anti-creeping device. Fig. 3—Wear self-inflating tire. Fig. 4—Miller carbureter

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The Automobile

World's Greatest Racing Car

Description of Peugeot Racer, Victor at Dieppe, Le Mans, Mont Ventoux and Boulogne—Photographic Reproductions Disclosing Details of Design and Construction—Most Consistent Speed Creation Yet Produced

WITH Dieppe, Le Mans, Mont Ventoux and Boulogne as evidence, the Peugeot racer is undoubtedly the finest pure speed production France has ever possessed. Built under no-limitation regulations, the car is distinctive as a specimen of the light-weight, high-efficiency type developed of recent years in Europe. Its four cylinders measure 4.3 by 7.8 inches, bore and stroke, from which it has been possible to get 175 horsepower on bench tests; the maximum speed of the car is about 120 miles an hour; its total weight empty is 2,000 pounds; and although shaft-driven, it holds to the road better than the majority of chain-driven racers. The car is largely the production of Georges Boillot, the Peugeot race driver, and his companions, Goux and Zuccarelli. With their experience in light car races, they determined the distinctive features of the big car and were responsible for many of the interesting details which go far toward the making or the marring of a speed production. Shaft drive was decided on after lengthy experience with both types of final drive, Peugeot having at first been a partisan of side chains for racing, and later coming over to the propeller shaft for all models.

The importance of restricted weight and perfect adherence to the road were manifest at the Dieppe Grand Prix. It was undoubtedly owing to the lower tire consumption consequent on the lower weight that the car with one-half the cylinder area was able to beat the Fiats in this long-distance event. At maximum speeds the Peugeot appeared to

Fig. 1—Peugeot racer, Europe's fleetest speed production, which has swept the boards during the present season in long-distance road races, speed trials and hill-climbs. The machine, the development of racing engineers, is a light-weight, medium-powered creation, weighing under 2,000 pounds and with four cylinders 4.3-inch bore and 7.8-inch stroke, much smaller piston displacement than cars it has outdistanced. On road straightaways it has proven to be speedier than any cars entered in contests this year

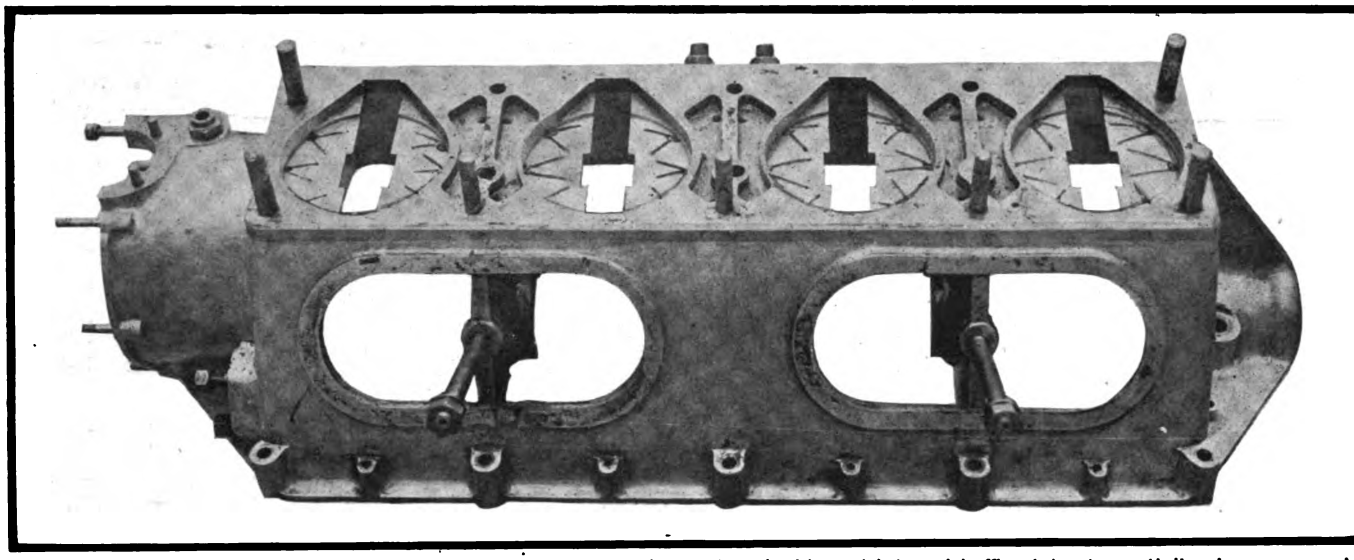
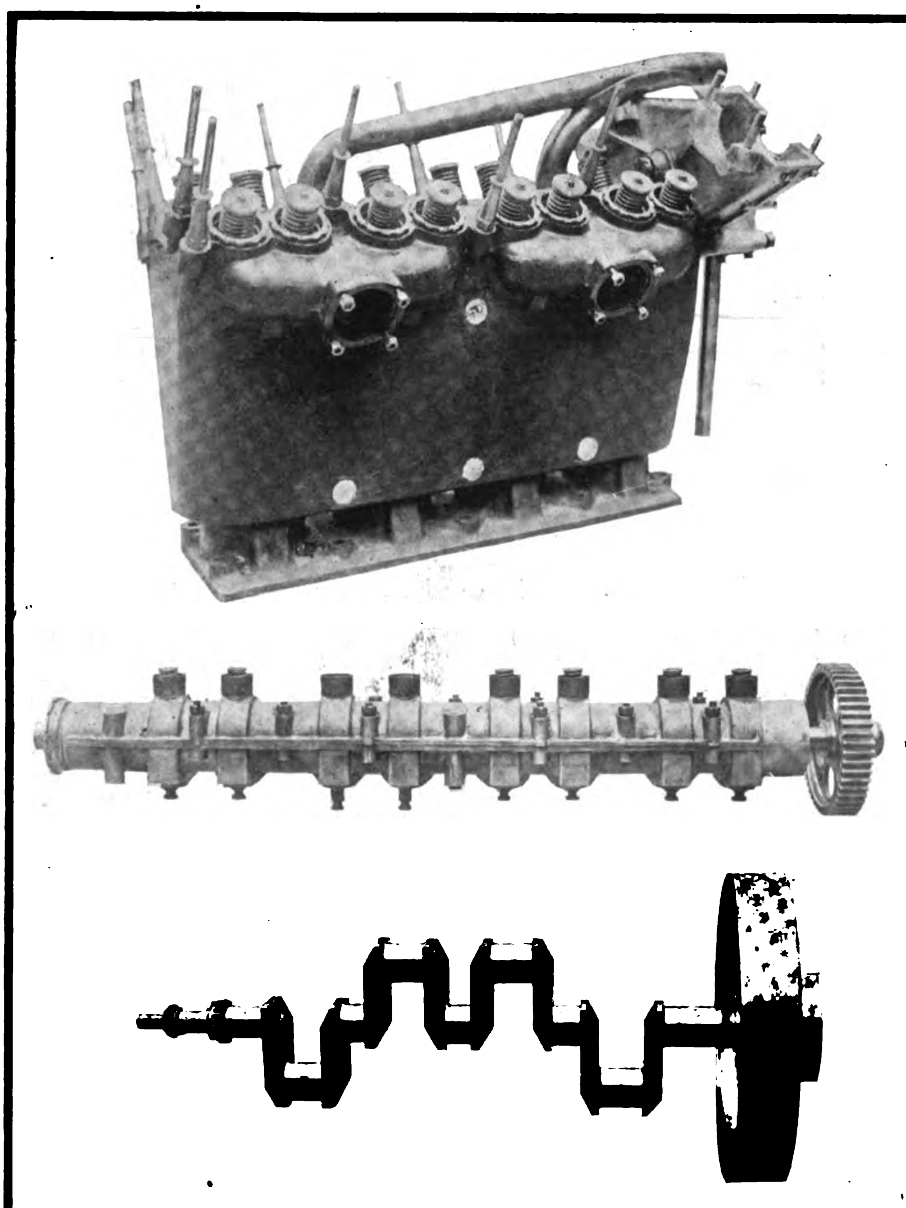


Fig. 2—Crankcase of Peugeot, showing large inspection opening s at each side and integral baffle plates to partially close open ends of cylinders to prevent an excess of oil reaching them



Figs. 3, 4 and 5—Top illustration shows the block four-cylinder casting with both camshaft housings removed. Middle illustration shows one of the camshafts removed with its housing. Bottom illustration shows conventional crankshaft

stick to the road better, and was probably easier to handle than Bruce-Brown's Fiat, although it would be impossible to offer much criticism of the Fiats on this.

A study of the accompanying tables will show the speed in the long races in the last few years. The French Grand Prix is of special interest in considering the Peugeot racing car. The average speed attained by this racer over the 478.4 mile course was 72 miles an hour.

The entire Peugeot power plant is carried on a three-point suspended subframe having the form of an elongated U, the curve being at the fore end and having a central trunnion attachment to a very substantial double cross-frame member. Both this and the two rear ball-and-socket attachments are provided with lubricators, the object of the design being to free the power plant from all the twisting straining of the main frame members. The frame members themselves have not much that is distinctive; they have an upward curve in order to clear the back axle; the chassis is carried on very broad flat springs, and two stout leather bands encircle the rear axle and the rear transverse frame member in order to eliminate violent action of the springs.

The motor has its cylinders in one casting, is attached to the crank chamber by five bolts a side, and has its valves inclined in the head at an angle of 45 degrees. There are four valves per cylinder, their diameter being 2.36 inches and their lift .43 inches. The normal speed of the motor is 2,200 revolutions, which gives a piston speed of 2,860 feet per minute. The valve design is a Peugeot patent, for, although the inclined position of the valves is not unusual, the method of operating them by means of independent overhead camshafts is altogether original. This position gives a hemispherical combustion chamber and allows the placing of the spark plug, one per cylinder, directly in the head. Each camshaft, with its push rods and recall springs, is complete in an aluminum housing placed sufficiently high above the head of the cylinder to isolate it from the heat of this latter, and is carried on a series of seven long projecting bolts. The drive is obtained by a vertical spindle at the fore end of the motor and enclosed gearing at the upper front end of the engine to the spur pinions on the end of each camshaft. Profiting by racing experience, the design of the valve is such that in case of a breakage it is impossible for the head to drop onto the piston. The camshafts, complete with their housing and pinion, are mounted over the respective range of valve stems and can be lifted away by removing a series of seven nuts. The exact nature of the valve operating mechanism has not been revealed. Each camshaft naturally carries eight cams operating within the interior of an eccentric having a push rod without roller forming an integral part with the eccentric. The tappets have adjustable heads and are recalled by light coil springs on the top of the camshaft housing.

The crankshaft is carried on five plain bearings, is of BND chrome nickel steel and is bored throughout for lubrication under an exceptionally high pressure. Steel pistons are used with hollow connecting rods, the weight of the reciprocating parts being kept as low as possible, the complete piston, with rings and wrist pin, weighing only 32 ounces. The wrist pin is fixed in the connecting rod and is carried in bronze sleeves within the piston. The crank chamber, divided horizontally into two portions and having the crankshaft carried in the lower portion, is provided with two large hand holes on each side for an inspection of the connecting rod ends. The space between the top of the crank chamber and the base of the cylinder is filled up with the exception of the space necessary for the passage of the

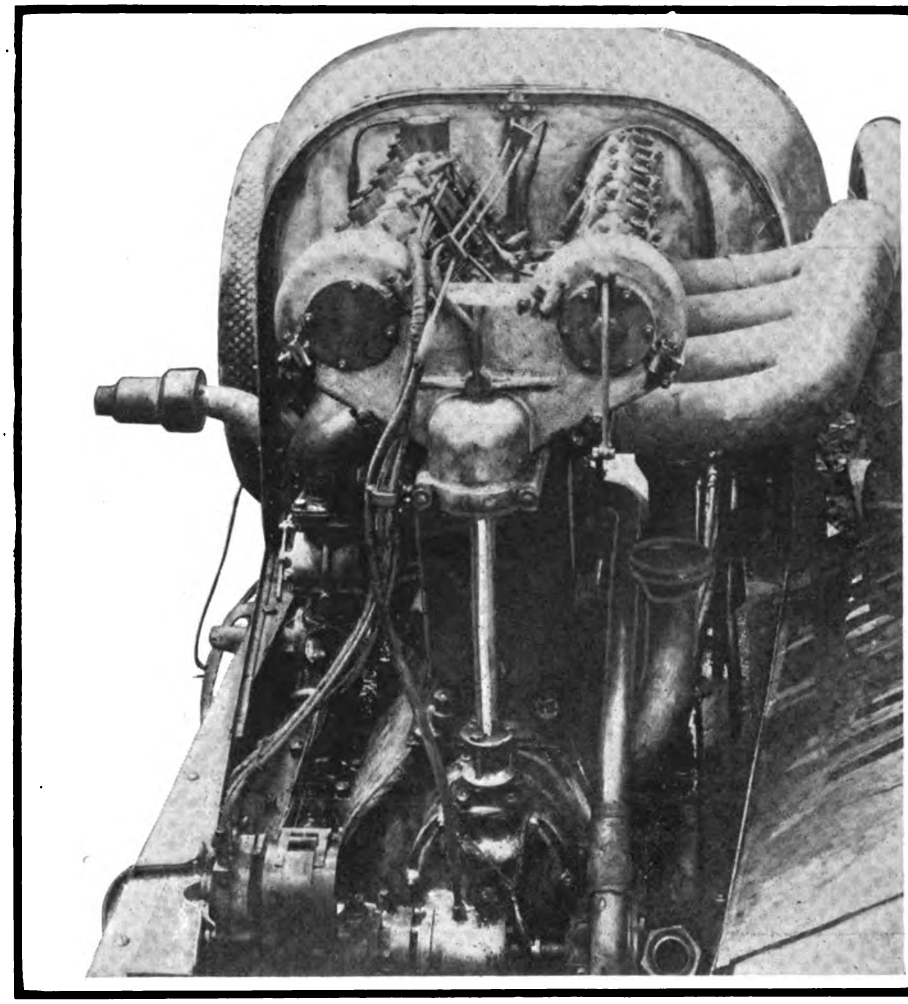


Fig. 6—Seven-eighths front view of the four-cylinder Peugeot racing motor

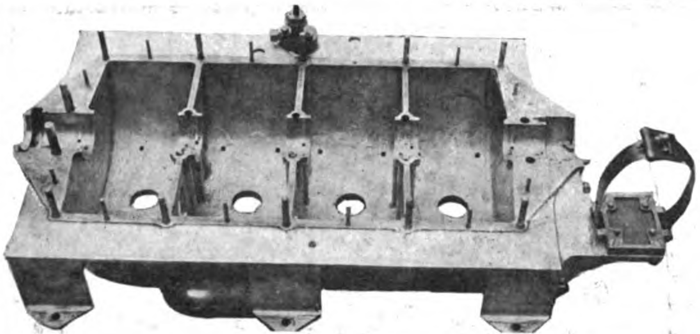
FASTEST TIMES UP TO 1912

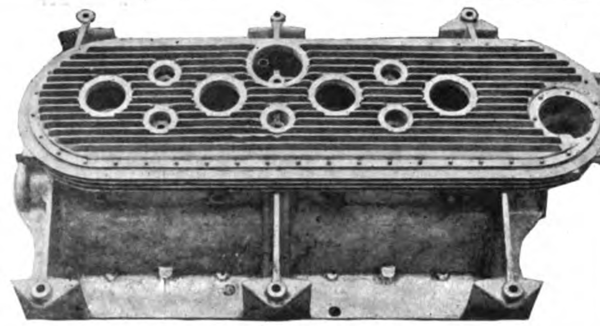
Year	Race	Distance miles	Car	Speed miles per hour
1906	Vanderbilt	297.1	Darracq	61
1907	Grand Prix	478.4	Fiat	70.61
1908	Grand Prix	478.1	Mercedes	69.24
1909	Santa Monica	202	National	74.62
1910	Santa Monica	202	Lozier	71.31
1911	American Grand Prize	411.36	Fiat	74.45

RACE: FRENCH GRAND PRIX

Year	Winning car	Distance	Time	Bore and stroke	Average speed miles per hour
1906	Renault	750	12:14:07	....	60.8
1907	Fiat	478.4	6:46:33	180 x 160 mm.	70.61
1908	Mercedes	478.1	6:55:43	6.6 x 7 inches	69.24
1911	Fiat	420	7:06:30	5.11x7.45 "	56.54

Year	Car winning	Distance miles	Time	Bore and stroke	Average speed miles per hour
	RACE: VANDERBILT CUP				
1906	Darracq	297.10	4:50:10	7¼ x 6	61
1908	Locomobile	257.98	4:00:48.2	7¼ x 6¼	64.5
1909	Alco	278.08	4:25:42	4.72x 5.51	63
1910	Alco	278.08	4:15:58	4.75x 5.5	65.5
1911	Lozier	291.38	3:56:57	5⅜ x 6	72
	RACE: AMERICAN GRAND PRIZE				
1908	Fiat	402	6:10:31	4.52x 6.49	65.11
1910	Benz	415.2	5:53:05	6.1 x 7.87	70.28
1911	Fiat	411.36	3:31:29.13	5.9 x 7.87	74.45
	RACE: LOWELL				
1908	Isotta	254.4	4:42:34	5.87x 5.5	53.6
1909	Buick	212	3:49:08	4.5 x 5	56.6
	RACE: FAIRMOUNT PARK				
1908	Locomobile	200	4:02:30	5 x 6	50
1909	Simplex	200	3:38:54.8	6.1 x 5 75	55.4
1910	Chadwick	200	3:29:07.8	5 x 6	58.1
1911	Benz	200	3:18:41	6.1 x 6.2	61.25
	RACE: SANTA MONICA				
1909	National	202	2:42:27.6	5 x 5 11/16	74.62
1910	Lozier	202	2:49:59	5⅜ x 5⅜	71.31
1910	Lozier (stock race)	151.5	2:04:10.8	5⅜ x 5⅜	73.22





Figs. 7 and 8—The middle portion of the crankcase showing it in its correct position and, at the right, upside down

Fig. 9—Top of cylinder casting, showing studs to anchor camshaft housings

connecting rod, and in this guard plate a series of holes is drilled to allow of the return of the oil swept from the cylinder walls into the base chamber. The lower portion forming oil tank is deeply ribbed to assist in cooling the oil. A constant level is maintained, and if this level should be exceeded a hand pump allows the mechanic to draw the excess out of the motor to the reserve tank. A gear pump carried within a cylindrical housing and having a cone seating draws the oil from the base chamber, delivers it to the main bearings through the hollow crankshaft to the connecting rod ends, and up the tubular connecting rods to the wrist pins. All the oil leads are internal and are steel tubes brazed in the crank chamber, special care having been necessary to prevent leakage owing to the unusually high oil pressure maintained. The camshafts are fed by a hand pump, with an overflow to the base chamber. A downward extension of the vertical spindle driving the timing gears operates the oil pump, and the Bosch high-tension magneto and the water pump are driven from the respective extremities of a transverse shaft. During all its races the car was fitted with a new type of Claudel carbureter.

A multiple-disk clutch takes the drive from the motor to the four-speed gearbox, this latter, as already explained, being mounted on the subframe. The gearbox is a compact structure with the two shafts carried in a horizontal plane and having the selector within the box, instead of being on the outside of the frame members, as is usual. Fig. 11 shows it is absolutely protected from dust, there being nothing external but the change speed lever. The arrangement of the three sliding sets of gears is not that usually adopted; the first one gives the first and reverse speeds; the second the second and third speeds, and the fourth direct drive by means of a dog clutch. At a motor speed of 2,200 revolutions a minute, the ratios give a car speed of 55, 74, 99 and 112 miles an hour. Both primary and secondary shafts are bored out in order to obtain a reduction of weight.

The propeller shaft has a universal joint at each extremity, these joints being carried on ball bearings. A floating rear axle is employed with a vertically divided differential housing of aluminum. This rear axle is a remarkably light construction, and in order to reduce weight

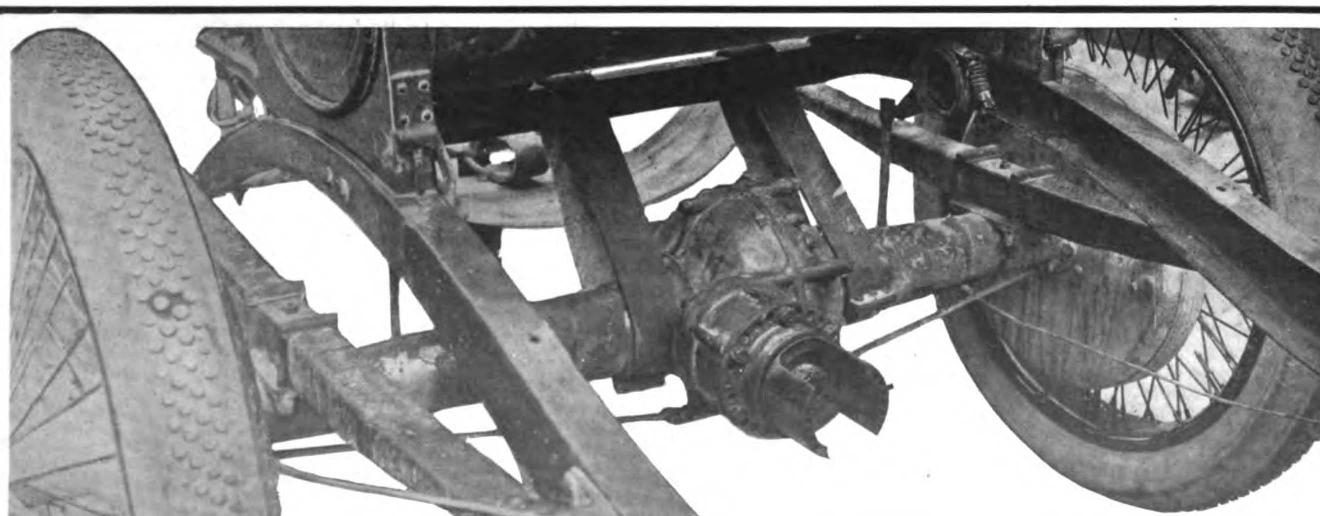


Fig. 10—Rear axle details of the Peugeot and mounting of gasoline tank. Springs are specially flat and frame is upswept over the axle

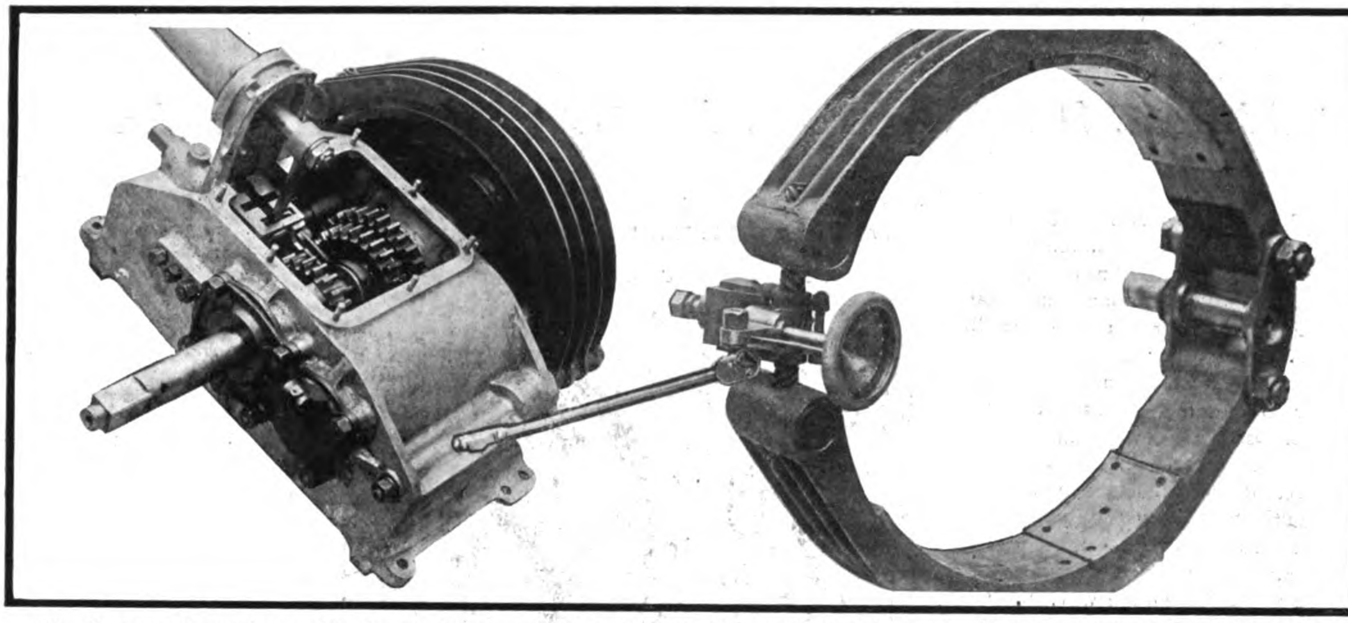


Fig. 11—Peugeot gearbox and brake, the former with its entire selective mechanism inclosed. All parts are protected from stones

even the cover of the bevel pinion housing and the jaws of the universal have been drilled (Fig. 14). Very large diameter ribbed brake drums are fitted, the operation of the rear wheel brakes being by hand lever with steel cable connection. There are neither radius nor torsion rods, all the effort being transmitted through the rear springs. The foot brake, also of the ribbed type (Fig. 11), encircles a broad-faced big diameter drum at the rear of the gearbox. The two shoes are united by a vertical screw having rapid right and left hand threads cut on it, it thus being merely necessary to turn this screw in either one direction or the other in order to separate or bring together the two shoes. Provision is made for very rapid regulating of the brakes; the hand brakes can be regulated through a trap in the footboards while the car is in motion.

No attempt whatever has been made to adopt a stream line body. The bonnet is narrowed in somewhat at the front, thus reducing the width of the plane surface radiator, but there is no other attempt at wind cutting. The gasoline tank is carried transversely across the frame behind the driver's seat and the two spare wire wheels are to the rear of the tank. Generally the car is run with 815 by 105 millimeter front tires with 880 by 120 tires at the rear.

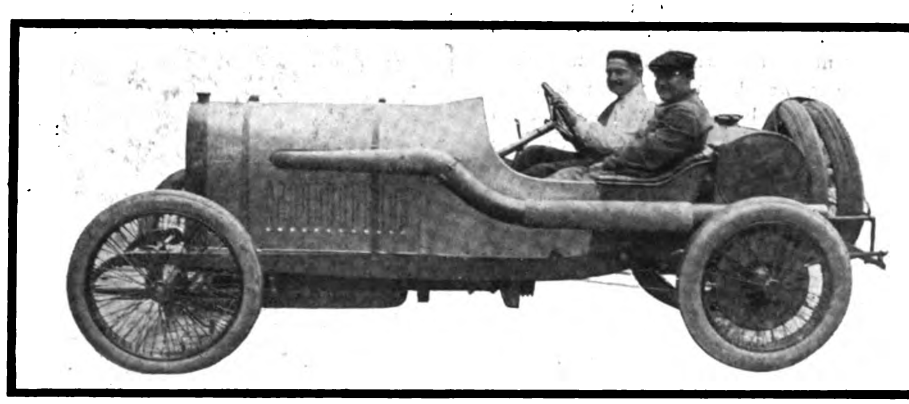
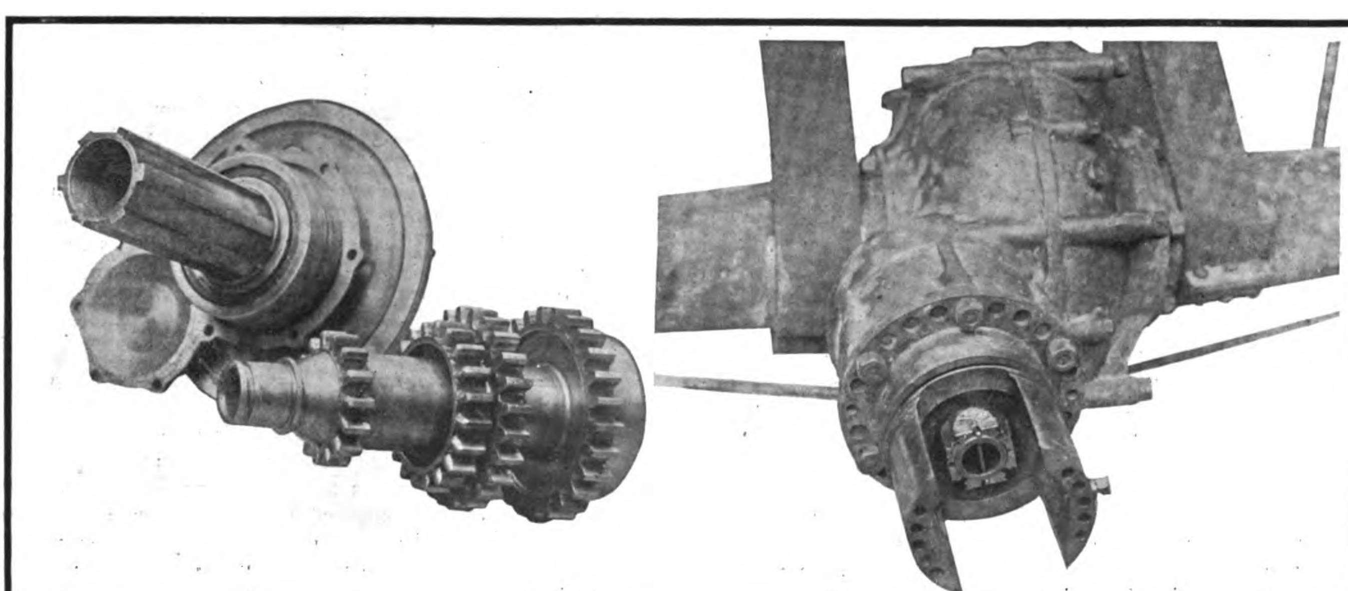


Fig. 12—Left side of Peugeot racer, showing how exhaust manifold is carried



Figs. 13 and 14—Main and countershafts. At right, rear universal joint attachment, showing perforations to reduce weight

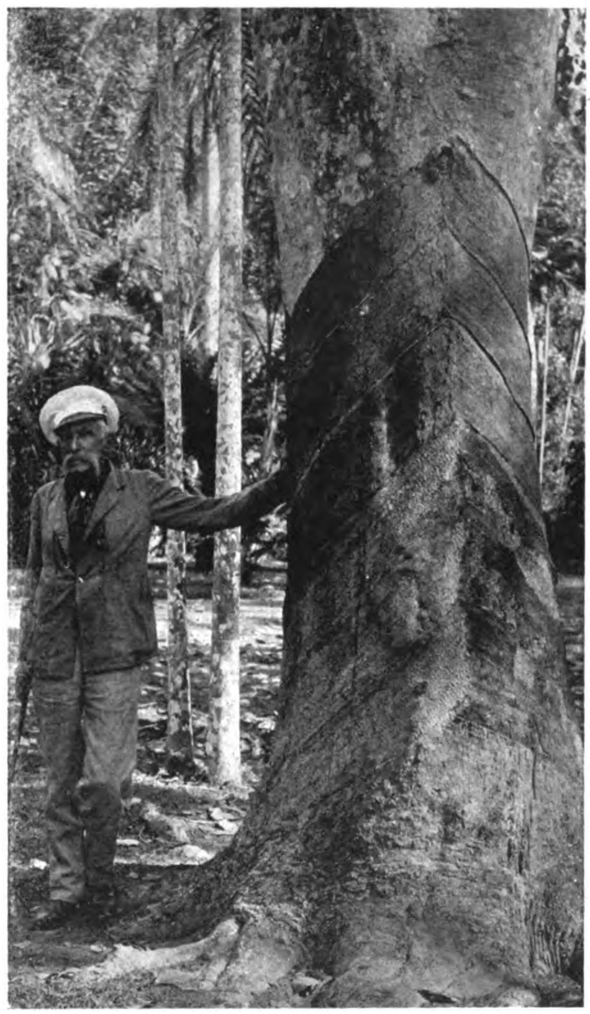
Stealing World's Greatest Industry

Imperial Commissioner from Ceylon Predicts Wider Use for Product of the Plantations

RUBBER production has superseded tea, coffee and sugar as major crops in Ceylon and Malaya and stands second to coffee among the Brazilian agricultural activities. F. Crosbie Roles, Imperial Commissioner to the International Rubber Exposition from Ceylon, and considered one of the highest authorities of the world on the subject of cultivate rubber, says that the industry as a whole is only at the beginning of its day. He predicts that 2 shillings a pound will be the prevailing price of pure gum rubber within calculable time and that at that price the planters will net a comfortable profit. From his viewpoint, he can see a gradual limitation of the indigenous production as the level of prices comes down, cutting off the rubber growing in the most remote districts first and gradually tightening the territorial lines until the only wild rubber that will be able to compete with that of the plantations will be that which costs so little to produce that it can be sold at a profit on the same general level of prices as the cultivated rubber.

In discussing the industry and its prospects Mr. Roles gave this exclusive statement to THE AUTOMOBILE:

"Plantation rubber, which will have a commercial production this year of about 20,000 tons, worth about $50,000,000 in your money, ranks first in the history of mankind for the rapidity with which it has taken its place as a factor in agriculture.



He Acted Under Orders

H. A. Wickham, who, on instructions of the Marquis of Salisbury shipped the rubber seeds from Brazil which formed the basis for the cultivated rubber industry of the Mid-East

"There is no record in history where any other agricultural element became an important wheel in the vehicle of commerce in so short a time. Only about 37 years ago H. A. Wickham, under orders from the Marquis of Salisbury, succeeded in shipping a boat load of rubber seed from Brazil. Brazil, naturally wished to retain its practical monopoly on the production of the *hevea brasiliensis* tree from which is obtained the crude rubber that sells at the highest levels in the markets of the world. The Brazilians had a very strict penal statute against exportation of the seed and Commissioner Wickham was instructed to get possession of some of it for introduction into the Asiatic possessions of the British Empire.

"After a series of wild adventures, Wickham managed to get out of the country with a boat load, numbering 70,000 seeds. It was well known that the seed of the hevea is exceedingly delicate and that even moderate ranges of temperature will serve to destroy its life. Therefore, Wickham observed all possible care in smuggling out the seed to protect it from exposure to the weather. Despite all this care only a small proportion of the seed germinated when planted in the Kew Gardens. All told 2,000 seeds retained enough of the vital principle to sprout, and from these seedlings the great plantation industry of the East has sprung.

"I do not mean to say that there never was any other rubber produced in the East except from these seedlings. because even today the production of low-grade rubber from a variety of trees, shrubs and vines is an important element in the industry. India, Borneo and the Malay peninsula grow large quantities of rubber from plants that have been known and exploited to some extent for centuries.

"But such elements are not included in the broad generic term plantation rubber.

"A brief outline of the various steps required to place rubber on the market may be described as follows: Plantations are usually about 3 square miles in extent, but may be either larger or smaller. The land selected for the active production of rubber is first cleared of jungle and underbrush. This is accomplished by burning over the land, or by some other method of clearing it. Latterly there has been a sharp question raised about the value of the burning method. It has been shown that there is more wind in Ceylon than in the Amazon valley and that after the clearing fire has done its work the air currents are very likely to whisk the ashes from the ground and deposit them in the nearest watercourse. Thus a large element of potash and nitrogen is lost to the land. Conservation engineers also point out that where land is denuded of its covering and where heavy rains mark some season of the year, there is great danger that exposed soil will be washed away and lost.

"But the use of fire is cheap and effective in clearing and if conditions are right rich soil of the tropics is soon covered with vegetation carpeting the ground in which the rubber trees stand. The hevea is not a very sturdy growth and excessive wind proves destructive.

"The planting is done with hand drills and the plantation is laid out in conventional form, the trees being placed in rows at regular distances. There is some difference of opinion as to the correct interval to be allowed between the rows and the trees in the row. Ordinarily there will be about fourteen rows of fourteen trees to the acre, or about 200 trees to the acre. This varies with the idea of the company as to the correct number to put out. Some experts favor less than 100 trees to the acre and some hold that 500 is not too large an amount to plant. The general average is probably about the figure I have indicated.

"The little trees are delicate and require care to bring them to maturity. In a carefully prepared and fertilized soil their growth is rapid. Noxious growths must be eliminated with the hoe or harrow and the surface of the earth must be protected as quickly as possible from the baking of the sun and the action of the elements. There are many expedients used by the planters to accomplish these ends, chief among which are the planting of catch crops between the rows, the introduction of certain types of vegetable growths that will crowd out the noxious weeds and by careful cultivation of the plants themselves.

"Take the case of a typical planter who has cleared and planted 2,000 acres of land. At the end of 1 year he will have 400,000 young trees, minus an uncertain proportion of initial losses. This proportion varies in response to numerous factors, some of which have been outlined above.

"Where the seedlings have failed, they are replaced as promptly as possible, for it has been shown that immature latex produces rubber less strong than that derived from mature trees, but more particularly because the mixture of the latices of immature trees with those of more fully developed plants results in a lack of uniformity of the marketed rubber. Thus it is important to use latex from trees of similar age in the manufacture of rubber of a standard grade.

"The time for tapping is reached when the trees are large enough. The rule has been that the tree should be 18 inches in circumference, 3 feet from the ground, before tapping is begun. This is usually some time after the end of the fourth year.

"The tools used in tapping are simple, almost primitive. Chief among these implements is a long, heavy, curved knife. The tapper, following the particular set of rules in force on the specific plantation, cuts into the bark of the young trees, first making a main channed down the trunk to carry the flow of latex. He leads into this channel a series of parallel, slanting cuts, so that the juice can flow by gravity. The utmost care is used to avoid cutting into the body of the tree and at the same time the cuts must be deep enough to reach the arteries that carry the latex.

"The cup placed at the bottom of the perpendicular channel is usually made of tin, but in many cases it is enameled inside and out.

"The flow of milk continues for only a short time, ceasing when the sun grows hot. The collectors move along the rows of trees after the daily flow has ended and dump the contents of the cups into pails that they carry. Having collected the milk from a certain section, the laborer pours his milk into a tank-wagon, drawn by man or animal power, which covers his section of the plantation. There may be one of these tank-wagons for each block of 5, 10 or more acres. Of course, all the trees in a plantation are not tapped the same day, the work being arranged so that every division receives regular attention at regular intervals during the tapping season.

"The tank-wagons proceed to the plantation factory, where their contents are run into vats. The main idea of the vats is to have them arranged so as to protect the latex as much as possible from the oxidizing influence of the air as well as extraneous matter.

"The process of coagulation is achieved by putting a certain amount of acetic acid into the vats. This causes the thick part of the rubber milk to rise and leaves a yelow serum at the bottom of the tank. The more advanced planters are now working on an efficiency plan to save a lot of labor in the process of coagulation. The latex consists of practically two-thirds serum, which is valueless at this time. Still it requires twice as much carrying power to bring it to the central station in its original form as is needed to carry the valuable part of the latex.

"The plan I refer to is one which contemplates the separation of the serum from the solid part of the milk right on the ground. But no matter how this question is settled eventually, the main idea of preparation for market is the same in any event.

"When the serum is separated, it is run off and the solid, cheeselike rubber is left. This is subjected to manipulation to remove as much of the serum as possible before subjecting the product to the roller machines.

"These machines are of two general types. First, is the machine which has two cylinders of equal size, geared to run in opposite directions on fixed axles. The rollers turn toward one another and are placed so that their surfaces come within a small distance of touching. The white rubber is run through these rollers until it is fairly free from water and when it emerges it is in the form of rubber known as Ceylon sheets.

"The other type of machine has its cylinders geared at different speeds and one of them is corrugated so that when the rubber is run through it comes out either stamped with a regular pattern or wrinkled, in the conventional form known as crepe.

"This crepe is hung in storehouses to dry out without smoking if it is to be marketed under the trade designation of pale

North corridor of the third floor at the Rubber Show in Grand Central Palace, showing some of the Brazilian exhibits

Where the Malayan products are shown under the auspices of the British government

crepe. If it is to be sold as smoked crude, it is placed in a smoke-house where the fumes from burning wood can be introduced.

"Just what effect smoking has upon crude rubber is still a problem. It is said that the wild rubber gains strength from the process. In my opinion the smoke acts as a preservative by introducing an element of creosote. I am not prepared to say that it adds anything to the strength of the product.

"The crepe or sheet is then packed in boxes or other packages and shipped to market.

"Mechanically the requirements of the plantation rubber industry are few and simple, as may be seen from the foregoing outline. In fact, it is one of the most obviously direct and uninvolved processes in agriculture. A knife, a cup, a pail, a tank-wagon, a coagulating vat, a little acetic acid, a pair of rollers and some green wood smoke.

"Now, as to the future of the industry. Broadly speaking, no large general commercial project can ever pay 100 per cent. on the investment per annum for any extended period of time, figuring the appraised valuation of the property each year with reference to its return in dividends.

"In other words, if rubber now returns 100 per cent. or more on current investment over the cost of production, and if there is a possibility of increasing the acreage and consequently the yield, the increase must be accomplished because the industry would attract unlimited capital and energy to participate in such profits.

"If the field is open and the opportunities unlimited, the man who has money to invest will choose rubber with a large return rather than something else which returns less.

"I can say that there is still a vast acreage available for rubber production that has never been exploited so far.

"It is generally admitted that at 2 shillings a pound there is a comfortable margin of profit, and the price averages over 4 shillings. It should be understood that the plantations now in bearing are those planted prior to 1907 and that since that year the acreage under rubber has doubled and trebled. The United States Rubber Company now has 22,000 acres of land planted to rubber in Sumatra and is extending its planted area with much vigor and will probably reach 25,000 acres before the end of this season. None of these trees is producing yet. Some idea of the producing capacity of the transplanted rubber tree can be gained from the careful records kept of the first trees raised in Ceylon. The figures show that a single tree has produced 240 pounds of dry rubber in 3 years. In the Ceylon exhibit at this show we have 17 pounds of dry rubber produced by that particular tree in April, 1912.

"Of course, such a general average production is away beyond our hopes and expectations, but if at full maturity the trees will yield even an average of 50 pounds per year, the total production of the plantations will be enormous. If the average acre under rubber has 200 trees, and supposing that the total acreage is 1,000,000, a very conservative figure, the eventual yield would be 10,000,000,000 pounds a year, or 5,000,000 short tons. At 4 shillings a pound this would represent a sum equal to the total valuation of the bumper crops of the whole agriculture of the United States for 1912.

"It is inconceivable that there should be any such price secured and the obvious conclusion is that the market level must yield. When it does yield, it will cut off the more remote sections raising rubber under jungle conditions. This must be true, because the expense of collection, transportation and marketing will prevent the wild rubber from such districts from competing with the cultivated product.

"Of course, I realize that improvements will be made in present methods of handling the wild rubber situation. Good roads, more railroads and a variety of factors will be introduced, but you may put it down as a settled fact that wild rubber costing more to produce and market than cultivated rubber must yield the right of way.

"In the past the point has been strongly made by the wild rubber section of the industry that the wild rubber is stronger, more uniform and more satisfactory than the cultivated varieties. There was some element of truth in these contentions, but great improvements have been made in the way of securing uniformity in plantation production. It is only reasonable to conclude that approximate uniformity can be gained under scientific methods, which, in my opinion, is all that need be said on that subject. As far as strength is concerned, it has been learned that immature rubber, or rubber obtained from immature trees in the plantations, is not so strong as that from the veterans of the Brazilian forests. Neither is mixed latex as good a foundation for rubber as pure milk from trees of full size and approximately equal age. But I am awaiting a test of the lump of rubber from the oldest and biggest tree in Ceylon in comparison with the best of the indigenous types of rubber. I believe the slight difference in tensile strength that has been noted is the result of the difference in the ages of the trees whose product was tested."

E. G. Salmon, Commissioner from the Imperial Institute to the exposition, takes a most optimistic view of the plantation rubber industry. Mr. Salmon believes that in the near future the lowering of prices and increase in the visible supply of rubber will cause it to be used much more widely than at present. He estimates that the automobile industry eventually will use something in excess of 100,000,000 pounds of rubber each year, but that the supply will be increased to such a degree that there will be a falling market for rubber for several years.

In a broad sort of way such an hypothesis would account for the attitude of buyers in the markets of the world. It has been noted that since April, 1910, when up-river fine stood at $3.10 a pound the buyers of rubber have been inactive. The trading was largely limited to the acceptance of rubber offered rather than securing it by bidding. As the supply has increased gradually but constantly and with it the offerings in the market, the lot of the purchaser has been easier than that of the seller.

From the buyers' viewpoint, purchases for future delivery in large lots could not be justified in a falling market on a basis of current prices. Therefore the dealings have been on a basis of lower figures for over 2 years, despite the much augmented total of sales.

On the other hand it is pointed out that the demand will increase much above the present level as new uses for rubber make themselves felt. Mr. Salmon believes that in the future rubber shoes without fabric will be common.

Rubber in the Spotlight

Large Attendance Marks First Sessions of Convention and Exposition In New York

Twenty-two Countries Represented by Official Exhibits of Which Brazilian is Largest

CRUDE rubber, rubber machinery used in production and preparation for market and in shaping the substance under various manufacturing processes and the finished manufactured products based upon rubber are shown with a wealth of detail at the Third International Rubber Exposition, which opened at the Grand Central Palace on Monday.

The exposition will continue until October 3 and during that period the men connected with the industry, shippers, manufacturers and growers will hold a convention similar to those of 1908 and 1911 in London.

Three floors of the big building are used for the show, the main floor being devoted to machinery; second, to manufacturing processes, reclaiming, chemicals, etc., and the upper floor contains a very complete display of crude rubber.

There are twenty-two countries or states represented in the crude rubber show, the largest display being made by Brazil, which has an exhibition space of 10,000 square feet. All the Brazilian states in the Amazon valley are represented with complete displays of crude wild rubber and a small representation of the cultivated product.

Among the other countries showing wild rubber are the African colonies of various European countries, Mexico, Central America and some parts of the East Indies.

The plantations are represented mostly in the displays of Ceylon, Malaya and the East.

Synthetic rubber has a part in the show, but from the commercial viewpoint it is not important at this stage of development. Such samples as are shown are said to equal the natural product in quality and service, but are eliminated from consideration by the cost of manufacture.

On the third floor there are exhibits of crude rubber aggregating not far from 150 tons and worth approximately $350,000 in the market. The Brazilian exhibits weigh about 90 tons and include all the commercial grades in six different varieties. All told, the different kinds of rubber shown in the Brazilian space number over thirty-five. The production of Brazil is about 40,000 tons a year.

Next in size to Brazil is the display of Malaya, which includes the Straits Settlements and Malay states under British protectorate on the Malay peninsula along the Straits of Malaca. This display is almost wholly of high-grade plantation rubber, ranging from pale crepe, which is not smoked at all, to smoked block rubber, which is about as dark as the wild Brazilian product. The Malayan production is not far from 15,000 tons.

Ceylon comes next in size and importance from the viewpoint of the automobile industry, its annual production being around 5,000 tons at the present rate. Other countries have exhibits, particularly the Philippine and Hawaiian Islands, but aside from Brazil, Malaya and Ceylon they are not of the first importance to the automobile business.

It has been conservatively pointed out that the world's production of rubber in 1912 will be about 90,000 long tons and that the automobile industry will account for 31,000 long tons.

Production is increasing steadily, but not rapidly in Brazil and is racing in the plantations of the Mid-East. It is estimated that the total yield of the plantations in 1915 will equal that of the indigenous product.

The United States Rubber Company has one of the largest show spaces in the building. A full line of its product is displayed and an interesting announcement has just been made by President Samuel P. Colt that the company has nearly finished the planting of 25,000 acres in the Island of Sumatra. Reckoning this plantation at 200 trees to the acre and the eventual yield at 50 pounds of dry rubber per tree, the supply of rubber for this company will some time reach the enormous amount of 50,000,000 pounds a year. Such a result is still far in the future, as the oldest of the trees on the plantation is now only 18 months. Trees begin to bear after their fourth year, and the production is small until they are 12 years old or more. The life of the rubber tree has not been determined so far as the plantations are concerned. The oldest trees in the Ceylon plantations are about 36 years old and all others are younger. The veterans are producing more rubber per tree than any of the others, and so far have shown few symptoms of age.

The exposition was preceded by a formal luncheon on Sunday at which Henry C. Pearson, vice-president of the convention, acted as toastmaster. It was attended by most of the dignitaries present as representatives of the rubber countries and the speeches promised much interest in the convention of the industry.

Mayor William J. Gaynor opened the show on Monday noon and a large attendance was enjoyed. The chief interest centered in the displays of crude rubber. A. Staines Manders, who successfully managed the former shows, is the organizing manager of the present exhibition.

A preliminary session of the convention was held on Monday, but the actual business of the gathering did not commence until the following day.

The attendance of Tuesday proved a surprise to the management on account of its size and quality. There were delegations from practically every section of the rubber industry, which were expected, but in addition the general public and particularly the automobile interests were strongly represented.

One feature of the show which proved surprisingly acceptable to the patrons was the fact that no retail selling was countenanced and the attendants at the various booths were equipped to inform inquirers as to the features of the exhibits displayed.

The general plan of decorations uses more color than has been customary in exhibitions held in the Grand Central Palace but the general effect is not unpleasant. In the crude rubber section the native types of architecture form one of the most interesting features of the show.

Growing rubber plants forms leading feature in the decorative scheme of the exposition

Trade News of the Week

Palmer & Singer Manufacturing Company Takes Out Licenses Under Two Groups of Dyer Patents

Applications for Space in Both Big National Shows Coming in Faster Than Ever Before

LICENSES under two groups of Dyer patents have been granted to the Palmer & Singer Manufacturing Company and the long litigation between the Enterprise Automobile Company and the defendant concern will be abandoned.

The patents involved in the license rights are first, the two covered by the settlement recently made between the Enterprise company and the Automobile Board of Trade by which the A. B. of T. was given the right to recommend the issuance of seventy-five licenses to its members on payment of a lump sum to the assignees of the patents. These patents cover the selective type of gear-change mechanism with direct drive in use generally. The other patent is one of the group of five that were originally sold to the Patents Holding Company in the days of the Association of Licensed Automobile Manufacturers and which were reconveyed to the Enterprise Company as part consideration for the license rights granted to the A. B. of T.

It is understood that the royalty rate is to be 1-10 of 1 per cent. on each of the three patents, thus making the aggregate royalty paid $3 on each $1,000 based on the retail list price.

The Enterprise Company has been inactive in prosecuting individuals since the settlement was made.

The suits against the defendants are docketed in the United States District Courts for the Southern and Eastern Districts of New York and will be expunged from the records as soon as the formal order is entered.

Berkshire Undergoing Liquidation

BOSTON, MASS., Sept. 23—Creditors of the Berkshire Motor Company, of Cambridge, Mass., have been notified by attorneys that the company is financially embarrassed. Its liabilities are placed at $25,000. Although the company has assets of greater book value than the liabilities, the attorneys have found it necessary to liquidate the affairs of the company. This is being done at the instance of the larger creditors. B. Deveraux Barker, an attorney, and James Addison, of the company, have been appointed agents to carry out the liquidation.

V-C Company to Make Truck

LYNN, MASS., Sept. 23—The recently formed V-C Motor Truck Company organized in Lynn, Mass., with Frank S. Corlew, president and sales manager, and Frank E. Vallier, treasurer and general manager, has secured temporary offices. The company has some well-known men affiliated with it, among them being John M. Nelson, John P. Stevens, William T. Langmaid, J. P. Crosscup, Charles M. Alley and S. D. Ritcey. The company is seeking a factory site in Lynn. The truck will be 1 1-2 tons, using a Continental motor, left-hand drive, center control and with a loading space back of the driver's seat of 9 1-2 feet.

Show Space Is in Great Demand

Applications for space in both the big national automobile shows have been coming in faster this year than ever before in the history of the industry. The New York show under the auspices of the Automobile Board of Trade will be larger than ever before, judged by the character of the applications. Merle L. Downs, secretary of the show committee, has announced that practically every application so far received is for a materially larger space than was asked by the same applicant last year.

He estimates that there are 15 per cent. more early applications than last year.

With regard to the Chicago show, the National Association of Automobile Manufacturers report much the same state of affairs as applies to the New York exhibition.

The Motor and Accessory Manufacturers, which handles a certain amount of space in each of the shows is in receipt of more and larger applications for representation at the shows than ever before.

Allotments of space will be made at the regular meetings of both organizations, which are scheduled to take place during the first week of October.

Johnson Heads Warner Gear

Ray P. Johnson has been appointed general manager of the Warner Gear Company, of Muncie, Ind., to succeed C. E. Davis, who has been named general manager of the automobile department of the American Locomotive Company, at Providence.

Mr. Johnson is an engineer of high attainments and has had much success in the line he has followed. He received his technical education at Chicago University.

World's Crude Rubber Market Sags

Still slowly sagging, is the news of the week from the crude rubber markets of the world. The price basis has been lowered to a level of $1.14 a pound for up-river fine, with the other grades in proportion. This represents a decline of about 2 cents since last week. On account of the record-breaking proportions

Automobile Securities Quotations

Irregularity marked the changes in the list of automobile and accessory stocks during the past week. Most of the list was weak but there were several notable exceptions. No marked advances were scored and the best that can be said for the standard investment stock is that they have been steady. In the speculative issues the trend was downward but the range was small. U. S. Motor showed a fractional advance on covering of short contracts. General Motors was slightly easier. International Motors gained a fraction on persistent buying of small lots.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., common	..	..	150	..
Ajax-Grieb Rubber Co., pfd	..	..	95	100
Aluminum Castings, preferred	..	..	100	102
American Locomotive, common	34	34½	46	46¼
American Locomotive, preferred	104½	105	107	110
Chalmers Motor Company	..	..	145	155
Consolidated R. T. Co., common	5	8	13	16
Consolidated R. T. Co., pfd	10	20	50	60
Firestone Tire & Rubber Co., com	175	180	273	276
Firestone Tire & Rubber Co., pfd	106	108	107	109
Garford Company, preferred	..	..	99	100
General Motors Company, common	38	41	36	39
General Motors Company, pfd	76	79	78	81
B. F. Goodrich Company, common	*237	*242	†77⅛	†78
B. F. Goodrich Company, pfd	*118	*119	†106¼	†107¼
Goodyear Tire & Rubber Co., com	225	235	330	333
Goodyear Tire & Rubber Co., pfd	105	107	105½	106½
Hayes Manufacturing Company	..	..	..	93
International Motor Co., common	..	..	26½	27½
International Motor Co., pfd	..	..	81	83
Lozier Motor Company	..	..	43	50
Miller Rubber Company	..	..	..	140
Packard Motor Co., preferred	103	106	105½	107
Peerless Motor Company	..	..	116	120
Pope Manufacturing Company, com	55	65	34	36
Pope Manufacturing Company, pfd	73	76	73½	75
Reo Motor Truck Company	8	10	10	11
Reo Motor Car Company	23	25	23	25
Studebaker Company, common	..	..	42½	44
Studebaker Company, preferred	..	..	94¾	96½
Swinehart Tire Company	..	..	99	101
Rubber Goods Company, common	85	95	100	..
Rubber Goods Company, preferred	100	105	105	110
U. S. Motor Company, common	28	30	1¾	2
U. S. Motor Company, preferred	69	71	6	6½
White Company, preferred	..	..	107	109

*Old. †New.

of the offerings at the regular auction in London 2 weeks ago and the reports of large receipts of plantations which will go on the block this week, the buyers are disposed to be conservative and as a result the offerings proved to be in larger volume than the demand could take care of. The New York market has been quiet all week.

Vital Subjects for Sales Managers

The Sales Managers' convention, which will be held under the auspices of the Automobile Board of Trade, September 30 and October 1 will probably attract a large attendance and preparations for a representative gathering from all parts of the country are being made.

The program of the meeting will embrace a wide field of observation. Among the subjects that will be treated by the convention are the following: Freight, shipping, motor car equipment, enclosed bodies, selling and advertising and annual models. As a whole volume might be presented on any one of these subjects the chances are that the proceedings will be filled with interest.

The committee in charge of the affair includes the following: H. O. Smith, F. C. Howard, W. E. Metzger, C. W. Churchill, W. T. White.

C. W. Eggers Promoted by Willys

TOLEDO, O., Sept. 23—C. W. Eggers, who for the past 2 years has been traffic manager for the Overland company, has been made general traffic manager for the Willys-Overland Company; the Garford Company, Elyria, O.; Gramm Motor Truck Company, Lima, O.; Federal Motor Company, Indianapolis, Ind.; Morrow Manufacturing Company, Elmira, N. Y.

Market Changes of the Week

The most important feature of the week's market was the decrease in price of rubber, which was $.02 per pound, caused by lack of trade. Tin varied throughout the week, closing at a gain of $.03 per 100 pounds, as a result of the great demand for it in foreign markets.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.....	.07½	.08⅛	.08⅛	.08⅛	.08⅛	.08¼	+.00¾
Beams and Channels, 100 lbs...	1.51½	1.51½	1.51½	1.51½	1.51½	1.51½	....
Bessemer Steel, Pittsburgh, ton	24.00	24.00	24.00	24.00	24.00	24.00	....
Copper, Elec., lb..	17 11/20	.17⅜	.17⅜	.17⅜	.17⅜	.17⅜	+.00 1/20
Copper, Lake, lb..	.17⅝	.17⅝	.17⅝	.17⅝	.17 13/20	.17 13/20	+.00¼
Cottonseed Oil, Sept., bbl...	6.35	6.32	6.36	6.45	6.30	6.38	+.03
Cyanide, Potash, lb....	.19	.19	.19	.19	.19	.19	....
Fish Oil, (Menhaden)	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime	.85	.85	.85	.85	.85	.85	....
Lead, 100 lb..	5.10	510	5.10	5.10	5.15	5.15	+.05
Linseed Oil..	.69	.69	.69	.69	.68	.68	—.01
Open-Hearth Steel, ton..	25.00	25.00	25.00	25.00	25.00	25.00	....
Petroleum, bbl., Kansas crude	70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa. crude.	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined ...	.68	.68	.68	.68	.68	.68	....
Rubber, Fine Up-River Para	1.14	1.14	....	....	....	1.12	—.02
Silk, raw Ital.	....	4.15	....	....	4.15	....	....
Silk, raw Japan		3.75	....	....	3.82½	....	+.07½
Sulphuric Acid, 60 Beaumé	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs.	4.95	5.00	5.00	5.00	5.03	4.98	+.03
Tire Scrap..	.09⅛	.09⅛	.09⅛	.09⅛	.09⅛	.09⅛	....

French Also Fear Invasion

Foreign Makers Generally Alarmed But Unable So Far to Find Practical Check for Americans

Britons and Gauls Futilely Complain That Their Market for $1,000 Automobiles Is Gone

SYMPTOMS of panic which marked the British automobile industry last week, due to the invasion of the British market by low-priced American automobiles, have subsided to a certain extent after a view of the situation from the standpoint of sober second-thought.

According to the cabled news from London, nothing further has developed as regards the formation of a $25,000,000 corporation to make cars to sell at from $1,000 to $1,250 in competition with American lines of somewhat similar price. The idea, according to the distinguished speakers, including the Duke of Westminster and Lord Montagu, was that while the company probably could not equal the American cars of the same class on an even price footing, that the government might be prevailed upon to impose a preferential tariff against the American automobiles to cover the difference in price between the new British lines and the regular product of the American factories.

Aside from the fact that the working of a protective tariff tends to raise wages, and consequently manufacturing costs, which must be covered by the selling price, thus still further emphasizing the difference between the British and American cars, it is pointed out that the secret of American success in the line of small cars lies in economic quantity production, using the most advanced types of machinery regardless of cost.

Leading members of the automobile fraternity emphasize the fact that British production is only about 15,000 cars a year and that if such a factory as has been outlined is to be operated at a profit, the local market must be vastly stimulated and the company must stand ready to compete in the markets of the world for business. A factory such as has been indicated would have to turn out at least 25,000 cars a year which means that a market for at least 20,000 cars a year would have to be found outside the British Isles.

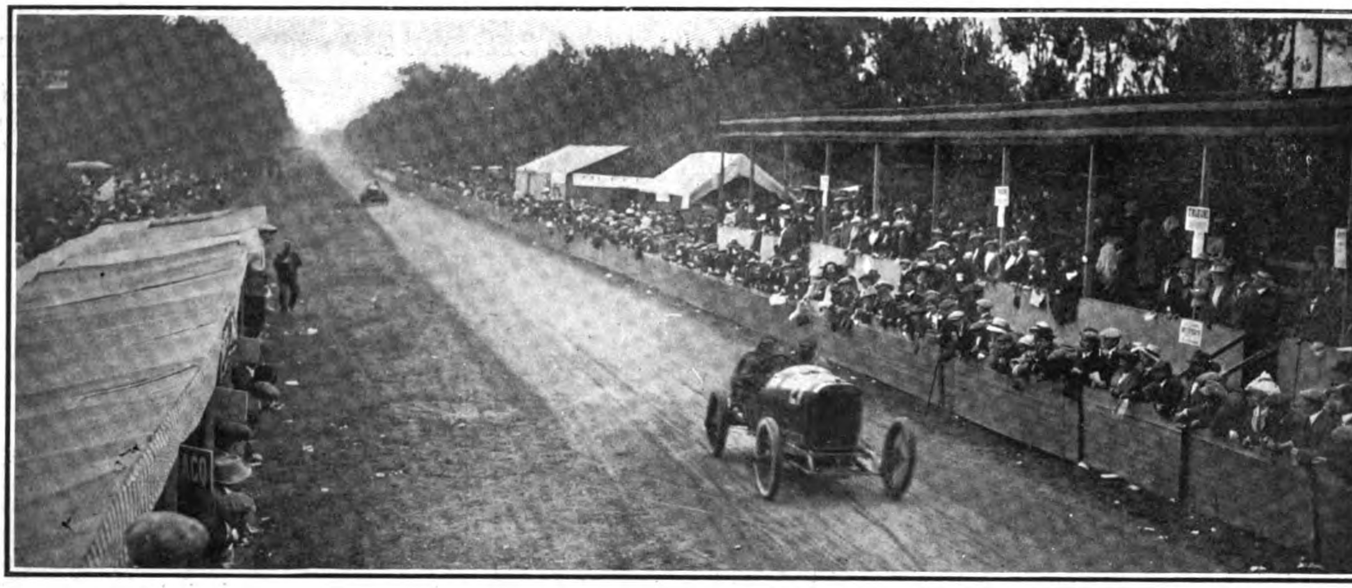
As the proposed preferential tariff would not affect the sale of American cars outside of Great Britain and Ireland, the American manufacturers are not alarmed over the situation.

Following the agitation in England about the invasion of the American small car, which has led to talk of the formation of a corporation with a capitalization of $25,000,000 to build lines to compete with the American automobiles, the French manufacturers are also becoming stirred up. The Frenchmen point out that their local market for cars listed at $1,000 is dead as the result of the American invasion. Both countries are to be protected from the dreaded American automobile by a tari ffwall if the wishes of the agitators are followed. The general opinion of American manufacturers is that no big competitive companies will be formed and that the preferential tariff talk will end in nothing.

BUFFALO, Sept. 23—Formal notification to the creditors of the E. R Thomas Motor Car Company has been issued that George C. Finley and Adolph Rebadow have been named receivers

A preliminary survey of the properties shows that while the nominal assets are in excess of the indicated liabilities, but that a severe shrinkage will be experienced in converting the assets into money. The liabilities are now estimated at $1,100,000.

The factory is closed, but the receivers have determined to continue the operation of the repair and parts departments.



Goux in his Peugeot racer in the Sarthe Grand Prix of 402.6 miles, in which he broke all European records for the distance

New Road Record in Sarthe Grand Prix

Goux Covers 402.6-Mile Course at 73 Miles an Hour—Zuccarelli Wins 3-Liter Race

Peugeot Proves Itself the Fastest Long-Distance Car France Has Ever Produced

LE MANS, France, Sept. 20—At practically 73 miles an hour Jules Goux won the Sarthe Grand Prix, 402.6 miles, race on a Peugeot identical with the car with which his teammate, Georges Boillot, captured the grand prix at Dieppe. This performance, of which a cable dispatch appeared in THE AUTOMOBILE last week, broke all European records for this distance and finally classed the Peugeot as the fastest long-distance racing car France has ever produced. Incidentally, this was one of the cars which should have been sent to the American races at Elgin and Milwaukee, but at the last moment was kept back to race at Le Mans, owing to a disagreement between the American backers and the French firm. It was fortunate that the Peugeots were kept at home, for without them the free-for-all class at Le Mans would have been a hollow event. There were the two Peugeots belonging to Goux and Boillot, a Crespelle with long-stroke single-cylindered De Dion motor and practically a stripped touring model S. P. A., driven by Leduc. As the Peugeots could walk around their rivals, there was an entire absence of competition in this class.

Boillot, who had started last, came in at the end of his first lap for a tire. At the end of the second lap he pulled in for another tire. After the third lap he took a wheel in place of one that had shed its tire. After the fourth lap he stopped again, crawled under his car to look at the universal housing, peeped at his motor, and went on. In the fifth lap he made the record of the race—33.55 miles in 25 minutes 9 seconds, including a stop for a tire—being equal to 79.9 miles an hour. Making a deduction for the stop, the average speed for the lap was about 85 miles an hour. His accident was not altogether unexpected and was irreparable. One of the bolts holding the exhaust manifold had broken; a repair was effected at the last minute, but, as the bolt went through the waterjacket, a leak was feared. It was after the fast lap that the water began to get away, finding a passage into the crankchamber and the oil reservoir and suddenly causing the complete seizure of the engine.

With Boillot out, it remained for Goux to maintain the Peu-

Molon in his Vinot at the Ponthiou hairpin turn

Zuccarelli finishing the small-car race in Lion-Peugeot

geot fame. He did it by covering the twelve rounds with nothing more than three punctures and a stop at half time to fill his tanks.

The competition lacking in the big class was provided in the 3-liter section, that is, for cars of 183.069 cubic inches piston displacement. The two sets of cars were run together, the small ones going away first at intervals of a minute and the big ones after. Lion-Peugeot, Alcyon, Schneider, Vinot-Deguingand, Hispano-Suiza, Crespelle, Cote, Picker and Koecklin were the firms represented. Thomas, on Lion-Peugeot, set a fast pace, coming round to the stands before Boillot had got away, and maintaining an average of 70 miles an hour, a really fine performance for a car of 3.07 by 6.14 inches bore and stroke. Guyot, handling a car known as the Picker, was unable to get away when his call came. He had to take down his clutch, remove a defective plate and put it back again, the work occupying almost 2 hours. Nicodemi, one of the Schneider men, was not present when his start was announced. He had started out late for the course, but at length appeared on the course with a loss of 30 minutes.

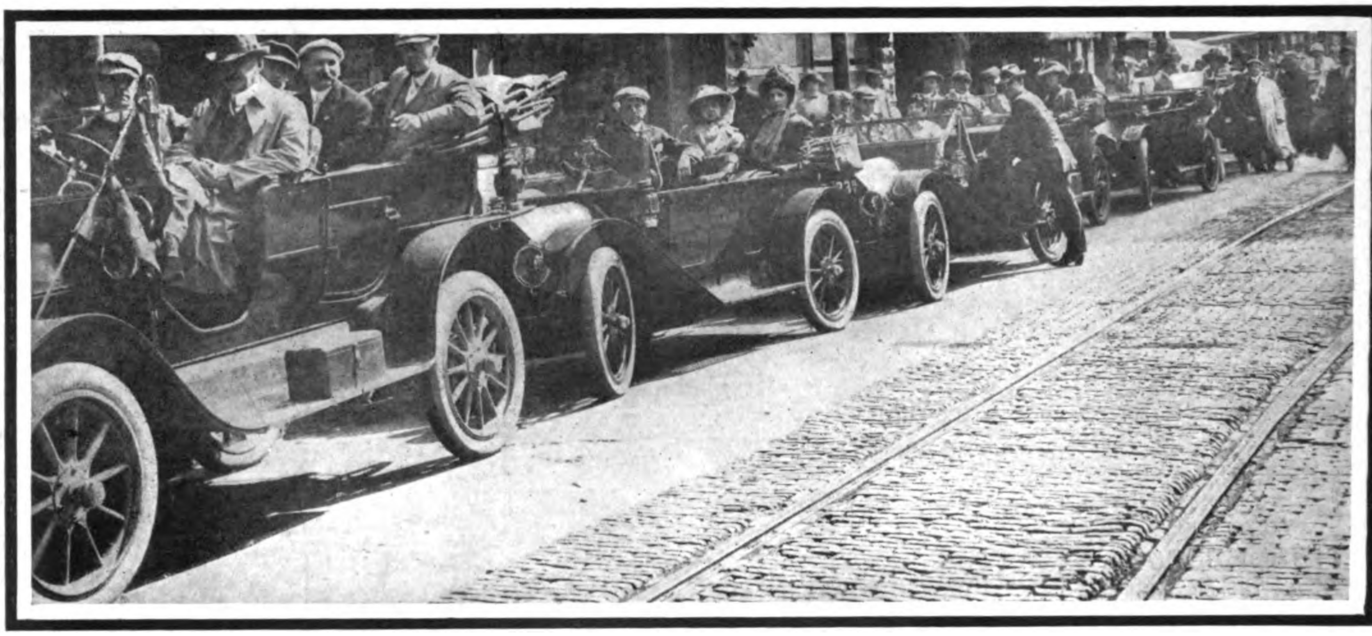
After his fast initial lap Thomas disappeared; Zuccarelli took his place, with Barriaux and Duray, both on Alcyons, hard after him and the two Vinots pressing the Alcyons close. The Schneiders were further down the list, but going well. After three laps, Zuccarelli with the small Lion Peugeot had got ahead of Boillot with the big Peugeot, and had a lead of more than 4 minutes on Barriaux, the nearest rival in his own class. Champoiseau of the Schneider firm had pulled in ahead of the Vinots and Croquet; another Schneider man was just to the rear of the Vinots. At half distance six cars were closely bunched, the intervals between them varying from a few seconds to 6 minutes. On the seventh lap Duray began to have trouble with the valve springs of his Alcyon, and realizing that the race was finished so far as he was concerned, stopped to bring Boillot home on his car. At this time the greatest excitement of the race was felt. Zuccarelli was being dangerously pressed by Barriaux on the Alcyon; the Vinots were running the Alcyons close, and Champoiseau and Croquet, of the Schneider team, had a personal jealousy in addition to their desire to beat the others. Guyot, after his long delay, had got into the running in excellent style, although obviously unable to wipe out the initial handicap of 2 hours. On his seventh lap, after making second best time, Guyot pulled in for gas. He filled the dashboard tank from a big can without the use of a funnel, and in doing so allowed a considerable amount of gasoline to run over the car. Just as he was pulling away there was a pop at the carbureter, and at the same instant flames appeared around the filler cap. Guyot and his mechanic jumped out and instinctively backed away from the car, while the grandstand spectators began to run at the fear of an explosion of the tank. But no explosion came, and after a few seconds of panic rags were thrown on the car to stifle the flames, and in 5 minutes the fire was extinguished. Having replaced his burned-out ignition wires, Guyot continued, put up a couple of fast laps, but was unable to finish in the time limits

Upper—Duray starting in Sarthe Grand Prix race in his Alcyon
Lower—Champoiseau starting his Schneider in 3-liter race

Towards the end Zuccarelli and Barriaux were fighting for first place, with Champoiseau on Schneider and Molon on Vinot struggling for the following positions. The final result was doubtful when, with only 20 miles to run, a ball bearing broke in the steering gear of the Alcyon car, making an easy win for Zuccarelli's Lion-Peugeot, putting Champoiseau's Schneider second, with Molon's Vinot a very close third and Croquet's Schneider fourth. Duray had been held back by valve-spring troubles; the two Cotes were regular without being particularly fast, and Riviere's Hispano-Suiza, a 4-year-old model of 2.5 by 7.8 inches bore and stroke, did not show itself equal to the modern cars.

TABLE SHOWING THE TIME MADE IN EACH LAP BY THE CONTESTANTS IN THE 402.6 MILE SARTHE GRAND PRIX

Laps Miles	1 33.55	2 67.1	3 100.65	4 134.2	5 167.75	6 201.3	7 234.85	8 268.4	9 302.95	10 335.5	11 369.05	12 402.6
Goux, Peugeot	0:25:57	0:51:26	1:16:42	1:42:36	2:08:31	2:37:33	3:06:29	3:31:55	3:57:57	4:31:01	5:03:37	5:31:54
Leduc, S. P. A	0:32:30	1:04:08	1:35:46	2:13:06	2:44:32	3:16:05	3:51:05	4:44:39	5:19:24	5:51:39	6:23:25	6:55:18
Boillot, Peugeot	0:27:15	0:54:42	1:25:43	1:57:48	2:22:57	Seized	engine					
Crespelle, Crespelle	0:35:42	1:23:09	2:38:00	3:12:52	3:47:50	4:44:35	5:20:58	6:01:55	6:37:18	Broken	valves	
	THR	EE - LIT	ER CAR	S (183.06	9 CUBIC	INCHES	DISPLA	CEMENT)				
Zucca. , Lion-P.	0:29:33	0:58:01	1:26:23	1:54:39	2:23:01	2:51:11	3:22:39	3:50:49	4:19:41	4:48:54	5:37:37	6:12:22
Champoiseau, Schneider	0:31:30	1:02:38	1:33:26	2:05:06	2:36:51	3:11:11	3:46:36	4:18;12	4:50:24	4:25:15	5:59:03	6:30:36
Leon Molon, Vinot	0:32:28	1:03:29	1:35:52	2:10:01	2:45:57	3:17:21	3:48:32	4:22:11	4:57:09	5:28:25	6:00:00	6:31:31
Croquet, Schneider	0:33:56	1:18:31	1:54:04	2:25:52	2:59:17	3:32:43	4:15:03	4:47:36	5:20:12	5:54:27	6:27:52	7:00:33
Lucien Molon, Vinot	0:32:16	1:04:20	1:34:50	2:06:15	2:37:43	3:09:08	3:40:53	4:15:49	5:38:24	6:11:22	6:43:43	7:16:13
Nicodemi, Schneider	0:58:24	1:35:42	2:12:38	2:46:34	3:22:23	3:56:39	4:30:54	5:04:26	5:37:28	6:10:40	6:44:09	7:17:36
De Vere, Cote	0:39:30	1:15:48	1:52:43	2:31:54	3:06:36	3:46:53	4:23:54	5:08:12	5:50:16	6:27:51	7:04:49	7:41:35
Riviere, Hispano-Suiza	0:34:27	1:13:38	1:52:45	2:28:01	3:03:09	3:38:45	4:13:51	4:54:20	5:29:47	6:03:47	6:52:53	7:50:06
Duray, Alcyon	0:30:47	1:01:01	1:30:24	1:59:46	2:29:38	3:03:10	3:39:10	5:01:08	5:44:38	6:52:02	7:32:05	8:12:10
Ollier, Cote	0:37:18	1:13:13	1:55:59	2:37:56	3:16:37	3:52:40	5:32:32	6:14:37	7:03:10			
Barriaux, Alcyon	0:30:45	1:00:28	1:30:19	2:00:04	2:29:36	3:01:01	3:30:20	3:59:30	4:36:30	5:10:52	5:40:53	Broke steering gear
Guyot, Picker-Guyot	2:21:56	2:53:25	3:24:10	3:54:39	4:25:06	4:55:36	5:31:14	6:32:30	Car took	fire		
Jaubert, Schneider	0:37:45	1:14:34	2:03:12	2:40:00	3:18:07	3:54:31	4:50:24	Broke di	stributer	driving c	hain	
Koecklin, Koecklin	0:39:37	1:15:34	Broke re	ar spring								
Thomas, Lion-Peugeot	0:28:51	Broken	valves an	d plugs								



Start of the fourth annual secret time sociability run for the "Syracuse Herald" trophy. C. B. Shaw won the run in a Buick

Speedway Races for 1913

May 30 and 31 Are Dates Set for 2-Day Meet—Entries Open January 1 and Close May 1

Entry Fee $500 for Long Distance Race, Which Will Probably Cover 500 Miles

INDIANAPOLIS, IND., Sept. 25—C. W. Sedwick, manager of the Indianapolis Speedway, has announced that a 2-day meet will be held on May 30 and 31. The first day's event will be a long race, in all probability 500 miles, while the second day's card will include a series of shorter races. For the long race the piston displacement will be fixed at a maximum of 450 cubic inches and the minimum weight at 1,600 pounds. Entries will open January 1 and close May 1. The entry fee for the long race is $500. For the latter race one of the requirements will be that the cars must be able to attain a speed of 75 miles an hour. A purse will be put up for the winner of the long race while on the second day, the prizes will probably include the Wheeler-Schebler trophy, the Prest-O-Lite trophy or the Remy brassard with its attendant salary of $75 per week.

Glidden Tour to Start October 14

On account of slowness in receiving entries for the National Reliability Tour of the American Automobile Association, the date of the start for the tour has been postponed until October 14, a week later than the original date. Announcement has been made by the A. A. A. that the reason for the slowness referred to is that many owners wished to compete with 1913 models and that deliveries of such have been slow.

The tour will cover 1,670.3 miles, commencing at Detroit and ending at New Orleans and will require 13 days of running.

Dawson Reinstated by A. A. A.

NEW YORK, Sept. 24—At the September meeting of the Contest Board of the Automobile Association held at headquarters yesterday Joseph Dawson, winner of the 500-mile Indianapolis speedway race, who was automatically disqualified as a registered driver for giving an exhibition at an unsanctioned meet at Memphis, Tenn., July 4, was reinstated, to take effect at once, as was his manager Shuart. Fred Radina, a Cino driver, was also reinstated. Applications for reinstatement from the Schacht Motor Car Company, Hugh B. Andrews and T. S. Duby, were rejected. The Cleveland agency of the Stutz was disqualified until January 1, 1913, for advertising the Stutz performance at Elgin as that of a stock car, when these races were non-stock. The records of Spencer Wishart in the 200-mile race at Columbus were accepted; the recent Brighton Beach records, timed by Warner timer, were accepted; and the recent track records at Cleveland, timed by the Baker electrical timer, were also accepted.

Minor Contest Items

As a test of reliable service the Long Island Automobile Club will conduct a century run October 5. Under the conditions the contesting cars must make five control points without allowing more than 15 seconds tolerance at any of the checking stations. They are approximately 20 miles apart and the whole course is exactly 100 miles. The aggregate running time for the 100 miles is 5 hours, or an average of 20 miles an hour.

The course is from the old Pettit Hotel, Jamaica, to the Mansion House, Roslyn; Grand Central Hotel, Hempstead, Creed avenue and Hempstead Turnpike and back to the starting point.

PITTSBURGH, Sept. 21—Four out of the six races run today on the Brunots Island track, near this city, were taken by Klinekars entered in the events by the manufacturer. The Kline drivers were Menker and Kerr. Menker drove the 6-60 Klinekar against Burman in the Ohio "999" and Horan in a Cutting, defeating both in the 5-mile free-for-all in 4:55, Horan dropping out of the race due to his running through a fence. Menker also won another 5-mile event in 4:58.06, while Kerr took the 5-mile free-for-all in a 4-40 Klinekar in 5:34. Burman and his Ohio were defeated in this event also.

ATLANTIC CITY, N. J., Sept. 21—Car No. 2, a Cadillac, Charles L. Martin driver; No. 36, a Pullman, C. Edward Firth; No. 25, Reo, David Cram, and No. 74, American, J. E. Mountain, captured the prizes awarded the four contestants finishing nearest a secret time schedule in the second annual sociability run of the

Lu Lu Temple Automobile Club from Philadelphia to the Hotel Strand, Atlantic City, today, seventy-four cars participating.

The official time designated for the 61 miles was 3 hours 13 minutes 30 seconds, and that competition was keen is indicated by the fact that all four winners finished 2 minutes or less from the mark. First prize winner's time was 3 hours 13 minutes 10 seconds; second, 3 hours 13 minutes 10 seconds; third, 3 hours 11 minutes 30 seconds, and fourth, 3 hours 13 minutes 25 seconds.

Although the weather was a trifle too cool for comfort, necessitating the wearing of heavy wraps, the South Jersey constables made it warm enough for many contestants before reaching the terminus of the run. These worthies made themselves more than usually bothersome to those participants in the run who were at all inclined to take improper advantage of the splendid roads of New Jersey.

Taken all in all, the run was a great success, not only as a competition, but also as a social event, the contestants especially enjoying the warmth and comfort at their destination after driving in the cold.

Syracuse Run a Success

SYRACUSE, N. Y., Sept. 23—The most successful automobile run ever held out of Syracuse, under the auspices of any organization, took place Saturday when 110 machines took part in the fourth annual sociability run for the handsome silver trophy cup offered by the Syracuse *Herald*. The small number of machines that turned out for the Watson Cup run of The Automobile Club, of Syracuse, this summer had led some to believe that public interest in runs was waning. However, today's fine showing proves two things: first, that motorists hereabout prefer the shorter runs, and second, that ideal weather and road conditions will bring them out.

C. B. Shaw's Buick, the winner, has the distinction of coming in within 23 seconds of the official time designated, this being 3:48:45 and known only to Mayor Edward Schoeneck. For this run of 60 miles, over beautiful country southwest of Syracuse, the secret time had been based generally upon both state and local speeding laws, and the times made showed that motorists had been studying these to a great extent.

MEMBERS of the St. Louis Automobile Club and a number of other St. Louis Motorists will take part in the Pilgrimage to the old home of Daniel Boone, at Mineola Springs, on September 26 and 27. A part of the road which leads to this historic old place is in bad condition and a number of state officials are working to have it put in first-class condition.

Milwaukee Postponed

Bad Condition of Course and Continued Inclement Weather Responsible for the Change of Schedule

Vanderbilt Now Set for October 2 with Small Car Races on October 3 and Grand Prix on October 5

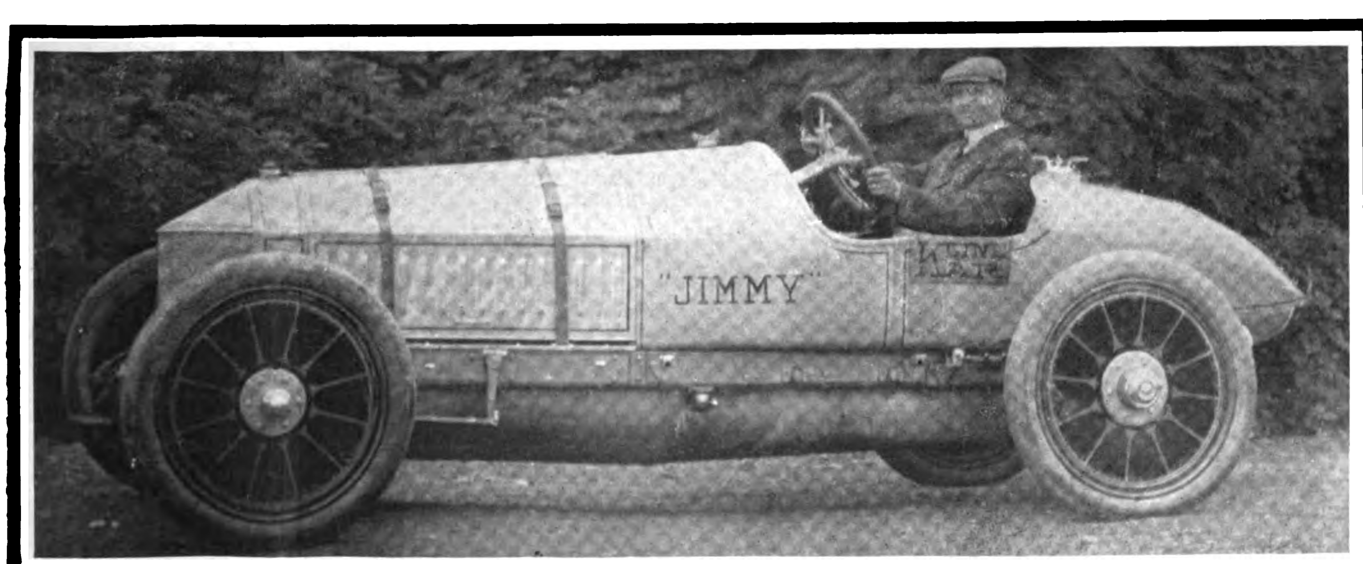
MILWAUKEE, Sept. 21—Bad course and inclement weather were responsible for the postponement of the race carnival, which was scheduled for September 20, 21 and 23, until the first week in October. As now arranged, the Vanderbilt Cup race will be staged Wednesday, October 2, followed by the two small car races, namely, the Pabst Blue Ribbon and the Wisconsin events on October 3, with the Grand Prix Saturday, October 5.

The week previous to the race week as scheduled was rainy, and this was of course a handicap to the road builders. On Friday, the race fans, drivers and all Milwaukee awoke to find an exceedingly threatening sky overhead and the disagreeable weather continued through Saturday.

Fully 40,000 tickets had been sold for the Vanderbilt Cup race, and these as well as those for the other 2 days' racing will be honored on their respective dates next month. No ticket money has been refunded.

All that is needed is warm sun for the coming week, and with continued work on those parts of the course which have proven to be soft, the road should be in fair shape by October 2. Considering that the course has been out of the road maker's care only a few days, and that there has been much rain lately, it is in as good condition, and even better, than should have been expected.

It is understood that the whole city of Milwaukee will combine with the M. A. D. A. to make the meet a big success when it is finally pulled off. All the various associations of the city will pull together, and with this increased interest, things should move along at a good clip. The hotel men's association, the Chamber of Commerce, the automobile club of the city have all joined hands with the parent organization. In fact Milwaukee has completely waked up, and has realized what it will mean to the city to carry the speed carnival off creditably, and all interests intend to see that such is the case.



James Kline, builder of the Klinekar, in one of his racers which starred at the Pittsburgh races last Saturday

Fire Chiefs See Motors

500 Department Heads at Denver Convention Look for Motorization of Their Equipment Throughout Land

Find That Economy, Reliability and Availability Under All Conditions Favor Automobile Against Horse

DENVER, COL., Sept. 23—Motor-driven fire-fighting equipment was the almost universal topic of discussion among the fire chiefs who met this week in Denver at the fortieth annual convention of the International Association of Fire Engineers. Of the eleven papers read and discussed at the meetings of the association, five dealt with motor-driven equipment, and none was more thoroughly discussed or listened to with greater attention than those on the subject of motors in the fire department service.

Among the subjects presented to the convention were papers on Tractors for Steam Fire Engines, Aerial Trucks and Water Towers, read by Chief Kenlon, of the New York fire department, and R. H. Bawker, chief of the department of Passaic, N. J.; Motor versus Horse-drawn Apparatus in Deep Snows, by Chief Smart, of Calgary, Can.; The Efficiency of the Motor Pumping Engine, by Geo. W. Boothe, chief engineer of the National Board of Fire Underwriters; and the Triple Combination Hose Wagon, Chemical and Pumping Engine, by F. J. Connery, chief of the Newcastle, Pa., fire department.

A canvass of the 500 fire chiefs gathered at Denver showed that practically every municipality of 10,000 inhabitants and over had one or more pieces of motor-driven equipment, and in some towns, notably Savannah, Ga., horses had been eliminated. Very few cities are there in which the chief's wagon is not a motor car, and usually the complete motorization of the department is only a matter of time after the advantages of motors over horses are demonstrated by the chief's own vehicle.

Speed Factor Is Important

Discussion of the advantages of the motor car over the horse-drawn wagon for the chief is hardly necessary. The foremost consideration is the speed with which it enables the head of the department to reach the scene of fire, have its seriousness gauged, his campaign planned, and be ready to give the necessary orders by the time the apparatus arrives. This is assuming that the motorization of the department has proceeded no farther than the chief's wagon. Where there are other pieces of motorized apparatus, a motor car for the man in command is an absolute necessity, otherwise he would be lagging so far behind his motor apparatus that his usefulness as a field commander would be seriously impaired. As to the actual speed, except on the very shortest runs, motorization of the chief's conveyance cuts in half the time required to reach the scene of battle. And this may be taken as generally true, that wherever the horse has been replaced by the motor in fire department service, the length of time to reach the fire from the station under average conditions is just about one-half of the time required for a similar piece of apparatus drawn by the four-legged tractor. What this means to a department at the early stages of fire when seconds mean thousands of dollars, or perhaps even human lives, needs no dilation here.

This average figure of twice the speed for the motor apparatus to that obtained by horse-drawn equipment is only for runs of medium length. In very short runs there is slight advantage in the point of time for the motors, but when the length of run approaches 1-2 mile or more, the motors gain more noticeably. In the case of very long runs, the motors show the most superiority, for they can maintain speed for the entire distance, whereas the horse driver must regulate his speed according to the distance. All in all, the advantage of the motor in the point of speed increases proportionately to the distance covered.

Very forcibly was this phase of the question presented to the chiefs at Denver on the evening of September 18 when an illuminated fire run was made.

Under average conditions, of load, distance streets and traffic, horse-drawn equipment can make from 10 to 15 miles per hour, while the motor-driven equipment under corresponding conditions can average between 20 and 30 miles per hour.

Figures for the cost of keeping a horse vary between $15 and $25 per month. Chief Kenlon, of New York, finds that the average cost to keep one horse 1 month in the fire department service of that city is approximately $20 per month. In this statement Chief Bawker, of Passaic, N. J., coincides, as do most of the others. Chief Kennedy, of Billings, Mont., finds that each horse costs him $17 per month; Chief Post, of Shelby, O., puts the figure at $19. San Francisco, St. Louis, Chicago, Los Angeles, Cleveland, Cincinnati, Boston, Savannah, New Orleans, Montreal—in fact all of the larger cities expend very close to $20 a month for each of their horses, so this figure can be taken as a good average.

Motor Apparatus Economical

Cost of maintenance of motor apparatus shows a wide variation. A chemical and hose combination costs Shelby, O., $2.60 per month for maintenance, including repairs, gasoline, oil, etc. The motor displaces two horses at $19 per month each or a total of $38 for the two. This represents a saving of $35.40 to the city per month, or over 90 per cent. T. F. Kennedy, chief of the Billings, Mont. department finds that triple combination displacing three horses costs $10 per month. The horses cost $17 each or $51 total per month, a saving through the motor of $41, or better than 80 per cent.

Savannah, Ga., a city of about 100,000 population, has effected a saving of $2,225.78 in 5 months by the use of its motor-driven equipment, according to Chief Ballantyne. This city is completely motorized. It has fourteen pieces, including two chief's cars. The pumps are all gasoline except three which are motorized steamers and are held as reserves. Chief Ballantyne states that the motor pumps save from three to four men, or rather make that many more available as fire fighters in each company.

Very naturally, one of the first developments in the way of the motorization of fire departments was the substitution of a gasoline tractor for horses, hitching the tractor to the same machine as the horses formerly pulled. This method of motorization has been successful, particularly with such heavy pieces as steam pumps, aerial ladders and water towers. New York is perhaps the leader in this method of motorizing, although some other towns are employing it. Passaic, N. J., is one of these and the chief of its fire department, R. H. Bawker, is authority for the statement that the cost of hauling the apparatus so equipped was one-tenth of he cost of hauling the same apparatus with horses. Chief Bawker states two tractors were purchased at the beginning of the year 1910 for pulling the hook and ladders. One is a 90-horsepower tractor which pulls an aerial truck having a 75-foot extension ladder and weighs 10 tons; the other is an 80-horsepower tractor pulling an ordinary city size truck. During the year ending May 30, 1912, the two tractors averaged a cost of $8.85 per month against the cost o $190.10 per month for horses on the same apparatus. These fig ures include gasoline, oil, and repairs of every description to the tractors, and the figures for the horses include feeding and shoeing, repairs to harness and veterinary fees.

Of even more importance than economy is the question of reliability. Chief Kenlon states that during the 6 months ending August 19, a motor-drawn steam fire engine has answered upwards of 500 calls, and in no case has it failed to reach the fire, in most cases in better time than the horses. On the strength of this performance the city of New York has just

(Concluded on page 643)

Autumn Care of the Car

At This Time of the Year Moist, Cold Days Affect the Finish If the Garage Is Not Adequately Heated

Vacuum Cleaner Is Excellent for Removing Dust and Dirt From the Interior of the Body

THE autumn months are always trying to the paint and finish and upholstery of the car. High winds, driving rains, muddy highways and abnormal road and weather conditions generally all conspire to viciously attack everything that makes the car beautiful. Decaying organic and other matter found in country and village highways mixed with the manifold soils are particularly destructive to varnish. Moreover, the car is more frequently and at longer periods exposed to beating storms, which exposure is harsh and unrelenting and blighting to the finish. These same untoward conditions are likewise detrimental to the upholstery, affecting its wear and color and general appearance.

No hard-and-fast rules need be written down to govern the care of the car during this period of weather extremes. Local conditions and circumstances must naturally to a certain extent be considered. However, this one general rule will apply to all classes of cars and to all sections of country, namely, frequent washing of the car with water robbed of its chill. At all events, wash the car immediately after a drive over muddy or wet streets and highways. Wet dust or mud are powerful absorbents, and acting on recently applied varnish, or upon varnish in the full flower of its luster, it will nip the gloss beyond any remedy other than revarnishing.

During the cold, moist days of autumn the car should have storage in quarters with sufficient prevailing warmth to dispel moisture. Moisture in any form except that applied through the process of washing is to a greater or less extent injurious to the finish or to the color under the protection of the finish. Moisture is a subtle medium, and it penetrates spaces often deemed impervious. When gaining a foothold under a body of paint its progress is certain, and the undoing of the finish is sure. It may not undermine the paint structure in a day or a night, and possibly not in months, but once seated it works persistently and with the certainty of fate. Garages and repositories are often inadequately heated during the cold months of the year. This is a bad practice, and to the car owner an expensive one. Other things being equal, the varnish will wear longer and maintain its luster more uniformly when given storage quarters uniformly warmed.

Water Baths Should Be Frequent

The top should at this period of the year receive constant attention, for now are the days of hard usage with days of improper storage. If, when exposed to stormy weather during road service, it is folded up immediately upon its return to storage quarters without drying off, and without the necessary cleaning operations, the top is sure to become very soon the shabbiest-looking part of the car.

Into a 12-quart pailful of tepid water whip enough Castile soap to create suds, and with a soft sponge clean off the accumulations and freshen up the enamel. This, in fact, is about all the treatment that the hand-buffed or the machine-buffed leather top should receive at any time so long as the enamel continues in good condition. Dry off the leather with a chamois skin. If the top is made of rubber, wash with the same weak soap solution, dry off, and, when the wear of the rubber has progressed sufficiently, apply a good, reliable dressing, preferably one bought ready for use.

If choice is made of a shop-prepared dressing, the following formula provides for a thoroughly reliable one: Of liquid asphaltum, one part; castor oil, three parts. Stir into the mass a bit of drop black to soften and increase the density of the color. Rub this on the top with a tuft of clean waste. Mohair tops will require a smart going over with a whisk broom. Pantasote may be sponged off and given a rub with some renovating medium to freshen the finish and keep it in presentable condition.

Ultimately, of course, the Pantasote will require something more substantial than a mere renovating, and when this stage of wear is reached, a thin coat of finishing varnish fully elastic, and thinned with turpentine, should be brushed on.

As a matter of general information for the car owner, it should be stated that all top dressings, renovators and the like should be put on sparingly. A thin, uniform application is more beneficial, invariably, than a heavy volume of material. All cloth linings for the top should get a systematic brushing out, and the leather furnishings likewise require attention. Clean white cotton waste will take up dust and dirt from the leather upholstery. To clean the parts around buttons and tufting, an oval chiseled sash tool, such as painters use in washing up work for varnishing, will be found effective. Carpets and other removable furnishings need to be taken out of the car often and put under the vacuum cleaner. Indeed, the vacuum cleaner under the right adjustment can be put inside the car and made to take out every atom of loose dust and dirt.

A car in constant use, and particularly during late summer and autumn, soon becomes unsanitary if left without regular cleaning work for the inside. With all dirt there is mixed more or less decaying matter, and this to make the car clean and wholesome should be taken out at the end of every run.

Top Should Not Be Folded When Wet

A good practice for removing dust from the outside of the body after a run is to go over the surface with a wool duster. For anything that sticks closer than dust, resort must be had to the water bath; and, in any event, this water bath, as already advised, should be often and generously given. With emphasis it needs repeating that under no circumstances, except those which for the present cannot possibly be surmounted, should mud be permitted to dry upon the finish of the car. When, unfortunately, this happens, a soft spray of water will loosen the earthy substance, and then under a gentle volume of water the surface will come forth clean and bright. Always dry the washed surface off with a clean, lint free chamois skin.

During the autumn months the surface, shorn of its high luster and perhaps a little parched from summer wear, will need, and should receive, the renewing effect of a first-class varnish polish and feeder. What the car owner requires of a varnish cleaner and polisher is that it is positively non-injurious to the finish.

Previous to using any cleaner and polisher the surface, if muddy or overcast with dirty accumulations, should be washed off with clean water.

The same practice applies to the chassis except that, after rinsing off the mud and dust from these parts, they should be coated over with kerosene oil, using a paint brush—a 6-0 oval bristle brush will serve the purpose completely—and then wiped dry with soft, clean waste. This sort of preliminary treatment will ordinarily suffice to clean up the chassis in good shape for the cleaner.

Automobile finishing varnish should possess a multiplicity of virtues chief among which is an elasticity sufficient to respond to all the demands made upon it through the oscillation and straining of the car. It should dry in a manner to be proof, so far as it is possible for the most perfect varnish to so prove itself, against a multitude of enemies. It should have a tough, durable surface, with a capacity to endure and hold itself intact and lustrous to the maximum limit, and it should have the property of being easily cleaned.

Interesting Mathematical Development of Surprising Theory on Countersprings Placed on Record Though with a Note of Disagreement—To Make Tires Hold Carbonic Gas—Some French and German Accessories

COUNTERSPRINGS in Theory and Fact—Matters relating to the spring suspension of motor vehicles form the subject of a widely diffused discussion in European technical publications at present. The use or non-use of spring moderators or shock absorbers interests some of the writers. The means for making a heavy motor truck run smoothly and without harmful vibrations though unloaded present a problem admittedly unsolved as yet. The influence of the spring suspension on the wear of tires and especially the means for obviating the extra wear of tires which is said to be due to the great weight of the parts which move up and down with the rear axle in all vehicles with shaft drive, whether the final driving element is a bevel or a worm gear, form divisions of the subject which engage the attention of the press, though so far, it seems, only with inconclusive results. The use of springs which act in a contrary sense to the action of the ordinary vehicle springs, and yet in conjunction with them, is one of the expedients on which both the theorists and the practicians disagree, though with a tendency to admitting that "there is something in them."

With regard to this expedient Mr. Contet, an engineer whose technical contributions on automobile subjects often scintillate with brilliant ideas, has advanced a startling theory in two issues of the most specifically technical French publication devoted to the construction of automobiles and aviation machines, and references to this theory as one now established are already noticed in articles by his *confrères*. His presentation of the subject is rendered in the following:

CONTET'S THEORY ON COUNTERSPRINGS

An expedient often employed to improve the suspension of automobiles consists in fitting the vehicle spring with a counterspring. The latter is a leaf spring, like the vehicle spring proper, but one whose flexure (or "open") is oppositely directed. This counterspring is then pressed down against the main leaf of the vehicle spring and is held in this position by clips or center bolt, so that the two springs now constitute a single spring in which the main leaf, which alone is formed with eyes for attachment to the vehicle frame, is held between two sets of leaves acting in opposite directions.

It has often been said that this system has no other effect than that of increasing the flexibility of the vehicle spring, since the counterspring acts in the same direction as the load. We shall show that this view is false and that this combination, far from increasing the flexibility, has on the contrary the effect of reducing it.

Let us consider two springs R and R_1, being respectively the vehicle spring and the counterspring. To facilitate matters, they may be supposed to be of the same length. Their ends coincide, their flexures f and f_1 are opposed, f being below the horizontal and f_1 above it. Their coefficients of flexibility are respectively y and y_1. United they form a new spring with a new flexure f_2 which is measured from the contact of the main leaves. Let us calculate this flexure f_2.

As understood, the flexibility of a spring is its deflection under a load of 100 kilograms. The deflection is proportionate to the load. [Hence 100 kilograms divided by y equals the load divided by the deflection.—Ed.]

As the spring R has been deflected f minus f_2 its load must be $100\,(f - f_2) \div y$.

The counterspring has been deflected f_1 plus f_2, and its load must be $100\,(f_1 + f_2) \div y_1$.

As the two springs are in equilibrium the loads which they support and which are due to their mutual reactions are consequently equal, and this fact may be written:

$$100\,(f - f_2) \div y = 100\,(f_1 + f_2) \div y_1$$

from which

$$(f - f_2)y_1 = (f_1 + f_2)y$$

By isolating f_2 we obtain

$$f_2 = (fy_1 - f_1y) \div (y + y_1)$$

The two springs thus constitute a new spring having the flexure ("open") f_2 of the value expressed in this equation.

Now let us seek to calculate the total flexibility Y of this new spring. To this end let us load it with a weight P and let us find what deflection this weight causes. Let f_4 be the new flexure which the spring takes under the action of this weight P.

The load of the main vehicle spring in the combination under the deflection f minus f_4 must be $100\,(f - f_4) \div y$.

On the other hand, the counterspring which presents the same flexure f_4 must be under the load $100\,(f_1 - f_4) \div y_1$.

Further, the combination of the two springs is in equilibrium under the action of the load (or tension) of the vehicle spring proper on one side and of the weight P plus the tension of the counterspring on the other side; for the spring is balanced between these forces. We therefore have the equation

$$100\,(f - f_4) \div y = P + 100\,(f_1 - f_4) \div y_1.$$

Assuming that P equals 100 kilograms, the deflection of the whole spring must then measure its flexibility.

The equation under this assumption is written

$$100\,(f - f_4) \div y = 100 + 100\,(f_1 - f_4) \div y_1$$

and from this we derive

$$(f - f_4) \div y = 1 + (f_1 - f_4) \div y_1$$

By multiplying the two sides of the equation by yy_1 (which is larger than 0) we get

$$(f - f_4)y_1 = yy_1 + (f_1 - f_4)y.$$

From this again

$$f_4\,(y + y_1) = fy_1 - f_1y - yy_1$$

and finally

$$f_4 = (fy_1 - f_1y - yy_1) \div (y + y_1).$$

As, further, the deflection of the complete spring due to the imposition of the weight of 100 kilograms is $f_2 - f_4$, and this deflection represents the coefficient of flexibility Y, we have, by going back to the value given above for f_2,

$$Y = f_2 - f_4 = (fy_1 - f_1y_1) \div (y + y_1) - (fy_1 - f_1y - yy_1) \div (y + y_1)$$

and by developing and simplifying this equation we get

$$Y = yy_1 \div (y + y_1).$$

This result is remarkable, since f and f_1 have disappeared, showing that the original "opens" of the vehicle spring and of the counterspring are of no consequence. The flexibility of the compounded spring depends absolutely upon the respective flexibilities of the two springs only.

Considering the value for Y, namely $Y = yy_1 \div (y + y_1)$, we see that, as y and y_1 are both positive, the fraction $y_1 \div (y + y_1)$ is smaller than unity and that consequently Y, which equals this fraction multiplied by y, is smaller than y.

The addition of a counterspring, far from increasing the flexibility of the ordinary vehicle spring, has thus, on the contrary, reduced it. And this fact is well known by the makers of these springs; for, when they remodel a vehicle suspension by adding countersprings they are very careful to increase the flexibility of the original springs, either by grinding down the leaves or reducing their number, so that the compound spring may be as flexible as the original spring. Without this precaution the addition of the counterspring would have for its first result a considerable stiffening of the suspension.

We can on this subject make even another curious observation. Supposing that in the value of Y, which measures the flexibility of the compounded spring, y and y_1 are equal; in other words, that the flexibility of the two springs is the same and that the springs are identical, in fact, we shall then have it that

$$Y = y^2 \div 2y = y \div 2.$$

Hence, if two identical springs of opposite flexure are mounted together on the counterspring plan, the flexibility of the combination is one-half of the flexibility of each of its constituents. If instead of placing these two springs in opposition we had placed them side by side, while having them support the same load, the result would have been the same. The flexibility of the combination would have been one-half of that of each of the springs. Identical results are thus reached by contrary expedients.

And if, on the other hand, our two springs had been combined in the shape of a full-elliptic, the total flexibility would have been twice that of each of the two springs, as well understood. By change in the manner of mounting the two springs, it is seen, absolutely different results are obtained.

Since now this is so; since the combination with a counterspring reduces flexibility instead of increasing it, where does then the improvement in vehicle suspension come from which has been ascertained as a result of this combination, provided, that is to say, that the flexibility of the compounded spring has first been reduced to what it ought to be?—From *La Technique Automobile et Aérienne,* July 15 and August 15.

A HITCH IN THE ABOVE MATHEMATICS

[Closing his argument with this question Mr. Contet has completely stated his new theory, and it does not seem to have been disputed as yet. Unless one's faith in mathematics includes faith in the mathematician, however, the theory must be hard to accept. The mere fact that the tension of the counterspring is high when that of the main spring is low, and *vice versa,* makes it appear peculiar that a definite value for Y can be found expressed in y and y_1 alone, these being both constants, while at least two variables ought to enter. One is tempted to look for a flaw in the mathematics. Astonishment begins where it is proposed to calculate the total flexibility of the new spring. Then comes the sentence: "On the other hand, the counterspring which presents the same flexure f_4 must be under the load $100 (f_1 - f_4) \div y_1$."

Exception may be taken to this. The flexure of the counterspring is not f_4 but $f_1 + f_4$, since this is the distance from its position of equilibrium, and thus its load or tension becomes $100 (f_1 - (f_1 + f_4)) \div y_1$, equalling the negative value of $100 (-f_4) \div y_1$ which is also more plausible than the value given by Mr. Contet, since the tension on the counterspring works in the opposite direction of that caused by the load P to which the whole spring is supposed to be subjected. By inserting this corrected value in the subsequent equation one gets

$$100 (f - f_4) \div y = (P - 100 f_4) \div y_1$$

and by insertion of the value of 100 kilograms for P

$$(f - f_4) \div y = (1 - f_4) \div y_1$$

and the value for f_4 is found to be $y_1 (y - f) \div (y - y_1)$, in which f_1 but not f is eliminated. Continuing with this value on the plan followed by Mr. Contet, the value of Y, which with a load on the spring of 100 kilograms equals $f_2 - f_4$, is now found to be

$$Y = (fy_1 - f_1 y) \div (y + y_1) - y_1 (y - f) \div (y - y_1)$$

Possibly this equation may be simplified, but the variables remain in it, and it does not seem to support the otherwise so delightfully simple new theory.

In continuing his exposition of the qualities of a spring compounded with a counterspring, Mr. Contet dwells upon the action of the counterspring to moderate the strain of rebounds which in ordinary springs must be borne by the main leaf alone (an effect which may be obtained less perfectly by clipping one or more of the short leaves, near their ends, to the main leaf); upon the tendency of the counterspring to break up periodic oscillations of the main spring; upon the increased friction between the spring leaves which has the same effect as a shock-absorber working by progressive friction, and finally upon those ruptures of the main leaf which have taken place when countersprings were employed and which he ascribes to the extra load placed upon the main leaf by the pressure of the counterspring, causing it to work nearer to its elastic limit, as indeed it would if the practice of paring down the main spring when a counterspring is applied actually obtains.—ED.]

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NEW French Accessories—The combination of a gasoline filter and a secret gasoline lock is brought out under the name Vivax. It is intended to be secured to the outside of one of the frame reaches. Referring to the accompanying illustration, Fig. 1, the pipe from the gasoline tank is screwed on at A and the pipe to the carbureter at B. P is the filter through which the fuel must rise and to get to this filter it must pass through the opening L. Two slits M and N in the tubes D and F must register with L to make the latter opening accessible. Their positions are controlled by the disks E and G, upon whose circumferences the rings I and K are mounted secured by screws, and these rings are engraved with letters. With 15 letters on each ring only one out of 225 possible combinations in the positions of the two rings opens the lock for the flow of gasoline. The combination may be changed by turning one or both of the rings on their respective disks and securing them in new positions by means of the two screws and various threaded holes provided for this purpose in the disks. H is a stuffing box nut, also serving to hold the two tubular keys in their longitudinal alignment. The leaf spring J acting on the knurled edges of the lettered rings prevents accidental displacement, and the bolt holding it in place acts as a stopper in the drain through which accumulated impurities may be removed. The most obvious objection to the scheme of the device seems to be the ease with which the combination may be detected whenever the car is in operation, unless the driver gives it a twist at every trifling stop.

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A simple device for telling the content of a gasoline tank consists in a split tube made in two parts hinged together and pro-

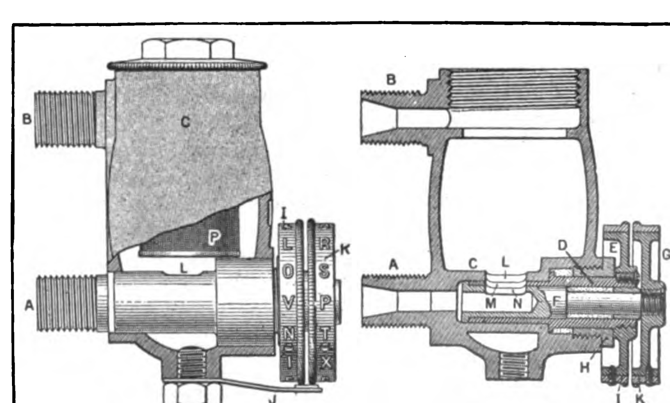

Fig. 1—Combination gasoline lock and filter

vided with a spring which tends to close the slit formed between its free edges. A float inside of the tube prevents the edges from meeting, however. When the tube is to be inserted in the gasoline tank to measure its content, the spring is compressed by means of a push button at the top of the tube, and the expansion of the tube releases the float, which drops to the bottom, where it is stopped by a lid secured to one of the tube parts. Upon insertion of the tube in the fluid, the float rises to the level of the latter and, when the spring is now released, it is held between the two tube-halves in the position given it. To make the instrument available it must, of course, be known to what content a given level of the gasoline corresponds.

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As fire insurance for automobiles is expensive and in some cases hedged with doubts, and as prevention at all events is preferable to cure, a suitable portable fire extinguisher has for a long time been considered an accessory which would meet the wishes of many prudent owners of cars. But the ordinary fire extinguisher, as used in buildings, is usually made of frail material, contains sulphuric acid and depends upon the mixing of two substances for the developing of fire-quenching gases. Most of all, it cannot be safely exposed to the shaking it would receive in a moving car. The Petrolex extinguisher devised in France consists in a metal bottle containing the active fluid ready for its work, and to the top of this bottle is screwed a faucet in which a conical valve with lateral ports opens an exit for this fluid through the faucet spout and at the same time brings pressure upon it by opening a channel connecting the interior of the bottle with the interior of a Sparklet phial secured to the top of the faucet. The Sparklet phial contains liquid carbonic acid gas and is of the same kind as those used for tire inflation.—From *Omnia*, Aug. 31.

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TIRES and Carbonic Gas—New light has been shed upon the question whether pneumatic tires may be inflated with carbonic acid gas—from a small bottle containing this gas in liquid form—without injury to the tire or risk of finding it deflated in short order by leakage. Laboratory experiments of older date on the diffusion of carbon dioxide through sheet rubber left the practical question in doubt, but recent tests by F. Steinitzer which are recorded in *Gummi Zeitung* this year are more nearly conclusive. A solution of 10 to 15 parts of glycerine and 20 parts of glue in 100 parts of water is recommended for producing a gas-tight coating on the inner surfaces of tire tubes. The tests related partly to the absorption of carbon dioxide by rubber and partly to the passage of the gas through rubber membranes, and it was found that different grades of rubber behaved very differently. As a rule, the purer grades absorbed much more of the gas than the mixed ones. The former became more or less tacky and lost from 12.6 to 27.5 per cent. of their tensile strength by exposure to the gas for a period of 5 to 8 days under a pressure ranging from 1 to 1.5 kilogram per square centimeter.

Where rubber washers are used to help in confining carbon dioxide their absorbent properties toward the gas are, on the other hand, found advantageous. P. Phillips reports in the other hand, found advantageous.

In the Steinitzer tests for diffusion through tire tubes the pressure used was 1 kilogram per square centimeter. Some time passed in all cases before diffusion began, after which it continued for 10 days with only slight abatement in the rate. As the samples varied not only in quality, but also in thickness the results are somewhat confused, not showing clearly whether the rate of diffusion is due to one or the other factor. A gray inner tube of poor quality and only 1.75 millimeter thick lost 4.90 cubic centimeters of gas in 36 hours through a surface of 22.3 square centimeters. The rubber in it had an admixture of 58 per cent. of mineral matter. A good black tube, 1.90 millimeters thick and containing 18 per cent. of mineral matter, lost 6.99 cubic centimeters. A good red tube, 2.15 millimeters thick and with 38 per cent. of mineral matter, lost 2.07 cubic centimeters, and a Best Para with only 12 per cent. admixture and 4.17 millimeters thick lost nearly as much, viz., 1.90 cubic centimeters. The time of exposure and the area tested were alike in all cases. Higher temperatures increased the diffusion.—From *Engineering*, September 6.

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GAS Regulation Without Moving Parts—The German-made Marvel carbureter is characterized (1) by having no adjustment of the air openings leading to the atmosphere, (2) by having a lining—24 in the illustration, Fig. 2—in the air channel surrounding the concentric nozzles, the thickness of which is varied according to the requirements of each motor, but not subject to adjustment after once fitted, and (3) by having the bottom entrance 9 to the outer annular nozzle 10 so subdivided and reduced that capillary effects retard the discharge from this nozzle when the discharge from the central nozzle tends toward its maximum by reason of high motor speed. By means of the latter provision the incoming air when moving at its highest velocity draws less gasoline than it would under ordinary circumstances, and thus the same result is attained as by automatic regulation of the air supply in other carbureters. The accelerator acts upon the rotary valve 15, which is shown in the illustration adjusted for starting the motor or runnning it idle. At this adjustment the mixture is drawn into the induction manifold through the small opening at 17 only, and the opening around the nozzle 8 is also contracted to a minimum, which is subject, however, to regulation by means of the screw 18. Even slow cranking draws air at high velocity through these small openings and therefore a rich mixture. A number of small holes, 11 and 12 in the drawing, are bored through the wall of the outer nozzle 10, 1 to 2 millimeters above the level of its fuel content. When the motor is sped up by turning the rotary valve, the first effect is to draw strongly from both nozzles, which makes the motor responsive, but at increasing motor speed the fuel in the outer nozzle falls to a lower level because the calibrated bottom entrance channels to this nozzle will not feed the fuel as fast as the holes at the top will discharge it, and then the central nozzle is functioning practically unaided. But at a reduction of the motor speed the fuel level rises again in the outer nozzle and it resumes its part in the action. The arrangement is plainly empiric and its efficacy must depend largely on preserving the capillary channels at 9 unclogged. In accordance herewith it is noticed that the gasoline enters the float chamber through what seems to be a triple metal gauze filter, marked 32, 33 and 34—From *Automobil-Welt*, September 1.

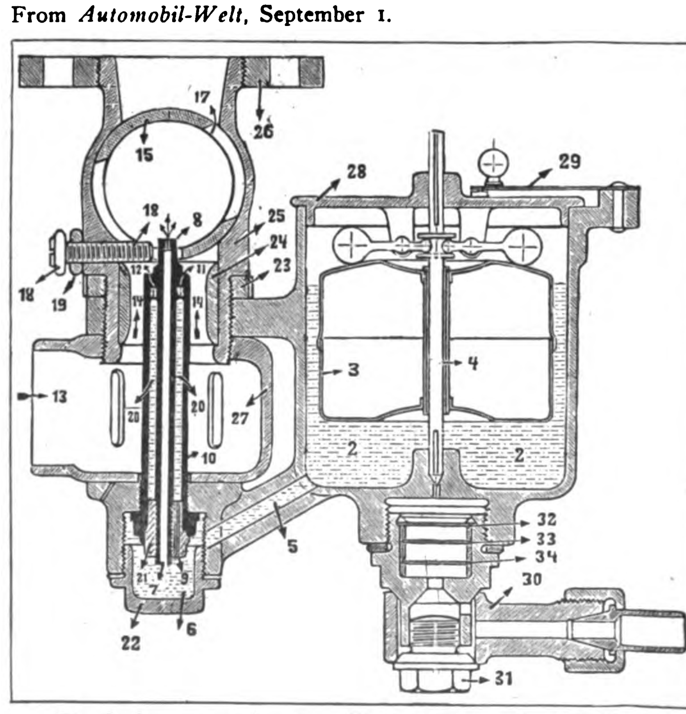

Fig. 2—German carbureter with automatic fuel regulation

Among the New Books

Recently Issued Works of Interest to the Car Builder—Deal with Grinding Work and the Principles of Efficiency

Rubber Trade Directory of the World Should Appeal to Tire and Accessory Manufacturers

IN the following book reviews, which are of interest principally to the manufacturers and students of the automobile, an outline of the contents is given together with remarks intended to bring out the value of the work and for whom it is particularly intended. Covering a broad field of allied industries as the automobile does, the books which are of interest to the automobile manufacturer as well as to the driver embrace nearly every field of science and research work. A few volumes which have recently appeared are reviewed below.

American Machinist Grinding Book, by Fred H. Colvin, Associate Editor, American Machinist, associate author of American Machinists' Handbook, etc., and Frank A. Stanley, Associate Editor, American Machinist, associate author of American Machinists' Handbook, etc. Published by McGraw-Hill Book Company, New York, 383 pages, 6 by 9 inches, with nearly 300 line cuts and engravings. Price, $3 net.

A compilation of data on a given subject by two men whose daily work brings them into contact with the subject-matter is bound to be of value where the work is carefully done. This seems to be the case in the American Machinist Grinding Book and the critical faculties of the authors give the volume an added value. The early chapters of the work are devoted to a description of the different types of grinding machines. These machines are profusely illustrated and the particular field for which each one is adapted is outlined. The machines are divided in to five groups. The first are intended for grinding cylindrical and conical surfaces; the second for plane surfaces and the third for cutters, tools and drills. The fourth and fifth include special portable apparatus. These are taken up and discussed at length and a clear insight into each is given. The remainder of the work is devoted to the actual work of grinding and many valuable kink will be found within its pages.

The Twelve Principles of Efficiency, by Harrington Emerson. Published by The Engineering Magazine and copyrighted by John R. Dunlap, New York City. 423 pages, 4½ by 7½ inches, with diagrams. Cloth, $2.

An organization with clearly defined ideals, governed with common sense, aided by competent counsel, discipline of its units, fair dealings to others as well as to itself, maintaining reliable, adequate and permanent records, adherence to schedule, standardized conditions throughout and rewarding the efficient employees by direct compensation, will represent the modern idea of efficiency and system. The author makes each of the qualities of success which are outlined above the subject of an essay, citing facts and figures to further illuminate the points which are to be driven home. The perusal of this work is a study which cannot but be of benefit to any reader. Although one might not agree with the author in many of the minor points of the work where he seems to depart from the main issue, the book, taken as a whole, is filled with useful facts.

The Young Electrician, by Hammond Hall, second edition, published by the MacMillan Company, New York City, 289 pages, 5 by 7 1-2, with numerous illustrations. Price $1.50.

Having no higher pretentions than the amusement of boys and at the same time presenting the subject in such a simple and interesting manner that the elementary principles of electric phenomena are readily grasped, this work should be a welcome addition to any boy's library. The first chapter tells of the early history of electricity, going back as far as the origin of the name, tracing it to Elekton the sun-god whose daughters wept themselves into poplar trees from which every year flowed amber which is possessed of electric qualities. Many other interesting legends are distributed throughout the book, giving an added interest to the phenomena which are described. Various electric machines and the methods by which boys can readily make them are also taken up, while a chapter on wireless telegraphy gives an insight into the fundamental principles of this important invention. It is not intended as a text book.

Rubber Trade Directory of the World, compiled by the *India Rubber World* and published by the India Rubber Publishing Company, New York City. 314 pages, 6 by 9 inches. Cloth, $3.50.

This work is intended to place at the disposal of buyers for the home or export trade, full lists of the manufacturers of rubber goods in every country of the world, although special prominence is given to those of the United States and Canada. The directory should also interest manufacturers as it gives a list of makers of compounding ingredients and also the manufacturers of machinery used in the rubber industry. It also contains a mass of valuable data on the trademarks now adopted in the various branches of the rubber industry in the United States and Canada together with a chapter on trademark legislation.

Harking Back a Decade

FROM *The Automobile and Motor Review*, September 20, 1902:

For several years past the governments of France, England and Germany have been deeply interested in the testing and improving of all types of motor cars with a view to their use in field service. Touring cars are used for following the great annual army maneuvers and carrying dispatches and heavy tractors are being tested with a view toward their ultimate utilization for moving troops, stores and ammunition.

The Standard Oil Company has put into effect a new schedule of gasoline prices, the 76-degree grade being quoted at 14 1-2 cents a gallon in barrels, including both barrels and cartage f.o.b. New York. A rebate is made to dealers of 95 cents for each barrel returned, which amounts to about 2 cents per gallon. The company declares that the amount of gasoline used for automobile fuel is trifling compared with the commercial demand. Stove gasoline is 11 1-2 cents a gallon net, under the same conditions.

The use of the motor car by commercial travelers is still in its infancy, but there is no question that it will in time largely supplement the railways for this class of work. The small car having about 6 horsepower and weighing about 600 pounds is being introduced into this field with much success where it is necessary to cover territory not thoroughly served by railroads.

The committee in charge of the A. C. A. Reliability Tour from New York to Boston and return has issued its preliminary road charts giving a description of the itinerary to be followed. There are thirty entries already for the run, which is scheduled to start October 9. The total distance to be covered is 488.4 miles.

William K. Vanderbilt lost one of his front teeth during the running of the recent Paris-Vienna race. Mr. Vanderbilt was moving along at 65 miles an hour when a stone thrown up by another car struck him in the face and knocked out the tooth.

During the calendar year of 1900 the American production of automobiles totaled 4,192 cars, according to the last report of the Census Bureau. These were manufactured in 109 factories and the value of the product was placed at $4,899,443. Of the aggregate number made, those designated as gasoline cars were 936.

The Winton Bullet broke the 10-mile track record at the race meeting held in Cleveland September 16. The time made by the Bullet was 10:50 for the distance.

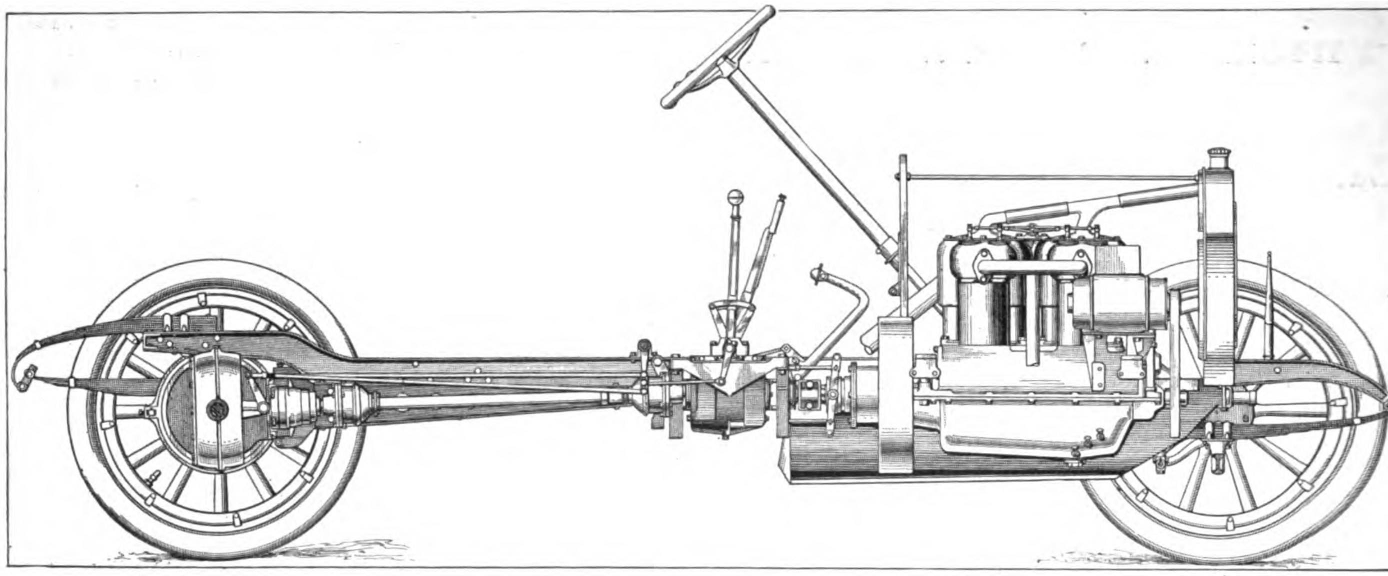

Fig. 1—Moon four-cylinder model 48 chassis showing arrangement of drive and control used on all three models

Moon Adds a Six to Its Line for 1913

Three Models Fitted with Electric Starting and Lighting Equipment to Be Placed on the Market for the Coming Season—Left Side Steering and Center Control a Feature—Mechanical Changes Few

AN entirely new departure for Moon practice is the building of a six-cylinder car. The motor of this type which will be marketed by this firm during the season of 1913 will be rated at 65 horsepower, it will be electrically started and will have an electric lighting equipment. It will have no crank attached to the front of the car. This latter feature will be common to all Moon cars for the coming season as will left-side drive and center control. There will be no difference in the mechanical details of the four-cylinder models, while the six will be a larger edition of the four-cylinder for last season.

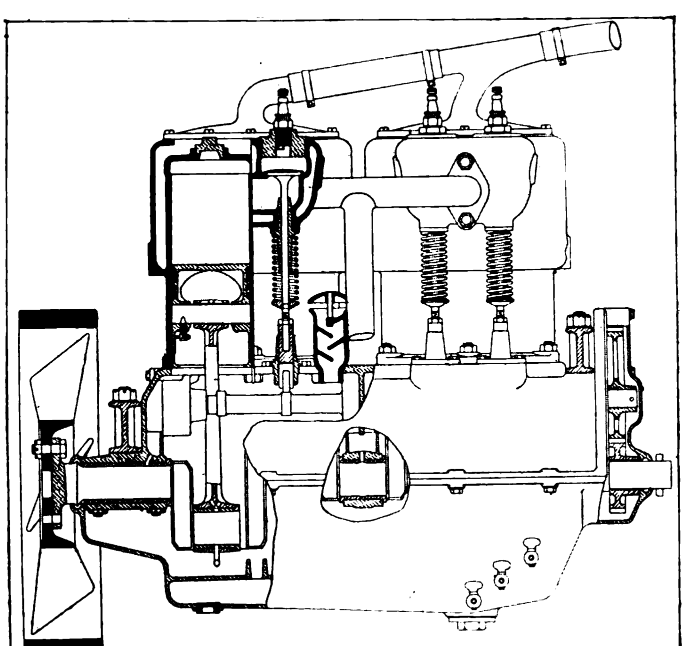

Fig. 2—Partial longitudinal section through model 39 motor

The Moon motors are all of the T-head type with the cylinders cast in pairs. The bore and stroke of the three models are as follows:

Model	Bore	Stroke	Horsepower
65	4 inches	5½ inches	65
39	4 inches	5¼ inches	39
48	4½ inches	5 inches	48

These horsepowers are all developed at 1,500 revolutions per minute and are determined by the brake test. It will be seen that the models are named after the motors' brake horsepower.

The valves are 2 inches in diameter and have a lift of 3-8 inch. This allows for a rapid entrance and escapement of the gases, even when the motor is turning over at low speeds. The valves are of the regular 45-degree poppet type and are made in one piece of chrome nickel steel. They work on a cast-iron seating. The valve tappets and cam followers are of roller type. The roller followers are made as large in diameter as possible to eliminate wear to the greatest possible extent, both on the cams and on the followers themselves. Wear is also kept down at this point owing to the fact that the cams receive a liberal supply of oil through the oiling system of the car. The tappets and valve stem guides are bushed with phosphor bronze, giving hard and durable bearings with very good frictional qualities. The adjustment feature of the valve stems is the same as that common to most modern cars. Turning a nut on the valve stem just above the tappet guide will take up the wear resulting from actual contact as well as for the drop of the valve after grinding. Silence in the valve action is secured by a solid aluminum cover plate which incloses the entire action.

The pistons in all the motors are of gray iron. They have four rings, all mounted at the top of the piston above the wrist-pin. The wristpins are set near the top and the pistons in all models are made long. The wristpins are hollow and run in bronze bushings. The latter are lubricated by oil forced through them. The pistons are all interchangeable, being made on automatic piston machines which turn them out in quantities. The wristpins are held solidly in position by a stud bolt fastened by a clip against the wall of the piston. They are thus prevented from working loose under running stresses.

Connecting-rods of I-beam are employed in all models. They are drop forged and bushed with Parsons white bronze bearing metal. The connecting-rod lower bearing caps are exceptionally strong and heavy and are held in place by four bolts. The diameter of the lower connecting-rod bearings is 1 3-4 inches.

The crankshaft of the Moon motor is 1 3-4 inches in diameter; it is of solid steel heat-treated, with the flywheel flange made integrally. In the four-cylinder models the total length of the main bearings is 11 1-4 inches. There are three main bearings in the four-cylinder models and four in the six-cylinder. These are supported by bridges in the upper half of the crankcase, the lower half being independent of the bearings and removable without disturbing the crankshaft. The grinding work on this part of the motor has a very small limit of tolerance, accuracy within .0005 inch being required by the inspection department. There is no key in connection with the crankshaft to the flywheel, the integral flange and the large bolts forming the only means of connection.

The camshaft and its connections are all one piece. This includes the shaft itself, the oil pump gear and the cams. This piece of metal is a drop forging given a double heat treatment under a secret process. The unit construction is more expensive, but the advantage claimed is greater silence owing to the impossibility of parts working loose. The camshafts are driven by a spiral gear train so designed that there are always three teeth in mesh. Lost motion is eliminated in this construction and exceptionally noiseless running assured. The load is distributed between the three teeth and the wear on the gears correspondingly lessened. The limit of tolerance on the gears is as small as that on the crankshaft. The final grinding in order to pass the inspection department must be within .0005 in. The lubrication of the gears is taken care of by the general lubrication system of the car.

The cooling system is taken care of by a circulating pump mounted on the left side of the motor. The waterjackets are of large size and a honeycomb radiator is used. Two features of the waterjackets are worthy of note, that is, the uniform thickness of the walls throughout, which will prevent internal strains due to the unequal expansion of the metal, and the extension of the waterjackets around the valve chambers. Owing to the T-head construction, it is possible to extend the waterjacket entirely around each valve and this has been done in the Moon motors. A drain cock placed on the bottom of the radiator is located at the lowest point of the cooling system and by opening this it is possible to remove all the water in the entire cooling system.

Lubrication of the Moon cars is accomplished in the same manner in the latest models as has been used in the Moon line for the past 6 years. The system is a combination of the force-

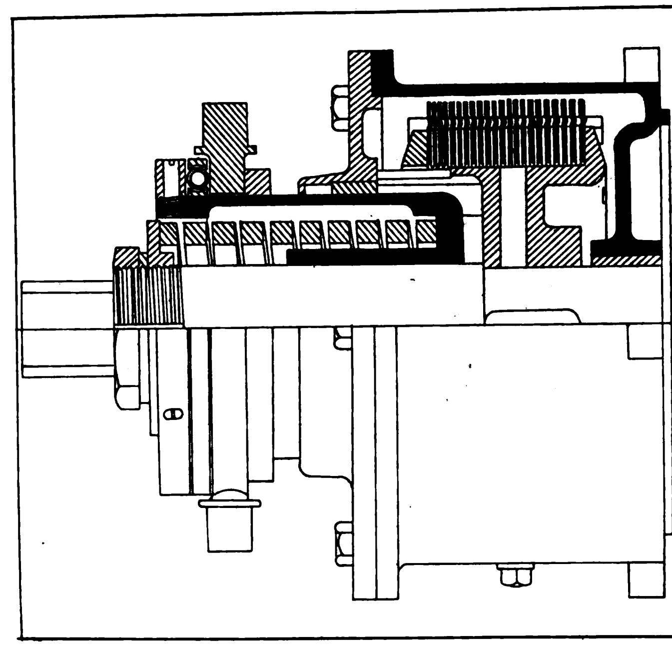

Fig. 3—View of clutch, showing spring, disks and housing

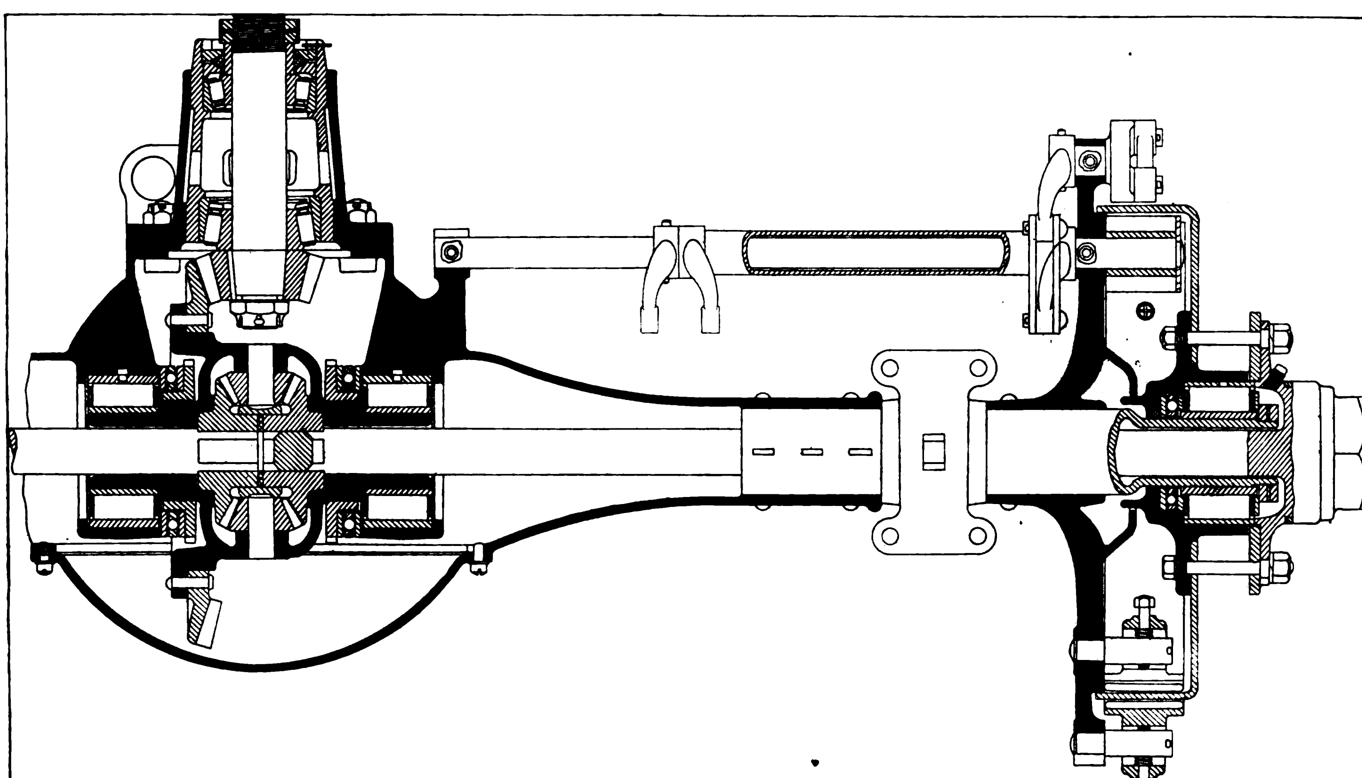

Fig. 4—Horizontal section through the rear axle. Note special Moon mounting of brake rod and ball and roller bearings in differential

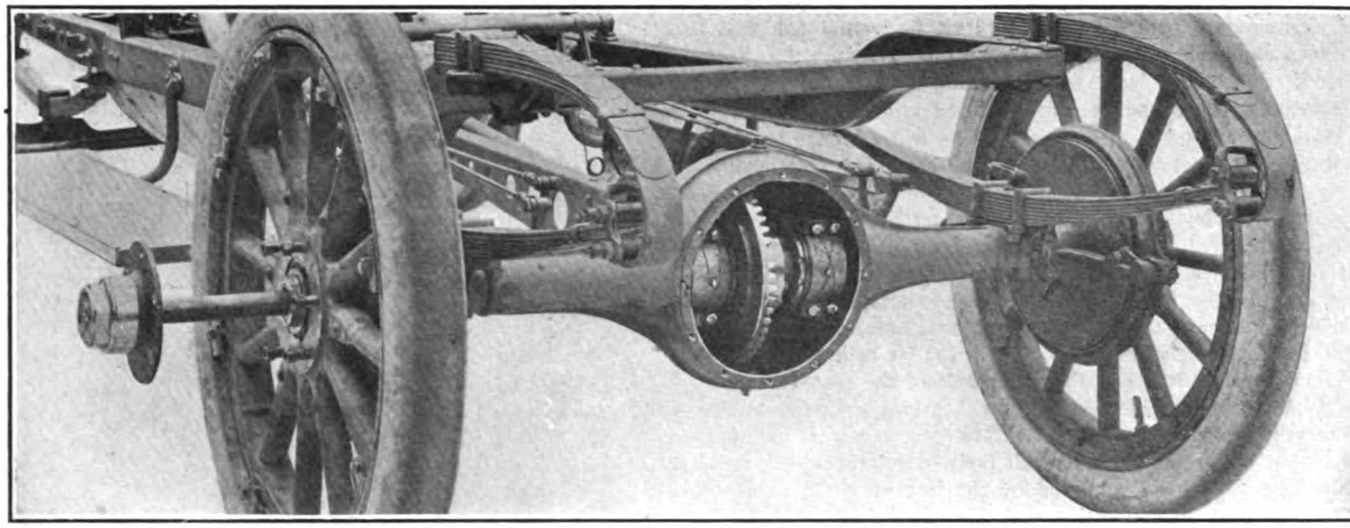

Fig. 5—Rear construction of the Moon 1913 rear construction showing torque member and differential

feed and splash systems. The oil is carried in the lower part of the crankcase. From the reservoir it is lifted by a circulating pump of the gear type driven by a vertical shaft from the exhaust camshaft. The oil is first led through a copper lead to a sight feed on the dash. All the oil passing through the lubrication system first passes through the sight feed so the driver is always aware of the quantity of the supply as well as the quality, for the oil turns to a dirty, brown color after it has been used too long in the crankcase and the observer can readily determine when the supply should be renewed. After leaving the sight feed on the dash the oil is led through independent leads to each main bearing. This assures the lubrication of these bearings immediately after the motor is started. After leaving the main bearings, the oil takes its course to the splash troughs in the crankcase just above the part that contains the oil. The troughs are separated from the oil reservoir by a horizontal partition which supports them. This partition is pierced by overflow holes to which the oil finds its way through standpipes so arranged that the overflow will not take place until after the oil has reached its proper level.

Lubrication of all the internal bearing surfaces of the motor, including pistons, connecting-rod bearings, camshafts, timing gears, etc., is taken care of by the splash of the connecting-rods in the pools of oil contained in the splash troughs. As the speed of the motor increases, the supply of oil is augmented in two ways. In the first place, the gear pump is driven at a higher rate of speed and thus furnishes a greater supply of oil to the main bearings and to the splash troughs and, in the second place, the connecting-rods will be moving more rapidly and the individual splashes into the oil pools will occur at lesser intervals. There are no adjustments necessary to the oiling system except that once a month the oil should be drained from the crankcase and a fresh supply put in. This is accomplished by means of a large drain plug located at the bottom of the crankcase. It is possible to tell very closely at any time the level of the oil in the crankcase by the three pet-cocks which are shown along with other details of the oiling system in Fig. 2. The first, or upper, cock should be opened. If there is no oil flow from here the others should be tried. The lowest cock is the danger point. If there is no flow from this cock the oil has reached a level which is unsafe for the proper lubrication of the car. The oil is poured into the crankcase reservoir through the large breather pipe located on the right side of the motor.

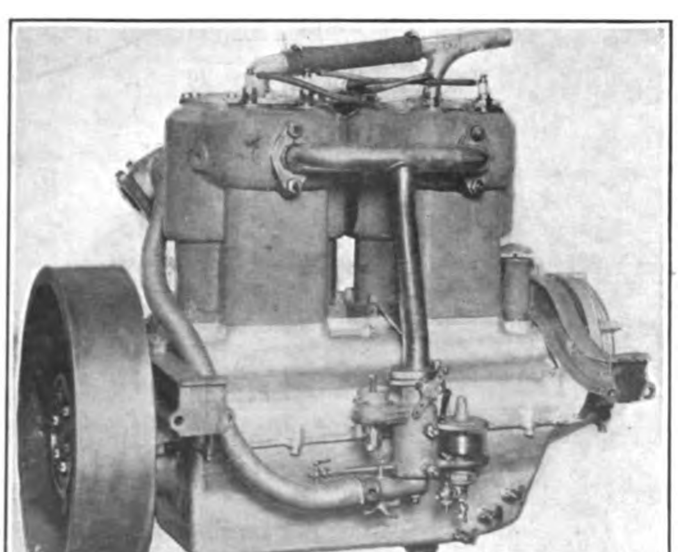

Fig. 6—Intake side of the Moon model 39 motor

The carbureter used with the 1913 Moon cars is the latest type Stromberg. This carbureter has independent adjustments for low and high speed and is hot-waterjacketed. Another feature of the carbureter is the hot air intake which allows the carbureter to draw in air which has been heated by the exhaust pipe, thereby eliminating to a large extent carburation difficulties in cold weather.

The electrical equipment of the car is in two independent parts. The two systems are the ignition outfit and the starting and lighting attachments. The former is the standard Bosch high-tension dual system. It is entirely independent of the starting and lighting systems, of which a short description follows:

The starter is built by the Wagner Electric Company, of St. Louis, and is known as the Moon-Wagner system. The system consists of a six-cell storage battery which are so arranged that the same electrical connections serve for charging as for discharging, that is, it is not necessary to connect the batteries in series for discharging and in multiple series for charging. The starting is effected by a motor weighing 60 pounds which is geared to the flywheel of the motor. When a button is pushed the current from the six-cell storage battery starts the electric motor and turns over the engine until it picks up speed under its own power. The motor is then automatically disengaged from the flywheel and after the car has reached a speed of approximately 8 miles an hour, the electric motor, which now acts as a generator, commences to recharge the storage battery. In a very short distance the storage battery is again stored up to its capacity. The batteries in this system are entirely self-regulating. There are no voltmeters nor ammeters to watch. The motor generator and its connections can be taken off the car by the removal of three bolts.

The multiple-disk clutch is shown in Fig. 3. The spring is of very generous dimensions, large in diameter and of square section. As may be seen, it is adjustable for tension by turning the nut on the end of the spindle. A ball thrust bearing is mounted at the end of the clutch shaft. The plates are of saw steel. There are twenty-three altogether and they are securely housed in a solid casing which is independent of the crankcase of the motor.

The gearset is of the three-speed type mounted throughout on annular ball bearings. The shafts are splined and the entire case is mounted in a solid aluminum casing. The use of aluminum throughout the Moon car wherever possible is intended to give as light a construction as possible and through the fact that aluminum is, to a large extent, a non-vibrating metal, the noise made by the gears is cut down to a minimum. A view of the gearset, looking forward, is shown in Fig. 7. The splined shafts and the relatively short distance between the bearing points may be seen in this illustration. The gearbox is supported by four strong arms cast integrally with the gearset housing. The gearbox is oiltight, a copper-asbestos gasket being fitted between the box and the coverplate.

From the gearbox, the drive passes through a universal joint to the propeller shaft and thence to the bevel gear differential. The differential may be partially seen in Fig. 5, which shows the rear construction and the axle with the differential coverplate removed. Timken roller bearings are used in the differential and the gears are made of large pitch with a factor of safety great enough to withstand a load three times as great as the maximum possible under any driving conditions. Adjustments on the bearings may be made without taking down the axle, but if necessary the entire differential can be removed from the rear axle housing through the opening left by the removal of the coverplate.

The axle construction is of the floating type and is designed and made by the Moon company. The housing is of one piece of pressed steel. The gears in the differential are of chrome vanadium steel heat-treated. The torsion member in the Moon cars is of exceptional strength. It is made of pressed steel in channel section and pierced by holes for the purpose of decreasing the weight without materially affecting the strength. The front end of the torque members terminates in a ball and is carried between two springs which cushion the shocks of the torsion strains.

The brakes are large in dimension. On all models the diameter of the drum is 16 inches and the face of the brakes is 2 1-4 inches. The brakes and the rear axle construction are shown in Fig. 4. The brakes are controlled through a cross-rod mounted on the rear axle frame. This cross-member is of tubular form and permits the linkage for the two sets of brakes to be carried to the drums through the tube. The clevises on the brake linkage may be taken up to compensate for wear at the point where the two sets of brake linkage are connected to the cross-member. A series of small oil drains in the rear axle housing permits the oil to flow from the rear system without letting it get as far as the brakes and thus cause these to slip. An equalizing bar is inserted in the brake linkage to allow of the

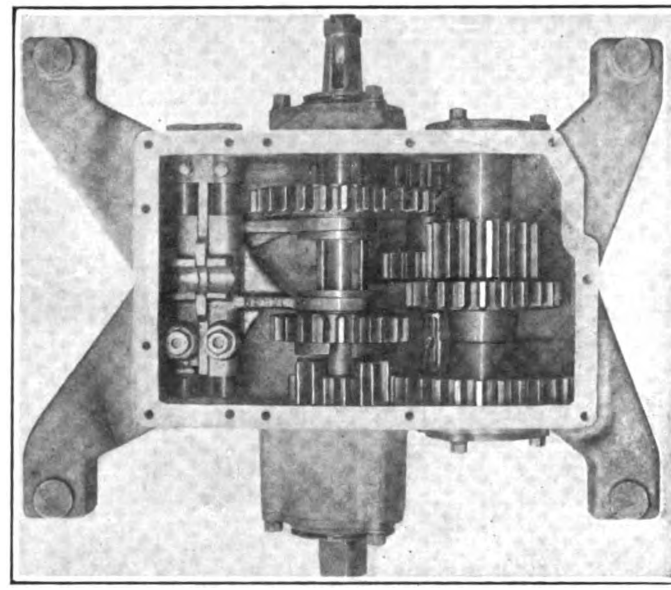

Fig. 7—Gearset with cover plate removed showing splines

same pressure being placed upon both brakes and to prevent excessive wear on one tire due to its taking up the entire braking load.

Hot riveting is used throughout the frame construction. The cross-members of the frame are all gussetted heavily to prevent racking strains. At the rear end of the frame there is a kick-up to carry the side-members over the rear axle and at the same time to furnish support for the three-quarter elliptic rear spring. A semi-elliptic spring suspension is used in the front. All the spring shackles are provided with integral grease-cups, which provide adequate lubrication for these bearings.

The wheel sizes are the same on all three models, but the spokes are heavier on the wheels for the six-cylinder and larger four-cylinder cars. The wheels will be 36 inches in diameter and will be equipped with 4 1-2-inch tires. There are ten spokes in the front wheels and twelve in the rear. The spokes are 1 5-8 inches for model 39 and 1 3-4 inches for models 47 and 65. Demountable rims are a part of the regular equipment and an extra rim of this type will be furnished with each car.

A worm-and-gear type of steering is used. On all Moon models for 1913 this will be mounted on the left side and the control levers will be in the center. The steering wheel is 18 inches in diameter and is provided with a safety grip.

Full equipment will be furnished with the 4-48 and the 6-65, on the 4-39 the equipment is extra if desired. The equipment consists of top, windshield and speedometer. The top is of imported mohair, padded and made to fit the car neatly. It is furnished with side-curtains and a close-fitting dust cover. The windshield is nickel trimmed in black with rain vision, clear vision and ventilating features. The speedometer is of the latest type and combines a grade indicator with the regular speed and odometer features.

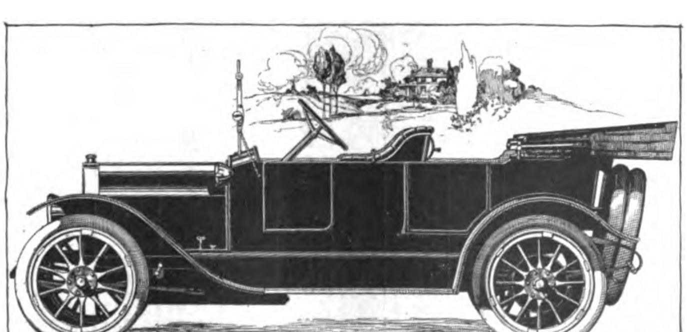

Fig. 8—Model 39 with five-passenger touring body

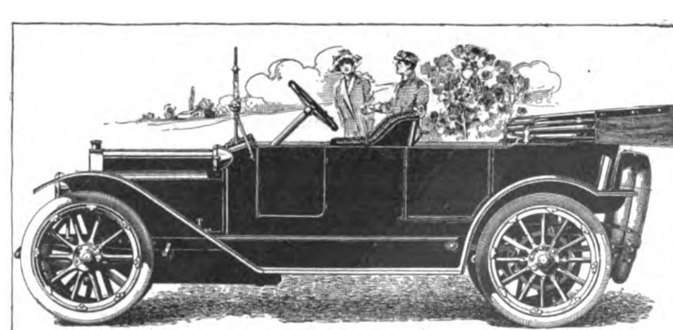

Fig. 9—Moon 48-horsepower five-passenger touring car

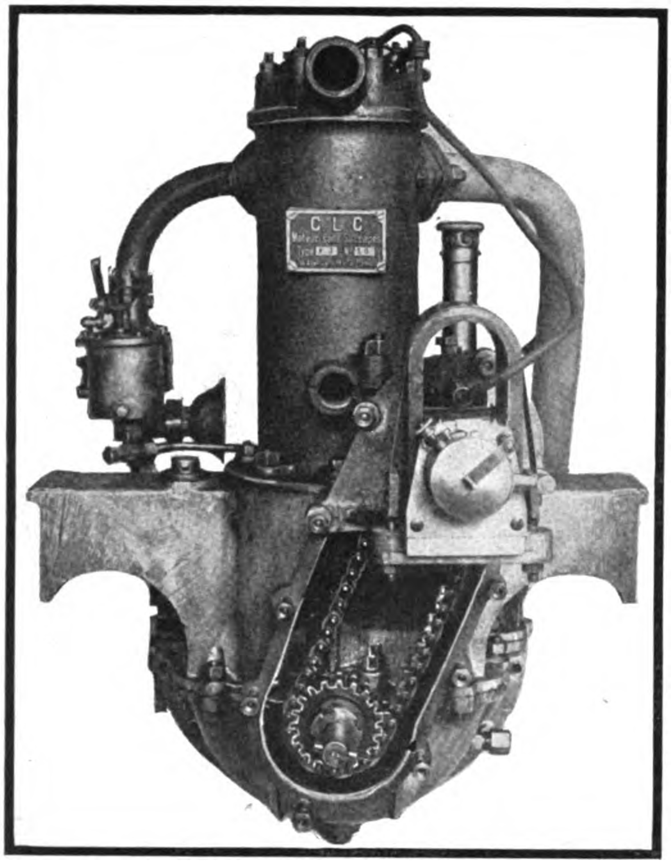

Fig. 1—C. L. C. rotary sleeve motor, showing silent chain drive

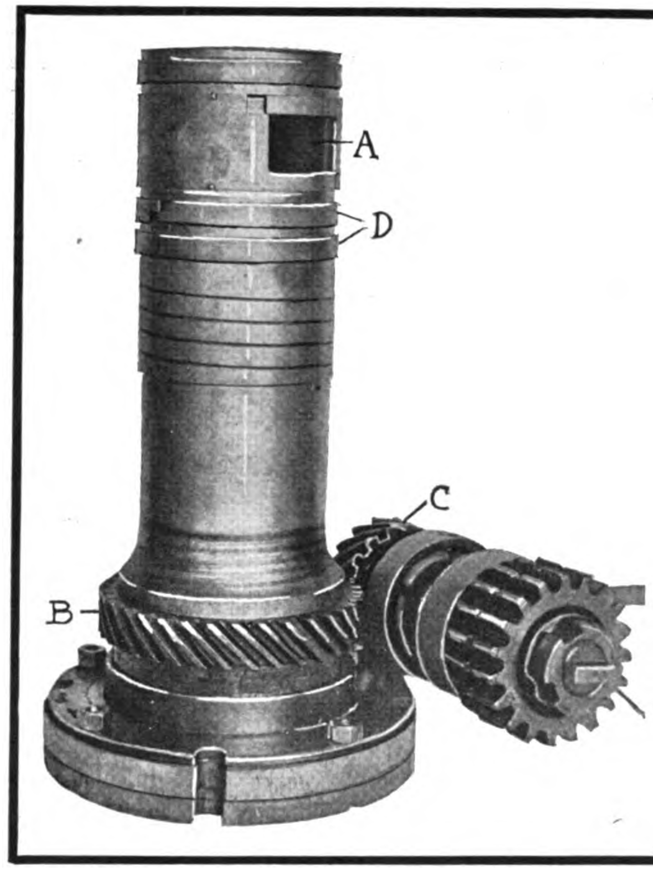

Fig. 2—Showing the drive of the rotary sleeve on the C. L. C. motor

Tests of C. L. C. Rotary Sleeve Motor

French Club Finds Rotary Sleeve Type a Success—Single Cylinder Develops 11 Horsepower at 2,188 Revolutions

PARIS, FRANCE, Sept. 3—Official power and fuel consumption tests have been carried out at the laboratory of the Automobile Club of France on a rotary valve motor built by the C. L. C. Company under Da Costa patents. The motor is a single-cylinder model of 3.1 by 5.5 inches bore and stroke having a cylindrical sleeve rotating at half engine speed. The sleeve carries one opening A, Fig. 2, which in its rotation covers and uncovers the intake and exhaust ports set at an angle of, roughly, 90 degrees from each other. The official tests lasted 1 1-2 hours, during which the motor was run from 1,882 to 2,188 revolutions per minute. At 1,882 revolutions the horsepower was 8.6; it increased to 9 horsepower at 1,952 revolutions; to 10.1 at 2,108 revolutions and the 11 horsepower at 2,188 revolutions. The oil consumption of the rotary distributor was 0.278 kilograms per hour. The total oil consumption could not be obtained owing to a leak. The cooling water remained between 60 and 75 degrees centigrade throughout the test, and according to the official report it was possible to maintain the hand on the part of the cylinder corresponding to the distributor throughout the whole of the time the motor was on the bench.

Since it was first introduced the C. L. C. motor has undergone a number of detailed improvements. Its sleeve, which is a gray iron casting fitting loosely in the cylinder, is carried on a combined radial and thrust bearing. Fig. 2. A gear B cut on the base of the sleeve receives a helical pinion C on a lay shaft obtaining its drive from the crankshaft by means of a Renolds silent chain. This shaft is carried on ball bearings and at its forward end drives the magneto by means of a dog clutch, while its rearward extension carries a pulley from which a belt transmits the drive to the mechanical lubricator. The sleeve is not relied on for gas tightness, this being assured by means of a deep compression ring having a rectangular opening corresponding with the intake and the exhaust ports and the opening on the sleeve. The ring has overlapping ends and is pinned on the sleeve in the manner often adopted for piston rings. This disposition allows a very wide tolerance in the fit of the sleeve within the cylinder, this tolerance having been increased, in certain cases, as high as 1 millimeter without any inconvenience. In ordinary practice, however, the tolerance is very much lower. In addition to the deep ring assuring gas tightness there are two ordinary compression rings D mounted on the sleeve below the opening and another one above it. These rings are pinned, having a stepped gap and are of greater depth than usually employed for piston rings. To assist in lubrication a spiral groove is formed on the outside of the sleeve and an oil lead is carried to the walls.

RESULTS OF OFFICIAL TESTS ON C. L. C. MOTOR

Model of Dynamometer	Size of Plates in Millimetres	Number of Hole	Temperature Degrees Centimetres	Atmospheric Pressure in Millimetres of Mercury	Revolutions per Minute	Indicated Horsepower	Corrections in Hundredths	Effective Horsepower	Fuel Consumption, Kilograms per Hour	Specific Consumption in Kilograms per Horse-power-Hour
3	105x105	7.5	21	760.5	2188	11.0	−4	10.56	2.480	0.235
3	105x105	8	21	760.5	2108	10.1	−4	9.70	2.424	0.250
3	105x105	8.5	21	760.5	2059	9.7	−4	9.31	2.364	0.254
3	105x105	9	21	760.5	2017	9.3	−4	8.93	2.348	0.263
3	105x105	9.5	21	760.5	1952	9.0	−4	8.64	2.264	0.262
3	105x105	10	21	760.5	1882	8.6	−4	8.26	2.200	0.266

Huber's Monopoly on Flexible Suspension

Patent Confronting Many Manufacturers Describes Specific Method of Mounting on a Three-Point Support

DETROIT, MICH., Sept. 16—The Huber automobile patent which is in the spotlight of the manufacturers at the present moment and under which some of Detroit's leading companies have taken out royalties relates to the suspension of the motor, clutch, and transmission mechanisms of a chassis on a sub-frame construction supported at three points, at the front center by a trunnion and at two rear points by a sliding support on the side members of the main frame. Fig. 1 reproduced from the patent papers dated August 25, 1905, Letters Patent No. 788,407 shows a plan view in which the two parallel sub-frame members SS support the motor, clutch and gearset mechanism. These two frame members are tied together at the forward end by a cross piece S1 which is supported by a trunnion S2 on the cross piece C of the main frane. At the rear these sub-frame members S attached rigidly to a frame cross piece T which rests upon the flanges of the side bars A of the main frame and are free to move fore and aft on these side members. At W1 is an elastic buffer between the cross member T and another cross member B, which latter is rigidly attached to the side members of the frame. This buffer keeps the trunnion S2 at the forward end of the sub-frame in engagement and allows a slight endwise movement of the sub-frame with the object of preventing destructive shocks. By not uniting the cross piece T to the side frame members any diagonal strains brought upon the main frame are not submitted to the sub-frame members S as the cross bar T is free to slide. Diagonal strains are resisted by angular braces U which bolt to the end of the cross bar T and extend diagonally forward and downward and are firmly attached underneath and beyond the flywheel H to a casting V, Fig. 2.

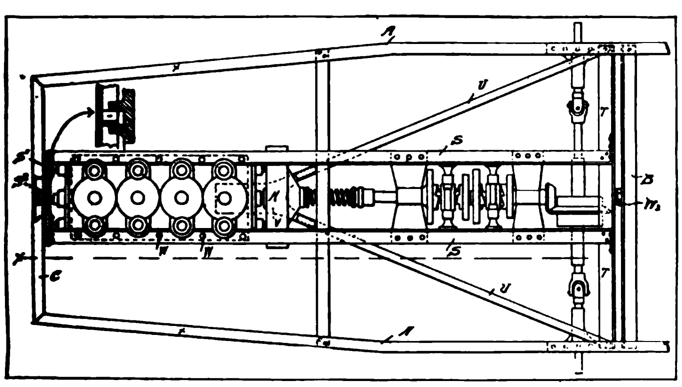

Fig. 1—Plan view showing suspension covered in Huber patent

The claims of the patent are:

1. In a vehicle, the combination of a main frame, a subframe rotably pivoted at its front end to the main frame and supported at its rear end by bearings resting upon but detached from the main frame, said sub-frame carrying the machinery of the driving mechanism, and whereby the twisting strains brought to bear upon the main frame are entirely relieved from the subframe and the machinery carried by it.

2. In a vehicle the sub-frame supported on three points, one of which is rotable in a perpendicular frame and the other two supported by the main frame, and diagonal braces running from the supporting points at the base of the triangle and to a common point in conjunction with the sub-frame substantially as described.

Electric Business Increases 45 Per Cent.

The fact has been noted that according to the latest figures available the electric vehicle business increased 45 per cent. in New York from July 1, 1910, to the same date in 1911, including, of course the growth of the commercial vehicle branch. During the past year an increase of 100 per cent. has been noted in the pleasure car sales of one company and since August 1, this concern has employed thirteen additional salesmen. The manager of the company said that prospects and indications all point to a much larger trade in the coming season. He says that he expects to double his sales.

In a general way the same story is told in other agencies. The Baker, Detroit, Rauch and Lang, Hupp-Yeats, Flanders and others have scored increases over 1911, the latter of course not being represented in the previous period and the Hupp-Yeats dating back only part of the year. Several agencies have been established in the past only to be abandoned, the latest example of that kind having been seen only recently.

Among the electric trucks an excellent business has been done for many years, the General Vehicle, General Motors, Studebaker and Lansden having a steady trade and several of the newcomers such as the Atlantic, doing a promising trade.

According to the New York dealers, the 1912 product is lighter, stronger, cheaper and much more satisfactory than the average product of former years. The radius of action is much extended. At present the dealers sell their cars on representations of from 65 to 100 miles on a charge.

This means that quite as much riding can be had in a day as the great majority of owners wish to take. Charging stations are more numerous and efficient than they used to be so that it is now possible to take long tours with an electric car.

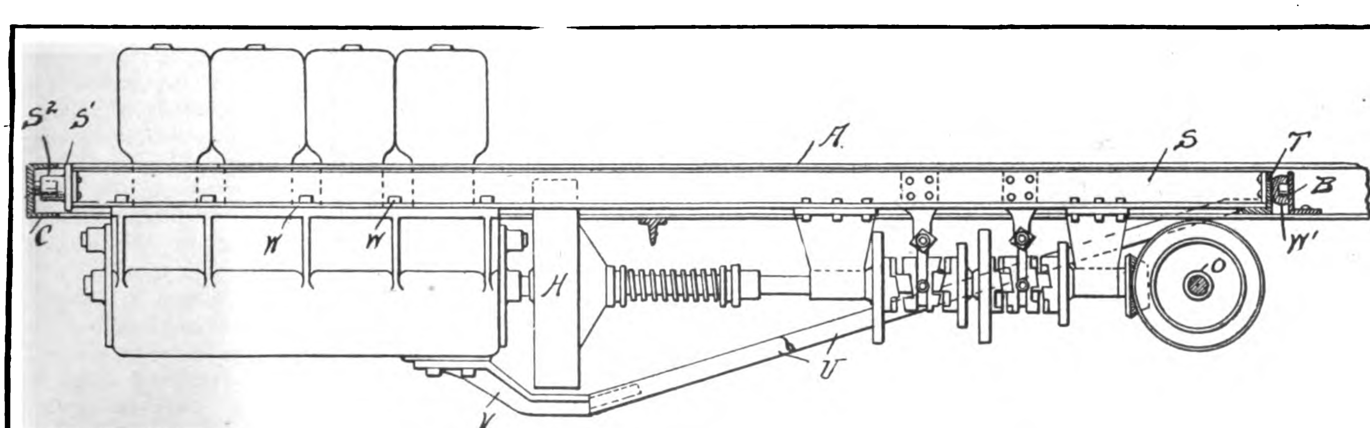

Fig. 2—Elevation showing braces designed to resist diagonal strains attached to a casting on the bottom of the crankcase

Car for Poor Mail Route; Various Motor Troubles Explained; Derivation of French Automobile Words; Cure for Motor Knock; Changing Gears in Two Ways; Suggests a Change-Gear Device; Poppet Valve Design

Wants Car for Bad Mail Route

EDITOR THE AUTOMOBILE:—We would like to get some advice as to the proper kind of a machine to be used on a mail route 22 miles in length. Twelve miles over an ordinary turnpike road, which is rather rough in places, the last 10 miles of the road is a steady climb up a mountain, the grade in some places being as great as 8 to 10 per cent. The road in places is rather rough, having many rocks in it; portions of the road, both on the level stretch and on the climb at times, when there have been rains, are muddy and rutted a good deal. When the weather is good, and the roads are dry, they are fairly good, but they are in their worst condition during the winter months when there is mud, snow and some ice on the ground, and also in rainy and muddy weather.

What is wanted is a machine that will cover this distance within a reasonable time—not necessary to have high speed, but a reasonable speed should be maintained. The load to be carried, in addition to the driver, would be the mail, consisting of five or six mail bags, sometimes rather heavy—possibly after the parcels post is put into operation the load would be still heavier. It would also be desirable to be able to carry one or two passengers in the machine should occasion require.

What we want to know is what type of machine you would recommend as best suited for the conditions above named.

Charlotte, N. C. A. H. WASHBURN.

—The vehicle which would probably suit you best would be a light delivery wagon of good construction. To secure the latter feature it will be necessary to pay a good price. It would be possible to secure a cheaply built car that would last for a short time, but it would be cheaper in the end to put more money into the car and get a vehicle that will stand the test of time. Wagons of 1,500-pound capacity are sold by a large number of makers who would be glad to make small modifications in the body so that two or three removable seats could be installed to take care of occasional passengers. This vehicle should have pneumatic tires of very substantial size so as to secure the maximum tire economy. If it is to be placed in the hands of a driver, it should be fitted with a governor that will not permit the speed of the vehicle to run above what the owner deems is safe. It is also suggested that the gear ratio be approximately five or six to one on the direct drive, that is, the highest gear.

Condition of Merrick Road

Editor THE AUTOMOBILE:—As many tourists are interested in the Merrick road, which runs along the south shore of Long Island, I would like you to tell me in what condition that road is at the present time.

Rondout, N. Y. E. P. MOORE.

—The Merrick road is very good except a few bad stretches where it is under repair. These are at Rockville Center, Amityville and Patchogue. Along the rest of the route the road is all that can be expected.

Cures for Several Troubles

Editor THE AUTOMOBILE:—Will you kindly give me the causes of the following:

1. A large quantity of smoke and a few explosions come out of my muffler.

2. When running on third speed my engine jerks a little and then stops.

3. Two of my cylinders do not explode because the vibrators stick to the pieces below them.

4. What does 40-45 H.P. 24.5 mean?

5. My magneto refuses to operate the engine.

My car is equipped with a Holley carbureter, sliding type transmission, Splitdorf four-cylinder coil and a Bosch magneto.

Watchung, N. J. A READER.

—1. You are using a mixture which is too rich. A section through the Holley carbureter is shown in the issue of September 19. This shows the adjustment point which is a knurled screw on the bottom of the carbureter. By turning this the mixture can be controlled and the smoke and muffler explosions stopped.

2. The reason your motor stops is probably because it cannot carry the load of the car on two cylinders which are alone firing according to your question No. 3.

3. Try a voltmeter on your battery current and see if it is 6 volts, which is the correct strength for the ignition system. File the vibrator contact points so they are flat and adjust on the adjustment screw until they vibrate properly.

4. It is difficult to say, but it is possible it is the rating of a motor which develops from 40 to 45 horsepower on the brake and has an S. A. E. rating of 24.5 horsepower.

5. This might be from most any cause and it is impossible to state without further details. It is recommended that you send the magneto to the factory where it will be placed in good condition at a very reasonable charge.

Derivation of French Terms

Editor THE AUTOMOBILE:—In view of the fact that there are several French words which have come into general use throughout the United States in connection with the driving and manufacture of cars it would be interesting to know their derivation and other interesting facts concerning them. There are three of these words to which I have particular reference and which I would like to see published in THE AUTOMOBILE together with their derivation and correct meaning. They are: chassis, tonneau and chauffeur.

Plainfield, N. J. JOSHUA T. LAMY.

—The derivations and plurals of these words as as follows:

(1) Chassis; plural, Chassis.

Derivation: French word signifying a frame of wood or metal; the frame work of a wagon. Later the term was applied to the frame work of a locomotive and then to the transverse and longitudinal frame members of the motor car. More correctly, however, the word chassis should only refer to the metal framework of the car receiving the motor, gearset and control mechanism.

(2) Tonneau; plural, Tonneaux.

Derivation: French word meaning a barrel; a wooden vessel formed of staves and hoops and made to contain a tonneau (1,000 kilogrammes) of oil. Later, a horse-drawn carriage, known in England as a governess car, having a rear entrance. A similar type of body was first applied to a motor car by M. Huillier, of Paris, and by reason of its resemblance to a barrel and to the horse-drawn tonneau already existing, was known as a tonneau.

(3) Chauffeur; plural, Chauffeurs. This word is always masculine in French, having no feminine form.

Derivation: From the French verb Chauffer—to heat. A chauffeur is a man in charge of a furnace or boiler fire. The first use of the word chauffeur was during the revolution of 1789 when bands of brigands heated (*chauffé*) the feet of their victims in order to make them reveal the place where their money was hidden. The chauffeurs were stamped out during the Consular period. The word chauffeur was first applied to automobile drivers under the popular supposition that they had to tend a fire. On the French railroads the chauffeur is the fireman, the engine driver is the mechanician.

Suggests Change Gear Device

Editor The Automobile:—I am sending a sketch (reproduced, Fig. 1) showing a suggested arrangement of the gears in the flywheel to provide for a change of speeds. The flywheel has three sets of cogs on its face for the purpose of giving the different speeds. The transverse shaft across the face of the flywheel carries the small pinions upon ball bearings. The shaft, as may be seen, is square between the pinions to allow them to slide into position to secure the different speeds. The cogs on the flywheel can either be made a part of the wheel or can be mounted upon it in some other manner. With this arrangement every speed would be a direct drive. Should it be desired the teeth could be omitted and the device made a friction drive. The pinions could be made hollow and the clutch could be of the cone type. The entire outfit can be housed within a tight casing and should be as silent as any type of drive. I would like to know what other readers of The Automobile think of the device.

Artesia, Cal. M. A. Cook.

—This device would never be of any practical value because the cross-shaft would be a point of weakness, in the first place. It would be difficult to get sufficient bearing space on the shaft to take care of the tremendous torque caused by the transmission of the entire motor power through the transverse shaft. When the high-speed pinion was in engagement there would be a noise that could be heard for blocks. The linear speed at which the periphery of a 2-foot flywheel travels at 1,000 revolutions per minute is over 6,000 feet per minute. The noise that would occur when the high-speed pinion came into engagement with the fast-running flywheel can be imagined. The arrangement would not be as compact as many of our three-speed boxes now in use and the distance between bearings would be greater. Changes of alignment in the propeller shaft would also not be compensated for as well as in the regular gearset. On the whole, it would not pay to attempt this type of gear change mechanism.

Mathematical Balance Possible

Editor The Automobile:—In reference to a statement in The Automobile of September 5, which, I believe, is not quite true, I would like to make a correction.

It is stated that "When measured mathematically the balance of a machine can never be perfectly determined because both primary and secondary forces and moments are involved, and, although the first may be reduced to zero, the secondaries can rarely, if ever, be nullified."

It is quite possible by mathematical calculation to determine accurately the balance of a crankshaft and if the theory and practice do not quite correspond, it is due to the fact that the crankshaft forging is not a true reproduction of the mathematically perfect balance crankshaft drawing.

As to the secondary forces and moments referred to by the author it is not correct that they can only rarely, if ever, be nullified, for the simple reason that a rotary mass can never produce a secondary force or moment. The secondary, fourth period and sixth period forces and moments which are present in a motor are due to the angularity of the connecting-rod and can be produced only by reciprocating masses.

It may be interesting to give a short explanation of these terms which are so often misused and which are so easy to understand without any special mathematical knowledge, if they are looked upon in the proper way.

In a standard four-cylinder motor it is apparent that when the piston turns the top dead point, the convexity of the imaginary circle, being just then swung by the connecting-rod, adds to that continuously described by the crank and that for this reason the deceleration of the upward movement and the acceleration in starting the downward excursion is more rapid than when the piston is turning the bottom dead point where the arc swung by the connecting-rod subtracts from that swung by the crank. Perceiving this, it is at once clear, as previously stated, that whenever two pistons are turning the top dead point and are supposedly balanced by two pistons turning the bottom one, the balance will not in fact be complete and the motor as a whole will jerk upwards. When one-half revolution has been performed and the pistons have changed places, the same thing will be repeated and there will be another jerk, not downwards but again upwards. Hence, since the motor cannot keep on continually going up, and must move down between these two jerks, it is apparent that it will vibrate up and down at a rate or periodicity twice as great as the speed of revolution. This makes clear the reason for the presence of the second harmonic force and moment.

Another effect of the angularity of the connecting-rod is that a piston going downward reaches its middle position before the crank has moved a full 90 degrees. It can again be qualitatively worked out on the basis of the physical conception without mathematics that at the 90-degree position there is a further unbalanced acceleration upward due to this cause, of which the maxima occur halfway between the upward jerks before referred to.

Thus it is apparent that with such a motor running at 1,000 revolutions we shall find that while there is no up and down

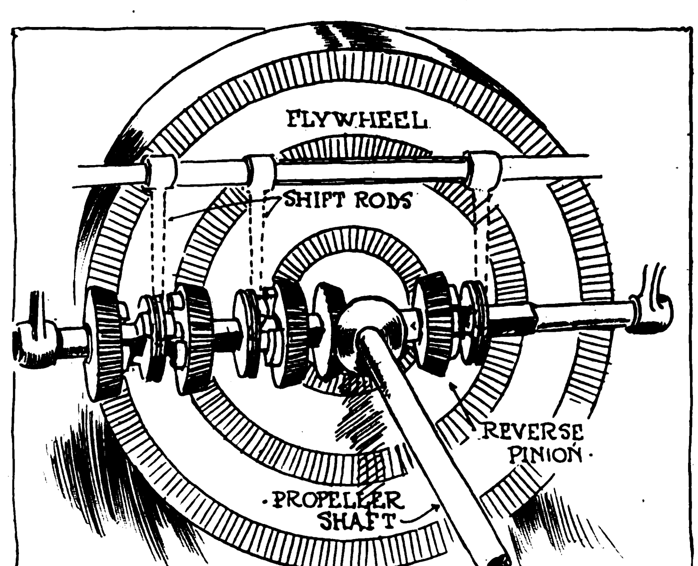

Fig. 1—Change-gear device suggested by a reader which is ingenious but not practical

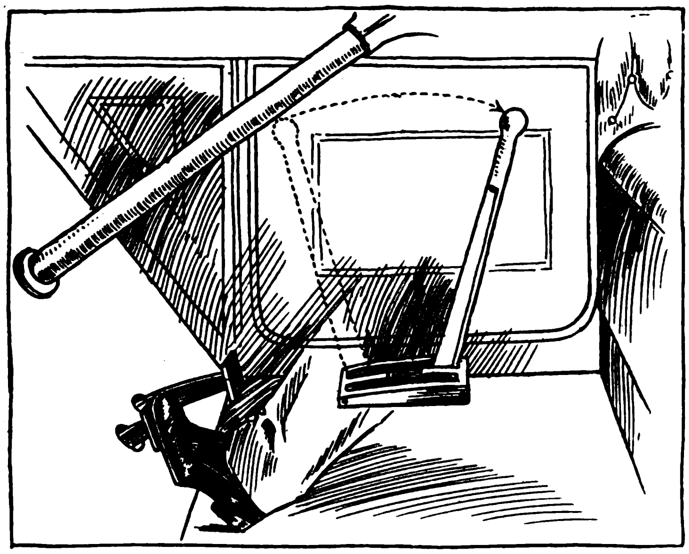

Fig. 2—Ordinary gear change. Straight pull of lever from one speed to next

vibration of a periodicity of 1,000 there is one at a periodicity of 2,000 and another one at a periodicity of 4,000.

The machine illustrated on page 508 of your September 5 issue seems to be a Norton running balance machine, which can only be used to determine if a crankshaft will give any vibratory moment, as the other disturbances which might be caused by the crankshaft—that is, the unbalanced forces—can be nullified by balancing the crankshaft on parallel ways, which has to be done before placing the same in the rotary balancing machine.

General Motors Company. ERNEST R. FRIED, Research Engineer.

Engine Knocks on Hill Only

Editor THE AUTOMOBILE:—I have a four-cylinder touring car with a 4 by 4-inch motor. It is equipped with a Splitdorf magneto and Maxwell 1912 carbureter. The engine picks up very well on level ground, but when climbing a hill on high gear it does not take hold but dies right down with a knocking sound in the motor which sounds exactly the same as when traveling with a spark that is too far retarded. What is the cause for this and what is the remedy?

Spokane, Wash. TROUBLED.

—There may be several causes for the trouble which you mention. When the motor is on a hill if there is any tendency to knock at all it is there that it will surely develop. The troubles which are commonly the cause of a knock that develops on a hill and which is not perceptible on level ground are as follows: Lean mixture, magneto set too early, valves seat poorly, carbon in cylinders, poor valve adjustment, loose wristpin bushing, loose magneto shaft coupling, sticking valves and piston slap. The cures for these may be taken up in order. They are as follows:

Lean mixture can be cured by opening the needle valve slightly or by closing the air valve. The former is preferable as it is easier to make a correct fuel adjustment than an exact air adjustment. This adjustment should be made on the road. Take the car out on a hill and run it up in the condition that it is at present. Return to the bottom of the hill and make a change in the mixture by turning the fuel adjustment. When this is done run the car up the hill again and note if there is any decrease in the knock. If there is none or the change is only slight it is time to pass to the next cause.

The setting of the Splitdorf magneto is explained in detail in the issue of September 19, and it is only necessary to follow the directions contained therein to secure perfect timing.

Bad seating of the valves may be due to two causes. Carbon or other foreign matter may lodge on the seats and prevent the valves from seating properly, or they may be adjusted too closely so that they are not able to get down to the seats when the motor is hot enough to have caused the valve stems to expand. The latter would be apt to cause a knock on level ground as well as on a hill, however, and thus can be discarded from the list of probable causes. Carbon flakes on the valve seats are common, however, and may be the cause for the whole trouble. They can be removed by dosing the cylinders with kerosene or some other carbon remover and then turning the motor over to work the deposits out from around the valve seats. In case the valves are worn or pitted they will have to be reground.

Carbon in the cylinders is removed as just described. If patent carbon removers are used be sure to follow directions accompanying same.

Loose magneto shaft couplings are readily cured by tightening up the connections. Should an Oldham coupling be used in your car and it is found that considerable play occurs between the driving and driven faces, coat these with solder.

Sticking valves are caused by insufficient lubrication of the stems. A little oil will cure this trouble, which is not probable in your case as it would have been evidenced on level ground as well as on hills. Slapping pistons are due to excessive wear and are of such a nature that the repairs can only be made at the factory.

Difficulty in Changing Gears

Editor THE AUTOMOBIE:—In the issue of September 12 there appeared an article entitled, Changing Gears Without Noise, in which the contributor, Elmer E. Grove, gives a particular method for changing from high to intermediate which I have tried with success. Perhaps he, or some of your other readers would give their experiences when shifting to various gears and the different methods which they use under different conditions. This is always an interesting topic.

I find, for instance, that when shifting the selective transmission on the Buick from first to second speed it requires a lengthy stroke to push the lever diagonally through the entire length of the gate, passing through the neutral point during the operation. The result is that often the speed of the car diminishes to such an extent that the engine has to struggle to pick up the load smoothly. Is this due to incorrect handling?

2. What is the proper method of dropping from second to first speed on a hill so that the change is made without grating the gears?

New York City. JAMES WOOD.

—In making a correct change of gears, a knowledge of the car itself is very often a necessity, although if a knowledge of the principles and conditions involved is possessed by the driver, a great amount of trouble will be avoided. In spite of the fact that there is apparently nothing complicated about moving the change gear lever to the different positions in the quadrant there are several methods by which these changes can be made and each is best suited for one particular condition.

Assuming the car started and running on first speed, before making the change to second speed it will be necessary to have the car traveling at such a rate that the drop in speed during the length of time it takes to bring the gearshift lever from the first speed position, through the neutral gate and into the second will not result in the car traveling so slowly that there will be any difficulty in the motor picking up the load. It will not be necessary to attain a speed of more than 7 miles an hour to make this change on level ground. When a speed approximating this has been attained make the change by a smooth but quick pull on the lever. You should practice the movement to such an extent that the transverse movement in going through the neutral gate movement will be made so quickly that it will hardly be apparent and will not interrupt to a perceptible degree the smooth movement of the gearshift. In making the change to a higher speed it is necessary that the throttle be opened as soon as the gears are meshed. The spark is also at once advanced slightly.

In driving the car the motor is acting on a system of levers.

When running on low gear the effect is just the same as if the power was applied at the end of a very long lever. A greater effort is applied to the load, but the effort is applied more slowly. Changing the motor to a higher gear corresponds exactly to the shortening of the length of the lever arm and consequently takes more power to move the load. This is given by opening the throttle.

When the car is resting on a hill and facing upwards it is a little more difficult to be able to judge when the speed is sufficiently great to justify a change from first to second speed. The hill may be of such slope that it is an easy matter for the car to take it on high in ordinary running, but is still steep enough that the pause in the gearshifting act is sufficient to cause the speed to drop considerably. In a case of this kind the driver should be able to judge just at what speed he should throw out his clutch and make the change. The steeper the hill the greater will be the speed required before the change can be safely made. In going from second to high speed the same directions apply except that the complication of passing through the neutral gate is not present and therefore the change is simplified to a slight extent.

In dropping from a higher to a lower speed a different set of circumstances will arise and a different method will have to be pursued. Unlike changing from low to high, when dropping down it is possible to make an advantageous shift by moving the gearshift lever in two movements. This was brought out by Mr. Grove in his communication to THE AUTOMOBILE of September 12. When traveling through traffic it is sometimes desirable to change to a lower gear on level ground without slowing down the car. To attempt this by de-clutching and putting the lever directly into the lower speed notch in the same way that this is done while ascending a hill would be to invite a very noisy clash of the gears. Instead the change is made in three progressive steps, as shown in Fig. 3, and the speed of the car is not reduced to any appreciable degree. The first movement shown at A in the illustration is to disengage the clutch and to bring the shifter lever back to neutral. This leaves the car coasting with the motor running. The clutch is now let in and the levers are in the position shown at B. Now the part where the skill is required and where practice is necessary comes in. The motor is speeded up until it is turning over at the same rate of speed that it would be were the second speed engaged. It will take a little practice to accustom the ear to judge by the sound of the motor whether it is turning over at the correct speed or not. After the motor is speeded up to the proper degree, the clutch pedal is depressed, as shown at B, and the change gear lever brought into second speed. The same method will apply in going from second to first. On some cars a better change can be made this way than in the usual manner of bringing the lever straight through as shown in Fig. 2, where the usual manner of making a gear change is depicted.

Trouble in dropping to lower speeds on a hill can be averted if the critical moment at which to make the change is learned. If the driver waits too long he may stall the motor and sometimes place himself in a very serious position. If he tries to make the change too soon he will clash gears. By changing at the critical moment, however, an easy, quick change can be made.

Correct Lift of Poppet Valves

Editor THE AUTOMOBILE:—Would you please tell me how to calculate the lift of a poppet valve when the diameter is known and the area of the part through which the gases must pass has also been calculated? I would like to know the lift required for valves of the conical type commonly known as the 45-degree valve and also for the flat-seated valves. I am designing a motor to have valves of which the diameter of the seat will be 1 1-2 inches. The diameter of the pipe to which the valve opening must correspond in order to get the gases into the cylinder with a great enough velocity is 3 inches.

New York City. J. E. S.

—According to data furnished by the Society of Automobile Engineers the following formulæ have been worked out for the computation of the valve lifts for both the flat-seated and the 45-degree types of valves.

Taking D as the smaller diameter of the valve seat and d as the diameter of piping to which the valve opening must correspond, the ratio of these two, r, will be:

$$r = \frac{D}{d}$$

The formulæ for flat-seated valves are as follows:

When $r = 1$ Lift $= d \times 0.250 = D \times 0.250$
" $r = 1.25$ " $= d \times 0.200 = D \times 0.160$
" $r = 1.50$ " $= d \times 0.166 = D \times 0.111$
" $r = 2.00$ " $= d \times 0.125 = D \times 0.162$
" $r = 2.5$ " $= d \times 0.100 = D \times 0.040$

For cone-seated valves when the cone angle is 45 degrees the formulæ are:

When $r = 1$ Lift $= d \times 0.307 = D \times 0.307$
" $r = 1.25$ " $= d \times 0.256 = D \times 0.205$
" $r = 1.50$ " $= d \times 0.219 = D \times 0.146$
" $r = 2.00$ " $= d \times 0.170 = D \times 0.084$
" $r = 2.25$ " $= d \times 0.138 = D \times 0.055$

The above are theoretical lifts and an excess is left over these for wire drawing. This is especially true of the flat-seated valves where 25 per cent. over the theoretical lift is often allowed.

For a valve of the dimensions you have given, the lift for a flat-seated valve would be about 1-2 inch and for the conical valve about 11-16 inch, which would be very high.

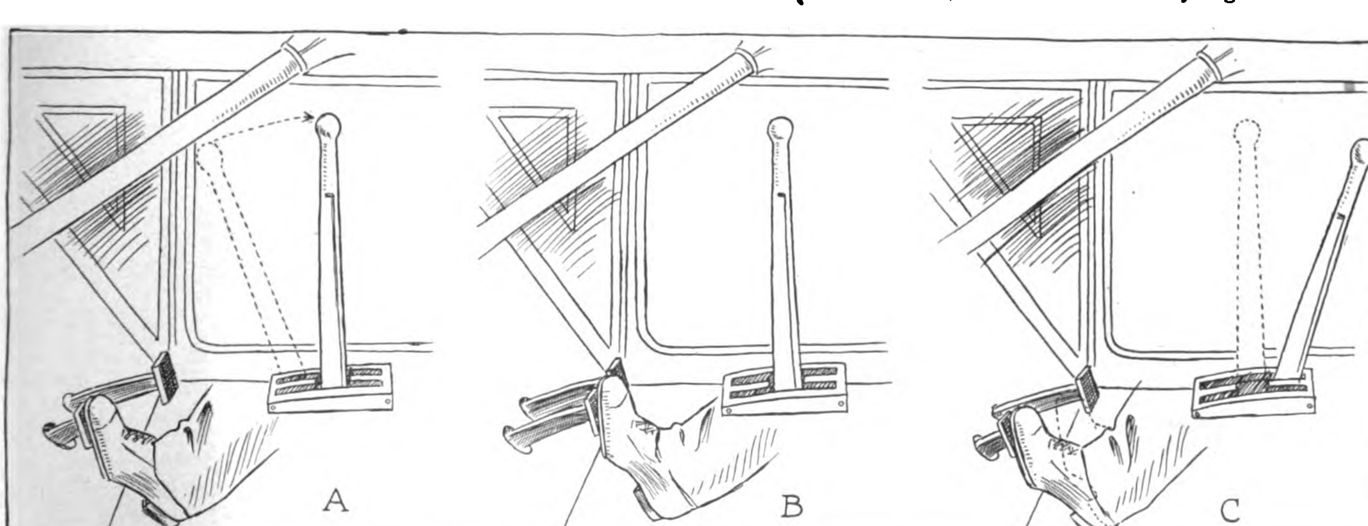

Fig. 3—Second form of gear change. A—Clutch out and lever brought to neutral; B—Clutch engaged with gears in neutral and motor speeded up to correspond to speed of car on low gear; C—Clutch out and gear change completed

Some Observations on Solid Truck Tires

Efficiency, Durability, Resiliency, Weight and Cost Determine the Value of the Different Makes

Tests at Different Speeds and Pressures Show That Tire Loss Varies Directly with the Load

THE object of this paper is simply to bring out some interesting points noted in studying the various types of truck tires on the market, the effect of load upon them and some rather peculiar characteristics. As my experiments have been confined to vehicles traveling at speeds below 20 miles per hour we have not considered pneumatic tires as entering the field. The various makes of tires now on the market may be divided into four distinct types.

Type A—Side Wire—Uniform compound throughout attached to wheel by means of cross wires embedded in rubber at base and secured to wheel by side wire or side flanges. Characteristic makes of this type—Firestone, Swinehart.

Type B—Wire Base—Uniform compound having several wires embedded in rubber at base running around wheel and secured to wheel by press fit on band and side flanges. Characteristic makes of this type—Diamond, Kelly-Springfield, Hartford.

Type C—Hard Rubber Base—Soft rubber tread, hard rubber base vulcanized to steel bands and secured to wheel by press fit and side flanges or T bolts. Characteristic makes of this type—Gibney, Goodrich, Polack, Goodyear.

Type D—Block—Separate blocks secured by cross or side wire and metal cages over blocks bolted through felloe. Characteristic makes of this type—Kelly-Springfield and others.

In considering the value of different makes of tires for use on commercial vehicles there are a number of features to be taken into consideration which will depend somewhat upon the type of vehicle on which the tires are to be used. These characteristics are: Efficiency, durability, resiliency, weight, cost.

NOTE—From a paper on "Some Observations on Tires for Commercial Vehicles" presented to the Philadelphia branch of the Society of Automobile Engineers by F. E. Whitney.

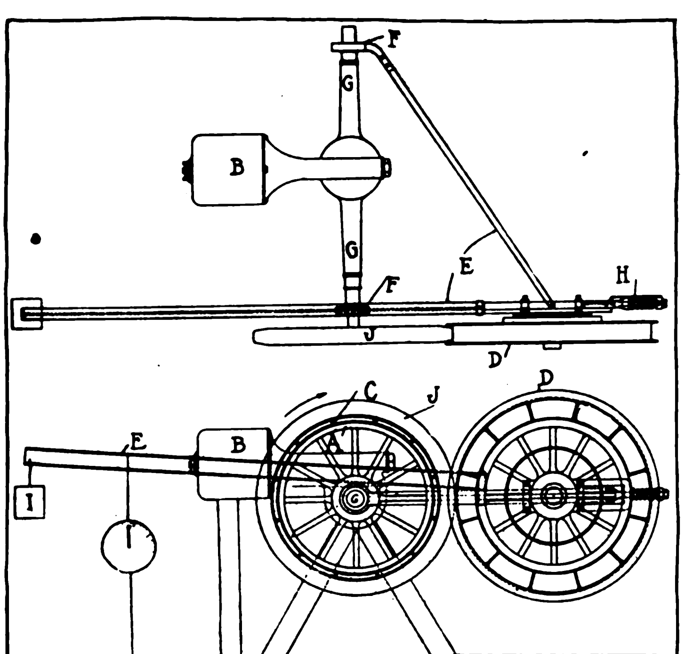

Fig. 1—Plan and elevation of apparatus for making tire efficiency tests

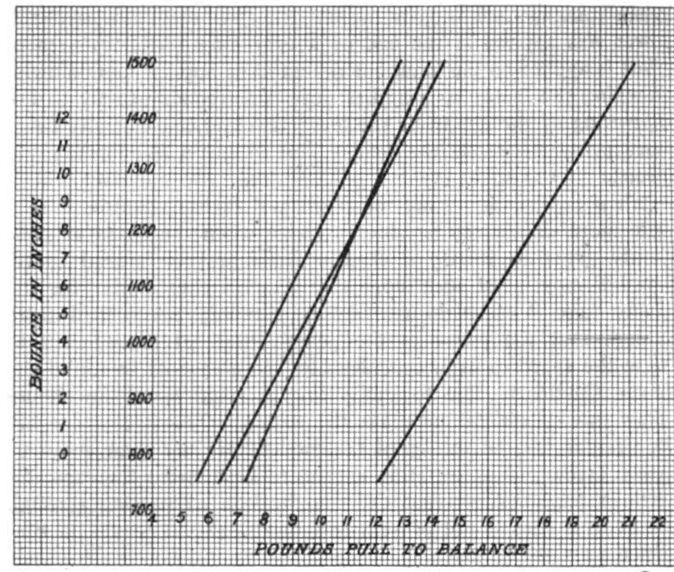

Fig. 2—Diagram of results of tests made on tires with the apparatus shown in Fig. 1

In determining the value of the different characteristics to the truck manufacturer I have arranged these in the above order as representing the order of their importance to the manufacturers of electric vehicles.

In making observations a number of tests have been made on various makes of tires, the size used being 3 inches by 36 inches. This particular size was selected because of ease in handling, loading, etc. The standard load rating of this tire is 950 pounds, but tests were carried up to 1,500 pounds.

Efficiency—In rolling a wheel along the road over any surface there is a resistance to rolling depending on road surface and type of tire, which varies all the way from 3 pounds per ton with true steel wheels rolling on heavy clean rails up to the 200 pounds per ton in ordinary wagon wheels through sand.

The best authorities give the following figures:

Steel-tired wheels on steel rails............	3 to 5 pounds.
Pneumatic-tired wheels on asphalt pavement..	15 to 35 pounds.
Solid-tired wheels	20 to 40 pounds.
Steel-tired wheels on average road, about	50 pounds.

In making tests on trucks with different makes of rubber tires results have been secured where the total resistance has run as low as 25 pounds per ton and as high as 60, all other conditions remaining the same except the tire. This is simply due to a variation in the compound of the rubber, the low results being with a very high quality of rubber, whereas the high results were due to an inferior compound. Of this the loss in transmission amounts to approximately 3 pounds per ton, friction and windage 5 pounds per ton, the remainder being in the tires.

In order to test for efficiency we make use of several methods:

First—by allowing the vehicle to coast down a grade and determine the distance it will run, this being repeated with different makes of tires. The more efficient tire will naturally coast further.

Second—Run the vehicle over a measured course and with electric instrument and stop-watch determine the power consumed per mile per hour, this being repeated with different makes of tires.

Third—The more accurate test has been with the use of a dynamometer on which the tire to be tested is mounted and rolled against a plain steel band. The resistance to rolling is determined in pounds at various speeds and pressures.

Fourth—The fourth and very simple method is to follow the system used in the Shore scleroscope for testing steel, which simply consists in dropping a piece of hard material on the tire from a definite height and measuring the height it will rebound, the efficiency of various tires comparing with the rebound.

Fig. 1 shows in plan and elevation an apparatus devised for making these efficiency tests. It consists of the rear construction of one of a worm-driven light delivery wagon. By means of a special driving shaft the differential is locked so that a wheel mounted on one end of the axle at A will be driven from the motor B in the same manner as the vehicle operating on the road. This wheel is made small enough so that a 36-inch tire mounted on its steel band will slip over the outside. The rim of this wheel is fitted with a number of set screws C, so that the tire can be readily centered and secured in position, after which it is securely wedged. Steel-tired wheel D, mounted on annular bearings, is carried by frame E so mounted that it swings readily on the annular bearings F of the axle G. The wheel D is mounted so that it can be moved in or out and it can be pressed against the wheel to be tested by means of the coil spring H. The wheel with its supporting frame is counterbalanced by the weight I. It will be seen that by revolving the wheel A in the direction indicated by the arrow with no pressure between the tire to be tested J and the wheel D, there will be no tendency to rotate the whole apparatus about the center of the axle G. When, however, pressure is applied any resistance or drag at the surface of the tire J will be resolved into a tendency of the whole system to rotate about G and this is determined in pounds pull by means of the spring balance K. In addition to the apparatus indicated the wheel is fitted with a speedometer so that tests at different speeds can be made. In this manner a range of tests has been made at varying speeds and pressures and the results plotted in curves, Fig. 2.

As a direct comparison with the above method of test, the bounce in inches of the same tires has been plotted, as shown at the left side of Fig. 3, from which it will be noted that tire 6 shows a bounce of 8 1-2 as against 4 1-2 for tire 3, showing about the same relative efficiency with the different method of test.

As indicating the effect on the mileage secured from one charge of the battery in an electric truck with the extremes as indicated by tires 3 and 6, a vehicle equipped with tire 6 would cover, say, 50 miles on one charge of the battery, whereas a vehicle equipped with tire 3, over the same route, and using the same battery equipment would be able to cover only 30 to 35 miles.

The amount of cushion which the tire interposes between the wheel and the road is an important factor in the value of the tire as measuring the amount of injurious vibration and shocks which are absorbed. In order to determine this effect tires were given various loads and observations taken of the compression of the tire; also of the area in contact with the road. From these observations curves have been plotted showing the load characteristics of various makes of tires and also the contact with the road and the load per square inch of the surface in contact.

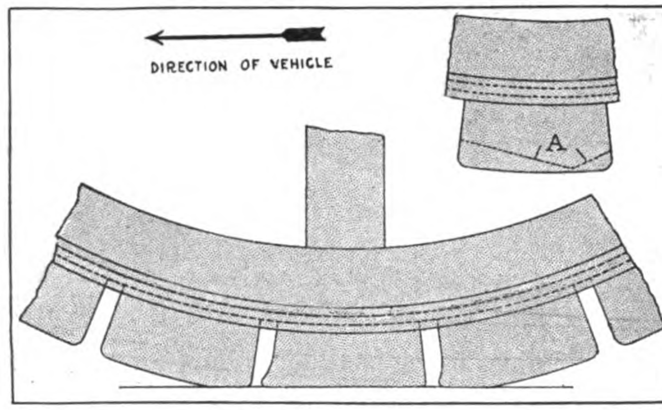

Fig. 3—Showing how the toes of block tires creep out from under the load and, at A, the shape resulting from long service

Fig. 4 shows a series of curves in which the deflection of the tire in sixty-fourths of an inch is plotted against load in pounds. This test is made by pressing the tire between two parallel surfaces and simply measuring the compression in inches. On curve 3 with a load of 1,250 pounds a compression of 16-64 is shown as against 24-64 on curve 4. In other words, on a bump tire 4 will compress 50 per cent. more than tire 3, and, consequently, absorb proportionately more vibration.

In Fig. 5 pressure is plotted against pounds. In Fig. 6 pressure per square inch is plotted against pounds. The area in contact with the road varies with the different makes of tires from 8 6-10 to 11 3-10 square inches.

I have shown in Fig. 3 the effect which is obtained with block tires. It is interesting to note that usually the heel of the blocks is worn out first, but, as a matter of fact, the toe is worn more on account of its creeping out from under the load as the wheel revolves. The dotted line A indicates the shape the blocks assume after having been in service for some time.

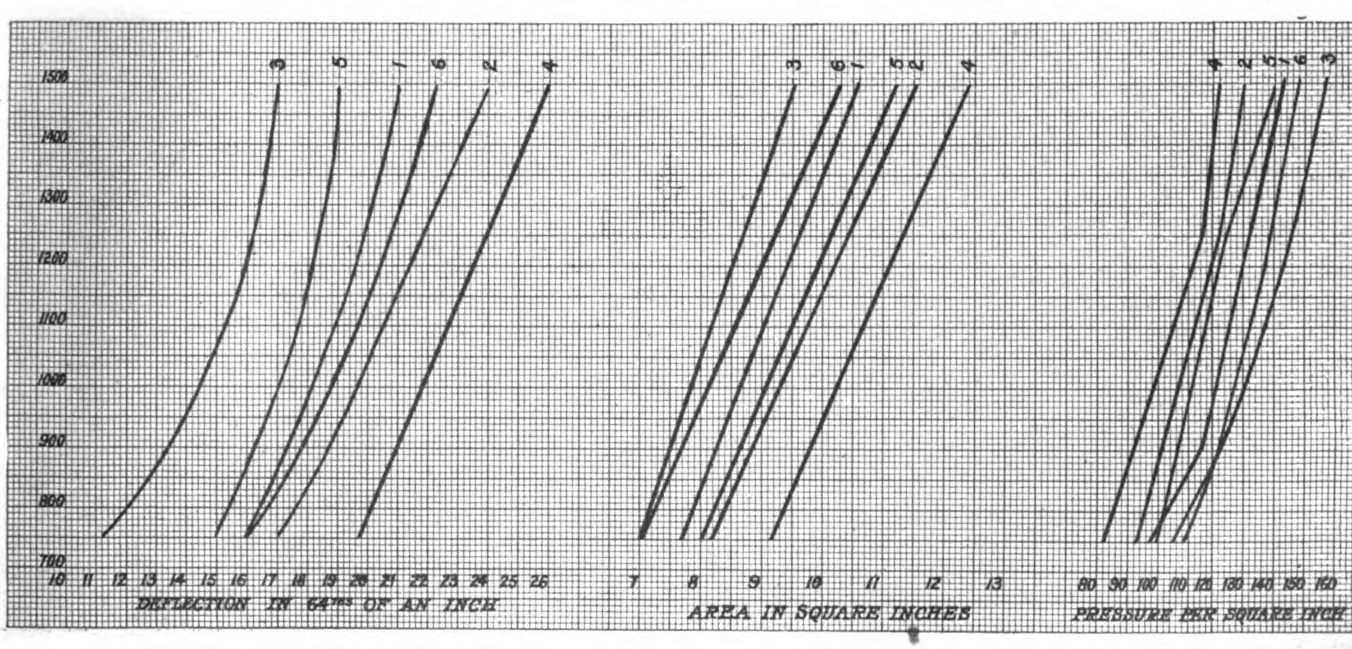

Fig. 4—Curves with the deflection plotted against the load in pounds. Fig. 5—Showing pressure plotted against pounds. Fig. 6—Pressure per square inch plotted against pounds

Alco truck, the first to cross the continent with a load of merchandise, passing a 20-horse freighter in an uninhabited mining district

Transcontinental Alco Finishes Run

Averages 44.09 Miles a Day for 94 Days—Weather and Road Conditions Very Trying

AVERAGING 44.09 miles a day for 94 days, the Alco 3-ton truck which started from Philadelphia with its rated load of merchandise has reached its destination at Petaluma, Cal. The road conditions and weather were extremely trying during a large portion of the run. There were cloudbursts in the desert states where rain is a novelty in summer and the extreme of everything had to be endured by the vehicle and travelers.

In the state of Iowa, where good roads and easy conditions generally might be expected, the crew had to inspect 500 bridges and strengthen 100 of them so that the truck could pass over them. In the far West dynamite had to be used to blast a path for the truck to cross some of the mountains.

After crossing the Missouri into Nebraska, better conditions were found and these prevailed until the truck ran into a series of terrific rainstorms in the western desert country.

Up to the time of reaching Julesburg, Col., the truck covered 2,184 miles in 24 days.

This is an average of 92.66 miles a day and an eloquent plea for better roads through the intermountain section, because the final results show that the average for the whole trip was about half the average daily mileage to Julesburg.

Wyoming proved a nightmare but in Utah, despite the heavy grades, much better road conditions were found. Nevada proved to the satisfaction of everybody concerned that it is no nice place to run a truck. In the first place there are no roads worthy of the name and in the second, the trails were so narrow and the curves so abrupt that dynamite was needed to make it possible to turn the truck around some of the projecting rocks. Between Elko and Austin, the progress was slow, climbing one grade 6 miles long that is said to average 20 per cent.

The course then lay southward through Reno to Carson City and thence up the main wall of the Sierras, rounding Lake Tahoe in the crest of the range. This climb was very severe on account of the steepness of the trails. From the California line to Folsom City the road was good but was largely up and down until after the second range of mountains was passed. From Folsom through Sacramento to San Francisco the truck traveled over boulevards.

Records of the time-measuring and distance-measuring instruments covering the run from Philadelphia to the Lucin cut-off at the north arm of Great Salt Lake are now available. The running time each day on the average was 10 hours, 29 minutes. The average actual operation was 5:21 per day and the average number of stops, per day, 25.

The longest day's run was August 8, when the truck was kept on the road for 20:03 but only traveled for 3:28, making forty-one stops.

The shortest day's run was 1:27, on July 27. The day's run in which the largest number of stops was made was July 20, when 100 were recorded on account of the weak bridges in Iowa.

While the general average of the whole trip is placed at 44.09

Blasting the rocks on a narrow mountain trail

Forging along more than 10,000 feet above sea level

Negotiating a boulder-strewn pass in the Desatoya range

per day, deductions are not allowed for Sundays, when the truck did not run as a rule. No allowances, however, were made for the days when it was impossible to run the vehicle for reasons beyond the control of the crew. By making allowance for the Sundays, and non-operative days, the average daily mileage during actual running is raised to 55.26. This makes the total mileage 4,145.

Cost figures of the trip have been kept in much detail and when the tabulations have been completed they will be presented.

The truck carried two drivers and was in charge of E. L. Ferguson as official pilot.

The trip was the first of its kind ever undertaken in that the load carried was regularly consigned freight routed via the truck instead of some other means of transportation.

The chief lesson learned by the experience of the trip was that it is possible to ship freight in that way, but that in point of time, the truck can not hope to equal transcontinental railways. In fact, that element of the problem was not considered in making the trip. The unprecedentedly bad weather conditions were purely incidental and the fact that the truck prevailed over them shows simply that weather will not stop the automobile truck where it can get traction and does not run into an immovable obstruction.

The most striking testimony of the trip is an affirmation of the chief lesson taught during the military maneuvers in Connecticut last month with regard to the weakness of bridges. The big car was stalled hundreds of times during the long run while its crew shored-up suspicious culverts and bridges and extricated it from the bottom of some creek after treacherous bridges let it down.

Alco crew picking the road to Eureka, Nevada

Captain Ferguson reports that many of the worst specimens of medieval bridges are being replaced with stone and concrete culverts, particularly in Iowa, and that subsequent trips across the continent will be made without such a grave complication as beset the Alco.

The car will be shipped back to Philadelphia and will resume its work in the service of its owner.

Calendar of Coming Events

Shows, Conventions, Etc.

Sept. 23-Oct. 3....New York City, Rubber Show, Grand Central Palace.
Sept. 30-Oct. 1....New York City, Sales Managers' Convention, Automobile Board of Trade.
Jan. 2-10..........New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 11-25.........New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8...........Chicago, Ill., Annual Automobile Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1.....St. Louis, Mo., Annual Automobile Show.
March 3-8..........Pittsburgh, Pa., Annual Automobile Show.
March 8-15.........Boston, Mass., Annual Automobile Show.
March 17-22........Buffalo, N. Y., Annual Automobile Show.
March 19-26........Boston, Mass., Annual Truck Show.
March 24-29........Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Sept. 29-30........St. Louis, Mo., Track Races, Universal Exposition Company.
Sept. ....Washington, D. C., Reliability Run, Automobile Club of Washington.
Oct. 7-20..........Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 21............National Tour American Automobile Association.

Proposed Contests

Sept. 28...........Indianapolis, Ind., Track Races, E. A. Moross.
Sept. 28...........Kalamazoo, Mich., Track Races, Inter-State Fair.
Oct. 4-5...........Sioux City, Ia., S. C. Auto Club and Speedway Association.
Oct. 4-5-6.........Peoria, Ill., Track Races, J. A. Sloan.
Oct. 12............Springfield, Ill., Illinois State Board of Agriculture.
Oct. 12............Salem, N. H., Track Meet, Rockingham Park.
Nov. 6.............Shreveport, La., Track Meet, Shreveport Automobile Club.

The AUTOMOBILE

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Large-Diameter Tires

JUDGING from a 2000-mile road test on which 7-inch pneumatic tires were used on a car with loads weighing over 5000 pounds it is certain that tires of this diameter are going to receive much more attention than they have up to the present. Several cars have been equipped with tires of this diameter, tests with them have been made over rough roads, and in every case the judgments given have been uniform, namely, that they are a big improvement in many respects over smaller sizes.

Instead of using a pressure of 75 or 80 pounds per square inch as would be used on a 36 by 5-inch size pressures of 40 pounds are possible with a 7-inch size on the same diameter of wheel. Using so low a pressure greatly reduces the possibilities of blowout, due to temperature rises in hot weather, and so adds to the period of usefulness of the tire. The large-diameter tire has been introduced because of its resilience due to the much greater distance between the wheel rim and the tread of the tire.

With the large-diameter tire a much larger rubber surface is in contact with the ground at all times and this results in a reduction in skidding as compared with smaller tire sizes running at much higher air pressures. In actual tests this anti-skidding factor has been much greater than first imagined and drivers consider it one of the merits of the large-diameter tire.

Front-Door Policy

Surroundings Influence Results

THE atmosphere of the business offices of an automobile factory is reflected in all of the manufacturing departments—it permeates every department from raw stock to the final assembly.

The slovenly factory head has his office more like the corner of a stockroom than a manager's sanctum. Disorder is its chief characteristic. The business units are promiscuously positioned around the room; the window blinds are at varying heights; submitted accessories or other units that should find a resting place on the shelves of the engineering department are strewn over the floor; the manager's desk bears close resemblance to a scrap pile in a foundry yard, it contains broken pieces of car parts, selling orders, parts orders and a score of other things; in a word, the entire room breeds a feeling of utter lack of business, and, while at heart the business executive may be a Napoleon, the influence that his surroundings have on those who come in contact with them cannot possibly be salutary.

Visit the factory and in not a few departments the same lack of system is apparent. The machine shop is ill-kept. Instead of cuspidors beside the various machines, the workmen are left to their whims; the floors are not regularly swept, and when cleaned it is only a semi-cleaning; raw stock, instead of being neatly piled at convenient places to await its going through the miller, the lathe or drill press, lies around in disorder; racks for carrying small parts to be machined and other racks, on which the workman can place them after machining so that he has not to move away from his machine or stoop to pick parts off the floor, are entirely wanting; several machines instead of being erected on substantial bases are poorly mounted, reducing their efficiency and, perhaps, the accuracy of their work; adequate provisions are not made for properly lighting the factory so that in the early fall and winter the efficiency percentage of the workman is sadly reduced because of lack of good light; poor ventilation is general; often machinery is not mounted with the aim of greatest economy of space, greatest lighting capacity, greatest ventilation and minimum handling of material—**from Alpha to Omega it is a poorly arranged, poorly conducted factory—every department in it reflects the dominating shortcomings of the management.**

Careless environments engender careless workmanship: It is not surprising in such a factory to find a high percentage of discarded parts due to over-allowances. The very atmosphere of the factory breeds such a condition. Men in such a factory work at much lower capacity than in a highly-organized and efficiently-conducted plant. Contrast the assembly work on a car in such a plant with that done on another make of car in which environments are so different. Contrast the workmanship with that in a plant where workmen on careful parts are required to wear white linen or cotton coats in order to impress on them the importance of cleanliness and accuracy. Contrast the work with that in a factory where the floors are kept clean every hour of the working day, where ventilation is looked after, where light falls upon the work at the correct angle, where individual towels are furnished for the workmen, where the entire atmosphere is order, cleanliness, brightness and system. **The result shows in the work, it exhibits itself in the manufacture of every part entering into the make-up of the car, it exhibits itself in the assembly of the car parts, in fact, it exhibits itself in every component part of the machine.**

A man's work cannot be any better than its creator. If the man is ill at ease, his work will be unreliable. If the worker operates in orderly surroundings, he will instinctively put the best there is in him in his work. The highest efficiency—which incidentally is economy in its strictest sense—can only be had as a result of the supreme effort which is the result of suitable surroundings. The investment, on the other hand, by which these effects are brought about, is comparatively small and pays for itself immediately and at a very high rate of interest.

Country's Fire Chiefs Meet in Convention at Denver

(Continued from page 622)

let the contract for twenty-eight tractors. Sixty-one new companies are being organized fully motorized. Instead of stables the stations are garages.

In illustrating the dependability of the tractors in the Passaic service, Chief Bawker stated that during the 18 months in which they have been pulling the trucks, there has not been a time when the alarm has sounded that there has been trouble in starting, and when started the tractors have always arrived at and returned from the fire without trouble or delay. There are some very steep hills in the city of Passaic but the tractors make 8 miles an hour on the steepest of them.

Bad Weather Has Little Effect

In the winter season when snow and ice cover the streets it does not interfere to any extent with the operation of the tractors. In one instance, Chief Bawker states, it snowed continuously for 24 hours when an alarm was turned in from the hill section of the city. A speed of 15 miles an hour was made through streets unbroken by traffic. The best horses could have done under similar circumstances would have been 5 miles per hour.

With tractors doing so well it is to be expected that apparatus in which the motor is on the same truck would do as well or better in snow and ice, for in the latter type the weight is on the driving wheels, where it should be to give traction.

According to Geo. C. Hale, Fire and Water Commissioner of Kansas City, Mo., a motor-driven three-way combination got to a fire and handled it through 26 inches of snow when all the horse-drawn equipment became irretrievably stuck. With chains on all four wheels and the load helping to give traction these motor-driven pieces can go through storms that horses cannot face.

For experiences in snow, one would imagine Calgary, Can., to be the city offering the most rigorous conditions, but James A. Smart, chief of Calgary's fire department, says that the snowfall is not great but is very dry and often drifts to a depth of 2 or 3 feet. He has had in use for the past three winters a 40-horsepower squad wagon and during that period has never been tied up and never failed to reach a fire under any weather conditions.

Mr. Smart believes that motor-driven apparatus has the advantage over horse-drawn apparatus wherever the use of wheels is possible and only in the use of runners has the horse-drawn apparatus the questionable advantage, for in severe storms horses will not face the average blizzard of the Northwest, and the motor will. Under light flaky snow, Chief Smart says he has seen 75 per cent. of the horses fail in attempting to reach a fire on asphalt pavement up a slight grade, that the motors negotiated without difficulty. The Society for the Prevention of Cruelty to Animals never had a spasm at seeing a motor standing facing a blizzard.

There is not the unanimity of opinion in regard to the availability of the gasoline motor as a pumping engine that there is as to its advantages as a propelling unit.

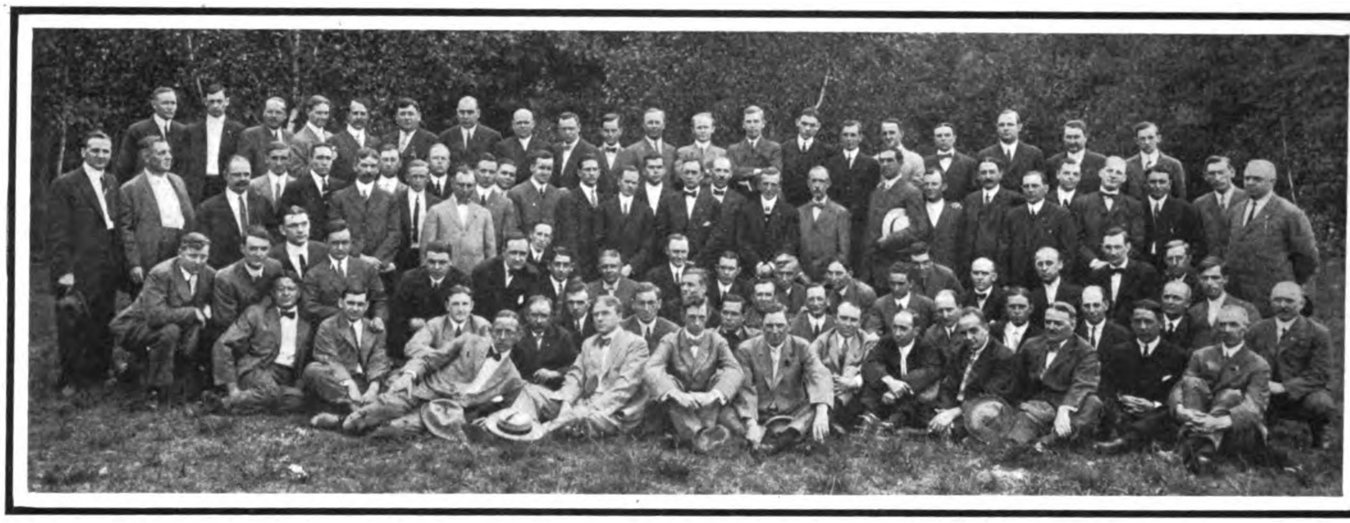
Chief Magee, of Dallas, Tex., allows but one man to look after his motor pump and permits no one else to lift the hood. He cites one long stretch of work which proved the reliability of the motor pump to his satisfaction. After getting the pump to the fire in record time the motor pumped water for three lines of hose for 17 1-2 hours and for one line of hose for 3 hours longer. The operators of the Dallas motor pumps number three to each pump and work on three shifts. One of these is called the chief engineer.

Motor pumps as distinguished from steamers have not yet proven their entire reliability to the complete satisfaction of many fire engineers, who hold that though the gasoline engine is the best method of getting the pump to the fire, the steamer is the better for doing the pumping. One of the reasons advanced by the adherents of the steamer as a pump in conjunction with the motor as the propeller, is that it is asking too much of the gasoline engine in its present state of imperfection, to expect entire reliability for hours of steady work at top load after it has been pushed to get the pump there in the shortest possible time. Adherents of the motor pump say that if the motor is looked after and operated by a competent man, and by that man alone, there need be no fear of premature exhaustion of the motor from overwork.

Frozen Hydrants a Problem

Another objection against the motor pumps is that with the present arrangements their exhaust gases cannot be used to thaw out frozen hydrants as is done with live steam from the boiler of the steamer. In answer to this, those who uphold the motor pump say that when the hydrants are properly installed and looked after, they will not freeze. Nevertheless, hydrants do freeze, and some means must be provided to thaw them out. Chief Kenlon urges the use of electricity in the same way as it is employed on water pipes and even suggests that the motor pumps carry with them an arrangement of some sort for utilizing the power lines and lighting mains. Chief Ringer, of Minneapolis, states that alcohol in the quantity of about a pint thaws the hydrants in a short time. Means for thawing hydrants with motor pumps is a question that the makers will have to solve.

There is another point in which motor pumps of some types at least are weak, although makers are waking up to the fact. As pointed out by George W. Booth, chief engineer of the committee on fire prevention of the National Board of Fire Underwriters, in his paper presented last week on the efficiency of the motor pumping engine, the chief reasons for the breakdown of motor pumps during service is the continued running at high speed. It is the opinion of all the engineers who have observed tests of motor pumping engines, that these machines should be provided with high-powered motors.


Branch managers and salesmen of the Fisk Rubber Company, Chicopee Falls, Mass., assembled during their recent conference

FISK Salesmen Hold Conference—From September 9 to 14 branch managers and salesmen of the Fisk Rubber Company, Chicopee Falls, Mass., were in conference at the factory. This conference ended at a clambake, and the above illustration represents the sales organization of that company.

Clarke with Chalmers Company—J. I. Clarke, formerly with the Boston "Post," has taken a position in the advertising department of the Chalmers Motor Company, Detroit, Mich.

La France Company's Bulletins—The American-La France Engine Company, Elmira, N. Y., makers of motor fire apparatus, is issuing monthly bulletins which give valuable advice to city officials who are contemplating the purchase of fire trucks.

Indianapolis Collects $25,000 on Licenses—Approximately $25,000 has been collected by the city of Indianapolis, Ind., so far this year for motor vehicle licenses. Until this year the annual fee was $3 and the amount raised last year was $7,800.

Columbus Club Fighting Ordinance—The Columbus Automobile Club, of Columbus, Ohio, will make every effort to secure the repeal of the recent ordinance that provides that an automobile while passing a street car discharging passengers must come to a full stop.

Omaha's Automobile Floral Parade—Many entries are being received for the automobile floral parade to be given in Omaha, Neb., during the Ak-Sar-Ben festivities early in October. A number of neighboring towns have expressed their intention of entering cars.

Drawback on Gear Duty—Under a ruling of the Treasury Department at Washington, D. C., a drawback of duties will be allowed under section 25 of the tariff act of 1909 on gears imported in the rough and finished by grinding and polishing by the Gear Grinding Machine Company, of Detroit.

Y. M. C. A. Has Automobile Class—The Y. M. C. A. of Columbus, Ohio, in order to teach the intricacies of the automobiles to business men has started a class which meets every day between the hours of 12 M. and 1 P. M., which is quite popular among the business men of the Buckeye capital.

Havens Resigns from Abbott Firm—C. E. Havens has resigned his position as manager of the technical and service department of the Abbott Motor Company, Detroit, Mich., and is taking an extended vacation in an effort to recover his health. Mr. Havens was at one time connected with the Hudson Motor Car Company.

Indianapolis Club's Road Activities—An appropriation of $2,000 has been made by the Hoosier Motor Club of Indianapolis for the fund being raised to buy the material for building a rock road from New York to San Francisco. The club has endorsed the plan, as has the Indianapolis Commercial Club. The club on September 28 and 29 will give a sociability run to the farm of George Ade, at Brook, and to Kentland. A reception will be given by the Commercial Club of Kentland to the club on the evening of September 28. Those making the trip will spend the night at Kentland.

New Headquarters for Baker Brothers—The Baker Brothers Motor Company, Buffalo, N. Y., formerly located at 846 Main street, have moved into the building at 1227-1229 Main street which was formerly occupied by the sales department of the E. R. Thomas Motor Car Company, which concern recently went into receivers' hands. Although originally constructed for the display of automobiles, the Baker company has had the entire showrooms remodeled and the 1913 Cole car, of which the Baker Brothers Company is local agent, is now on display in the new building.

Novel Use of Stearns Car—D. M. Clark, of Prescott, Ariz., road superintendent of Yavapai county, is transforming his 40-horsepower Stearns car into a road-building utility. The rear seat has been discarded and replaced with a big air compressor. This apparatus will be driven by power from the auto's engine and attached thereto will be a big mine drill. When the remodeling is complete the automobile drill will be used in boring on the Copper Basin Road, which is to be widened and repaired. It is expected that it will be very valuable in rock work. Mr. Clark plans to patent his invention.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Albany, N. Y.	Hupmobile	Park Garage Co.
Albany, N. Y.	Lozier	C. S. Ransom
Albany, N. Y.	Stutz	Northern Motor Car Co.
Aledo, Ill.	Moon	E. B. Miller
Baltimore, Md.	Cutting	Baltimore Garage Co.
Bradford, Pa.	R-C-H	Smith Agency
Calgary, Alberta	KisselKar	H. H. Kerr
Carbondale, Ill.	KisselKar	Chas. F. Hamilton
Charleston, Mo.	Moon	Luke Howlett
Chicago, Ill.	Great Western	Deibler Motor Car Co.
Chicago, Ill.	Ohio	Mattoon Motor Co.
Circleville, O.	Hudson	Mader Auto Co.
Columbus, O.	Alco	M. P. Murnan
Columbus, O.	Cadillac	Curtin-Williams Auto Agency
Louisville, Ky.	Cole	Miles Auto Co.
Columbus, O.	Hudson	Hudson Sales Co.
Columbus, O.	National	C. E. Ross
Coshocton, O.	Imperial	Standard Auto Co.
Pittsburg, Pa.	Ohio	Ohio Motor Sales Co.
Columbus, O.	Overland	O. G. Roberts & Co.
Columbus, O.	Stearns	O. G. Roberts & Co.
Decatur, Ill.	Moon	North Main St. Garage
Detroit, Mich.	Lozier	Grant Brothers Auto Co.
Fort Plain, N. Y.	Franklin	Alphonso Walrath Co.
Harrisburg, Ill.	Moon	Chas. V. Parker
Indianapolis, Ind.	Abbott-Detroit	Andersch Brothers
Jersey City, N. J.	KisselKar	B. & H. Garage
Kinderhook, N. Y.	Studebaker	George H. Brown & Bro.
Lawrence, Mass.	R-C-H	Lambert Morin Mot. Veh. Co.
Logan, O.	Hudson	Gage Auto Co.
Louisville, Ky.	Franklin	Younger Auto Co.
Marion, O.	Hudson	C. C. Stoltz
Marinette, Wis.	KisselKar	Myron R. Churchill
Memphis, Tenn.	Moon	Chickasaw Motor Car Co.
Milford, Mass.	Oakland	William H. Baker
Milwaukee, Wis.	Imperial	Imperial Auto Sales Co.
Mineral Wells, Tex.	KisselKar	L. M. Dunn
Montreal, Que.	KisselKar	J. D. Lapoint
Newark, O.	Hudson	Charles W. Stevens
New Rochelle, N. Y.	KisselKar	H. A. Fuller & Co.
Pekin, Ill.	R-C-H	O. L. Cottingham.
Phoenix, Ariz.	KisselKar	Wesley A. Hill
Punxsutawney, Pa.	Moon	G. Frank Porter
Ravena, N. Y.	Studebaker	Snyder Bros.
Regina, Sask.	KisselKar	D. L. Boureau
Rice Lake, Wis.	R-C-H	Crisler & Co.
Rosenberg, Tex.	Moon	Rosenberg Motor Car Co.
Salina, O.	Hudson	Nickel Co.
Salisbury, Md.	KisselKar	L. D. Collier
San Angelo, Tex.	KisselKar	W. A. Bell
San Francisco, Cal.	Regal	Frank O. Renstrom Co.
Seattle, Wash.	R-C-H	I. D. Lundy Co.
Sheboygan, Wis.	Rambler	Erie Garage Co.
Sioux City, Ia.	Moon	Bennett Auto Sup. Co.
Springfield, O.	Abbott-Detroit	Dunbar Motor Car Co.
Springfield, O.	Elmore	Dunbar Motor Car Co.
Springfield, O.	Overland	Dunbar Motor Car Co.
Springfield, O.	Palmer-Singer	Blue Ribbon Garage
St. Johnsbury, Vt.	KisselKar	Percival & Silsby
St. Louis, Mo.	Moon	J. D. Perry Lewis
Syracuse, N. Y.	KisselKar	George Finck
Tacoma, Wash.	Stearns-Knight	American Auto. Co.
Taylor, Tex.	Moon	Prewitt Auto Co.
Temple, Tex.	R-C-H	J. E. Brown
Texarkana, Ark.	Moon	Paul Jones
Toledo, O.	Moon	Moon Sales Co.
Toledo, O.	Paterson	J. W. Banting
Wibaux, Mont.	Franklin	Wibaux, Mont.

COMMERCIAL CARS

Place	Car	Agent
Boston, Mass.	Daimler-Mercedes	R. L. & H. H. Smith Co.
Columbus, O.	Gramm	O. G. Roberts & Co.
Elyria, O.	Sanford	Edward E. Critz
Lynn, Mass.	Chase	Sibley & Green
Lynn, Mass.	White	Sibley & Green
Manassas, Va.	Sanford	F. A. Cockrell & Co.
Montreal, Que.	Sanford	Francis Hankin & Co.
Norwich, Conn.	Sanford	F. O. Cunningham
San Diego, Cal.	Sanford	P. M. Price

ELECTRIC CARS.

Place	Car	Agent
Springfield, O.	Krebs	Dunbar Motor Co.
Milwaukee, Wis.	Flanders	Kopmeier Motor Car Co.
Milwaukee, Wis.	Detroit	Smith-Hoppe Auto Co.
St. Louis, Mo.	Flanders	Colonial Auto Co.

Secures Arizona Essenkay Agency—R. Alyn Lewis, of Phoenix, Ariz., has secured the Arizona agency for Essenkay.

McWhirter Manager Rubber Company—H. D. McWhirter has been appointed acting manager of the Winnipeg Rubber Company, Winnipeg, Canada.

Haines Company Moves—Carroll A. Haines & Co., Baker electric distributers in Philadelphia, moved September 15 to their new and larger salesrooms at No. 1927 Market street, Philadelphia, Pa.

Page Joins Accessory House—Wallace G. Page, for many years connected with the Shawmut Tire Company as sales manager, has become associated with George S. Van Voorhis in the American Marine Equipment Company, 27 Haverhill street, Boston, Mass. This company has built up a large business selling automobile tires and supplies.

Mapping the Pasear Tour—The photograph shows the caravan of Studebaker cars used by Californians in laying out a model trip for tourists who will visit the 1913 exposition at San Francisco, Cal. The cars made the trip of 2,000 miles without repairs or adjustment to their machinery. The photograph was taken at Jawbone Pass, overlooking Mojave Desert.

New Boston Baker Quarters—F. N. Phelps and A. F. Neale, representing the Baker Motor Vehicle Company in Boston and surrounding territory, have taken new headquarters at No. 801 Boylston street. Mr. Neal is one of the Baker Company's oldest pleasure car dealers. F. N. Phelps represents the truck department of the Baker Motor Vehicle Company in a large part of New England.

Hear Sermon in Automobiles—To compete with the motor car, as he expresses it, the Rev. Louis Magin, pastor of First M. E. Church at La Crosse, Wis., is trying the experiment of holding outdoor services, the steps of the church being used as the pulpit. All motorists of La Crosse and visiting motorists have been invited to drive up to the church, remain seated in their cars and participate in the services from the curbstone.

Nebraskan Clubs Hold Meetings—The annual meeting of the Nebraska Automobile Association will be held in Lincoln, Neb., the last week in November. The Knox County Automobile Association held its annual meeting at Bloomfield recently, electing officers and appointing delegates for the coming convention. Many new members were added to the rolls. O. C. Turner, secretary of the State Association, was present and gave an address on the State and National bodies and on good roads.

Hoosier Members' Police Power—Special police powers have recently been granted a number of members of the Hoosier Motor Club, Indianapolis, Ind., for the purpose of aiding the Police Department in enforcing the speed law. One evening recently, W. S. Gilbreath, secretary of the club, ran down and arrested Baird Brill, who was running at the rate of thirty miles an hour. In police court Gilbreath "made his case," Brill being fined $30 and costs. The regular schedule of fines for speed violators in the Indianapolis police court is $1 a mile up to the maximum of $50 provided by the law.

Studebaker cars laying out the Pasear tour at Jawbone Pass

Baseball team of Streator Motor Car Company, Streator, Ill.

National in New Quarters—The National Motor Car Company, Pittsburgh, Pa., has moved into its new showrooms at Baum and Beatty streets.

Sandell Gets Oakland Appointment—Herbert S. Sandell has been appointed retail sales manager of the new Oakland Philadelphia, Pa., branch, 506 North Broad street.

Goodrich Declares Quarterly Dividend—The B. F. Goodrich Company, Akron, O., declared its regular quarterly dividend of 1¾ per cent on the preferred stock, payable October 1.

Hatter Resigns from Velie—C. P. Hatter, assistant manager of the Velie Motor Vehicle Company, Moline, Ill., has resigned and is succeeded by George Fitzsimmons, formerly with the Thomas factory at Detroit, Mich.

To Build 11,500 Oaklands in 1913—The Oakland Motor Car Company, Pontiac, Mich., announces that the plans for next season call for the building of 11,500 Oakland cars, and that this will necessitate a number of factory additions.

Halladay's Baseball Team—The Halladay baseball team, composed of employees of the Streator Motor Car Company, Streator, Ill., recently closed a very successful season, having played 26 games, winning 21 and losing 5. The accompanying photograph shows the team.

Automobiles Yield Big Revenue—A $91,497.19 gain in state revenue over the corresponding period of the previous year is shown in the report of Commissioner of Motor Vehicles Lippincott, who has remitted $440,509.89 to the State Treasurer as against $358,012.71 over last year.

Lasher Joins Abbott-Detroit—William J. Lasher has just severed his connection as branch manager of the Carl H. Paige Company, New York City, handling the Chalmers, to join forces with the Abbott-Detroit Motor Company, New York City. He will in his new capacity have charge of the agency business.

Winning Cars Bosch Equipped—At the recent Light Car Grand Prix of France, arranged by the Automobile Club of Sarthe, Zuccarelli driving a Lion Peugeot car gained first place, being equipped with a Bosch magneto. In the race for the Sarthe Cup, Coupé de la Sarthe, Goux in a Peugeot gained first place, also equipped with a Bosch.

Wilby's Across-Canada Trip—Thomas W. Wilby of New York City, who last year made a 9000-mile automobile tour of the United States from the Atlantic to the Pacific and return, is this autumn undertaking the first motor tour ever attempted across Canada. The tour is made for the purpose of mapping out a Canadian highway from ocean to ocean.

Association Opens Twelfth Branch—The Automobile Service Association, a mutual service corporation launched about a year ago, the main offices of which are located at Fifty-second and Chestnut streets, recently opened its twelfth branch, at Lancaster, Pa. S. M. Waasus is president of the association and G. W. Carrington is vice-president and general manager.

Dwight President Iron Firm—John H. Dwight, manager of the motor car body and wagon departments of the Mitchell-Lewis Motor Company of Racine, Wis., has resigned to become president and general manager of the Belle City Malleable Iron Company of Racine, Wis., which does a large business in supplying motor car manufacturers with castings of all kinds. Mr. Dwight succeeds W. C. MacMahon, who has become vice-president and manager of the Northwestern Malleable Iron Company of Milwaukee.

Road Improvement in Amarillo—The fact that Amarillo, Tex., is on the motor car tourist route between points in Texas south and east of here and Denver, as well as on the route between Oklahoma and Kansas points and New Mexico and other points of the Southwest, has forced upon the people of this section of the Panhandle the necessity of improving the highways, and with this object in view steps have been taken by the chamber of commerce of Amarillo and other civic bodies of this part of the state to not only improve the existing roads but to construct others that will be devoted exclusively to motor car travel. Signboards and distance markers will be placed upon all of the main highways.

Automobile Incorporations

AUTOMOBILES AND PARTS

CINCINNATI, O.—Federal Motor Supply Company; capital, $250,000; to manufacture and sell all kinds of automobiles, parts and accessories. Incorporators: George W. Platt, Emil C. Schmitt, R. L. Dollings, A. M. Draddy, M. F. Platt.

DETROIT, MICH.—Traveler Motor Car Company; capital, $15,000; to manufacture automobiles and accessories. Incorporators: Wm. J. McIntyre, Joseph P. Lavergne, William L. Kenfield.

FLINT, MICH.—Sterling Motor Company; capital, $300,000; to manufacture automobile engines. Incorporator: W. C. Durant.

INDIANAPOLIS, IND.—Martin Tractor Company; capital, $350,000; to manufacture automobile tractors. Incorporators: C. H. Martin, H. R. Richarss, E. D. Moore.

JOHNSTOWN, PA.—United States Motor Sales Company; capital, $50,000; to manufacture motors. Incorporators: A. C. Simler, J. L. Simler, C. H. Raymond.

NEW YORK CITY, N. Y.—Motor and Gear Improvement Company; capital, $1,250,000; to manufacture automobile parts, etc. Incorporators: Henry C. Derham, S. V. Brady, Dwight Partridge.

ROCHESTER, N. Y.—Lamay Manufacturing Company; capital, $25,000; to manufacture motors, etc. Incorporators: Arthur B. Headley, Philip E. Tucker, Arthur C. Lamay.

TORONTO, CAN.—Standard Motors, Ltd.; capital, $40,000; to manufacture automobiles. Incorporators: George S. Skinner, Harry A. Newman, George P. McHugh.

GARAGES AND ACCESSORIES

ALBANY, N. Y.—Taxicab Transportation Company; capital, $5,000; to run a motor car business. Incorporators: William Hildebrant, Elizabeth Hildebrant, Elsa Hildebrant.

BALTIMORE, MD.—Automobile Tire Repairing Company; capital, $500; to carry on a tire repairing business. Incorporator: L. Vernon Iller.

BOSTON, MASS.—Motor Service Company; capital, $2,500; to carry on a motor service business. Incorporators: Sanford Small, Harold Chisholm, Williams H. Evans.

BUFFALO, N. Y.—Buffalo Resilio Company; capital, $25,000; to manufacture and deal in tire fillers. Incorporators: Stafford D. Noble, Alexander D. Falck, Philip E. Lonergan.

CLEVELAND, O.—Pioneer Gasoline Company; capital, $10,000; to deal in gasoline. Incorporator: Edward J. Cherney.

DALLAS, TEX.—Automobile Owners' Protective Association; capital, $25,000; to carry on a garage for the use of members of the association, and to give legal advice. Incorporator: O. H. Bettes.

DETROIT, MICH.—Motor Patents Company; capital, $10,000; to manufacture machinery and mechanical devices. Incorporators: John W. Dyar, Sherman L. Depew, Earl W. McGookin.

DETROIT, MICH.—General Castings Company; capital, $2,000; to manufacture castings. Incorporators: F. Walter Guibert, J. C. Eckliff, D. Fitzgerald.

DETROIT, MICH.—National Automobile Owners' Protective Association; capital, $2,000; for the purpose of protecting automobilists. Incorporators: H. Bertram St. Clair, Henry O. Sage, Elmer H. Beach.

INDIANAPOLIS, IND.—Glover Equipment Company; capital, $20,000; to manufacture automobile accessories. Incorporators: Frank L. Glover, Leonard Gieger, William A. Uphrey, Louis A. Libkings.

INDIANAPOLIS, IND.—Showlater Manufacturing Company; capital, $10,000; to manufacture automobile bodies, etc. Incorporators: H. G. and F. W. Showlater, William Small.

JACKSONVILLE, FLA.—Chalmers Motor Company; capital, $15,000; to deal in automobiles. Incorporators: C. L. Bagwell, Garland J. Bagwell, W. Parker Holmes.

Richmond Clubhouse Nearly Completed—Completion of the new clubhouse of the Richmond County Automobile Club, Richmond, N. Y., is expected in a few weeks.

Willman, Sales Manager Warren—G. L. Willman, formerly connected with the Board of Commerce, has been made sales manager of the Warren Motor Car Company, Detroit, Mich.

Clark Makes Cole Change—A change in the Cole Kansas City distribution house has taken place. H. J. Clark, who formerly worked for the Cole distributers in Kansas City, secures the distributing business.

Essenkay Opens Buffalo Salesroom—The Empire Essenkay Company, which concern was incorporated recently at Albany, N. Y., to deal in that city in automobiles, has opened a salesroom at 248 Washington avenue, Buffalo, N. Y.

Morgan Joins Machine Company—C. L. Morgan, formerly sales manager of the electric division of the General Motors Truck Company, has resigned to take a position with the Moon-Hopkins Billing Machine Company of St. Louis.

Speedwell San Francisco Branch—The Speedwell Motor Car Company, Dayton, O., has established a branch in San Francisco, Cal., taking over the interests of the Speedwell Motor Car Company of California. R. Harry Croninger is manager.

Trego With Packard Company—Frank H. Trego has returned to Detroit from Buffalo, where he was chief engineer of the E. R. Thomas Motor Car Company, to take charge of the department of research engineering for the Packard Motor Car Company.

Sampson truck displacing sixteen mules in Santa Monica, Cal.

Foster Company's New Men—The Foster Motor Sales Company, Detroit, Mich., State distributers for Cutting cars, has secured the services of T. E. Ball as sales manager. Two other automobile men, George H. Irvine and Edwin G. Galvin have recently taken positions with the Foster Company.

Russell Company's Annual Conference—The branch managers and salespeople of the Russell Motor Car Company, Toronto, Ont., held their annual conference last week at the West Toronto headquarters of that concern, sessions including demonstrations of the new Russell models and a conference on automobile business matters.

Sampson in Oil Service—One of the latest concerns to dispense with their mule-driven transportation system is the A. F. Gilmore Oil Company, Santa Monica, Cal., which supplies oil for road work from their wells in the Santa Monica district. The Gilmore Company has recently purchased a five-ton Sampson truck and has fitted it with a huge tank of 1,100 gallons capacity. The accompanying photograph shows the truck.

Holmes Resigns from Swinehart—C. E. Holmes, formerly of the Diamond Rubber Company, Goodyear Tire and Rubber Company, and the late Southern manager of the Swinehart Tire and Rubber Company, resigns his position on September 15 to enter into the retail tire and vulcanizing business in Birmingham, Ala. Mr. Holmes has traveled East and South, representing the above firms for the past eight years, and is quite well known with the automobile distributors.

Studebaker's New Detroit Quarters—On October 1 the Studebaker Corporation will take over the new garage and showroom at Woodward and Charlotte avenues, Detroit, Mich., now occupied by the United States Motor Company, the deal involving a consideration of about $100,000. The Studebaker interests will use the property as headquarters of a recently formed Detroit branch which is at present located at Studebaker Plant No. 1 on Piquette street. The new headquarters will be managed by A. K. McLundy, Michigan sales manager.

Kurtschora President Battery Company—Martin W. Kurtschora, for many years manager of the Beaver Manufacturing Company, manufacturer of motors, Milwaukee, Wis., has purchased the controlling interest in the Northwestern Storage Battery Company, of Milwaukee, and will assume the active management. Officers of the reorganized company are: President, Martin W. Kurtschora; vice-president, E. D. McLaughlin; secretary, F. E. Scudder; treasurer, William Jacobs. The new management is outlining a policy of immediate expansion.

Automobile Incorporations

MARIETTA, O.—Gerhart Spring Tire Company; capital, $15,000; to manufacture vehicle wheels of all kinds, including automobile tires. Incorporators: J. A. Gerhart, G. O. Salzman, Casper Hopp, O. C. Mohler, A. A. Schramm.

MARLINGTON, W. VA.—Marlington Garage Company; capital, $10,000; to carry on a garage business. Incorporators: F. T. McVlintic, C. A. Yeager, M. E. Pue, C. R. Goodall, L. S. Shoemaker, G. W. Clark.

MINNEAPOLIS, MINN.—O. Fenstermacher Company; capital, $300,000; to deal in automobile supplies. Incorporators: O. Fenstermacher, T. O. Fenstermacher, Fred Chambers.

MONTREAL, CAN.—Mount Royal Garage Company; capital, $500,000; to carry on a taxicab business. Incorporators: James A. Brooks, George Ross, Sen. F. L. Beique, F. A. Beique, L. J. Beique.

NEW YORK CITY, N. Y.—Miller, Hicks & Hewitt, Inc.; capital, $10,000; to go into the automobile business. Incorporators: Harry D. Miller, Henry T. Hicks, George A. Hewitt.

NEW YORK CITY, N. Y.—Cameron-Rowe Auto Service, Inc.; capital, $10,000; to conduct an automobile service business. Incorporators: James Cameron, Norman Cameron, August T. Rowe.

NEW YORK CITY, N. Y.—Mercedes Daimler Selling Corporation; capital, $50,000; to carry on an automobile business. Incorporators: A. M. Becker, John A. Lemline, E. H. Ferguson.

NEW YORK CITY, N. Y.—Hunt & West, Inc.; capital, $10,000; to carry on an automobile business. Incorporators: Burton R. Law, John W. Collopy, Elly Z. Parker.

NEW YORK CITY, N. Y.—Volkmar Manufacturing Company; capital, $100,000; to manufacture automatic starting devices for automobiles. Incorporators: William M. Giegerich, Edward Giegerich, Bernard Volkmar.

NEW YORK CITY, N. Y.—Auto Despatch Bureau, Inc.; capital, $25,000; to carry on an automobile business. Incorporators: Walter Stackhouse, Harold Parker, L. S. Parker.

PEORIA, ILL.—Jefferson Automobile Company; capital, $30,000; to manufacture, repair and deal in automobiles, and operate garage. Incorporators: R. C. Uckena, Frank E. Howland, F. I. Archdale, W. C. Rounneberg, Cederic Howland.

ROCHESTER, N. Y.—Automobile Safety Fender Company; capital, $100,000; to manufacture automobile fenders. Incorporators: William A. Snyder, Abram DeWolf, Abram Bune, William D. Elliott, Abraham DePotter.

SAN ANGELO, TEX.—S. L. Henderson Company; capital, $10,000; to deal in automobiles. Incorporators: S. L. Henderson, J. S. Allison, George S. Alleson.

WELLSBURG, W. VA.—Brooke Automobile Company; capital, $10,000; to deal in automobiles. Incorporators: J. H. Scott, C. M. Magee, P. A. Chapman.

ST. LOUIS, MO.—Lewis Automobile Company; capital, $26,000; to engage in the automobile and garage business. Incorporator: J. D. P. Lewis.

WELLSBURG, W. VA.—Brooks Auto Company; capital, $10,000; to deal in automobiles. Incorporators: J. H. Scott, W. H. Scott, C. M. Magee, F. A. Chapman, E. A Fegan.

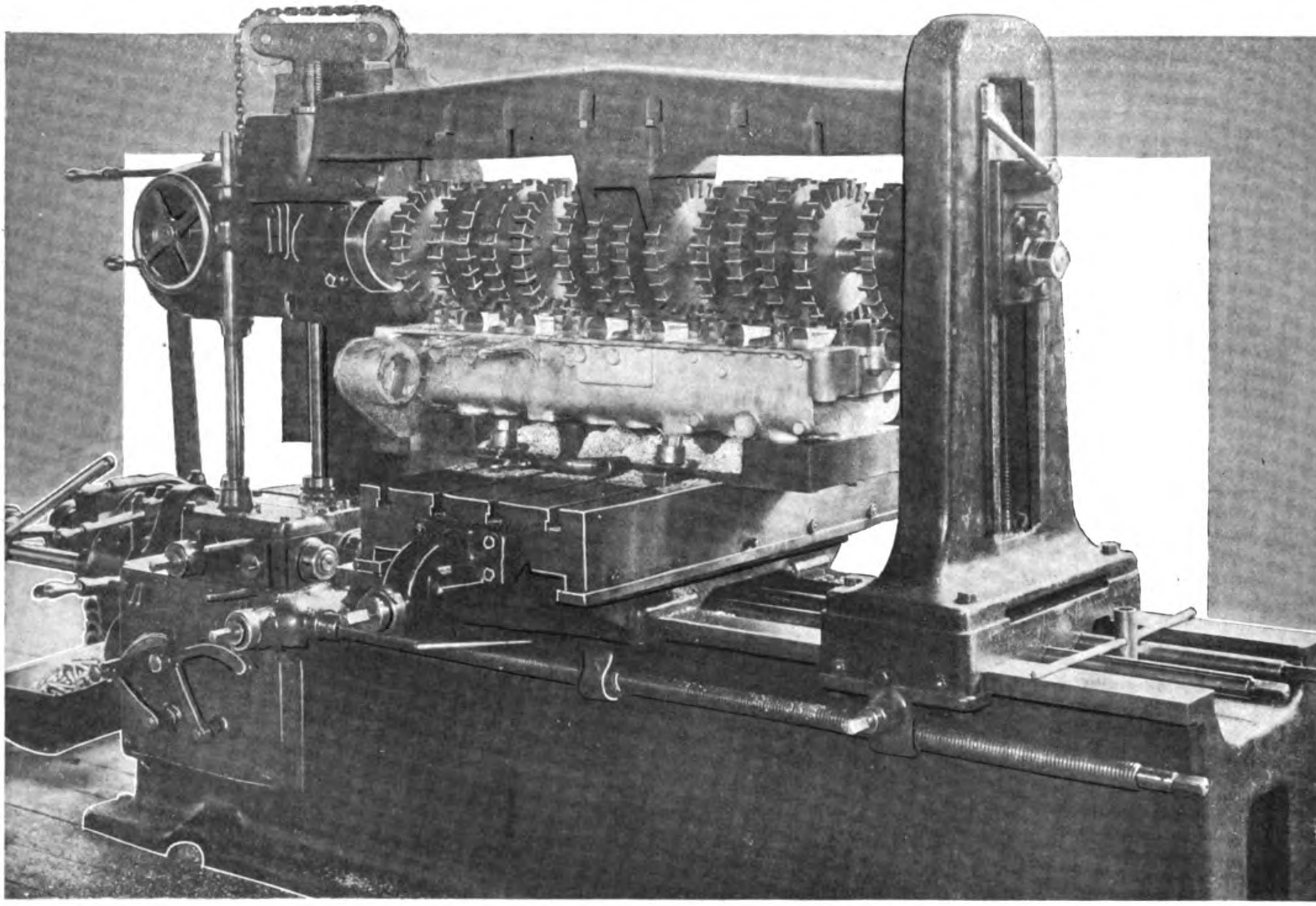
CHANGES OF CAPITAL.

DETROIT, MICH.—Kelsey Wheel Company; increase of capital from $500,000 to $1,000,000.

DETROIT, MICH.—Detroit Socket Company; increase of capital from $40,000 to $75,000.

JACKSON, MICH.—Hayes Wheel Company; increase of capital from $100,000 to $300,000.

TOLEDO, O.—Hupp Motor Car Company; increase of capital from $500,000 to $750,000.



Machine used for milling crankcases in the factory of the Peerless Motor Car Company, Cleveland, O. It mills a crankcase in 25 minutes

The machine depicted above accomplishes a large quantity of work in a very short space of time. It is used by the Peerless Motor Car Company in its factory at Cleveland, O., for milling crankcases. It will be remembered that the Peerless six-cylinder car has a seven-bearing crankshaft so it will be realized that the machine is accomplishing a large amount of work in completely finishing the milling work on one of these crankcases in approximately 25 minutes. The machine can work steadily during the working day of 10 hours and in that time will turn out 25 completed jobs. It requires but one man to run and take care of the machine. As will be noted from the above illustration, the milling of every part requiring this work is accomplished simultaneously. It is very easy to set the job up as the castings to be handled are of aluminum and consequently very light while the table carrying the work can readily be adjusted owing to its easily controlled mounting. The cost of operating this machine is low on account of the small wear on its parts, while performing the work and the fact that it requires but one man to operate it and to set up the work. One setting of the machine is all that is necessary for each job and when the piece is removed from the machine it is finished.

POPE COMPANY DOUBLES CAPACITY—The Pope Manufacturing Company, Hartford, Conn., has its plans nearly completed for a big four-story factory, to be erected to produce a line of lower priced cars. It is expected that this plant will double the capacity of the Pope plant. The accompanying photograph shows the Pope Manufacturing Company's proposed new building.

Packard Kansas Company's Plant—The Packard Kansas City Company, Kansas City, Mo., a subsidiary of the Packard Automobile Manufacturing Company, Detroit, Mich., will build a $30,000 plant at that city for repair works.

Ford Acquires Factory Site—The Ford Motor Company, Detroit, Mich., has acquired 51 acres of land adjacent to its branch plant at Walkersville, across the river from Detroit, with a view of permitting extensions to the plant.

Flanders Plant Enlarged—Extensive additions are now being made to the Flanders plant, Detroit, Mich., which when completed will more than double the floor space and bring up the output fom 3,500 cars in 1912 up to about 15,000 cars in 1913.

Olmstead Company Erects Additions—The Olmstead Traction Engine Company, Great Falls, Mont., which proposes to manufacture traction engines and automobile trucks, has made arrangements to erect two buildings. They are to be 50 by 200 feet in size and will be used for manufacturing purposes, while the other will be the office building.

Grand Rapids Company's Addition—The Page Automobile Hoist Company, Grand Rapids, Mich., is making negotiations with the common council for a lease of the old lighting plant on South Market avenue, which was abandoned when the city occupied its new lighting and water station on Monroe avenue. The business of the company has increased until it has been forced to seek more room.

General Vehicle's $600,000 Building—The General Vehicle has started a $600,000 plant in Long Island City, N. Y., which will form a unit of an extensive plant.

Croxton's Washington Plant—The Croxton Motor Car Company, Cleveland, O., is building a new plant at Washington, Pa., for the manufacture of automobiles.

Peteler Car Company's Building—The Peteler Car Company, St. Paul, Minn., is making arrangements preliminary to the building of a plant on a 23-acre tract recently acquired.

Negotiating for New Albany Plant—The Advance Power Company, Chicago, Ill., is negotiating for the plant of the American Automobile Corporation, New Albany, Ind.

Northway Plant Doubling Capacity—The Northway Motor & Manufacturing Company, Detroit, Mich., is preparing to double the capacity and to this end has awarded a contract for five new buildings.

Oakland to Build Factory Addition—A total of 300,000 square feet of space will be added to the factory of the Oakland Motor Car Company, Pontiac, Mich. These additions will be started at once.

Pontiac Firm's New Factory—The Pontiac Automobile Casting Company, Pontiac, Mich., has recently incorporated and has purchased a five-acre site and awarded a contract for the erection of a one-story building, 40 feet by 100 feet in size.

Hess Spring Company's Addition—The Hess-Pontiac Spring & Axle Company, Pontiac, Mich., maker of automobile springs, will build an addition, 62 by 54 feet, which with the addition now being completed, will double its present manufacturing capacity.

Whiting Company's Addition—The Whiting Manufacturing Company, Hartford, Conn., manufacturer of machine tools and automobile driving chains, is preparing plans for the erection of a two-story addition to its plant. It will be of steel and concrete construction.

Kissel Adds Two Buildings—The Kissel Motor Car Company, Hartford, Wis., recently added two commodious buildings to its plant at that city, and figured that the additional facilities thus provided would enable a less nerve-racking production schedule than that of last year.

Pierce Adding to Assembling Building—The Pierce-Arrow Car Company, Buffalo, N. Y., has awarded contracts for three additional stories to its truck assembling building. The size will be 184 feet by 244 feet, and one additional story will be added to each wing of its three-story body building, the sizes being 60 feet by 402 feet and 60 feet by 325 feet.

Julian Factory Under Way—Work has been started on the construction of the Julian Motor Company's new factory at Messina Springs, N. Y. A building site of 15 acres has been acquired and it is expected that the factory will be in operation by February 1, 1913. The company is comprised of Syracuse men who will put out the highest-priced motors in the country, for automobiles, boats and stationary work.

Peninsular Company Purchases Works—The Peninsular Steel Casting Company, recently formed by men of Detroit and Pontiac, Mich., to make lines of crucible steel castings that are in strong demand in the automobile industry, has purchased the former Michigan Bolt & Nut Works property in Detroit, Work of remodeling, building furnaces and installing equipment has begun and operations are expected to be started within 60 days.

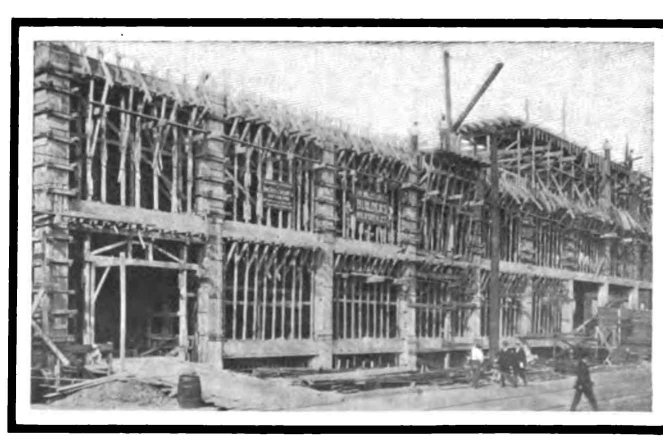
Remy Increases Factory Building—The Remy Electric Company, Anderson, Ind., has started the addition of two fire-proof buildings. The new buildings will give the Remy factory an increase of 10,600 additional square feet of floor space. They will be completed within three weeks. The factory is at present the largest of its kind in the world, employing over 1,000 men and working day and night shifts.

Motor Company Increases Capacity—The Milwaukee Motor Company, Thirty-second and Burleigh streets, Milwaukee, Wis., has completed additions and improvements which will increase its capacity by one-third. The company manufactures motors for pleasure cars and commercial vehicles, furnishing the power plants for all Imperial cars made at Jackson, Mich. More than $70,000 worth of new machinery and equipment has been installed during the summer months. The officers of the company are: President, E. E. Warner; vice-president, John D. Bowers; secretary and treasurer, Charles J. Kaiser.

Trabold Heads Johnstown Concern—Adam Trabold, who is one of the Johnstown, Pa., pioneers in the automobile business, is at the head of a new concern which has for its purpose the manufacture of high-grade trucks. Mr. Trabold has been working on the plans for such an institution for some time, but did not make his intention public until he was sure that a truck could be built that would stand up under the severe roads and heavy grades in that section, at a price that would be attractive to the purchaser of this class of vehicle. The first truck built was recently delivered to the Germania Brewing Company, of Johnstown.

Case Puchases Pierce Company—It is announced that the J. I. Case Threshing Machine Company of Racine, Wis., has purchased the stock, plant and rights of the Pierce Motor Company, of Racine, which has been building the Case car for the big farm machinery works for two years. The Pierce works will at once be consolidated with the immense Case works and lose its identity as a coporation. The change is simply one of name, as the principal stockholders in the Case company in July, 1910, purchased the entire stock issue of the Pierce company from A. J. Pierce, the noted motor designer, and his associates, at the same time that the Case company purchased the entire output of the Pierce works and began to market the cars under the trade name of Case. Thus the Pierce company has been for two years the property of the owners of the Case corporation.

New Fond du Lac Corporation—The R. C. Wells Manufacturing Company, a new corporation at Fond du Lac, Wis., has leased a large plant and will engage at once in the manufacture of electric lighting and starting systems for motor cars. The company virtually is the successor of the Duplex Coil Company, of Fond du Lac, Wis., which recently was purchased by the wealthy Rueping interests from E. J. Huber and his associates. R. C. Wells was the general manager of the concern, which manufactured coils, batteries, ignition devices and electric lighting systems for the motor car trade. The new corporation is capitalized at $200,000, the 2,000 shares being divided into 1,500 common and 500 preferred. The principal product will be an improved electric lighting system designed by Mr. Wells, although the production of all kinds of electrical devices will be continued.



View of the partially completed addition being made to the plant of the Pope Manufacturing Company, Hartford, Conn.

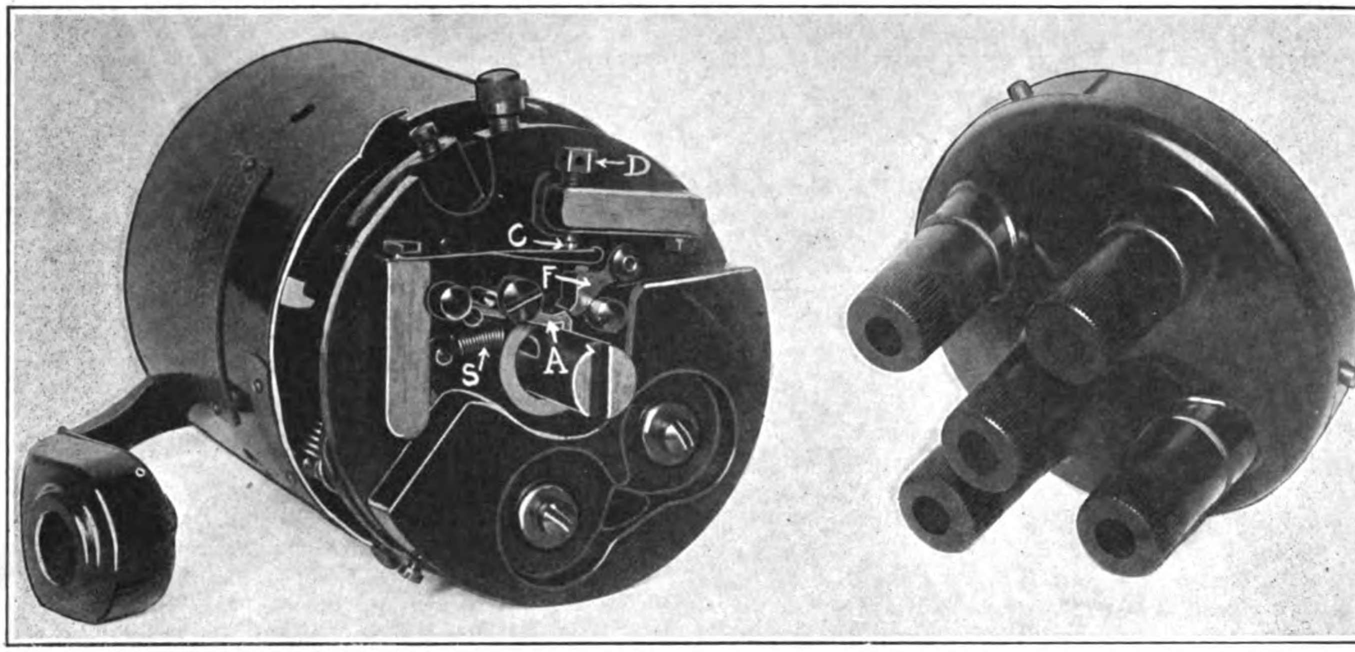


Fig. 1—Showing assembly of new Unisparker with rubber cover plate removed and details of the contact breaker mechanism

New Unisparker Has Automatic Advance

Improved Atwater-Kent Device Precludes Back Kicks—Is Silent in Operation

MODEL K Unisparker is now on the market. It is an improvement on its predecessor in that it embodies an automatic advance which makes it impossible for the motor to kick back when cranking. It is also more silent in its operation; the slight click which is made while making and breaking contact is hardly perceptible.

Realizing the increase in the use of the electric starting and lighting systems with the use of the storage battery for ignition, the Atwater Kent Manufacturing Works have turned their attention for the past three years to an instrument which would be of the utmost satisfaction when used with a battery ignition system. During the last seven years the former type of Unisparker has been on the market. It did not incorporate the automatic advance which is in the improved type but proved so popular that 75,000 of them have been sold during this time. With the introduction of the unique spark control and the added feature of silence the new system, according to the engineers of the Atwater Kent Company, has been brought to a state of perfection.

In appearance the device is cylindrical in shape and, when

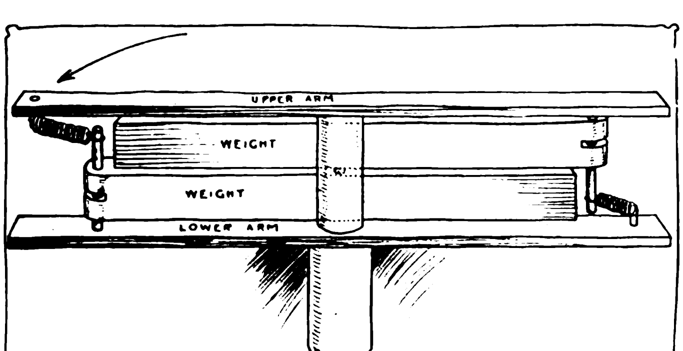


Fig. 2—Diagrammatic view, showing operation of automatic advance

completely assembled, is of the form shown in Fig. 4. The casing is of pressed steel while the cover piece containing the binding posts is of hard rubber. It is mounted on a vertical shaft which is driven at half the speed of the crankshaft. Within the casing are contained the governor which automatically controls the advance, the circuit breaker and the high tension distributor.

The governor is a highly ingenious modification of the regular centrifugal type. The first feature which is noticeable is the complete balance of the revolving parts. The weights, arms and springs which compose the mechanism are symmetrically disposed and remain so regardless of the motor speed. The principle upon which the automatic advance operates is illustrated in the diagrammatic view in Fig. 2. The lower arm marked in the sketch is attached to the vertical half-time shaft and is solidly fixed in relation to this shaft. The upper arm is entirely independent of the lower arm and the vertical shaft to which the upper arm is attached fixedly is capable of turning independently of the lower arm. The upper shaft corresponds to the one which operates the circuit breaker so that it will readily be seen that the time at which the circuit is broken will be sooner or later in relation to the vertical half-time shaft's position according to the position of the upper arm in relation to lower arm.

Assuming the motor to be rotating the lower shaft in a clockwise direction when moving slowly there will be no relative motion between the two shafts. The upper and lower arms will be in the correct relative position to cause the circuit breaker and distributer to give a spark at the correct time for cranking the motor or for driving very slowly. When the motor is speeded up the tendency for the weights to fly away from the center of rotation becomes stronger and the weights move away from the axis of the half-time shaft.

There are two sets of these weights or four weights altogether, one set only being shown in the illustration for the sake of clearness. Each pair of weights is pivoted together at their centers. A cross sectional view as in Fig. 4, shows the pivots which join the weights A, more clearly. When the half-time shaft starts to revolve rapidly, the weights will fly away from the center and at the same time, being pivoted together will rotate in relation to each other, while the pivoted point moves directly away from the axis. Each weight will pull the arm to which it is connected away from the center of rotation and as the weights are connected to the arms on different sides of the center this will give a relative motion of the arms. Since the arms are connected rigidly to their respective shafts the positions of these shafts will change in respect to one another. In order that the weights will not move away from the center too easily and give too great an advance at low speeds, the arms carry springs so arranged that the weights have to act against them when obeying the impulse of centrifugal force and moving away from the axis of rotation. Virtually each weight is a bell-crank lever with one point of connection at the point where it is pivotted to the arm and the other point of connection being where it is pivotted to the weight. The four weights thus give four bell-crank levers which work in the same direction at the same time against the four respective springs.

Referring to the sectional view of the governor in Fig. 4, the weights are shown at A, E is one of the springs connecting the lower arm B with the pivot pin holding one of the weights. B' is the upper arm and C, the connection to the half-time shaft of the motor. The distribution of the weights in the governor is shown plainly in the assembled view in the left side of Fig. 3. The slotted part shown in the illustration is the upper shaft which carries the circuit breaker and the distributer. The weights are labelled W1, W2, W3 and W4, in this view, while the springs are lettered S.

In Fig. 3, the governor and the circuit breaker are shown independently, while in Fig. 1 they are shown assembled. Referring first to Fig. 3 it will be noted that in the shaft with the slotted end there are four nearly crescent shaped indentations on the side of the shaft, one of which may be very plainly seen. The purpose of the indentations on the shaft is the operation of the circuit breaker through the trigger arm A in Fig. 1. As the shaft revolves, the trigger A in Fig. 1 or E in Fig. 4 engages with the slot in the shaft. As the shaft revolves it pulls the trigger with it against the spiral spring S, Fig. 1, or G, Fig. 4. until it has turned so far that the indentation in the end of the trigger no longer has a grip on the slot. The trigger is then released and snaps back, striking on its way the hammer F, Figs. 1 and 4. The hammer striking in turn against the contact spring C will bring the two contact points together and then permit them to fly apart with a make and break action so rapid that the eye can scarcely follow it. It will be noted that the stationary contact point is carried on a spring B instead of directly on the adjustment screw. The smallness of the moving parts and the short distances through which these parts travel reduce the noise to a slight click which is barely perceptible when the cover is on the device. As may be seen in Fig. 4, the wires are led through the casing A and connected to the interior binding posts on either side of the hole through which the wire enters. The current is led to the contact points from these binding posts through flat busbars which are insulated from each other and from the metal work on the interior of the box by hard-rubber and leather washers which are specially prepared to resist a high tension current.

Above the circuit breaker is the high tension distributer. This

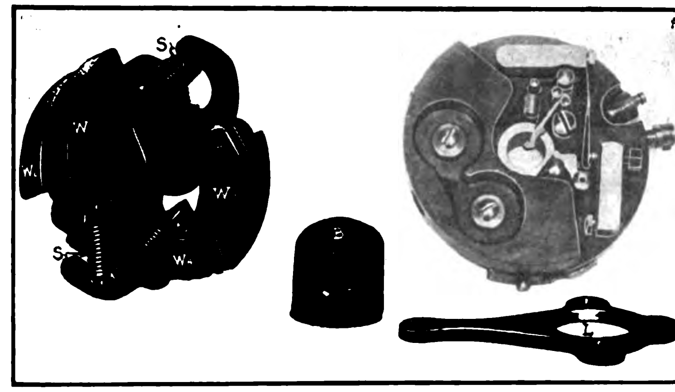


Fig. 3—Illustrating the centrifugal governor and circuit breaker

is shown in the foreground of Fig. 3 and again in Fig. 1. It is a hard rubber block which fits over the slotted shaft shown in Fig. 3. A key within the recess that contains the hard rubber shaft allows the block to become fixed to the shaft and rotate with it. The rubber block carries a segment of bronze which forms a wiping contact with the four distributer points embedded in the hard rubber cover. Each of these contact points is connected with a binding post from which a high tension cable is led directly to a spark-plug. There is no ground connection used rendering the entire system independent of other circuits such as that used for lighting or wiring systems, etc., should the latter become grounded.

One of the greatest advantages claimed by the makers for the Unisparker is that a perfectly synchronized multi-point igntion system may be installed by its use. It is claimed that the automatic advance is so regulated at the factory that two of these instruments could be used for the purpose of double ignition and that the resulting sparks would be simultaneous. The automatic advance feature does not interfere with the hand control of the spark but does in a measure render it useless except to an expert driver. There are very few drivers who carry the spark continually in the correct position. In driving through traffic for instance the speed of the vehicle is changing continuously and a driver has no opportunity to manipulate the spark to take care of every change of speed. For such an occasion the automatic advance is ideal. During the January meeting of the Society of Automobile Engineers in New York, the automatic advance was very thoroughly discussed and the advantages of the system in city work were clearly brought out. In country work, where the driver was not exceptionally skilled the difference in economy with the automatic and hand advance was little if any. With very skilful drivers greater economy was obtained with the hand control.

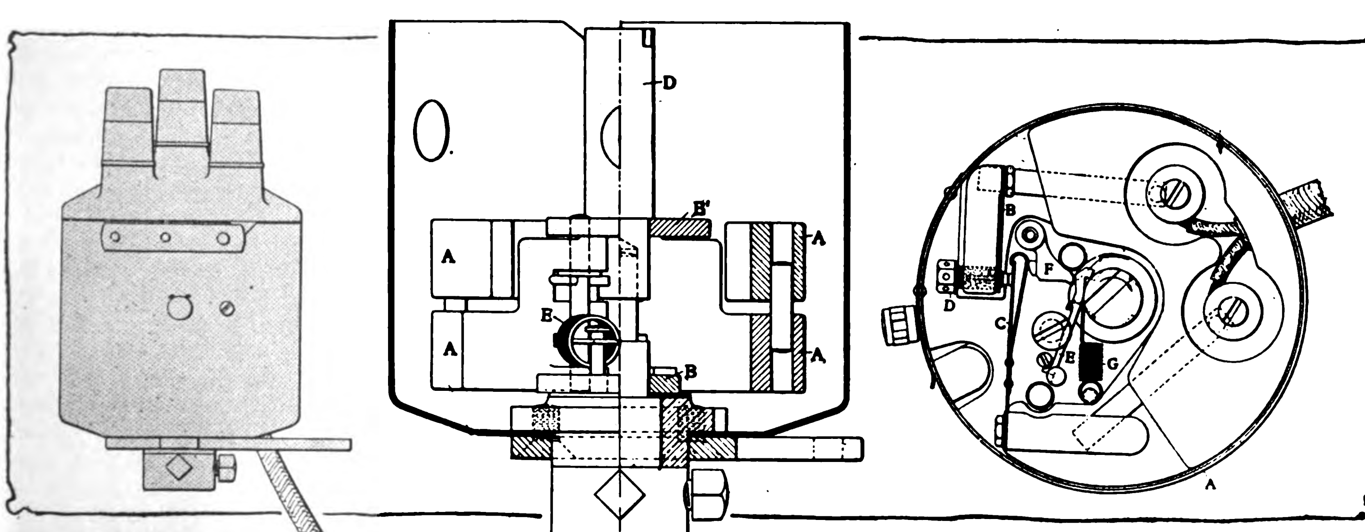


Fig. 4—Exterior view, transverse section through Unisparker assembly and plan view of circuit breaker with wiring connections

Rubber Glove for Steering Wheel; Tire Paint for Waterproofing Shoes; Cementless Inner Liner; Buggy Reach for Light Runabouts; Device for Turning Headlights in the Direction of Motion; Silver Plating Preparation

Steerease; a Rubber Wheel Grip

THE purpose of this article is to provide a good non-slipping grip on the steering wheel. It is made of rubber and slips over the rim of the wheel, being held in place by cement and its own elasticity and fit. This article, which is illustrated in Fig. 3, Steercase, replaces twine, rope and tape wrappings on the steering wheel and overcomes the principal objection to these, which are their unsightliness and the tendency of all windings of cord or rope to be tight on the inside of the steering wheel, but loose on the outside. The rubber used in the Steerease grip is moulded to the form of the steering wheel and does not require any preparation for putting it in place. It is simply slipped over the wheel and is then ready for use. The quality of the grip which it is possible to get on the wheel is better because the rubber is corrugated to such an extent that the hand cannot slip. A small flap on the rubber handle is left at each steering wheel spoke and as may be seen in the illustration the wheel grip is so designed that the ends of the spokes pass through the projections on the rubber giving a very neat and close fit all over the wheel. To apply Steerease, the steering wheel is thoroughly cleaned and dried to remove all moisture and grease from the surface. When thoroughly clean the Steerease is slipped over the wheel, adjusting the rubber neatly to shape and seeing that the edges fit closely together. The edges are then trimmed to conform to the spokes, should this be necessary, and then turn the edges back and apply the cement which accompanies the Steerease outfit. Allow the cement to spread as much as possible to secure a firm, solid grip and then wind with tape to hold the rubber in place. Let this stand over night, when the tape can be removed and the work is finished. Steerease is made by the Goodyear Rubber Hose and Parking Company, Philadelphia.

A New Preservative for Tires

Preserv-O is a tire paint packed in a cylindrical tin can with a friction cover. The can holds enough paint to cover six large tires. The object of the paint is to give a waterproof covering to the tire that will not only cover the exterior part of the casing, but will penetrate into the cuts and crevises, thus preventing water from working its way into the fabric and ruining the tire in a short space of time. The use of this paint will make the tires look like new, giving them a new white appearance. It is claimed by the makers that nothing is used in the paint that is not used in the manufacture of the tire itself. The preparation is made by the Atlas Auto Supply Company, of Chicago, Ill.

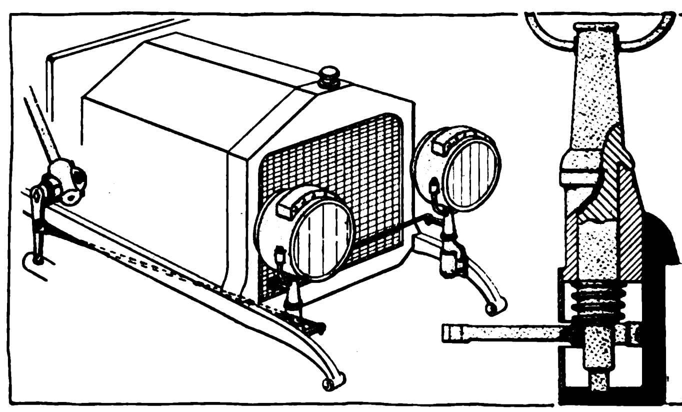


Fig. 2—Peters headlight turner interconnected with steering gear

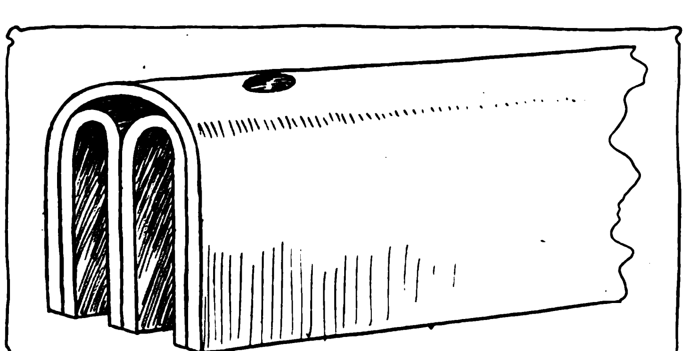


Fig. 1—A buggy reach suggested for use in light runabouts

Self-Vulcanizing Inner Liner

This is an inner liner which vulcanizes itself to the casing without the aid of any cement. It is made by Hagstrom Brothers Manufacturing Company, Lindsborg, Kan., who claim that a product of this kind has long been desired owing to the impossibility of getting the right kind of cement to fit the ordinary inner liner while on the road. A section of the inner liner is illustrated in Fig. 4. It is composed of four-ply, best quality Sea Island cotton thoroughly filled with raw rubber. There are no seams in the liner and special care is taken that there shall be nothing on its surface to chafe the inner tube. They are vulcanized at the factory to the exact shape of the tire and are given a soft cure. The adhesive property is given to the inner liner by a heavy coating of pure raw rubber cement which, it is stated, will positively not crumble or disintegrate under the stress of travel. The inner liner can be inserted on the road should the tire give evidence of being weak and will make the casing last for a sufficient length of time to carry the car through several hundred miles. It is applied by washing out the casing with gasoline and also the outer surface of the inner liner. When the gasoline on the latter has evaporated sufficiently to leave a sticky surface the liner is then gently inserted in the casing until it is flat against it around its entire surface. The flaps, which will be noted in the illustration, are then pulled out and passed around the bead of the shoe to be held by the clincher ring, thus preventing any tendency to creep.

A self-vulcanizing outside blow-out patch, which is also new on the market, is shown in the same illustration. This is put on over the shoe where the blow-out has occurred and will vulcanize itself firmly to the shoe, forming a fixed support for the weakened spot and not permitting sand or water to work its way into the shoe and destroy its integrity. The application of the outside patch is taken care of in the same way as the inner liner. The outside of the shoe is thoroughly cleaned by washing with gasoline and the interior of the blow-out patch is rendered sticky by the same kind of treatment. The patch consists of the same material as the inner liner, being Sea Island cotton thoroughly impregnated with raw rubber. It is made heavier, however, to take care of the wear which will be imposed upon it while acting as the tread of the tire for the time being.

Bryant Steel Runabout Reach

A steel reach has been brought out by the Rochester Pressed Steel Company which is designed to replace the wooden reach or the steel reach with the metal filler. The material used in the reach, a section of which is shown in Fig. 1, is high carbon annealed steel of from 19 to 20 gauge. The advantages claimed for the reach are that it cannot rumble, will cost no more than second-growth hickory which has been properly ironed and that owing to the double U-section it is impossible for it to buckle under the stresses of ordinary running. The bolt holes in the reach are not drilled but are embossed or corrugated, forming a supporting wall for the bolt. The hole is punched so that no stock is removed in cutting the hole.

Automobile Headlight Turner

This is a device for turning the headlights in the direction that the car is tending to go for the purpose of examining the state of the road on that side of the car. Ordinarily the rays of light which are thrown out by the parabolic headlight reflector do not permit of the illumination of the roadside and as a result when a turn is made the car is forced to traverse a dark stretch of ground which may be full of holes, broken bottles or any of the other perils of the road. The lamps are mounted on brackets which in form are similar to the ordinary brackets used on the stationary light. As illustrated in Fig. 2, the upright posts are pivoted and held in their correct positions by spiral springs which also check vibrations and permit no noise to emanate from this source. The interior construction of the bracket is shown in the sectional view. The main standard consists of a casting, bolted rigidly to the frame, within which the movable spindle, which supports the lamp fork, is pivoted. A

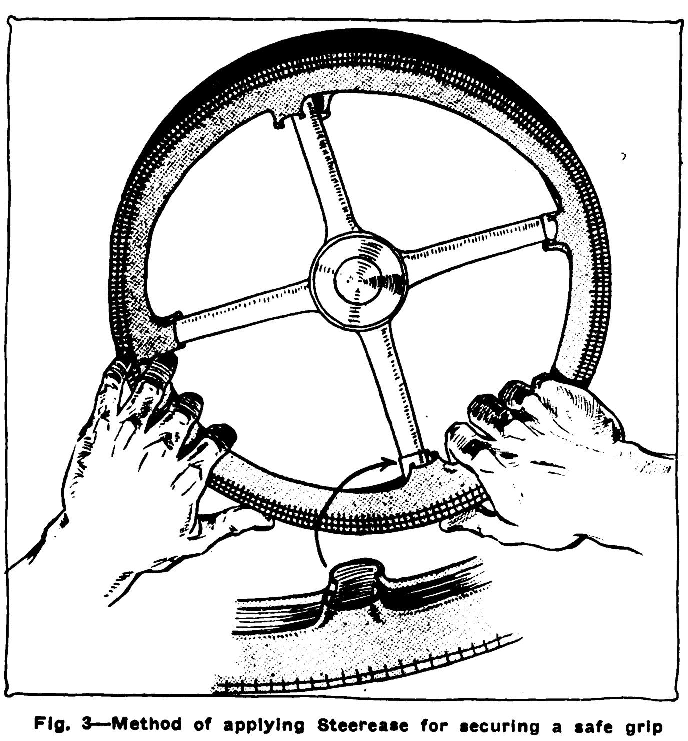


Fig. 3—Method of applying Steerease for securing a safe grip

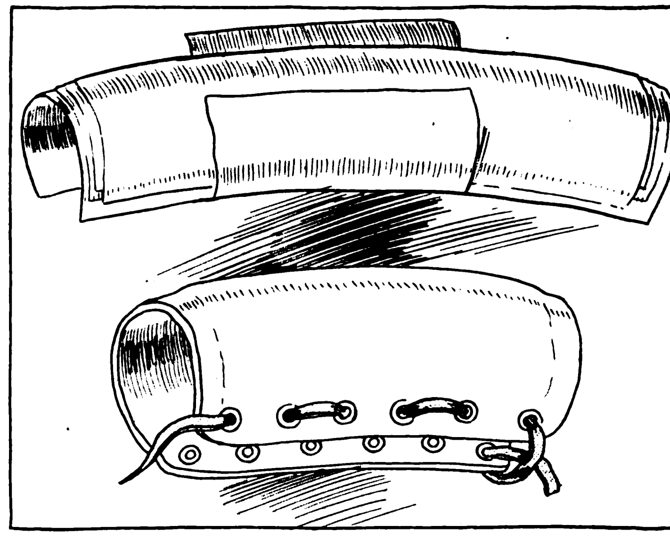


Fig. 4—Section of Hagstrom inner liner and outside blowout patch

spiral spring holds the spindle down in contact with a dust-proof bearing at the top of the stationary bracket, bearing against the shoulder on the spindle. Below the sprong, which is seated on its lower portion against a strap iron bracket, the spindle shank is square, and arms are disposed thereon. These arms extend behind the column and are connected by a tie rod. To one of the brackets is attached an additional control arm, which is connected by means of another rod to the steering arm, as shown in the illustration. All working parts with the exception of the two rods just mentioned are concealed and out of the way. H. D. Peters, of Sioux Falls, S. D., is the inventor.

Silver-Quick for Silver Plating

One rub with this material will silverplate brass or copper. Silver-Quick is a milky liquid put up in bottles holding about one pint. It has a smell similar to that of most metal polishes employing whiting as a base. To use Silver-Quick the article to be polished should be cleaned thoroughly and wiped dry. The bottle containing the preparation should be shaken to thoroughly mix the ingredients, which are held in suspension. A piece of cheesecloth is then saturated with the solution and rubbed on the surface of the article to be plated. Although it generally requires but little rubbing before the desired polish will be given the article, the application of the preparation should be continued until the entire surface has reached the desired polish. There will be a white deposit left after Silver-Quick has been used on a metal and this must be removed immediately with a dry cloth. After a week it would be well to replate the metal as this puts a thicker coat on the brass or copper and renders it more easy to take care of. After the metal becomes tarnished Silver-Quick can be used as a polish. This is one of the Atlas Auto Supply Company's products. This concern is located in Chicago.

Twentieth Century Tire Protector

An improved Twentieth Century tire protector has been brought out and called by the 20th Century Tire Protector Company, of Midlothian, Texas., the model 1913. It is of leather with a heavily studded tread. Its construction is of one-ply of chrome tanned leather which covers the casing from clincher bead to clincher bead. On the center of the protector is placed a tread which is built entirely independent of the body of the protector itself. It consists of two plies of imported Swiss leather tanned by a process which permits it to remain pliable after exposure to dampness. This tread is studded with hardened steel rivets which pass through the two thicknesses of leather on the tread and are clinched on the under side by a machine which presses the two prongs on the rivets far enough into the leather to make it perfectly smooth. The Swiss leather tread is attached to the main body by two rows of rivets.

Patents Gone to Issue

CARBURETER Construction—In which the unit controlling the air-flow consists of a funnel-shaped tube fitting into the mixing chamber port.

The carbureter described in this patent, Fig. 1, is of the float-feed type. The gasoline enters at G and passes through the float chamber inclosed in the container shell C to the air-controlling unit, which comprises, principally, a tubular shell S fitting into a central passage leading from the lower portion of the carbureter container into the mixing chamber. The shell is formed with a downward flaring portion fitting into the central passage mentioned above, while the upper portion of the shell, which is of lesser diameter than the flaring one, is surrounded by a retaining ring R. To hold the shell securely in position relative to the ring R a coiled spring S_1 is interposed between them. Throttles T and T_1 serve to regulate the amount of mixture supplied by the carbureter to the motor.

No. 1,037,834—to John W. Raymond, assignor to the Air Friction Carbureter Company, Dayton, O. Granted September 3, 1912; filed October 9, 1911.

Self-Contained Spark-Plug—In the interior of which a high-tension vibrating coil is located.

The spark-plug, Fig. 2, described in this patent comprises a moistureproof case portion C in which a spark coil C_1 and condenser are contained, which are connected to the outside of the casing, permitting of wiring the plug to a battery. A cap C_2 closing the coil case carries a vibrator V which may be connected to the coil makes a tight, frictional fit with the case C. The lower portion of the plug case is fitted with sparking electrodes.

No. 1,036,760—to Ernest V. Wilcox and Burton L. Lawton, assignors to the Connecticut Telephone & Electric Company, Meriden, Conn. Granted August 27, 1912; filed November 11, 1911.

Force-Feed Lubricator—In which a semi-rotary pump casing makes communication between oil outlets and inlets of the lubricator.

Fig. 3 shows the lubricator referred to in this patent, which consists of a fixed member F having a circular series of alternately arranged oil inlet and outlet ports and of a semi-rotary casing C which bears on the part F and carries a circular series of pump barrels. At the lower ends of the latter are ports which register in turn with inlet and outlet ports of the fixed part F. Pistons are moving in the pump barrels, which are reciprocated at the same time as the pump casing C is imparted a semi-rotary movement.

No. 1,036,929—to Hjalmar A. Swanson, Chicago, Ill. Granted August 27, 1912; filed December 1, 1911.

Motor Lubrication System—In which the overflow of oil is passed from the crankcase through a relief valve to the cylinder walls.

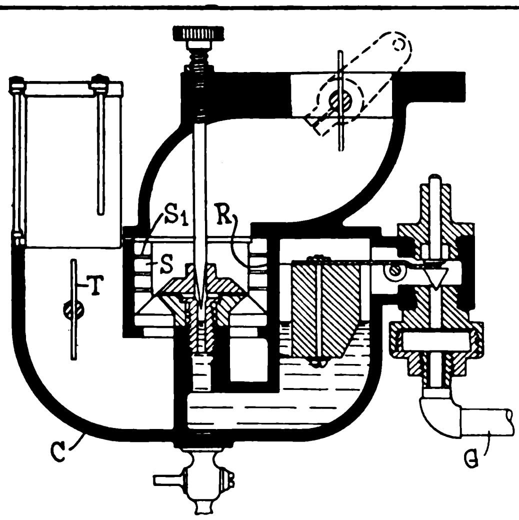
The method of lubricating a hydrocarbon motor described in this patent comprises the use of means for feeding oil under pressure to the crankshaft bearings and of a relief valve in this oil lead. The oil passing the relief valve is delivered to the interior of the motor cylinders and lubricates the pistons.

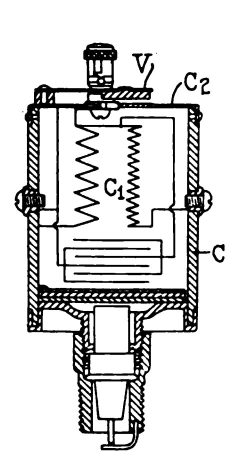
No. 1,036,756—to Sidney D. Waldon, assignor to the Packard Motor Car Company, Detroit, Mich. Granted August 27, 1912; filed June 16, 1912.

Automobile Engine Starter—In which the engine is cranked through a system of gears.

This patent refers to an automobile engine starter and consists of a starting shaft which may be moved longitudinally and rotated, being adapted to be engaged with the crankshaft by a clutch member. A gear is mounted on the starting shaft, being in mesh with a second gear mounted on a second shaft. On the latter shaft is also mounted a third gear wheel by means of a feather and spline connection. This gear is capable of being engaged with or disengaged from the second gear mentioned, means being provided for this purpose. Other means serve for imparting longitudinal movement to the starting shaft, whereby it is engaged to the clutch member of the crankshaft. On the second shaft mentioned above a ratchet connection is mounted by means of which intermittent rotary motion may be imparted to the shaft.

No. 1,038,286—to Edward M. Card, Bridgeport, Conn. Granted September 10, 1912; filed September 5, 1911.





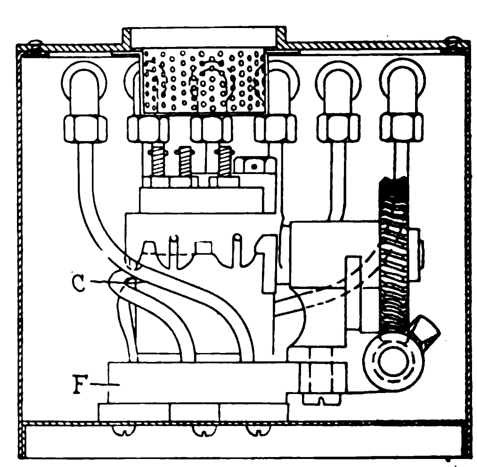


Fig. 1—Raymond automobile carbureter. Fig. 2—Wilcox-Lawton spark-plug. Fig. 3—Swanson force-feed lubricator

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The Automobile

De Palma Wins Vanderbilt Cup

Elgin Victor Repeats at Milwaukee—Averages 68.97 Miles Per Hour—Hughes, in Mercer, Second at 68.79 Miles an Hour—Tetzlaff, the Favorite, Leads Until Out in Lap 26—Pace Slower Than in 1911

IN the longest Vanderbilt Cup race on record, Ralph De Palma drove Mercedes 22 across the finishing line in front of the swift Mercer entry handled by the skillful Hughes, winning the classic in the comparatively slow time of 260:31, with a margin of 1 1-4 minutes. De Palma's victory, though well deserved and clean cut, was not the feature of the struggle. The meteoric flight of the Fiat under the handling of the dashing Tetzlaff and the bitterly hard luck that overtook the Italian car deserves its share of the limelight. Tetzlaff's mount made the pace from the drop of the flag and steadily increased its lead right up to the minute it succumbed. It made some rounds at the rate of better than 75 miles an hour and had lapped the whole field when the misfortune came. A broken driveshaft on the back stretch tells the story.

While the day was delightful overhead and under foot and the course better than at any time since it was selected, the time made was disappointing. The drivers took as few chances as possible and avoided jamming on the turns. The effect of this care is to be seen in the summary which contains the record of no accident. It did not make for record-breaking, however.

The course of the race was fractionally under 300 miles and is about 9 miles longer than the race of last year, which was won by a Lozier in record-breaking time, averaging 94.07 miles an hour.

It was faster than the Alco's time in 1910 or any of the previous marks established for the classic.

Even if the Fiat had stood up to the end, it is unlikely that the Lozier's time last year would have been equalled.

The race was thirty-eight laps of a course measuring about 7.88 miles around. Five cars completed the full distance and the Lozier entry was running at the end, but had completed only twenty-six laps.

The race of the Mercer was wonderfully good as Hughes was well up with the more powerful Mercedes pair throughout, outspeeding the Wishart car in the final quarter and causing De Palma to open his throttle to keep out from under foot.

The Stutz made a gallant showing, running the steadiest race of the field, reeling off round after round in a little over 7 minutes. The car lacked the supreme power to take the pace, but the remarkable sturdiness displayed attracted an immense amount of interest.

The Wishart and Clark Mercedes cars were in the hunt to the end, ready to come on and win if anything happened to the leaders. This did not eventuate as it happened,

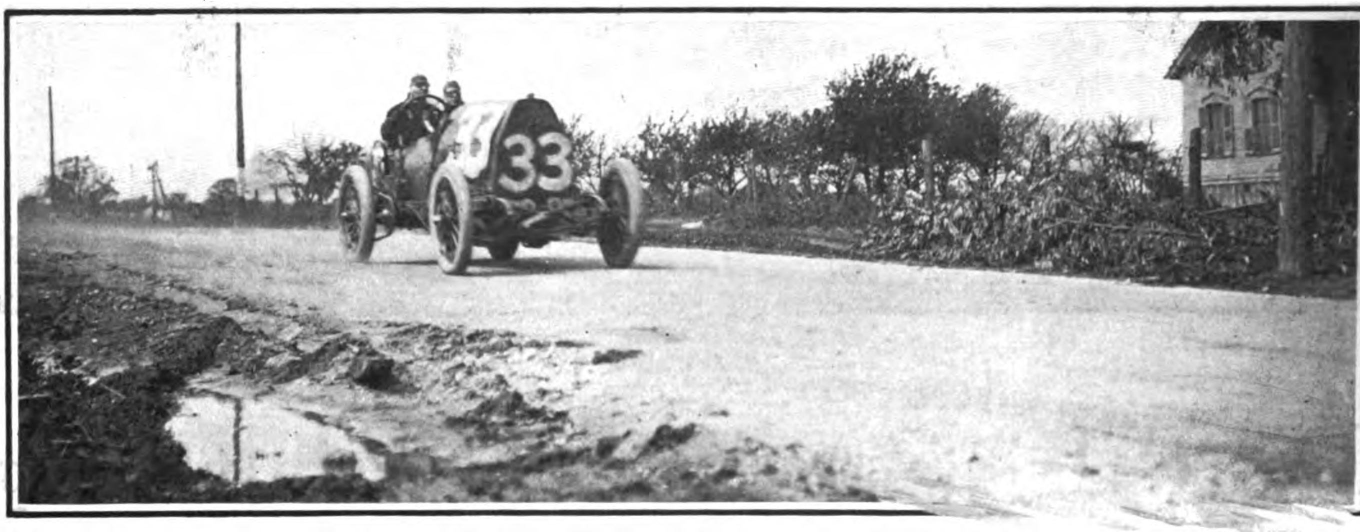
Ralph De Palma, Winner of 1912 Vanderbilt

THE SUMMARY

No. Driver	Car	M.P.H.
1—De Palma	Mercedes	68.97
2—Hughes	Mercer	68.79
3—Wishart	Mercedes	65.
4—Anderson	Stutz	64.6
5—Clark	Mercedes	61.6

PREVIOUS VANDERBILT SPEEDS

Year	Miles	M.P.H.	Year	Miles	M.P.H.
1904	284.3	52.2	1908	258.6	64.3
1905	283	61.4	1909	278.08	62.8
1906	297.1	60.8	1910	278.08	65.18
1907 Not held			1911	291.38	74.07



Teddy Tetzlaff in the Fiat leading the field at over 74 miles an hour in the Vanderbilt cup race at Milwaukee

but they performed with credit to themselves and the drivers.

The Knox had a short airing, succumbing in lap 5, after encountering trouble in two of the earlier rounds. It did well while it was going, but it did not go far. Magneto trouble was announced as the cause of the failure of the Knox.

A magnificent crowd witnessed the running of the race, it being estimated that the stands and points of vantage contained at least 50,000 enthusiastic spectators.

The sentiment of the crowd was with Tetzlaff's Fiat, and as the big car took the pace and whisked away from its competitors in the early stages of the race the Californian was cheered repeatedly by the assembly. He kept shooting the car along under this encouragement and as events proved out his pace was too fast. He was fortunate with his tires and was obliged to draw up at the pits only once. This came in lap 19 and for the first time thus far in the race the Fiat failed to gain on the average time of the contenders. The round was made in about 8 1-2 minutes, and when he started away once more the lead of nearly 10 minutes was not materially reduced.

At this point in the contest the majority of the crowd was willing to concede victory to the Fiat, but the contending drivers, notably the cool, crafty Hughes and the mercurial De Palma, maintained their slower pace in anticipation of just what did happen to the flying leader.

It was a magnificent bit of generalship which was largely overlooked by the crowd, but it paid dividends in the final result. This pair could not be persuaded to sprint with Tetzlaff, but they hung on each other's skirts for 100 miles, waiting, waiting, like a pair of hawks. They nursed their cars carefully, changing tires together and taking supplies as nearly as possible at the same time.

To those who were motorwise in the crowd, this duel was the most beautiful thing about the contest. They both seemed to realize that the Fiat could not survive such a terrific beating as she was getting from the Californian and that the final test would be between them.

The big German car and the little yellow Jerseyite proved to be well matched and the finish, while not so close as some of those developed in Vanderbilt Cup races, was close enough to keep the crowd on tiptoe.

That the Mercedes won was due to the extra power of its motor and the handling it received from a great driver.

As to the Mercer, it can be said that considering its size it made the most wonderful showing ever displayed in a Vanderbilt Cup race.

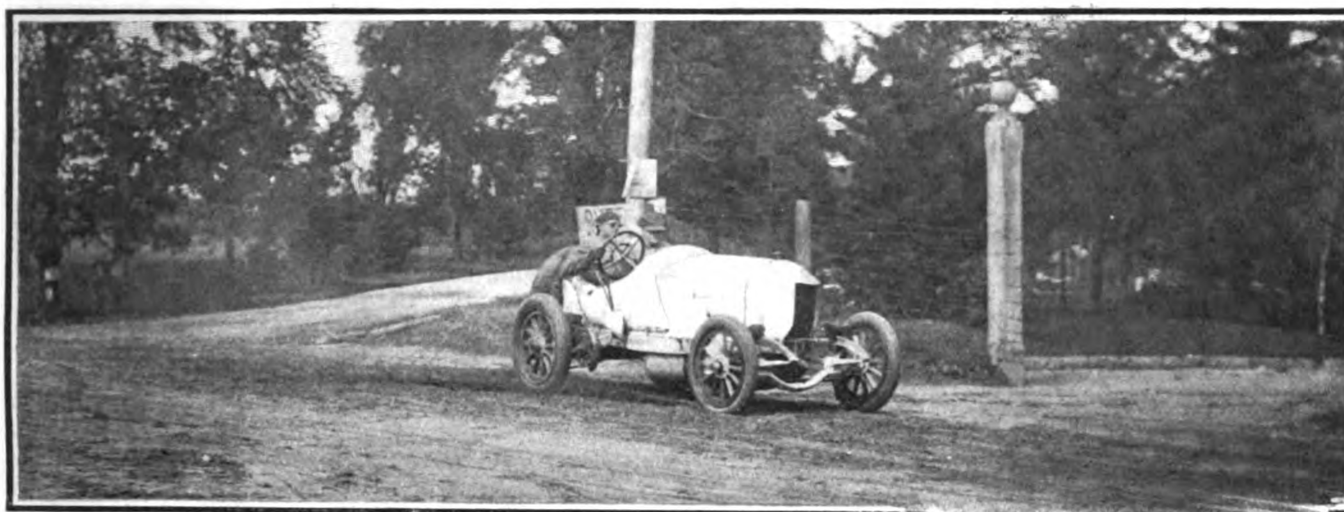
Although only five cars finished, their performance was consistent throughout and there was plenty of excitement for the 50,000 spectators who lined the course, mostly at the grandstand. Although no records were broken, the time was much faster than was anticipated by the officials of the meet and it looks good for the balance of the race to be run during the week.

De Palma, who crossed the tape well in the lead of most of his competitors, was wildly cheered by the spectators when he strolled back to the grandstand after putting his faithful Mercedes in its camp. It was easily seen that the big crowd was with the plucky driver, although they were sorry for the misfortune that befell Teddy Tetzlaff, who had driven at a daredevil pace until misfortune overtook him. De Palma drove a consistent race and the victory was deserved, coming as it did for the second time this year.

Considering the fact that the race was over a new course, the time which was made may well be regarded as remarkable. Every one rejoiced at the propitious weather conditions as well as at the state of the course which permitted the race to be run off in such good order from the viewpoint of both participants

RACE OF 299 MILES AND 2764 FEET (THIRTY-EIGHT LAPS OF THE COURSE) FOR THE

No.	CAR AND DRIVER	Lap Miles	1 7.88	2 15.76	3 23.64	4 31.52	5 39.40	4 47.28	7 55.16	8 63.04	9 70.92	10 78.80	11 86.68	12 94.56	13 102.44	14 110.32	15 118.20	16 126.08	17 133.96	18 141.84
22	**Mercedes**	Elap. Time	6:57	13:22	20:11	26:52	33:31	40:09	46:52	53:42	61:17	68:00	74:37	81:13	87:44	94:24	104:34	111:15	117:46	124:12
	De Palma	Lap Time		6:25	6:49	6:41	6:39	6:38	6:43	6:50	7:35	6:43	6:37	6:36	6:31	6:40	10:10	6:41	6:31	6:26
23	**Mercer**	Elap. Time	7:13	14:04	22:37	29:59	36:32	43:47	50:39	57:25	64:16	71:06	77:54	84:40	91:32	98:17	105:01	111:45	118:28	125:10
	Hughes	Lap Time		6:51	8:33	7:22	6:33	7:15	6:52	6:46	6:51	6:56	6:48	6:46	6:52	6:45	6:44	6:44	6:43	6:42
24	**Knox**	Elap. Time	6:31	13:17																
	Mulford	Lap Time		6:46	Out—Magneto trouble															
25	**Lozier**	Elap. Time	7:32	14:38	22:20	34:41	46:51	65:28	74:43	82:46	91:34	100:14	109:05	119:42	128:07	136:45	145:39	153:59	162:30	171:40
	Nelson	Lap Time		7:06	7:42	12:21	12:10	18:27	9:15	8:03	8:48	8:40	8:51	10:37	13:25	8:38	8:54	8:20	8:31	9:10
26	**Mercedes**	Elap. Time	6:52	13:14	21:33	27:59	34:23	40:48	47:15	53:14	60:22	66:53	73:25	83:33	90:18	96:55	103:07	110:05	116:45	123:27
	Wishart	Lap Time		6:22	8:19	6:26	6:24	6:25	6:27	5:59	7:08	6:31	6:32	10:08	6:45	6:37	6:12	6:58	6:40	6:42
27	**Stutz**	Elap. Time	7:23	14:32	21:40	28:46	35:54	43:02	50:12	57:21	64:29	71:36	78:57	86:11	93:26	100:40	107:54	115:10	122:27	129:45
	Anderson	Lap Time		7:09	7:08	7:38	7:08	7:08	7:10	7:09	7:08	7:07	7:50	7:14	7:15	7:14	7:14	7:56	7:17	7:18
28	**Mercedes**	Elap. Time	7:13	14:05	20:58	28:05	37:52	44:53	52:00	61:14	69:44	76:49	83:50	91:08	101:22	110:11	116:53	123:30	130:13	138:45
	Clarke	Lap Time		6:52	6:53	7:07	9:47	7:01	7:07	9:14	8:30	7:05	7:01	7:18	10:14	8:49	6:42	6:27	6:43	8:35
29	**Fiat**	Elap. Time	6:27	12:42	19:00	25:15	31:34	37:56	44:16	50:40	57:03	63:22	69:45	76:08	82:33	89:01	95:18	101:41	108:07	114:33
	Tetzlaff	Lap Time		6:15	6:18	6:15	6:19	6:22	6:20	6:24	6:23	6:19	6:23	6:23	6:25	6:28	6:17	6:23	6:26	6:26



Ralph Mulford in the big six-cylinder Knox taking a sharp turn on a back stretch of the course early in the race

and spectators. The latter were intensely interested and enthusiastic throughout the contest, cheering madly whenever a favorite driver forged to the front or made a spectacular maneuver and feeling correspondingly depressed when some one was obliged to retire. This was especially marked when Teddy Tetzlaff failed to finish the twenty-sixth lap and was officially declared out of the race on account of his driveshaft breaking on the back stretch of the course.

But the most interesting way to follow an automobile race is to watch it as it progresses, lap by lap, observing the changeful aspect of the situation, so let us begin at the starting line and keep right up with the field to the finish:

The Vanderbilt 7.88-mile race course is in very good condition, the best it has been so far. The weather is ideal and fast time is looked for, although the spirits of some of the drivers are somewhat dampened by yesterday's accident. There are no damp or soft spots and those parts of the course which were in bad shape a week ago have been carefully rebuilt. Fast time should be made.

De Palma in his Mercedes was the first at the line. Hughie Hughes, in the yellow Mercer, was beside him. Back of them were Mulford, in the Knox, and Nelson in the Lozier. The third pair consisted of Wishart, in Mercedes 26, and Anderson, in his Stutz. Clark, who disabled his car at Elgin, was at wheel of the third Mercedes, and he, together with Tetzlaff in the lone Fiat, brought up the rear. Pullen, who was to have driven Mercer 21 was disqualified by the technical committee yesterday because the piston displacement of his car was below the necessary 301 cubic inches. This made the number of starters eight. De Palma got a bad start and did not jump into motion as he usually does. Although his start was slow, he quickly shot away amid the cheers of the 50,000 spectators and the race was on.

Hughie Hughes came in for an equal amount of cheers and was off to a quick start with his Mercer.

The others came in for a like amount of applause and were off in the order mentioned.

Tetzlaff, the last to start, was easily a favorite with the vast throng. It was as though they looked to him to carry off the Fiat honors for himself as well as for his dead team-mate.

At the first lap, De Palma, Hughes and Mulford were running about evenly, although Tetzlaff appeared to be gaining. Wishart came next, having passed Nelson. Tetzlaff followed and was trailed by Clark. Tetzlaff tore past the stand and made the fastest lap of the bunch, completing the circuit in 6:27, at the rate of 73.4 miles an hour. At the end of the initial lap the order was Fiat, Knox, Wishart, Mercedes, De Palma, Mercedes fourth, and Hughes and Clark tied for fifth with Stutz seventh and Lozier last.

On the third lap, Tetzlaff was in the lead, closely followed by De Palma. Then came Clark, Wishart, Anderson, Hughes and Nelson in the order named. Mulford was held on the back stretch for engine trouble. The next lap saw no change in the positions of the two leaders, although Wishart changed places with Clark. The others retained their third-lap positions. Mulford bringing up the rear. On his fourth lap, Nelson stopped at pit on account of engine trouble. He was obliged to stop for 3 minutes on back stretch for the same reason.

Mulford was again forced to stop in his fifth lap for magneto trouble.

The trouble proved of such serious nature that Mulford was obliged to quit the race.

Clark was forced to stop on the back stretch in his fifth lap, which put him in fifth place and gave his former position to Anderson in the Stutz.

VANDERBILT CUP RUN AT MILWAUKEE, WIS., ON WEDNESDAY AFTERNOON, OCTOBER 2

19 149.72	20 157.60	21 165.48	22 173.36	23 181.24	24 189.12	25 197.00	26 204.88	27 212.76	28 220.64	29 228.52	30 236.40	31 244.28	32 252.16	33 260.04	34 267.92	35 275.80	36 283.68	37 291.56	38 299.51	M. P. H.	Pos.
130:38	137:16	143:41	151:47	158:13	164:32	171:03	177:33	183:57	190:29	199:44	206:31	214:01	220:45	227:26	234:00	240:33	247:15	253:59	260:31.54	68.97	1
6:26	6:38	6:25	8:06	6:26	6:19	6:31	6:30	7:24	6:22	9:15	6:47	7:30	6:44	6:41	8:34	6:33	6:42	6:44	6:32		
131:52	138:33	145:20	153:26	160:25	167:10	174:00	180:46	187:38	194:41	201:34	208:11	214:49	221:24	228:04	234:44	241:19	247:54	254:32	261:14.24	68.79	2
6:42	6:41	6:47	8:06	6:59	6:45	6:50	6:46	6:52	7:03	6:53	6:37	6:38	6:35	6:40	6:40	6:35	6:35	6:38	6:42		
179:30	190:16	199:24	208:10	217:33	227:05																
7:50	10:46	9:08	8:46	9:23	9:32																
130:12	139:24	146:16	153:04	162:05	168:57	175:38	182:35	189:24	196:12	207:06	213:52	220:37	227:26	239:51	248:58	255:38	262:56	269:36	276:35.75		3
6:45	9:12	6:52	6:48	9:01	6:52	6:41	6:57	6:49	6:48	10:54	6:46	6:45	6:51	12:25	9:07	6:40	6:58	7:00	6:59		
137:14	144:21	151:32	159:09	168:51	176:11	182:28	190:43	198:05	205:24	213:02	222:24	229:34	236:42	243:53	250:57	258:12	265:21	272:30	279:40.95		4
7:29	7:07	7:11	7:37	8:42	7:20	6:17	8:15	7:22	7:19	7:38	9:22	7:10	7:08	7:09	7:04	7:15	7:09	7:09	7:10		
145:51	152:38	159:19	166:15	173:04	179:48	186:32	193:17	200:08	206:53	214:03	224:25	231:33	238:28	245:22	252:19	259:42	268:46	275:38	291:39.75		5
7:03	6:47	6:41	6:56	6:49	6:44	6:44	6:45	6:51	6:45	7:10	9:22	7:08	6:55	6:54	6:57	7:23	9:04	6:52	6:01		
123:04	129:39	136:07	142:37	149:01	155:41	164:11															
8:31	6:35	6:28	6:30	6:24	6:40	8:30															

Hughie Hughes, who captured second place in the Vanderbilt with a Mercer

On his sixth lap, Nelson's Lozier developed brake trouble which put him out of the running, although on the stretches he appeared to be going well.

On the ninth lap, Tetzlaff was still way ahead, his average for the nine laps being 74.9 miles an hour. De Palma still second in the seventh lap, had covered a distance of 55 miles at an average speed of 70 miles.

It was in the ninth lap that Wishart, in Mercedes 26, succeeded in nosing De Palma out of second place. This Wishart held for three more laps, but on the twelfth, he was forced to stop at the pit to change a tire. This gave the second place to De Palma again. But all this time, Tetzlaff was fairly burning up the course, completing twelve laps or nearly 95 miles at an average speed of 75.4 miles an hour.

At the end of lap 13, with the race practically one-third run, the Fiat had established a commanding lead of almost 5 minutes and was going steadily at the rate of approximately 74 miles an hour. De Palma's Mercedes had maintained second place but was gradually losing. Wishart was third, ahead of the fast coming Mercer. The Stutz held fifth place with the Clark Mercedes and Lozier trailing, the latter completely distanced.

In the fifteenth lap, Wishart again forged ahead of De Palma. The latter was forced to stop at the pit to replace a tire. While at the pit, he also took this opportunity to replenish his oil and gasoline tanks. This allowed Wishart a lead of 22 seconds over De Palma, these two cars furnishing a neck and neck race so far.

From the ninth lap through the first half of the race, or about 150 miles, Hughes ran consistently in fourth position, while Anderson in the Stutz, Clark in the Mercedes, and Nelson in the Lozier, followed in the order named.

As to the three leaders, no change in their respective positions occurred from the fifteenth lap on through the nineteenth, or century and a half mark.

Considerable tire trouble developed thus far in the race, although up to this time Tetzlaff has not been troubled with his tires.

On his nineteenth lap however, he slowed up at the pit to the dismay of the crowd. A left rear tire was replaced and at the same time, water, gasoline and oil were taken on.

On his twelfth lap Clark lost time by misjudging his stop at the pit and being obliged to back up. He changed both rear tires and also took on gasoline.

De Palma's right rear tire had to be changed on the fifteenth round, in which operation 39 seconds were consumed.

Laps twenty and twenty-one were troublesome for several of the drivers although they made remarkably quick changes at the pits. Wishart took 28 seconds to replace a rear tire, a speed record for this operation.

At the start of the second half of the grind, Tetzlaff looked like a sure winner, he being 7 minutes ahead of his nearest rival, Wishart.

At the beginning of the twentieth lap, the contestants stood: Tetzlaff, De Palma, Hughes, Wishart, Anderson, Clark and Nelson. This order held for the next lap, but in the twenty-second, Hughes relinquished his position to Wishart. The former was obliged to stop at the pit for gasoline, oil and water.

Hughes, however, hit it up after thus rejuvenating his car and regained his former position in third place on the twenty-fourth lap. The other cars maintained their positions as at the start of the second half. On the twenty-second lap Anderson was obliged to stop at the pit for oil and gasoline, while in the twenty-third, Wishart had to stop to replace a front tire. Tetzlaff's average speed for twenty-five laps was 72 miles an hour, De Palma's 69.1, Hughes' 67.9 and Wishart's 67.4.

Tetzlaff died in front of lap twenty-six, while leading his field by almost 7 minutes, having averaged 72 miles an hour De Palma finished the lap in the lead. The Fiat had made the pace from the start and averaged fully 3 miles an hour faster than the next speediest up to the moment of withdrawal. The car was timed at 197 miles. The Mercer was second, 3 minutes behind De Palma. Wishart, Anderson and Clark followed in the order named. Nelson succumbed in lap twenty-five.

It was in his twenty-sixth lap that misfortune overtook Tetzlaff, when the drive-shaft of his big Fiat broke on the back stretch, putting him permanently out of the race. After going 205 miles, at an average speed of nearly 75 miles an hour, he was obliged to sit by the wayside and see the honors go to one of his rivals when it seemed almost certain that the race was his. Tetzlaff's hard luck recalled De Palma's fate at Indianapolis last June, and there was a murmur of dismay from the crowd when the husky voice of the announcer proclaimed that Teddy Tetzlaff, easily a favorite with them all, was out of the running for keeps.

Tetzlaff's fastest lap, and which proved to be the fastest lap of the race, was his third, when he completed the circuit in 6 min. 15 sec., an average speed of 75.70 miles an hour. This was 1.35 faster than the average time of last year's Vanderbilt.

With Tetzlaff's misfortune, De Palma took the lead, never losing the premier position from then on to the end, driving the remaining 94 miles at a dare-devil clip.

Nelson in his Lozier rounding the southeast corner of the course near the city limits

Tetzlaff out, Hughie Hughes, in his Mercer, assumed second position. It was only a matter of seconds between him and the leader to the end. Wishart was now third, Anderson fourth, Clark fifth and Nelson sixth. Excitement was running high, for it was seen that, should anything happen to De Palma, Hughie Hughes would be the victor. Only the time required for a tire change separated the leaders.

De Palma and Hughes knew this full well. On the back stretch on his 28th lap, De Palma blew a tire, but this did not materially affect his time, he running to the pit to make the change. On the 29th lap, De Palma led the Englishman by 1 minute 50 seconds.

The 29th lap proved disastrous for three of the cars, although from the 26th on to the end of the race there were no changes of the positions of the contestants. After the 27th lap, the list was cut down to five cars. Nelson in the Lozier in this lap withdrew from the race because he was too far behind. Wishart was obliged to put a new chain on his Mercedes on the back stretch in the 29th lap, while in the same lap Clark, Anderson and De Palma were obliged to call at the pits for new tires for the rear of their cars. Again in the 31st lap, De Palma was forced to stop for a tire change, but Hughes in the following lap had to stop for gasoline and water, which practically evened things up. The other cars were still in the positions which they had held from the 205th mile.

Although De Palma and Hughes were traveling at a terrific pace, their speed was considerably below that which Tetzlaff had set earlier in the day.

De Palma's average speed was 68.9 miles an hour, about 5 miles less than that of Tetzlaff.

On the 33d lap the Italian led by 30 seconds, but Hughes cut this down 1 second ere another circuit had been made. At the end of the 35th, however, De Palma had increased his lead by 8 seconds. He now had the best of his rival in the yellow Mercer by 46 seconds. Again Hughes cut this down, when, after completing 36 laps, he was found to be only 39 seconds in the rear. Two laps later, however, when De Palma flashed across the tape winner of the eighth Vanderbilt cup race, Hughes was still at about the same position. The other cars finished in good shape, Wishart being the third to receive the checked flag, followed by Anderson and Clark. The latter had tire trouble in his 35th lap.

De Palma's time for the distance of 299 miles 27.64 feet was 260 minutes 11.54 seconds, making an average of 68.9 miles an hour for the entire race.

Hughes completed the distance in 261 minutes 14.24 seconds, averaging 68.8 miles per hour. Wishart's time was 276 minutes 35.75 seconds; Anderson's was 279 minutes 40.95 seconds, while that of Clark was 291 minutes 39.75 seconds.

These speeds are good, considering that the course has sharp turns and there are severe grades. For a new course the racing fans should feel well satisfied with the results.

Bruce-Brown's Fatal Accident

The late David Bruce-Brown

MILWAUKEE, WIS., Oct. 1—David Bruce-Brown, millionaire racing driver, died this afternoon at 3:15 at the Trinity hospital here, from a basal skull fracture as a result of the ditching of his Fiat car, in which he was speeding at the rate of about 82 miles an hour on the Wauwatosa course, while in practice for the Vanderbilt Cup race which is to be run tomorrow. His mechanician, Anthony Schudelare, whose skull was also fractured, lies at the point of death.

The accident occurred on the back stretch shortly before 1 o'clock when the entrants in tomorrow's big event were at the height of the day's practice. One of the rear tires of the big Fiat exploded, causing the car to lurch into the ditch. In a vain attempt to right the machine Brown jerked the wheel in the other direction causing the car to jump to the opposite side of the road. Both driver and mechanician were pitched out of the car, which turned over and crashed through a fence. Brown and his mechanician were picked up unconscious by farmers who had witnessed the accident. Word was immediately conveyed to the officials and both men were rushed to the Trinity Hospital where they were operated upon. Brown never regained consciousness. The accident occurred on the lap following that in which Brown had made the circuit in 5:53.82, unofficially establishing a new world's speedway record at 82.2 miles per hour.

The first inkling of the disaster reached the grandstand and officials when Tetzlaff, Bruce-Brown's team-mate, in another Fiat drew up before the stands to inquire where Brown was. Tetzlaff missed the other car which had been close behind on the back stretch. Meager reports of the disaster began to come in soon after. To have escaped disaster after blowing a tire while traveling at such a terrific speed would have been nothing short of a miracle and the accident can in no way be ascribed to the condition of the course, which has been put in excellent shape since a week ago when the races were at first scheduled to take place.

Although practice was called off immediately after the accident, the unfortunate occurrence will in no way interfere with the running of the Vanderbilt Cup race tomorrow as scheduled.

David L. Bruce-Brown was born in New York City, in 1887, and began racing in 1907. His first appearance was in an Oldsmobile at the Empire City track, where he won his first race. In 1908 he acted as mechanician for the late Cedrino at Ormond Beach. His two most brilliant victories were the Grand Prize races at Savannah in 1910 and 1911, the latter in the same Fiat which he was driving today.

In the French Grand Prix this year, he won the first leg of the 2-day event, and finished third, but was disqualified for taking on gasoline outside a regulation station.

As a racing driver Bruce-Brown was looked upon as the best, not only in America but in the entire world. Built around a rugged framework were as stout a set of muscles as any athlete of his age and height could boast of, a fact which made the racing car more or less of a plaything in his hands so far as guiding it on the highway. Born in 1887, he began driving in 1907 when but 20 years of age. His first appearance was in a race at Empire City track in 1907. The following year brought him into the limelight at the Florida beach races where he acted as mechanician to Cedrino and also drove his Fiat, establishing new amateur beach records. After that he gained prominence in hill-climbs, winning Giants Despair, in his Benz, in 1909. His great fame came at Savannah, in 1910, when he won the grand prize race, averaging 70.45 miles per hour for the 415 miles. Last year he again won this American classic, gaining the distinction of being the only driver to win the grand prize twice in succession, averaging 74.45 miles per hour with his Fiat for the 412 miles.

Trade News of the Week

Knox Automobile Company Makes Assignment Because of Lack of Funds To Pay Current Expenses

Ford Cuts Prices and Increases Output—Chalmers Adds to Capital, Lowers Prices and Pays Dividend

SPRINGFIELD, MASS., Sept. 28—Considerable surprise was created here today when the announcement was made that the Knox Automobile Company, one of the best known concerns in the country, had made an assignment for the benefit of its creditors to Edward O. Sutton and Harry G. Fisk. It is estimated that the assets of the company as a going concern are about $2,000,000 and its liabilities exclusive of its capital stock are about $1,300,000. The immediate cause of the assignment was a lack of funds to pay current expenses and it was said that there was hardly enough cash on hand to meet the weekly pay-roll last week. As a result the directors held a meeting Friday evening and they voted to make an assignment, so the papers were made out in the office of Charles H. Beckwith and filed shortly before noon today.

Unless creditors who have not already assented to the program of the directors in making an assignment take such action as will throw the company into bankruptcy, the trustees will keep the factory in operation for the present. The company has been doing a good business lately and there are many orders on the books for both pleasure cars and trucks, many of them fire wagons. Mr. Sutton stated that a curtailment of expenses will be necessary to pull the company through the assignment without going into bankruptcy, and this will be made by a lessening of the force and a temporary reduction in output. This will be divided equally between the lines as the orders have been coming in generally in equal numbers.

The Fisk Rubber Company is one of the largest creditors of the company, the amount being about $75,000. To the estate of the late Alfred N. Mayo, who a few months ago at the time of his death was treasurer of the company, there is due about $900,000, consisting chiefly of the company's notes. Mr. Mayo was the largest owner of Fisk company stock and Harry G. Fisk is a son-in-law of Mr. Mayo, so also is Mr. Sutton, secretary and assistant manager of the company; thus the matter is somewhat of a family affair. Knox company notes aggregating $70,000 indorsed by Mr. Mayo are held by banks, of which $30,000 are held in Springfield. The remaining $270,000 of liabilities are held by about 300 creditors scattered about the country. Not one of them reaches $5,000 and none of them is pressing, so that the company has a good chance to get going again.

There is outstanding nearly $1,000,000 of capital stock, much of which is held in and about Springfield. About one-half of this is preferred stock, and represents the liabilities of the Knox company to its creditors 5 years ago when the creditors agreed to take their pay in this stock. Whether the stockholders will get anything back now is a question. If the company should now be liquidated the outstanding debts could hardly be paid. The $2,000,000 assets are said to include $315,000 for the real estate, $1,200,000 for finished product and stock in process of manufacture and about $200,000 in bills receivable. The Mayo estate is so large that it can withstand the present trouble as it comprises besides the Fisk Rubber Company, the Merrimac paper mill at Lawrence and large interests in a brick making industry.

Mr. Mayo went into the Knox company originally through being a creditor when the company became involved in 1907 after several years of prosperity. An assignment was then made to Mr. Mayo and he took up the management of the company with energy and ability. He cleared things up and returned the management of the business to the company of which he became treasurer. The preferred stock issued in payment of debts at that time reached $494,700 and was cumulative 8 per cent., being preferred not only as to dividends but as to principal in cases of liquidation, to the $500,000 common stock. The first year following the company did a big business, clearing $160,000 and next year double that amount. Three semi-annual dividends of 4 per cent. were paid and things looked bright. But two bad years followed and Mr. Mayo had difficulty to finance the company and on his death last summer there was much speculation as to the future of the company.

NEW YORK, Sept. 30—Parts makers and manufacturers of accessories shortened credit lines to the Knox company, after the death of Mr. Mayo but despite that precaution many of them are heavily involved in the failure. Schedules are being prepared upon which to base a reorganization.

Ford Swells Product: Cuts Prices

DETROIT, MICH., Sept. 30—The Ford Motor Company announces a reduction in price on all models to take effect October 1. The figure on the runabout, model T, has been placed at $525, on the touring car $600, and on the town car $800. This price reduction is ascribed to the great increase in Ford production, it being reported that nearly 200,000 machines will be turned out of the Ford factory during the 1913 season.

Chalmers Increases Stock: Pays Dividend

DETROIT, MICH., Sept. 30—At a meeting of the stockholders of the Chalmers Motor Company held October 1, the corporation voted to increase its capital stock from $3,000,000 to $5,000,000. Of this amount, $1,000,000, was paid in stock dividends to the

Automobile Securities Quotations

Changes noted in the market for automobile and accessory securities were few and unimportant during the past week. While the general range was small, individual securities were slightly irregular. American Locomotive, Firestone common, Goodrich, Studebaker common and United States Motor Company were lower and Consolidated, General Motors, Pope and Studebaker preferred were stronger. The whole trade awaits the official announcement with regard to U. S. Motors. The comparative table follows:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., common	..	..	150	175
Ajax-Grieb Rubber Co., pfd	..	..	95	100
Aluminum Castings, preferred	..	..	100	102
American Locomotive, common	35½	36	45½	46
American Locomotive, preferred	105	106	107	109
Chalmers Motor Company	..	..	145	155
Consolidated R. T. Co., common	5	8	14	16
Consolidated R. T. Co., pfd	10	20	50	60
Firestone Tire & Rubber Co., com	175	180	270	275
Firestone Tire & Rubber Co., pfd	106	108	107	109
Garford Company, preferred	..	..	99	101
General Motors Company, common	38	41	37	39
General Motors Company, pfd	76	79	80	82
B. F. Goodrich Company, common	237	242	75	75½
B. F. Goodrich Company, pfd	118	119	106½	107¼
Goodyear Tire & Rubber Co., com	225	230	330	..
Goodyear Tire & Rubber Co., pfd	105	107	105	106
Hayes Manufacturing Company	..	..	..	92
International Motor Co., common	..	..	26½	27½
International Motor Co., pfd	..	..	81	83
Lozier Motor Company	..	..	43	50
Miller Rubber Company	..	..	..	140
Packard Motor Co., preferred	104	106	105½	107
Peerless Motor Company	..	..	116	120
Pope Manufacturing Company, com	55	65	36	37
Pope Manufacturing Company, pfd	73	75	73½	75
Reo Motor Truck Company	8	10	10	11
Reo Motor Car Company	23	25	24	25
Studebaker Company, common	..	..	42	44
Studebaker Company, preferred	..	..	95	97
Swinehart Tire Company	..	..	99	101
Rubber Goods Company, common	85	95	100	..
Rubber Goods Company, preferred	100	105	105	110
U. S. Motor Company, common	28	29½	1¼	1¾
U. S. Motor Company, preferred	69	70½	4½	5
White Company, preferred	..	..	107	109

shareholders, and the other $1,000,000 was placed in the treasury for future use. The regular quarterly cash dividend of 2 1-2 per cent., payable October 1, was also declared at the meeting. This amounts to about $75,000. The closing price of the Chalmers stock on the Detroit exchange on September 28 was 156, and figuring on this basis the new stock issue of 10,000 shares has a value of $1,560,000.

The Chalmers Motor Company since its incorporation has enjoyed a wonderful growth, having extended its factory in 5 years from a single 3-story building to the present plant.

Rubber Off 2 Cents in Quiet Market

Crude rubber dropped 2 cents a pound at the close of the week, sales being made below $1.10 for up-river fine where the level had been maintained at $1.12 heretofore. Trade was sluggish and without sharp selling pressure. The offerings were large but the market absorbed them easily at the recession. The ease of the local market was a reflection of similar conditions in London. Plantations were steady at the former level, which makes a difference between up-river and pale crêpe of 6 1-2 cents a pound, with the crêpe occupying the higher level.

Henderson to Leave Cole

INDIANAPOLIS, IND., Oct. 1—In order to assume the presidency and take active part in the Henderson Motor Car Company, arrangements have been made whereby C. P. Henderson, Director and General Sales Manager of the Cole Motor Car Company, will discontinue the Cole sales work on October 25. This move will be a surprise to the automobile industry in general, as Mr. Henderson has directed Cole sales work and policies since the inception of that company.

Market Changes of the Week

This week's market showed a decrease in rubber of $.02 1-2, in lead of $.07 1-2 and in cottonseed oil, of $.05, all due to lack of trade. Tin varied throughout the week, rising on Monday to $5.10, but falling to $5.03, its price on Wednesday, thus making no gain for the week. Antimony experienced a small gain of $.00 5-8 while copper remained unchanged and lead declined slightly.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.......	.08 1/4	.08 1/4	.08 7/8	.08 7/8	.08 7/8	.08 7/8	+ .00 5/8
Beams & Channels, 100 lbs.	1.51 1/2	1.51 1/2	1.51 1/2	1.51 1/2	1.51 1/2	1.51 1/2	....
Bessemer Steel, Pittsburgh, ton	24.00	24.00	24.00	24.00	24.00	24.00	....
Copper, Elec. lb....	.17 13/20	.17 13/20	.17 5/8	.17 5/8	.17 5/8	.17 5/8	— .00 1/20
Copper, Lake, lb.....	.17 7/10	.17 3/4	.17 3/4	.17 3/4	.17 3/4	.17 3/4	+ .00 1/20
Cotonseed Oil, Sept., bbl...	6.23	6.15	6.20	6.23	...	6.18	— .05
Cyanide, Potash, lb......	.19	.19	.19	.19	.19	.19	....
Fish Oil, (Menhaden)	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @..	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime	.85	.85	.85	.85	.85	.85	....
Lead, 100 lb...	5.17 1/2	5.15	5.15	5.15	5.10	5.10	— .07 1/2
Linseed Oil....	.68	.68	.68	.68	.68	.68	....
Open-Hearth Steel, ton....	25.00	25.00	25.00	25.00	25.00	25.00	....
Petroleum, bbl., Kansas crude	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa, crude...	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine Up-river Para	1.11 1/2	1.12	1.12	1.12	1.12	1.09	— .02 1/2
Silk, raw Ital..	....	4.15	....	....	4.15	....	....
Silk, raw Japan	....	3.82 1/2	....	....	3.85	....	+ .02 1/2
Sulphuric Acid, 60 Beaumé..	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs...	5.03	5.10	5.09	5.09	5.10	5.03	....
Tire Scrap....	.09 1/8	.09 1/8	.09 1/8	.09 1/8	.09 1/8	.09 1/8	....

Plan for U. S. Motors

Official Announcement Not to Be Made Before Thursday, But Tentative Scheme May Be Satisfactory

Proposes Selling to New $28,000,000 Company—Present Stockholders to Pay $22.50 Per Share for New Stock

WHILE the official situation as regards the affairs of the United States Motor Company is indecisive, the following tentative plan of reorganization has been published in New York covering the reorganization by Wall street specialists in the securities of the company.

According to L. P. Cartier, the plan appended was submitted to all the interests involved in the problem of reorganization and was pronounced accurate except as to the details of distribution under the plan of assessment.

Officially, the reorganization plan will not be announced before Thursday afternoon, but it is generally understood that the plan has been arranged and the steps to be taken between Tuesday and Thursday are perfunctory.

The plan suggested to those interested is as follows:

"The U. S. Motors reorganization plan has been practically decided upon with the possible exception of a few minor details. The plan provides for the equitable protection of all parties at interest and works out to the advantage of both the present preferred and the common stockholders. While the company is now in the hands of a receiver, the receivership is a friendly one and is for the sole purpose of legally conserving the assets of the company in the interest of all concerned.

"A general outline of the reorganization plan is as follows:

"The present company will be sold to a new company, which will have a capitalization of about $28,000,000 par value. The new company will have three classes of stock. $10,000,000 first preferred 7 per cent. cumulative stock, $8,000,000 second preferred 6 per cent. non-cumulative, and $10,000,000 common. There will be no bonds or debentures, and no fixed charges of any kind.

"The present obligations of the company, amounting to about $12,000,000, will be taken care of as follows: The $6,000,000 outstanding debentures will be exchanged for new stock; $4,000,000 notes held by banks will be exchanged for new stock; merchandise bills amounting to about $2,000,000 will be paid in cash.

"Present stockholders will be permitted to exchange their holdings for stock in the new company upon payment of $22.50 a share on their old stock. The proceeds of these subscriptions will amount to approximately $5,500,000. The subscriptions will be underwritten by prominent New York bankers.

"As the company now has in the treasury about $1,500,000, the new company will have approximately $5,000,000 working capital after the payment of the $2,000,000 merchandise bills. The new company will, therefore, start out free of debt and without fixed charges, with no obligations and with about $5,000,000 working capital.

"It is estimated that the present assets of the U. S. Motors Company, which will be owned by the new corporation, have a conservative book value of at least $18,000,000 to an operating company, and are probably worth considerably more in the hands of a new, well-organized concern such as the new company will be. With the $5,000,000 working capital added to these book values the company will have good assets of at least $23,000,000 back of the $28,000,000 total issue of stock. This means that there will be values of two and one-third times the total issue of first preferred stock, one and five-eighths times the second preferred stock and about one-half on the common stock. In other words, there will remain $5,000,000 of assets against $10,000,000 par value of common stock.

"It is conceded by all familiar with the present business of the U. S. Motors Co. that with an adequate working capital the company would have earned in excess of $2,000,000 a year and that $2,000,000 is a conservative estimate of the new company's earnings during the next twelve months. This will leave, after the payment of first and second preferred dividends, about $1,220,000 for depreciation, reserve and dividends on the common stock.

"Upon payment of $22.50 a share on 100 shares of old preferred stock there will be issued therefor in stock of the new company, approximately:

30 shares of first preferred 7 per cent. cumulative stock,
20 shares of second preferred 6 per cent. non-cumulative stock.
30 shares of common stock.

"On the payment of $22.50 a share on 100 shares of old common stock there will be issued therefor in stock of the new company, approximately:

22 1/2 shares of first preferred 7 per cent. cumulative stock,
20 or 17 1/2 shares of second preferred 6 per cent. non-cumulative stock,
20 or 25 shares of common stock.

"Based on the assets that will be in possession of the new company it is estimated that the new stock should have the following values:

First preferred	$90 a share.
Second preferred	70 a share.
Common	10 a share."

British Want $1,000 Car

Manufacturers and Engineers Certain Such a Machine Can Be Successfully Built in England

Would Not Interfere in Any Way with the Existing Automobile Firms in That Country

LONDON, ENG., Sept. 21—Interest in the production of a $1,000 car of all the British manufacturers continues at high tension. The leading engineers who have recently studied the American market are certain that it is possible of attainment. Robert W. A. Brewer, who spent several weeks this summer studying the American industry, thinks it is possible, basing his conclusions on careful observations made during his American visit and also backing it up by figures on materials and parts, for such a car as can be purchased on the home and foreign markets. Mr. Brewer says:

"There is a market for this small car. It must equal similar American cars in performance, so that it will meet the American car not only at home but also in our colonies. In Canada and Australia, bodies could be supplied for such a car by makers in the respective countries. In selling cars, appearance goes a long way, and to develop a rapidly growing business it will be necessary for the manufacturer to cater to the wants of the public in bodies.

"The feeling is gaining ground here that it is far better for the buyer to purchase a stock car for $1,000 and spend a little additional money in adapting it to his own purposes than it is to buy a more expensive car produced to suit his particular whims. It is not the intention of the movement to start a co-operative scheme, as has been voiced by certain trade journals. The plan is that all those who are supplying the manufacturing company with parts, or who are rendering service by sales or otherwise, shall become stockholders in the concern. In this way they make their profit and receive a fair and reasonable payment.

"It is not a question of tariff whether the cars that sell at $1,000 can be made or not. We can make the car at the price. The time will come when by good management and modern business methods the all-British $1,000 car will make itself seriously felt by those who import American cars. We hope that soon a strong unionist government will be in power, and will be enabled to pass such measures in parliament as will put a substantial tariff on the importation of American cars, so that in spite of the cutting of prices, the price to the consumer will remain at least equal to that which is charged for the British product.

"The production of the $1,000 car will not interfere in any way with any of the existing motor car firms in England. It will educate the buying public to the use of a British car in preference to an American one."

S. F. Edge, commenting on the situation, says: "The scheme is excellent, and only wants the proper support of capitalists to make it a success. I am sorry to see any motor cars imported into this country; they should be made here, and the wage money spread through our land."

E. Berkeley Omerod, in speaking on the matter, said: "We must set out to supply the demand for a low-priced British car in a well-thought-out manner. A tariff would greatly affect eventualities, but concerted and immediate action is needed. This is not a question of British makers casting aside established factories and high-class cars, but of formulating a scheme whereby we can establish in this country the manufacture of a low-priced car for the man of small means."

A leading engineer who has studied the situation says: "The majority of motor cars in the United States are not made by one single firm; they are made by dozens of firms, each of which is a specialist in the making of certain parts. They are then assembled at the factory and given a name. The total cost of every part which goes to make a complete car of a really high standard sold in the United States at $1,500 is approximately $625. What we want is a combination of firms in this country, each to supply various parts for the British car."

British Merger Talk Subsiding

According to officials of the federal government, financial interests in New York and several important factors in the automobile, the recent talk about the imposition of a preferential tariff against American automobiles of low and moderate price by Great Britain, is a subterfuge. The subject has been thoroughly aired since it was first announced, and the uniform conclusion reached is that there will nothing develop.

The government officials point out that there is a maximum and minimum clause in the Payne-Aldrich law which provides for such emergencies. Under the law, if any discrimination is made against American manufactures it is possible to slide up the rates against all classes of manufactured imports from the discriminating country and by doing that it would impose an additional duty of 25 per cent.

The financial interests state that the agitation for a tariff is probably a counter-diversion to cover the financing of a big automobile merger in England.

The automobile industry takes the position that the American makers have too long a lead to be caught at this late day and that if retaliatory measures are adopted, the competition would be rendered fiercer and that the smaller production of the British factories and the consequent higher price of the automobiles turned out would accentuate the stress of present conditions without aiding the British makers.

Reply to Be Made in Huber Suit

DETROIT, MICH., Sept. 28—On October 7, a reply to the claims of the Detroit Taxicab and Transfer Company, which concern is the nominal defendant in a patent infringement suit brought through its attorney, R. A. Parker, by the North American Vehicle Company, of this city, owner of the Emil Huber patent relating to the three-point suspension of the main frame of an automobile, will be filed in the United States District Court. The Kelly Motor Truck Company, Springfield, O., whose make of motor trucks the Detroit Taxicab and Transfer Company owns, is defending the case for the latter concern, through its attorneys Staley & Bowman, of Springfield.

Screw Patent to Be Tested

Suit has been filed in the United States District Court by the Du Bois Safety Lamp Company against the Gray & Davis Company for alleged infringement of patent number 919,837, which covers a certain type of set-screws used inside instead of outside the lamp structure. Duell, Warfield & Duell represent the complainant. The matter is returnable on the October rule day, and will be answerable 30 days thereafter. The patent while apparently of minor importance is said to involve considerable values.

Decrees *pro confesso* have been taken by the Enterprize Automobile Company against the following named defendants for violation of the Dyer patent rights owned by the complainant company: Benjamin R. Wurtzel, Sultan; James Barnshaw, Darracq; Oscar L. Lyons, Mais; John J. Conners, Charron; Henry F. Naresca, Lion; Herman Grossman, Sultan, and Frank Ritzo, Hotchkiss.

Adolph S. Bergquist has been granted an individual license and an importer's license has been issued to the Adams-Lancia company.

Hoosiers Hosts to Dealers

Merchants and Salesmen at Indianapolis October 8 and 9 to Study Selling and Advertising

Electric and Commercial Branches of the Industry Interested as Well as the Gasoline Element

INDIANAPOLIS, IND., Sept. 30—Indianapolis swings open her doors to the retail motor car merchant and his salesmen on October 8 and 9. During those 2 days the guests of the Indianapolis automobile manufacturers and those motor car manufacturers from other cities who are coming here to help his dealer and salesmen will be given an opportunity to get the inside on intensified salesmanship and advertising.

This, therefore, is the purpose of the gathering: Every person interested in the automobile field, irrespective of what line he handles, is invited to attend. Not only will the general speakers from the platform talk on their respective viewpoints, but automobile merchants who have been successful will be asked to tell experiences.

The dealer who comes to this convention will be told the basic principles of all good business in such a way that he will never forget them. He is to be told how to plow the soil deeper; how to determine the wants of his customer and how to meet them with the product on his floor. He will be told how to make a sale without cutting the price; he will be told how to keep his customer satisfied after the sale is made, which means keeping the balance on the right side of his own ledger. He will have emphasized for him the importance of keeping his salesroom orderly and attractive. He will be told how to follow up systems that have proven successful for other dealers. He will have the opportunity of discussing with the greatest men in the country his own individual problems.

The dealer will be told that the days of passing out advertising copy to solicitors is past. The friendship ceases when the expense begins. He will be told how to pick mediums, and how to eliminate personal prejudice in the selection of mediums. He will be made to understand that advertising copy can never accomplish more than the bringing of the prospect on his sales floor, and that the placing of an advertisement is a useless effort unless he is equipped to follow it up with practical salesmanship.

Not only has the gasoline pleasure vehicle branch of the motor car game been interested in the project, but the commercial and the electric veins of the industry have been active.

The convention will be held in the Auditorium of the Claypool Hotel. The plans call for business throughout, but arrangements will be made for those who desire morning diversion to visit the Speedway and other places of interest in the city.

Business sessions are scheduled for both October 8 and 9 with a Speedway dinner on the evening of October 8.

Wilbur D. Nesbit, of Chicago, has accepted the post of permanent chairman, which promises real interesting fun.

On the speakers' program are John G. Jones, of the Alexander Hamilton Institute, New York—topic, "Headwork in Salesmanship."

T. J. Zimmerman, *Opportunity Magazine*, Chicago—"The Opportunity of the Automobile Dealer."

J. J. Cole, President Cole Motor Car Company—"Why I Thought of a National Salesmanship and Advertising Convention."

H. O. Smith, Premier Motor Car Company—"Welcoming Address on Behalf of Indianapolis Manufacturers."

Advertising Director Leroy Pelletier, Flanders interests, Detroit—"The Co-ordination of Advertising and Sales."

John Lee Mahin, Mahin Advertising Company, Chicago—"How to Use Advertising in the Retail Game."

Elbert Hubbard, East Aurora, New York—"Ideal Salesmanship."

B. F. Lawrence, *Indianapolis Star*—"How to Get the Co-Operation of Your Local Newspapers."

Ex-Mayor Chas. A. Bookwalter—"Business Methods and the Motor Car."

John Wetmore, *New York Evening Mail*—"How to Spend Your Advertising Appropriation."

Herbert Kaufman and Samuel Blythe are also expected to be here and give inimitable talks. N. H. Van Sicklen, president of the Chicago Motor Club, has already stated he will be present at the convention.

Ward Buys King Assets for $41,000

Artemus Ward, of the advertising firm of Ward & Gow, New York City, has purchased the assets of the defunct King Motor Car Company for $41,000 and will continue the factory indefinitely. His bid was accepted by the United States District Court, receiver, the Union Trust Company of Detroit, last Saturday and the consummation of the agreement means that the creditors of the company will receive about 12 cents on the dollar.

Mr. Ward is the heaviest creditor of the company, having loaned it $100,000 in cash and also has an unsettled claim for advertising against the concern amounting to about $29,000.

The action of Mr. Ward was due to his desire to protect his investment and the determination to continue the company, at least for the present, means that the 219 cars, partially completed and represented by unassembled material and parts will be finished and marketed in the near future.

When the first appeal to the courts was made concerning the affairs of the company, it was found that in order to continue the manufacturing as contemplated by Mr. Ward would require material, parts and money to the extent of $175,000. This did not appeal to the accessory men and the field was left open to Mr. Ward to take the initiative.

The history of the King company has been stormy. The car in its present shape is well regarded in its class but it represents a tremendous number of expensive changes in the original plans. The blue prints show, according to financial experts who have inspected them, that 211 mechanical changes were made from the time the original drawings were completed until they represented the current model.

These changes cost much money and the company found itself with insufficient capital to carry its plan through to a successful termination.

While Mr. Ward declined to forecast anything but the immediate future of the company, it is understood that the organization will be kept together for a considerable period and if the operations prove as successful as expected, that a permanent organization will be effected to continue the manufacture of automobiles, probably under the same name.

Receiver Appointed for Ohio Company

CINCINNATI, O., Sept. 26—Edward G. Schultz was appointed receiver of the Ohio Motor Car Company yesterday. The company is engaged in the manufacture of automobiles at Carthage, O. The suit for a receiver was brought by the Diamond Rubber Company, a creditor on a promissory note for $6,000 which was due on September 15, 1912, but on which payment has been refused. One of the allegations of the plaintiff is that it believes irreconcilable differences exist between C. F. Pratt, president, A. E. Schafer, vice-president, who are in active control of the business, and the officers of the company, and that, unless harmony is restored, the assets will be wasted and reduced in value. The assets of the company are believed to be at least $200,000 in excess of liabilities.

Forty-Nine Experts at Sales Convention

Thirty-Six Companies Represented at First Meeting of Sales Managers of the Automobile Board of Trade

To Meet Again in Three Months—J. S. Marvin Speaks on Freight and Shipping

ONE of the largest and most important gatherings of the sales representatives of the automobile industry was concluded Tuesday when the first sales managers' convention of the Automobile Board of Trade adjourned to meet again in about 3 months. There were thirty-six of the leading companies represented by a total of forty-nine sales experts.

The program of addresses included the following:

Freight and Shipping—James S. Marvin, Traffic Manager, N. A. A. M.

Selling and Advertising—J. G. Monihan, Premier Motor Manufacturing Company.

Motor Car Equipment—George E. Daniels, Oakland Motor Car Company, and C. S. Jameson, Willys-Overland Company.

Territory and Selling Rights—Alfred Reeves, Maxwell-Briscoe Motor Company.

Annual Models—Charles W. Mears, Winton Motor Carriage Company, and S. D. Waldon, Packard Motor Car Company.

Enclosed and Semi-enclosed Bodies—H. O. Smith, Premier Motor Manufacturing Company.

The committee in charge of the convention consisted of the following: H. O. Smith, chairman; E. C. Howard, William E. Metzger, C. W. Churchill and W. T. White.

The Monday session had for its presiding officer William E. Metzger, who occupied the chair until the arrival of Chairman Smith. The liveliest and most intimate discussion attended the presentation of the various papers and the conclusion of those who attended the meeting was that it was one of the most valuable conferences ever held in the industry.

Mr. Marvin's presentation of the subject assigned to him was probably the paper of most general interest to the industry and following is the full text.

When your chairman first requested me to prepare a paper on freight and shipping, I felt that I had been assigned a *task*, but I quickly realized that instead of a task, I had been granted a privilege, for there is much in connection with the shipment of automobiles and the prompt and economical handling of same that is of direct interest to the dealers with whom you are constantly in touch. I am, therefore, glad of this opportunity to bring to the attention of the sales managers some of the points involved in this automobile traffic question which, for reasons which I will attempt to explain, is an unusual one in many respects.

In producing a manufactured article, there is first the purchase of materials to be considered and the question of having them arrive at the factory at the time required. This is a matter for the purchasing department. Working the raw materials into completed articles is the task of the manufacturing department, and when that is finished, the sales department becomes responsible. The handling of finished articles from the factory to the customer is, therefore, of particular interest to the sales manager. Shipping might be termed the last factory process applied to manufactured articles, and it is important that this be properly done, otherwise the efforts of the best organized factory can be marred.

The manufacturer strives to produce an article that will please his trade. There are few, if any, manufactured articles which call for a greater variety of detail than automobiles. From the time each particular model is conceived in the drafting room and in the minds of the management until it reaches the shipping department, consideration must be given to the purchase of a great variety of materials and the workmanship to be applied on them. The article, when completed, is one that can be seriously damaged if turned over to an incompetent shipping department. The problem of the manufacturing department is to produce an article consisting of a powerful and flexible engine combined with strong and accurate machinery and the whole combined into a road vehicle graceful in appearance and of the highest finish that painters can give it.

All this the customers expect, and when it is realized that the entire output is turned over finally to the shipping department, whose task it is to arrange for its safe transportation to all parts of the country, over the speediest routes and at the lowest possible cost, the task of the shipping department is better appreciated. Careless loading, resulting in a chafed tire or a scratched body, will do much to make a bad impression on the consignee, and all the care with which each department of the factory has followed this particular car to its completion with the intention of pleasing him to the utmost, will, in a large measure, lose its desired effect. Or if through inefficiency or clerical errors the freight bill is one hundred dollars, whereas the consignee knows the shipment could have been made for seventy-five dollars; or if the freight car arrives on a railroad whose freight station is a mile or two from the consignee's place of business, whereas it could just as well have been shipped over a road with a nearby freight delivery; or if, instead of arriving within the usual time of perhaps three days, a week passes, and the consignee learns that the shipment is blockaded at some congested point, which a well-informed shipping department might have avoided, then the freight and shipping department of that particular factory has failed to do its work as well as the other departments, and this last function of the factory in its dealing with the customer has, to a certain extent at least, spoiled the good work of the other departments.

This question of transportation is, perhaps, the oldest of all business subjects, and the problem of shipping promptly, safely and economically has been before the people from the days of primitive methods, and it is a self-evident fact that were it not for the great improvements that have been made in this feature of our industrial system, our manufacturing resources could not have been developed to the point they have reached. Nothing illustrates this better than the periods which at times occur when, for some reason or other, the arteries of commerce become clogged. The impossibility of conducting business without suitable methods of transportation are then at once apparent to the manufacturer, who finds his goods indefinitely delayed, and to the dealers, whose customers are demanding delivery and perhaps cancelling orders which these delays render him helpless to fill.

A new device which is a source of wonder today becomes an article of common use tomorrow. So it is with transportation. A few years ago, where a manufacturer at one point and his dealer at another were accustomed to a week's time in transportation of the manufacturer's goods, improved methods of railroading have reduced the handling of freight between these points to perhaps the second morning delivery, and they arrive with fair regularity on this schedule. Both manufacturer and dealer naturally time their orders and tune their business up to this schedule, and chaos results when it is interfered with.

We all know that the automobile, as has been the case with other inventions, had a rapid development from being a new sort of toy to an article almost indispensable, and it has entered very largely and is destined to take an increasing part in the solution of this very question of transportation. Nevertheless, the manufacture of automobiles on a large scale in this country presented a new problem in transportation and one which rendered the task of the shipping department much more difficult than it would have been ordinarily. Most manufactured articles are packed for shipment, but it was apparent at the start that this could not be the case with automobiles.

The first problem, therefore, that presented itself to the shipping department was how to fasten an article on rubber-tired wheels into a freight car so that the tires and finish would not be damaged and the automobile would remain stationary in the car. This problem was quickly followed by another one much more serious, for while a suitable method of blocking was learned after a little experience, the increasing size of automobiles rendered it impossible to load them into ordinary box cars; so here was an article of very high finish, which made shipping on open cars out of the question, but could not very well be packed for shipment, about to be produced in very large quantities, and therefore unable to use the arteries of commerce so far as they had at that time been developed to suit the requirements of other industries. These facts had to be laid vigorously before railroad officials throughout the country, and the objections that some of them made at that time to meeting this situation in the only way that it could be met, are interesting. Box cars in those days were equipped with side doors from five to six feet in width and directly opposite each other. To give the automobile industry transportation facilities, it was necessary to get railroad officials to build cars with doors on an entirely different principle. To do this the traffic officials of railroads had to be convinced first of the necessity of such new cars. It must be remembered that in those days the possibilities of the automobile were not freely admitted in all quarters, and some traffic officials were skeptical; they hesitated to recommend a radical departure in the design of freight cars, especially when they found their mechanical departments strongly opposed to it. Some traffic officials held the opinion that their tonnage in automobiles would be temporary and that, instead of increasing, it would decline; comparisons with the bicycle business were made. A great point was made by them with respect to grain, which they insisted could not be handled in box cars having doors wider than six feet. Officers of the mechanical departments of railroads insisted that freight cars would be so weakened by wide side doors that they could not handle the usual loads of other freight.

In the meantime, the automobile industry was getting along as best it could by using box cars having end doors, a limited number of which had been built up to that time, for shipments of large-sized horse-drawn vehicles. The railroad people gradually revised their views on these points, and one road after another, in building new box cars, provided them with doors suitable for handling automobiles. As the extent of this shipping became more and more evident, increasing numbers of such cars were built, until to-day there are something like 50,000 box cars in service known as automobile cars. The total box car equipment of all the railroads in the country is over 1,000,000, and as the distribution of automobiles from the factories requires that shipments be made to all parts of the United States and into Canada and Mexico, these 50,000 automobile cars become widely scattered and disseminated among box cars of other kinds.

When the building of freight cars with wide doors was brought about through the requirements of the automobile industry, it was soon found that cars of this sort were not only available for handling almost any other kind of freight, but were sought after by shippers of other commodities. An eastern road building a thousand cars of this kind would soon find them scattered all over the country, so that only a small portion would be on their home rails at any one time.

Notwithstanding the rules of the American Railway Association with respect to returning freight equipment to its home rails and the urgent demands of the roads owning the cars, there are times when automobile factories' requirements cannot be met as promptly as desired. The supply of cars generally may be fairly good, but the automobile shipper cannot participate in the general supply and is confined to this particular kind of car, which is the principal thing that renders his task difficult in getting completed machines away from the factory. The problem of providing proper service for these shipments is, of course, one for the railroads. Shippers can have no direct control over the interchange of cars between the different lines. Nevertheless, shippers should, in their own interests, see that they do nothing to make this task unnecessarily difficult for the carriers. A serious shortage of automobile cars occurred last winter at some points, and when we urged the railroads to extra efforts in supplying this demand, we were met with the response that while they would do their best, it would help matters if the practice of using automobile freight cars for storage purposes was discontinued. They made the point that factories should not continue to ship to dealers who did not accept their drafts and take up shipments and thus cause an accumulation of loaded automobile cars at that point. This is a matter in which the sales departments can perhaps render valuable aid.

The purchasing departments can help by requesting shippers of material to use automobile cars for their shipments of material to auto factories so far as possible, instead of ordinary cars; this brings to the automobile factory a car that it can use as soon as unloaded for shipping automobiles, and it makes all of the traffic more desirable to the railroads by reducing the hauling of empty cars to automobile factories. We believe the sales departments can also render assistance by getting their dealers to frequently remind the local agents of the railroads handling their business and enjoying their patronage, that these automobile freight cars when made empty should be given the particular attention of the local freight agent and furnished with a new load destined to a point in automobile shipping territory. This relates particularly to dealers in the West and South. The pressure on the local freight agents for freight cars is, of course, very strong at times, and it is undoubtedly the action of freight agents in the West and South in permitting automobile cars to be re-loaded out of line with the service for which they are intended that accounts for the difficulty in getting automobile cars owned by eastern lines returned from their western and southern connections.

This would be a good time to agitate this matter with dealers. The shipping season is starting and the local freight agents, if this matter is brought to their attention by dealers, will take some notice of it because, if they do not, they will fear the loss of patronage, and if a dealer really took sufficient interest in this matter he could probably get his freight agent to report to him the disposition made of each of these cars after it is unloaded. If a freight agent, for instance, in the Northwest, permits a local shipper to load one of these cars to a point in Texas, the automobile industry will get no service from that car perhaps for months. A freight agent who permits this would not do so if he felt that the automobile dealer was still interested in that freight car and wanted to know that it had been loaded back to the automobile manufacturing territory.

In the beginning I made reference to the possibility of clerical errors resulting in freight charges exceeding what the dealer anticipated. The freight rates and rules governing the charges on automobiles are such as to readily admit of errors on the part of railroad billing clerks, whereby excess freight charges are collected from consignees. We have endeavored in every possible way to overcome this. The National Association offers the use of its traffic department to its members and their dealers, without charge; all the factory or dealer has to do is to send their receipted freight bills to us, each one of which is examined, and if any overcharge exists the money is collected and remitted. We believe that you could render your dealers a great service and one which they would appreciate later on, if you could impress upon them the necessity of having every dollar that they pay in freights properly audited. They can do this by communicating direct with us or through the factories, which in turn can communicate with us to whatever extent is necessary; but, in any event, the immense amount paid annually for the transportation of automobiles should be scrutinized carefully by those who are efficient in that work. The railroads do not intentionally make these overcharges. They occur entirely through clerical errors and are readily corrected when brought to the attention of railroad officials. It takes only a hasty estimate to indicate the amount of money involved in this question. The approximate annual shipment of automobiles is one hundred thousand carloads. These shipments are subjected, of course, to freight charges varying from $30.00 or $40.00 per car up to $400.00 or more. The charge on a 36-foot car from Detroit to New York is $64.50. If that figure is taken as representative of an average haul, the total freight paid would be six and one-half million dollars. This freight is paid at destination, and a large proportion of the several thousand dealers involved do not know whether their freight bills are correct or not. It is absolutely certain that such an amount of money cannot be paid in freights without a good many thousands of dollars occurring in overcharges. The billing of freight is done by clerks in local freight offices who receive memorandums of what has been shipped, and they make out the way bills, applying the rates which, in their opinion, are correct; all this is done in more or less of a rush, and there are naturally frequent changes in the clerical staffs. No one concern paying out large amounts for transportation would think of letting it go unchecked, but in the case of this automobile item it is scattered. Then there are the changes in freight rates and classifications. The clerk in the local freight office is billing all kinds of freight; one bill is for a carload of automobiles, the next is for a carload of lumber, the next one is perhaps for a box of shoes, etc.; each one he must rate. When a new classification or freight tariff, containing several hundred pages, comes out, he is very likely to overlook some change and thus cause an overcharge in the freight bill. These changes may consist of only a word or two in the language of a classification item, the significance of which does not impress him, but it is at once apparent and in fact was probably brought about by the shipper of that particular article. For example, when we succeeded in getting trucks rated separately from passenger vehicles in the Official Classification, it is a certainty that many a freight bill was paid for excessive charges which were never refunded. Instead of the new classification reading "Vehicles, self-propelling, including automobiles and automobile chassis," it was changed to read "Vehicles, self-propelling, including automobiles," and separate items were installed covering automobile chassis and self-propelling freight delivery wagons or trucks. Notwithstanding our advices to the factories covering these changes, we found that chassis were, in some instances, described on bills of lading as automobiles, and they were accordingly charged a higher freight rate than they were entitled to. We also suggested that factories notify their dealers particularly regarding this important change and that all freight bills be checked either by the factories or by sending them direct to the National Association's Traffic Department. We did not get very much response in the way of direct inquiries from dealers regarding the freight bills, but to indicate the possibilities of overcharge on an item of this kind I can mention an instance of one factory which followed the matter up and urged its dealers to send us their freight bills; we heard from nineteen of that factory's dealers and out of the bills received from them presented overcharge claims for $1,066.97. Another factory sent us seven bills and we found four of them overcharged on this point.

Another rule of the Classification that has a very important bearing on the proper freight charge on automobile shipments relates to the size of car ordered by the shipper as compared with the size of car furnished by the railroads. One western dealer sent us some freight bills covering a considerable period of his shipments, and we found on examination that he was overcharged $753.84 on this question of minimum weight applicable to the cars of different sizes.

It is very apparent that the sales departments would render a valuable service to their dealers if they can be made to understand the advantage of having their freight bills audited regularly in this manner.

There are two phases of this question of transportation of automobiles; one pertains to service and the other to the cost of the service. I have endeavored to bring to your attention some of the points in connection with both which I thought would be of particular interest to the sales managers, and which, if kept in mind by you in your dealings with agents and branches, would result in benefit to the industry in getting machines handled promptly and at the lowest possible cost, from the factories, and I want to add that the traffic department of the National Association of Automobile Manufacturers is always at the service of the factories and your dealers in these matters.

Those present included the following:

Auburn Automobile Company	J. I. Farley
Autocar Company	H. M. Coale
Cadillac Motor Car Company	A. C. Howard
Cartercar Company	H. R. Radford
	W. S. Williamson
Chalmers Motor Company	Percy Owen
Jas. Cunningham Son & Company	J. W. Fulreader
Columbia Motor Car Company	F. K. Dayton
Flanders Motor Company	William E. Metzger
Hudson Motor Car Company	R. B. Jackson
	E. C. Morse
	R. D. Chafin
	C. C. Winningham
International Motor Company	H. D. Watson
Knox Automobile Company	H. K. Sutherland
Locomobile Company of America	J. T. Roache
Lozier Motor Company	C. E. Emise
Maxwell-Briscoe Motor Company	Alfred Reeves
Mercer Automobile Company	W. T. White
	E. H. Sherwood
Mitchell-Lewis Motor Company	Leo A. Piel
	J. M. Cram
Moline Automobile Company	C. H. VanDervoort
	Rufus Walker, Jr.
Moon Motor Car Company	W. J. Coglan
	E. I. Moon
Matheson Automobile Company	F. F. Matheson
National Motor Vehicle Company	J. M. Clarke
Nordyke & Marmon Company	Herbert H. Rice
Oakland Motor Car Company	J. B. Eccleston
Packard Motor Car Company	S. D. Waldon
	H. H. Hills
Paige-Detroit Motor Car Company	Jas. F. Bourquin
	H. Krohn
Peerless Motor Car Company	R. S. Schmunk
Pierce-Arrow Motor Car Company	J. Elmer Pratt
Premier Motor Mfg. Company	H. O. Smith
	John Guy Monihan
Alden Sampson Mfg. Company	M. C. Reeves
Selden Motor Vehicle Company	James Joyce
S. G. V. Company	F. F. Weston
F. B. Stearns Company	R. H. Williams
Stevens-Duryea Company	H. C. Beaver
E. R. Thomas Motor Car Company	C. S. Henshaw
	J. E. Quimby
The White Company	Walter C. White
Willys-Overland Company	C. S. Jameson
Winton Motor Carriage Company	C. W. Churchill
	Chas. W. Mears

New Companies in Hoosierdom

INDIANAPOLIS, IND., Sept. 23—With several new companies being organized and old concerns enlarging their plants, together with agency changes, the 1913 season is starting out in a brisk manner in this city.

The H. J. Martin Forging Company has just acquired another tract of ground adjoining its plant and will erect an additional building at once to cost $50,000. The company manufactures motor car steel forgings. A factory branch, service station and repair shop has been opened by the Eisemann Magneto Company with Lon R. Smith, western representative of the company, as manager.

With an authorized capitalization of $20,000, the Glover Equipment Company has been organized and incorporated to manufacture motor car tops, dust hoods and seat covers. F. L. Glover formerly with the R. J. Irvin Manufacturing Company, is president and general manager.

Another new company is the Auto Finishing and Wonder Polishing Company, incorporated with $50,000 capital to manufacture motor car polish. J. W. Cummings and J. J. Sheehan, of this city, and N. S. Tedrow, of Des Moines, Iowa, are interested in the concern.

The Archey-Atkins company has arranged to distribute the truck made by the Brown Commercial Car Company, of Peru, in central Indiana. The Brown company will have an office with the concern. F. N. Martindale has bought at receiver's sale the property of the Indianapolis Auto Top and Rubber Company for $700 and will continue the business.

PHILADELPHIA, PA., Sept. 30—By a decision handed down today by Judge Thompson in the United States District Court, the Penn Auto Supply Company was adjudged bankrupt and John V. Harrigan and Hugh B. Turner appointed receivers, with authority to carry on the business of the concern until further orders from the court.

Security was fixed at $10,000.

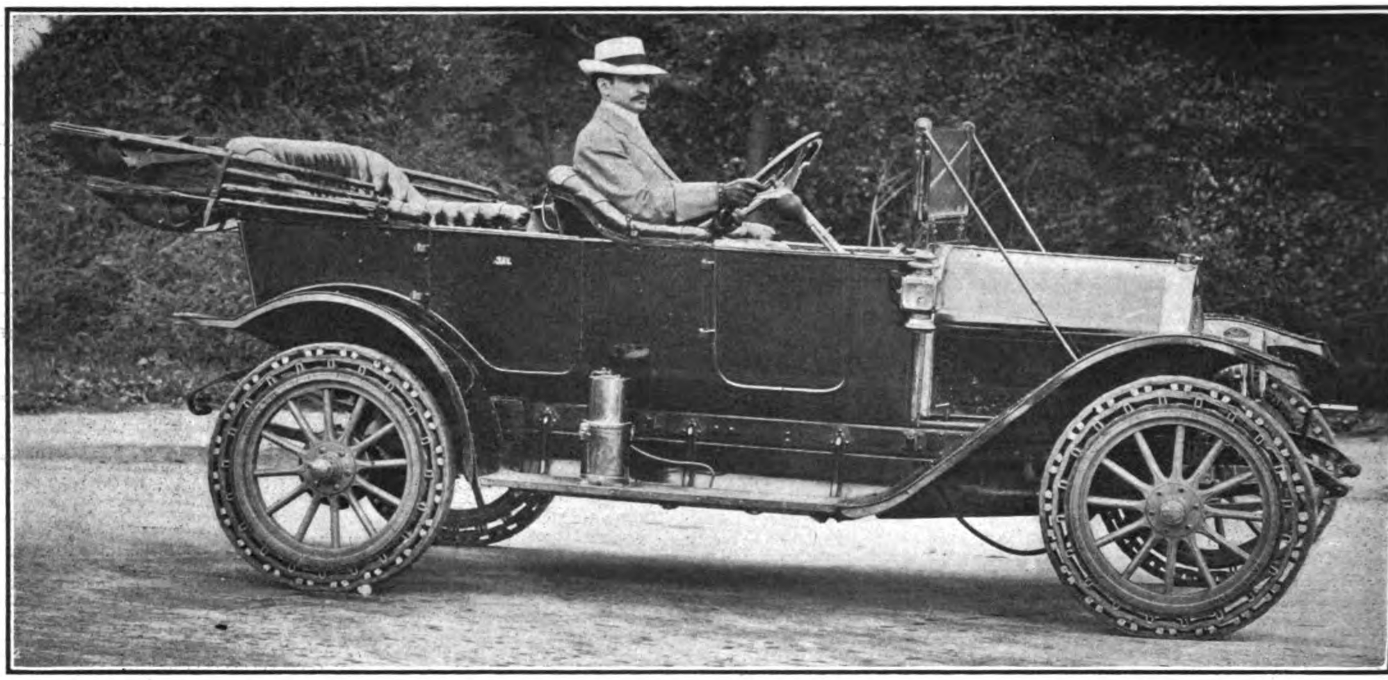


Fig. 1—Ethelbert Favary in Overland car equipped with his patent mechanical tire. Note the action of the bands of the right rear wheel in taking up the shock of the stone

S. A. E. Considers Tire Possibilities

Metropolitan Section Hears Interesting Talk on Favary Tire and Various Fillers Are Discussed

THE first meeting of the Metropolitan section of the Society of Automobile Engineers was held September 26, at the United States Rubber building. The topic of the evening was substitutes for pneumatic tires. An interesting session was held, the greater part being devoted to a paper by Ethelbert Favary who has invented a very novel and ingenious form of non-pneumatic tire. After Mr. Favary had answered with dispatch the various questions put to him, O. A. Parker dwelt upon the virtues of Newmastic, a tire filler, and Mr. Phelps of the Zilio company also touched upon the requirements of a successful filler. A part of Mr. Favary's paper follows:

While pneumatic tires have contributed in very large measure to the rapid development of the automobile, nevertheless at the present day pneumatic tires offer a great drawback to motoring, through expense, breakdowns, etc.

Two different principles have been employed in the construction of the tires in general use today, viz.: pneumatic and solid rubber. Besides these, tires embodying springs of a great number of varieties have been experimented with, without success, for reasons well known to those familiar with the art. The different types of tires relying on rubber compositions, rubber fillings, or solid rubber in conjunction with air at atmospheric pressure may all be classified as solid rubber tires, since they rely on the elastic efficiency of rubber as the resilient medium. As is well known, this elastic efficiency is very poor. A simple experiment with a block of rubber will demonstrate this fact quickly. When placing a load or weight on a block of rubber, the depression to the point of rest will not be instantaneous, nor will it reach this point nearly as rapidly as a spring or pneumatic cushion. When the load is removed the last two mentioned will resume their former position immediately, while in the case of the rubber block some time will pass before it resumes its former shape, since rubber changes its form under compression.

Power will be consumed by a rubber tire, since the effect is analogous to running up a grade or in deep sand or mud; there is a resistance against the forward motion, it being necessary to compress the rubber in front up to the central axis, whereas with a good resilient medium the counter-pressure behind the axis is approximately equal to the pressure in front of it. The amount of power wasted will depend on the "give" of the rubber, the quality of the rubber and the speed of rotation of the tire. But apart from the power consumption, vibrations are set up on account of the slowness of the "give" of the rubber, and the greater the speed of travel the greater the rate of vibration set up. Hence for fast travel solid rubber tires are impracticable.

The primary desideratum in a tire is a deformable, accommodating outer periphery, capable of absorbing obstructions on the road without raising the axle; this will eliminate road shocks and vibrations, and therefore greatly increase the life of the machine. The second desirable quality is a good resilient medium which will not waste the power of the engine. The third quality (the most important from the passenger's standpoint) is reliability, which includes economy. While the pneumatic tire fulfills the first two requirements fairly well, the third has been the bane of the motorist's existence.

In the tire to be described a purely mechanical principle is employed whereby resilience is obtained by the flex action of a combination embodying pliable bands under tension.

The bands A and B (Fig. 3) are composed of extra strong belting or fabric, especially woven and waterproofed for the tire. C, D and E are aluminum blocks attached to the bands with tubular steel rivets. The large heads of the rivets rest on the bands and their tubular section is opened on the aluminum blocks. There is no friction in any part of the tire between the blocks or the fabric, they being solidly riveted together. F (Fig. 2) shows small aluminum blocks attached to the canvas of the tread, fitting the blocks C when assembled upon the tire.

The tread is detachable from the tire proper, for the purpose of renewal. The blocks F are riveted to the canvas band of the tread, neither rivets nor blocks resting on the rubber, thus eliminating wear or friction in any part of the tread except on the outer surface contacting with the ground. G, Fig. 5, shows the bottom blocks shaped to fit the blocks E, holding them securely against any displacement. Fig 4 shows how the bottom blocks are removed to demount the tire from the wheel. When all the blocks are in position, and the tire is assembled on the wheel, the bands are under great tension and pressure, blocks E being pressed into blocks G, holding the tire securely on the wheel.

The tire is purely mechanical in both construction and operation. The operation is as follows: Immediately under an applied load the bands dip downward, while adjacent thereto there is an upward movement due to the increased tension of the bands.

With 1,000 pounds on a rear wheel the weight of the car will be about 3,500 pounds. For such a car we employ a 4½-inch tire, and the tensile strength of the band would be about 30,000 pounds. The blocks under the second band very seldom carry the entire load, as in practice they are proportionately closer together and the load therefore rests in part on more than one block; this will also tend to reduce the result by at least 25 per cent., so that the above value should be about 1,500 pounds. It will be seen that the factor of safety is amply sufficient, even when hitting stones at high speeds.

When traveling over bad roads the tires should be softer comparatively for maximum efficiency. Theoretically the degree of resiliency should be such as to absorb obstructions of the average height encountered on the road. Thus tires should be harder on smooth roads and softer on rough roads. In the tire described the tension may be adjusted correctly to meet these requirements. With pneumatic tires the exact reverse is true; on rough roads they must be relatively hard in order to prevent rim cuts. Every motorist knows the effect of traveling over bad roads with hard tires; the vibrations and shocks are bound to increase bills for repairs to the machine. In addition all these shocks and vibrations mean wasted energy.

Fig. 4 shows the tools in position for removing the blocks, after which the tire may be easily slipped off the rim. This being done, the tread may be removed by hand from the tire proper by alternately raising one side of the consecutive blocks and then pulling slightly sidewise. Thus, when the tire is running at high speed the tread will not be raised away from the tire proper by centrifugal action on account of the two halves of the top blocks interlocking. The two levers shown in Fig. 4 (the only tools required with the tire) are also used for tensioning the bands, to make the tire hard or soft or in taking up any slight stretch which may develop after several thousand miles. This tension is accomplished by the insertion of a thin aluminum shim under every second bottom block and under every block subsequently.

While the factor of safety in the bands is high as regards their tensile strength with relation to the tension they carry under load, still when using ordinary belting where the warp threads cross one another, there may be a certain amount of stretch. To overcome this a specially woven fabric is employed having the warp threads absolutely straight in pockets surrounded by thin weft threads. This fabric has been found to satisfy all requirements.

During the early period of development the tires were covered at the sides with a thin canvas and rubber coating, making them in appearance very similar to a pneumatic. This was found unnecessary, however, since centrifugal force prevents any dirt or stones entering the apertures in the tire. When packed by hand with clay and cement and allowed to dry, immediately the tire was in action it rid itself of all foreign substances.

On account of the peculiar construction of the tire, it having no lateral "give," skidding is reduced to a minimum, as compared with a pneumatic, in the case of which the lateral "give" exceeds in magnitude the vertical depression

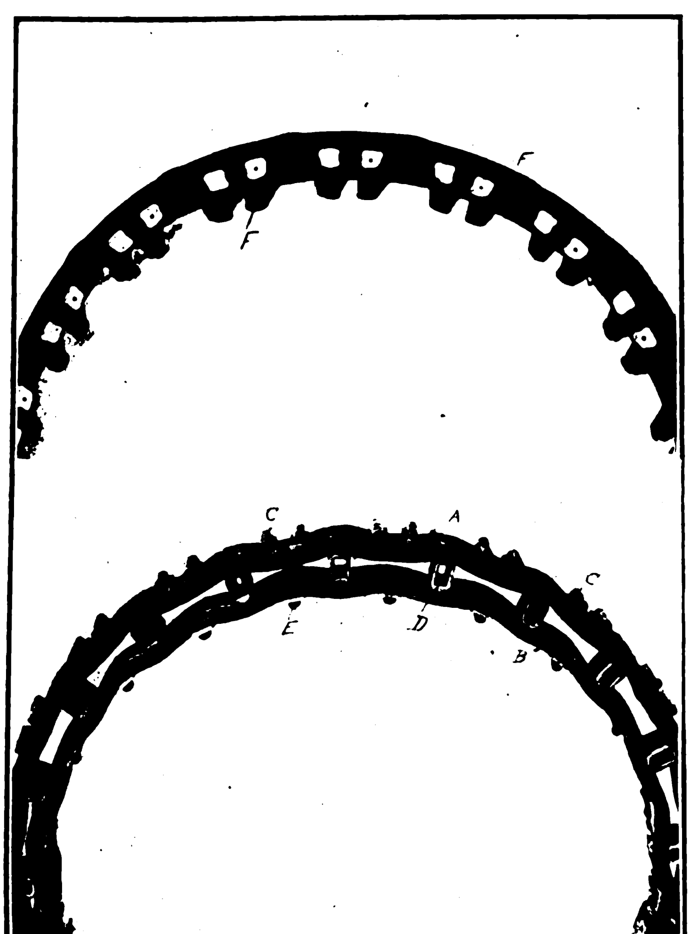


Fig. 2—(Upper) Showing outer tread of the Favary mechanical tire
Fig. 3—(Lower) Favary tire with outer tread removed

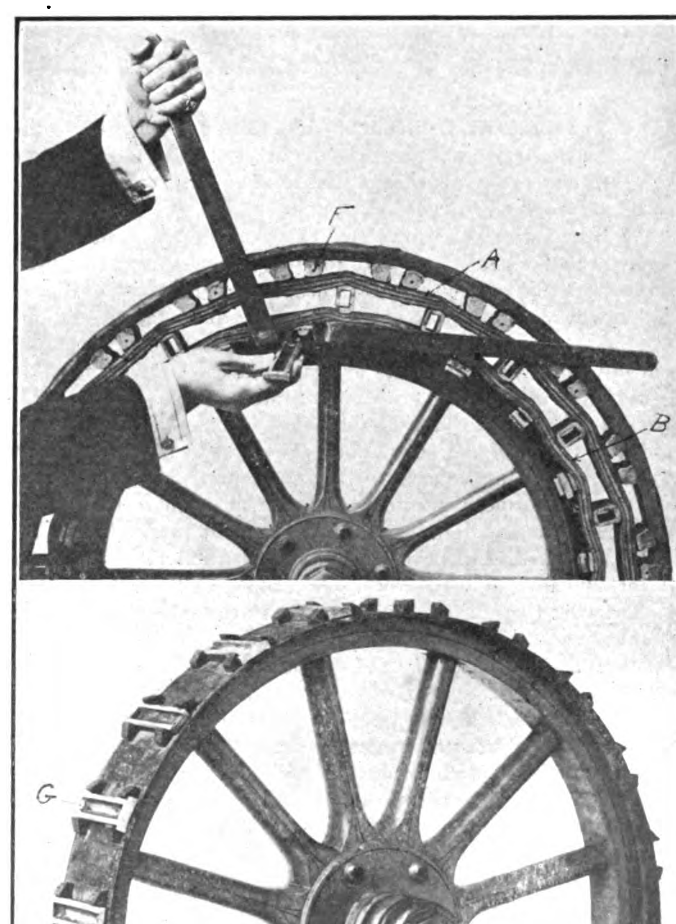


Fig. 4—(Upper) With side flanges removed, showing tire irons
Fig. 5—(Lower) View of rim with bottom blocks in position

New Alliance of Speed and Competence in Hygiene—Differentials Still Developing —A Clutch With Minimum Inertia—Starting Motors With Their Own Gas —Cutting Mystery Out of Casehardening—Rise of Two-Cycle Design

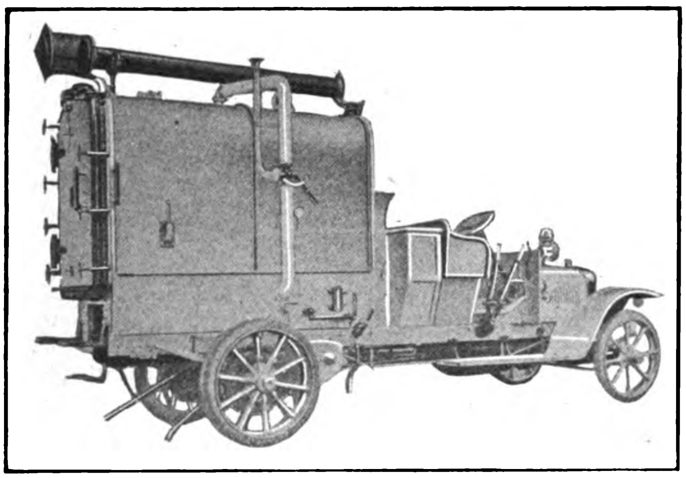


Fig. 1—Disinfector-car proposed for German sanitation districts

SANITATION Centralized by Motor Power—At the recent hygienic exhibition in Dresden, Germany a large number of physicians inspected the disinfector-car whose outward appearance is shown in Fig. 5. It was built at the Benz-Gaggenau works and designed on the basis of the experience of a Dr. Otto, who for more than 1 year has used automobiles for expediting and cheapening the work of disinfection which becomes necessary in the case of contagious and infectious diseases. Sanitation of this order has become more urgent in Germany of late years by reason of the large numbers of foreign agricultural workers who migrate to and from the rural districts twice a year and, generally by reason of the much-increased travel of the population. The system heretofore used has involved the employment of a large number of persons, each of whom, as a rule, trundled or drove a car with a small apparatus within a small radius of action and more or less accurately and intelligently carried out the instructions given them all for guidance in their work. According to the reform plan of the medical profession, large districts are to be placed under a central sanitary administration and motor power is to enable few persons, and these of tried competence in the work, to follow up the notifications received from physicians quickly and at long distance if necessary. The disinfecting is to comprise two processes. First, the nurses or caretakers in a case of disease are provided with means for disinfecting the immediate surroundings of the patient as thoroughly as the nature of the case allows. Secondly, after the case has been disposed of locally, by death, removal or recovery of the patient, complete sterilization of clothing, rooms and of all objects which have been exposed, even remotely, to the infection, is to be effected, and it is for this process that the disinfector-car is required. Some data on the feasibility of the proposition are available. In the lower department of the Seine, in France, thirteen public disinfecting establishments were until recently in operation, Dr. Otto states, and now, thanks to the use of motor power, all the work done at these places and by emissaries from them is taken care of by five disinfectors and one inspector. One of the disinfectors has charge of the final work after each case and has at his disposal a 9-horsepower Dion-Bouton vehicle with a spacious fumigation chamber, while the other four have each a motorcycle carrier with the necessary apparatus for attending to the cases which are in progress. By means of the car it has been possible to effect five thorough disinfections in 2 days at distances involving in all 260 kilometers of travel. During the year 2,550 visits and disinfections were made. The expenses for 1 year for the whole system are given as follows:

Gasoline, lubricating oil and taxes	$590
Operation of garage	192
Repairs and tires of motor car	660
Repairs and tires of five motorcycles	508

Adding to these items the wages, rent, insurance, etc., it is calculated that the cost per capita of the district, which, however, is a metropolitan one, comprising a portion of Paris and suburbs, comes to 1 1-4 cents per year.—From *Automobil-Betrieb,* middle of September.

IMPROVED Shaft-Drive Differential—The demand for a considerable speed reduction at the point where the rotation of the driving shaft is transformed into rotation of the two rear wheel shafts has been held responsible for the introduction of the worm drive on the ground that the size of a bevel gear crown cannot be increased in size without reducing the road clearance. The silence of the worm gear was an incidental advantage. A method for obtaining the desired gear reduction by compounding the bevel gear—placed in front of the rear axle—with a spur gear to the differential casing has long been in use. Other methods adopted largely for the same purpose involve the use of wheel-driving shafts separated from the rear axle and of a spur gear on the brake drum of each wheel. With the rotary speed of motor shafts higher than it ever was before, the greater gear reduction becomes desirable not only for trucks but also for pleasure cars, while the heat treatment and final machining of large bevel gear crowns remains onerous and expensive, and designers are therefore seeking new expedients in those cases where the adoption of worm drive is not considered advisable. In THE AUTOMOBILE of June 13 the new differential used in one of the Mercedes models was illustrated and described. The opportunity which this design offers for in-

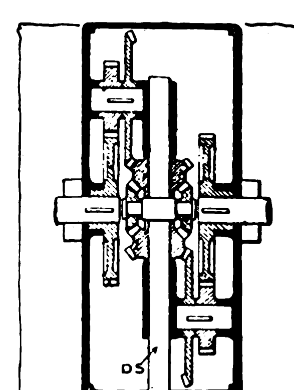


Fig. 4—Renault truck differential with reducing-gear

creased gear reduction is mainly based upon the division of stresses between two bevel gear crowns, so that the gear teeth and therefore also the diameter of the crowns may be made smaller. In the construction recently put forth by Louis Renault and shown in Fig. 3 this feature of the Mercedes design, including the prolongation of the driving shaft DS, is coupled with a further reduction of gear effected by two pairs of spur gears. By this arrangement end thrust on the wheel shafts is also avoided.—From illustration in *Automobil-Welt*, September 13.

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PANHARD Clutch and Change-Gear—The clutch and change-gear of the Panhard 15-horsepower car with Knight motor, three-point suspension and unit construction are shown in Figs. 1 and 2, giving respectively a vertical and a horizontal cross-section of these parts. The clutch is said to work with remarkable sweetness and, by virtue of its small weight, stores up very little momentum. It is entirely inclosed in the motor flywheel which is formed of two plates, hollowed out and joined by screws. At the center is the clutch shaft which is joined to the primary shaft of the gear box by a cylindrical boss with six rifles. The clutch shaft carries a steel disk to which is riveted a fiber ring F. A movable ring P2 is placed in the flywheel and can be pressed against the fiber ring by means of two springs R which are placed in the hollowed part of the rear plate of the flywheel. Disengagement of the clutch is effected by six levers L which are controlled from the clutch pedal and draw the ring P2 back. While exact centering of the fiber ring is not imperative, the clutch shaft is extended into a bore in the motor shaft, the extension being provided with oil grooves. Normally this clutch operates with the clutch casing—which is the extended crankshaft casing—one-third full of oil, as a tube from the change-gear box communicates with the clutch cavity at this height, but it is said to be an advantage of the construction that it operates equally well with little and with much oil.

With regard to the change-gear box the principal features of interest are the following: The casing is bolted in front to the crankcasing as in most other unit constructions, while at the rear it is carried on a rounded sleeve fitted upon a cylindrical extension of the universal shaft housing N, which in turn is secured to a stout cross member T of the chassis. The rounded sleeve constitutes a flattened ball joint protecting the casings against stresses which might arise from torsions of the chassis. The primary and the secondary shaft are concentric for their entire length. The most exclusive feature, howevere, is the control of the gear shifters, which are three in number. It is effected by a simple forward and backward movement of the control lever without any lateral displacement. The shaft A of the lever, see Fig. 2, carries an internally toothed sector meshing with a pinion J, and the latter is secured by bolts to the same shaft which carries a cam-plate K in which are formed grooves r1 and r2 which make the shifting forks G1 and G2 slide upon the fixed guide B. The object of the toothed sector and pinion is to cause

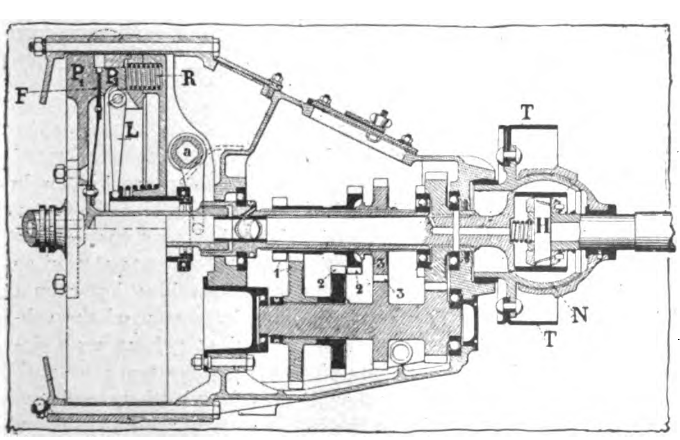

Fig. 2—Showing very light Panhard plate clutch F in flywheel

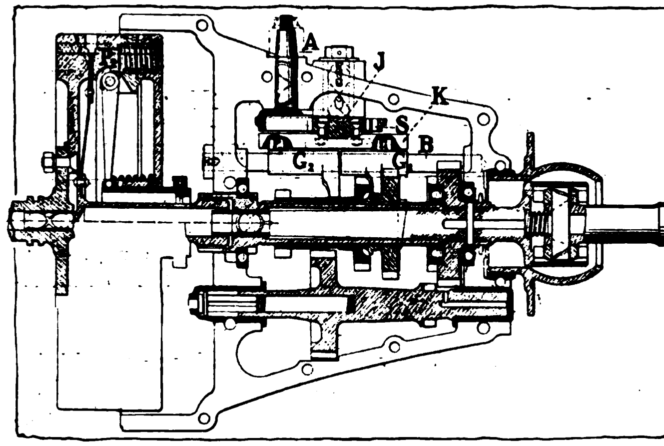

Fig. 3—Panhard change-gear with cam control of shifters

a large angular movement of the cam-plate by a small movement of the lever. As any given position of the cam-plate corresponds to only one possible position of the forks two speeds cannot get in mesh at the same time. The neutral position is double. One is back of the low speed, but a stop on the sector between the second and the third speeds provides a second one which enables the driver to start on second speed by a very short forward movement of the lever, whereafter he gets to the third by drawing the lever back, past the neutral, to third, having the same advantage in the way of short movements that is obtained by lateral displacement.—From *La Vie Automobile*, September 7.

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IMPROVED Casehardening—A general desire for reducing the casehardening process to mechanical terms, so as to make it fit better into manufacturing routine and render it independent of the personal skill of workmen, finds expression in recent patents. German patent 244,966 to Gio Ansaldo, Armstrong & Company, of Genoa, Italy, provides for the combined use of carbonaceous solids and a gas. Both the depth and the degree of hardening can be regulated by this method, it is claimed. The gas used is the anhydrous carbonic acid gas CO_2 which can be obtained cheaply and in great purity in commerce. According to the equation $CO_2 + C = 2CO$, it forms carbon monoxide by combining with the carbon in the carbonaceous solid—usually a powder—until the chemical balance is established. and carbon monoxide is the most suitable gas for carrying carbon into steel, as its use does not lead to the generation of free carbon, and the free carbon is the element mainly responsible for brittleness in the hardened surface layers of the object. According to the process, the articles are embedded in the casehardening compound, as usual, and the CO_2 gas is circulated through the receptacle of the work, being passed in, gathered and passed back again. Some time before the end of the process, the compound or powdered charcoal is removed. In order to increase the carbon content of the hardened portions, hydrocarbons may be introduced in the receptacle either in liquid or gaseous form. To reduce the carbon content, on the other hand, air may be mixed with the circulating gas. Another patent, No. 245,183, secures to the same firm the method of removing the solid carbon compound which serves to regenerate CO from CO_2. from the objects under treatment during a portion of the time, so as to become able to regulate the casehardening temperature independently of the temperature which is most suitable for the formation of CO.

Another casehardening method is secured to W. R. Hodgkinson, of Blackheath, England, by German patent No. 243,238. It consists in exposing the iron or steel to vapors formed by heating substances or compounds containing nitrogen in carbocyclical or heterocyclical combinations. A number of such substances are mentioned. Their evaporation may be effected by spraying them into the closed muffle in which the work is heated. A hardening which suffices for many purposes is obtained by exposing the

Fig. 5—Design of the Galaine muffler

metal at a temperature from 650 to 800 degrees centigrade to any one of the suitable gases for about 30 minutes.—From *Metallurgie*, August 8.

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MOTOR Starter—An arrangement for making sure of being able to start the motor of an automobile by means of the spark has been developed by Unterberg and Helmle of Germany, the same firm whose mechanical device for producing a spark from a magneto with the motor at a standstill was noted at the Berlin, Olympia and other automobile shows opening the 1912 season. The new arrangement comprises gas-collector bottles screwed by their necks one into each cylinder head, next to the spark-plug, and a shaft with three cams by the action of which two valves connecting each bottle with the interior of the respective cylinder may be opened and closed. One is a non-return conical valve held to its seat by two springs, one light and one strong, and the latter may be put out of action by one of the cams. The second and lower valve serves to shut off positively all communication between the cylinder and the gas bottle during the normal operation of the motor. The loading of the gas bottles is done while the motor is running to rest with the spark shut off; in other words, every time the motor is stopped. The control shaft of the device is then turned a little, opening the positive valve and putting the strong spring of the upper valve out of action. The compression strokes during the last turns of the motor now force ignitable mixture into the bottle, having only the resistance of the light spring to overcome, and the compression in the bottle comes by a few strokes, it is stated, somewhere near to that normally reached in the cylinder. When the motor has come to a full stop, the control shaft is turned a little more and releases the strong spring of the upper valve which effectually closes the bottle against leakage, while the lower valve is closed at the same time.

To start the motor, the two valves are opened by another turn of the shaft, allowing the gas contained in the bottle to flow into the cylinder, whereafter the two valves are closed again at once. The motor is then in condition to be started by a spark from the ignition apparatus. If the latter is a magneto suppplemented by the magneto-starter device referred to above, the shaft controlling the gas bottles is connected by a sprocket chain with the starting lever of this device. In other cases, as when the initial spark is supplied from a battery, the shaft is carried through the dashboard and is operattd with a small lever within reach of the driver.—From *Automobil-Welt*, September 8.

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SIMPLE Formulas for Coil Springs—H. Al. Siebeck publishes in *Revue de Mécanique* for May a simplified method for calculating the dimensions of coil springs with reference to the work for which they are intended. The action of a coil spring is determined by its highest admissible load and by its degree of elongation under a given load. The starting point for calculation is the degree of elongation, the value of which depends upon the load and the stroke of the spring. It contains the following elements: H, the stroke in millimeters; P_e, the final load in kilograms, which approaches more or less closely to the ultimate fiber stress, according to the number of strokes of the spring in a time unit, and P_v, the initial load in kilograms, which may be positive or negative. The useful load with these notations equals P_e minus P_v. These values determine the elongation, h, in millimeters per kilogram of load. The formula arrived at is:

$$h = H \div (P_e - P_v).$$

Experience has demonstrated that the functioning of the spring depends upon an exact choice of the elongation h.

With a given proportion $c = D \div d$, between the mean diameter, D, of a convolution and the diameter, d, of the wire itself, the ultimate fiber stress, P maximum, is obtained by the very approximate formula:

$$P = 1{,}600\, d^2 \div c.$$

The safety factor, S_f, of a spring is often calculated after the formula: $S_f = 1 + (n \div 150)$, in which n designates the number of strokes of the spring per minute.

The necessary number of convolutions, s, is figured from the formula: $s = 10{,}000\, dh \div c^2$.—From *Le Génie Civil*, August, 17.

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SPEED of Two-Cycle Motors—The success of slide and rotary valve motors in competition with four-cycle poppet valve motors is interpreted by many European automobile engineers as a development which is not only interesting in itself but which should also greatly encourage those who believe in the eventual practical triumph of the two-cycle type of motor, which was the pet of nearly all engineers in the early days and the first form of valveless gasoline engine. The good accounting which the Cote car equipped with a Cote two-cycle engine gave of itself in the recent Grand Prix race at Dieppe and in some of the subsequent racing events in which it took part—running in every instance with great regularity—has confirmed this opinion. A two-cylinder motor of this type gives, according to bench tests, its highest power at 1,380 revolutions per minute, and with 90 millimeter bore (3.6 inch) and 120 millimeter stroke (4.8 inch) this maximum is 22 horsepower. As now built the motor comprises four cylinders, however, and gives 43 horsepower. The speed can be regulated from 250 to 1,500 revolutions. The weight is 135 kilograms (300 pounds). Two smaller four-cylinder models give corresponding results. The fuel consumption is given as 14.7 kilograms for driving a two-seated car 100 kilometers over a level road, while the same work is done by a four-cylinder motor of 65 by 85 millimeters bore and stroke with only 8.4 kilograms of fuel and by one of 75 millimeters bore and 105 millimeters stroke with 11.9 kilograms. As neither the speed nor the road quality is indicated, these figures are of course not conclusive.—From *Automobil-Welt*, September 13.

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MUFFLERS Which Increase Power—Mention was made in THE AUTOMOBILE of September 5 of the Galaine muffler which had been found by tests, conducted at the laboratory of the Automobile Club of France, to increase the power of the motor to which it was applied. Fig. 4, representing a cross-section of this muffler, shows the construction which was not made quite clear in the first report from France. The partition F was not mentioned. Recapitulating, the exhaust passes through the inner tube, a portion of it expanding through the slits in it into tube A and through holes in the latter into tube B. A hollow conical body with a central passage MN contracts the exit to the atmosphere from the inner tube, increasing the speed of the gases at this point and setting up a suction, by siphon action, in that portion of tube A which lies beyond the partition F, thereby drawing the gas from both A and B as indicated by the arrows.—From *Bulletin Officiel*, August.

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TO Improve Traction of Solid Tires—Solid tires perforated with radial holes of nearly 1 inch diameter are known in the American market. A French firm, Abeil & Son, inserts a short corrugated steel tube in each of the holes of such a tire, the corrugations being formed with a saw-tooth cross-section so that the tubes can be driven farther into the rubber but cannot fall out. As soon as they reach the rim, by reason of the rubber wearing down, the lack of elasticity in the tire becomes a signal that its replacement is in order. The rings work as anti-skid rivets or better, filling up with gravel and other road material and having no tendency to eject it, as they are not in themselves elastic—From *Omnia*, September 14.

Chances for Foreign Trade

Items Culled from Consular Reports Showing Where Opportunities for Business Exist Abroad

Inquiries for Automobiles, Trucks, Motor Plows, Engines, Tools and Accessories

AUTOMOBILE **Accessories**—A business firm in a European country, which states that it is in a position to furnish first-class references and is now the agent for a firm handling automobile accessories, advises an American consulate that it desires to receive agencies and selling offers from American manufacturers of automobile accessories of every type, except pneumatic tires. It is especially anxious that the supplies in question shall be new to the local markets. Correspondence should be in English. File No. 9,540, Bureau of Manufactures, Washington, D. C.

Crude Oil—An American consul writes that it would interest American petroleum interests to know that a certain foreign railroad is studying the question of oil versus coal as fuel for its engines. The company will require between 3,000 and 4,000 tons of crude oil annually, if it can be demonstrated that crude oil is cheaper and more satisfactory fuel than the coal now used. The company at present pays about $9.65 a ton for coal delivered. American companies should send proposals and prices to an official named in the report, also to a consular officer who is interested in the proposition. File No. 9,542.

Motors—A report from an American consul states that he is in receipt of a communication from a business firm in his district requesting catalogs from American manufacturers of kerosene and benzine motors. Prices should be quoted c.i.f. certain city, if possible, otherwise freight rates from port of shipment to the city of destination should be given. Correspondence may be in either English or German. File No. 9,539.

Motor Tricars for England and Other Countries—An official in an American trade association has forwarded to the Bureau of Foreign and Domestic Commerce a request from a business man in England, who formerly resided in the United States, for the names of manufacturers in the United States of motor tricars and low-priced motor cars. He is said to have good connections and in the opinion of the official referred to would make a good agent for manufacturers of the articles mentioned who are not already represented in England and Scandinavian countries. File No. 9,533.

Automobiles, Motor Trucks and Parts—A New York firm reports to the Bureau of Manufactures that it has a foreign inquiry calling for a moderately priced automobile similar to a well-known American car, also motor trucks and frames equipped with motors complete. File No. 9,375.

Automobile Tires—An American consul in Mexico has transmitted the name of a person in his district who, according to an article recently published in a local paper, has improved on automobile tires. The improvement consists in a metallic construction of round wires that form an embracing piece, passing through the interior of the rubber tire and fastened by means of these wires to the iron rim of the vehicle. File No. 9,378.

Gasoline Engines—The Bureau of Manufactures is in receipt of a communication from a firm in England requesting to be placed in touch with American manufacturers of four- and six-cylinder gasoline engines for use in automobiles and trucks and engines for propelling motor boats. The firm sells a large number of gasoline engines for farm and stationary uses, and thinks there would be a good market for low-priced engines for motor cars and boats. File No. 9,377.

Automobiles—A business man in a German city requested an American consul to place him in communication with American manufacturers of automobiles with a view to represent some line in that market. Correspondence in German or Italian. File No. 9,472.

Motor Trucks—A foreign business man informs an American consulate that he would like to secure information and quotations on the following: A car, comprising platform for operator, to run on standard gauge tracks, equipped with a motor of sufficient horsepower to haul six flat, platform cars, size 8 feet by 4 feet, height from track to platform 21 inches, weight of each car to be 800 pounds, each car carrying 2 tons of freight, no hauling up inclines, at a minimum speed of 10 miles per hour. He also desires particulars regarding a car as above to haul ten flat cars loaded with 2 tons of freight each. File No. 9,528.

Repair Shop Tools—The Corinth Automobile Company, Corinth, Miss., is in the market for machine tools for its repair shop, including a lathe, drill and milling machine.

Motor Trucks—A business man in the Far East informs an American consulate that he desires to secure illustrated catalogues, with price lists and discounts, gross and net shipping weights, capacity and horsepower of motor trucks for hauling goods from railway stations and steamboat landings to various parts of a certain city. The trucks must be of heavy construction and the wheels fitted with non-skidding solid tires, as the streets and roads are deep in places. Extra copies of the catalogues should be sent to the consulate for filing. File No. 9,520.

Automobiles—An American consular officer in a European country desires to receive catalogues of American manufacturers of medium-priced automobiles ranging in price to agent, f.o.b. New York, from $800 to $1,200. Price lists, discounts, terms and other pertinent information should be furnished. A considerable number of requests are being received by this officer from dealers and agents, and care will be taken to submit the catalogues, etc., to interested inquirers. File No. 9,503.

Automobile Service—An American consul has submitted a report, accompanied by certain documents, relating to a competition that has been opened by a municipal government in his district for the grant of a concession to conduct an omnibus-automobile service to be inaugurated upon the approaching discontinuance of an existing service by horse-drawn vehicles. These documents were received from the mayor of the city, who suggested that they be forwarded to first-class American firms that may desire to compete. Bids must be received by September 30, and the opening of the sealed schedules offered is to take place not later than October 10. The consul writes, however, that a reasonable postponement of these dates would no doubt, if necessary, be granted upon the application of interested firms desiring to submit offers. File No. 9,505.

Motor-Driven Plows—An importer and commission agent in a European country informs an American consulate that several of his clients desire prices and specifications of motor-driven plows. He adds that large numbers can be sold in this country, which is largely agricultural. What is wanted is a light motor-driven plow with two or three shares. The consulate would be glad to receive additional catalogues and price lists of all kinds of machinery, especially agricultural, as there is constant demand for them. File No. 9,510.

Customs Tariff of Japan—The duty on automobiles in general is 50 per cent, while the conventional duty is 35 per cent. The conventional duty applies to products of the United States. On parts the general duty is 30 per cent. and the conventional is 25 per cent.

How Tires Are Protected

Methods Used by Depot Men in Storing Goods to Supply the Automobile Trade of New York

Red Rays of the Lower Solar Spectrum and Dry Heat Are Regarded as Chief Enemies

LIGHT and dry heat are the most potent enemies of the stored tire and tube. Oil, grease and water are less powerful factors tending to deteriorate automobile rubber goods. Storage for a year or even more under scientific conditions will improve a tire and render it more serviceable, but if the conditions are not right, the same length of time will serve to destroy the usefulness of the stored tire.

These axiomatic truths have been recognized almost from the commencement of the gigantic automobile tire industry, but the underlying reasons for each of them have been subordinated to the axioms themselves.

Disposing of the effect of oil and grease, it may be said that the structure of rubber, either pure or in composition, is such that all oily or fatty substances have the property of entering into the rubber surfaces and destroying them. The immense importance of protecting tires and tubes from contact with oil or grease can not be made too emphatic, but ordinary care is sufficient to prevent such contact and so the proposition is not so grave as some of the other factors that go toward tire deterioration.

An interesting fact has been noted by the tire men that appears to be of so little importance that it would scarcely appeal to the casual user of tires as a factor, but in reality may account for apparently causeless blow-outs in a small percentage of tire mishaps.

In the process of manufacture where hand labor is used in building up the carcass of the casing, a drop of perspiration falling from the face or limbs of the workman and lodging between the plies of fabric upon which the tire is based, has been known to wreck a perfectly good shoe. The perspiration contains a certain proportion of grease from the sebaceous glands of the body and that tiny particle of grease embedded in the fabric spreads rapidly and separates the plies. If the original space occupied by the foreign matter is 1-8 inch in diameter it may grow to 1 inch or more under a small amount of travel, and if the separation lies in a vital spot there is a strong probability that the tire will blow at some inconvenient time.

One Little Drop of Honest Sweat

There is no way to guard against such a condition of manufacture until the handling of tires by the workmen shall be obviated by the use of machinery.

However, the proportion of tires ruined by drops of perspiration is exceedingly minute when compared with the total output and the same may be said for the numbers of tires spoiled by oil and grease while under storage at tire depots.

In the hands of consumers, there is a different story to tell; but the facts in the case are so well recognized by tire dealers and so clearly set forth to purchasers that the subdivision of the subject is not vital.

As regards the effect of water and moisture from the tire depot man's point of view, little need be said. It is obvious that if water gets inside a stored shoe and remains there until it is dried out by evaporation and if the process is repeated, the tire will be destroyed. This is unquestionably true if the water reaches the inner layer of fabric and is probably true even where the inside of the shoe is protected with a layer of rubber composition. But, a certain amount of humidity in the air is a good thing for stored tires. It prevents them from drying out to a destructive degree. The instruction books of some of the tire companies contain a caution to the depot man to sprinkle the floors of his storeroom occasionally so that the natural evaporation will render the air more humid.

It is old Sol himself who exerts a baneful influence upon the tire exposed to his rays; providing that such tire is not in service. It has been noted that tires displayed in show windows of shops where the sun has a full swing at them degenerate rapidly. Test of tires that have been exposed for 8 months in this way have been made and compared with tires in daily service. The conclusions are rather startling. It has been shown several times that the rubber in the tire lying in the show window is in worse condition from the viewpoint of service than the rubber contained in the tire that has been used daily on an automobile.

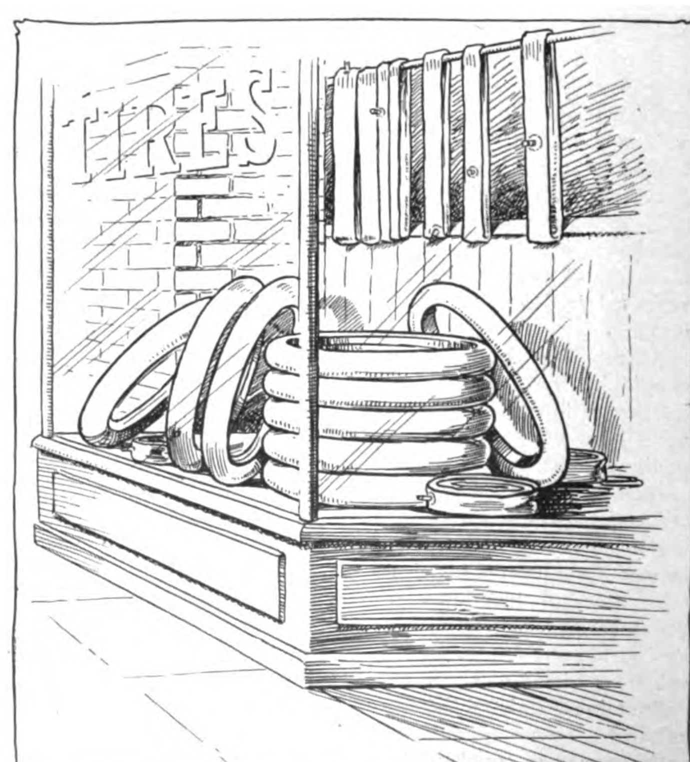
The chemical reasons for the change in the displayed tire are simply that the red rays of the lower part of the solar spectrum have an affinity for the rubber gum. The action of these red rays is the cause of the deterioration. Just what this action is, the rubber chemists still hold different opinions. Some of them hold that the rays set up a process of oxidation and the oxidation results in disintegration of the molecular structure of the rubber. Others state that the process is not oxidation, but is really something else which has not been classified so far.

At any rate the results are pretty well known. The tire surface becomes brittle and crumbles away and its life is short.

One view of this factor is that the effect of the sunshine is to make an extra cure. At every tire factory in the land final inspection of the product shows a percentage of over-cured tires. These are rejected by the inspecting officer and are not allowed to go out as first quality product. The action of the sun probably serves to bring about a condition of over-cure, or some similar condition, and a tire after exposure to the sun progresses to the stage where the inspector would have rejected it had the condition been reached before leaving the factory.

In its natural state as crude rubber, the effect of the sun is deleterious, bringing about a loss of elasticity and rendering the crude rubber less useful for exacting manufacture.

Dry heat ranks higher than all the other factors of destruction to tires in storage. The effect of heat is felt only slightly



Tires displayed in exposed show windows are subjected to an extra cure by the rubber contained in the tires unless it is sufficient in degree to break down the rubber structure. It is chiefly apparent in its action upon the composition of which the rubber forms a part. Dry heat of say 100 degrees Fahrenheit has small effect upon the pure rubber used to impregnate and bind together the various plies of fabric, known to the industry as friction cloth. It does take away some of the moisture that is incorporated into the structure of the tire, but is not a major factor in that direction.

It is upon the tread that the dry heat works havoc. It saps out the moisture and dries the composition so it loses its characteristic elasticity, rendering the substance of the tread brittle and of little use.

The whole subject may be summed up as follows: Oil and grease are generally destructive, affecting fabric, carcass, bead and tread with impartial damage.

Water is chiefly dangerous to the fabric, causing it to rot and separates the plies.

The sun, through the action of its red rays, brings about oxidation, over-cure and loss of elasticity in the gum rubber.

Dry heat affects the rubber composition, robbing it of its resilience.

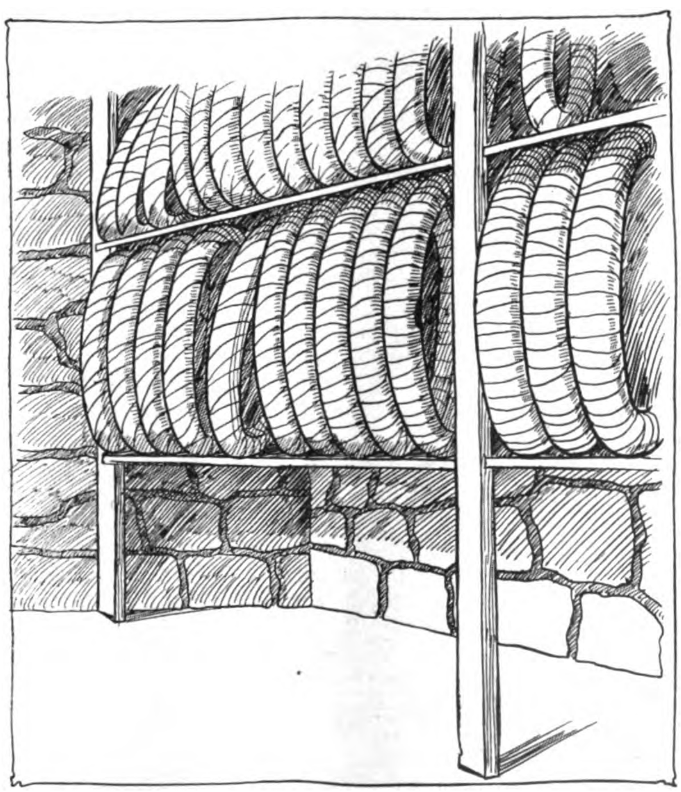
The way to obviate these various effects is to avoid the cause in each instance.

Modern practice is very uniform. In the selection of a storeroom for tires and tubes, the officer who has the responsibility always picks out a location where the sun can not reach his wares. He strives to make such arrangements as will insure moderate temperatures in the storeroom. He may or may not provide for additional humidity in the air by sprinkling the floors or some other expedient.

Stored tires should never be placed flat upon the floor or shelves. They should be arranged vertically, resting upon sectional racks. They should not only be placed out of the sunlight but they should also be stored in such a way that a free circulation of air may be had, under, above and beside them. They should be wrapped carefully in paper or some other protective material.

If tires are laid one on another in a pile, the lower tires will be pressed out of shape and strained unwarrantably by the weight of those above. This method of placing them in storage may well be charged with some of the ruptures of fabric-plies that have plagued automobile operators in the past. Such a method is never used in the modern depot.

Inner tubes must be treated with even greater care than shoes



Casings should be stored in racks away from light and heat as much as possible

Tubes, composed of a much higher percentage of gum rubber than the casings, require much care in storage to guard against heat and light as well as injury through contact with hard, sharp substances. They are usually stored in separate bags or cartons on shelves that keep them away from standing moisture.

The ideal conditions under which tires should be stored are: In the first place, in a dark room, preferably a basement. If there are windows in the room, they should be heavily shaded or else have a northern exposure. It is the direct rays of the sun that are destructive, but reflected and refracted rays probably have some effect also. The room should be comfortably dry in the sense that there should be no standing moisture on the floors or dripping from the wall, but the natural humidity of the air is not destructive and may be increased mechanically with benefit, according to some authorities. The temperature should be moderate and constant, the ideal condition for storage being somewhere between 45 and 70 degrees Fahrenheit. Freezing renders rubber brittle and alternate freezing and thawing of any substance does it no good, to say the least.

Tire Is Improved By Storage

It is stated very positively that if a fresh tire is wrapped and stored in a dark room where the temperature is kept within a moderate range and where it may be protected from oil, grease and water, that at the end of 1 year it will have improved to such an extent that it will deliver from 100 to 1,000 more miles than if it had been put into use as soon as the manufacturing processes had been concluded. Of course, quantities of standard sizes are stored for as much as 6 months and the depot men claim that that period of seasoning has proved to be advantageous.

The limit of time during which improvement takes place has not been set with definiteness. Several of the leading depot men say that they are willing to give the standard guarantee of their factories with tires that have been stored for 2 years. At 3 years they are doubtful but hopeful, the data being insufficient to permit them to be certain.

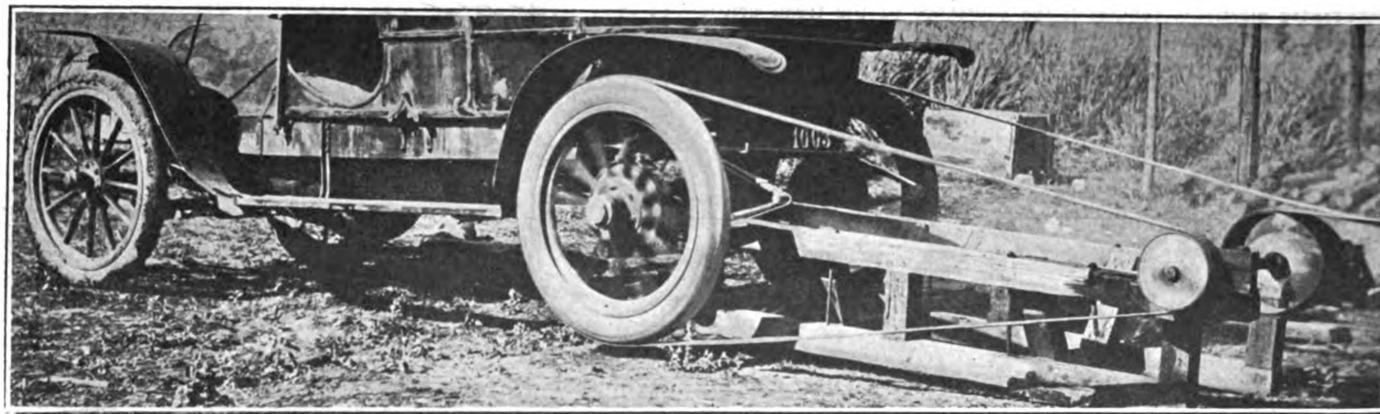


Fig. 1—Franklin car rigged up to run a saw by means of belting taking the drive from the rear wheels

Effect of Valve Chamber Expansion; Commercial Glycerine Contains Acid; Carrying Spare Casings; Radiating Surface Required for 28 Horsepower; Motor Tire Pump; Scraping Brake Shoe; Heating the Garage

Expansion of Cylinder Metal

Editor The Automobile:—Recently you gave instructions as to setting push rods on valves. I would like to have you explain why the walls of the firing chamber do not expand as much if not more than the push rods when they become hot. Are they not hotter than the push rods?

Hillsboro, N. H. W. H. Manahan.

—The metal of the cylinder casting which is in direct proximity to the flame and therefore submitted directly to the heat of explosion would naturally expand more than the metal of the push rods. This would not alter the fact that in the adjustment of the push rods themselves a small amount of clearance would have to be left to allow for the expansion of the rod.

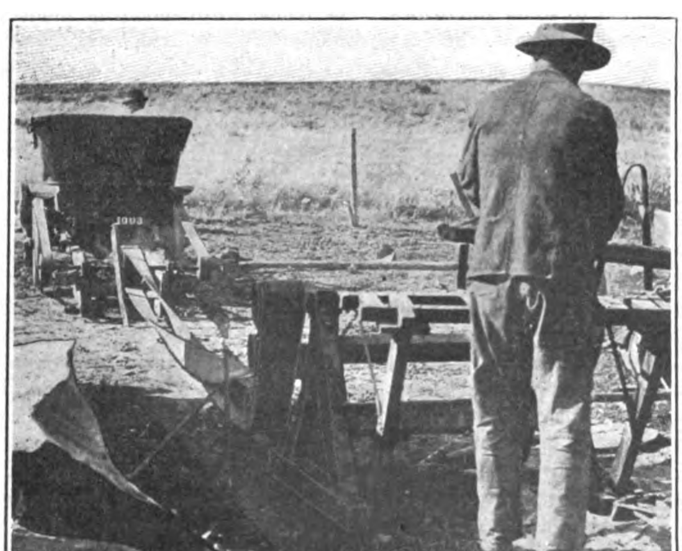


Fig. 2—Final drive to saw when using the car as the driving power for a saw

Glycerine No Scale Preventer

Editor The Automobile:—I read that glycerine, used in the radiator, would prevent the formation of scale. Is there any truth in this statement? Will glycerine form a chemical compound in connection with hard water that will hurt the metal?

Fort Wayne, Ind. George T. Townsend, Jr.

—Attempts to use glycerine as a scale preventer in radiators are rare indeed, as it is difficult to see that it would be of any value for this purpose. Glycerine has been used extensively in radiators, however, as an anti-freezing agent and in this respect is very valuable. The boiling point of glycerine is very high, while the freezing point is so low that it cannot be reached under climatic conditions in any place where automobiling is practicable. The commercially pure glycerine is very expensive, however, and this is a decided barrier in the way of its use. Any other but the commercially pure glycerine is sure to contain fatty acids which destroy the metal-work in the circulating system. A monthly washing out of the radiator with a handful of soda to a pail of boiling water will keep the cooling system bright and clean. The soda solution is poured into the radiator and the motor is run for a minute to thoroughly pass the solution through the cooling system. It is then drained out and fresh water put into the radiator.

How to Carry Spare Casings

Editor The Automobile:—Would you please tell me through The Automobile what is the best way to carry spare casings so they will not be affected by the weather and still at the same time be out of the way? What are some of the most approved methods adopted by the makers of the latest model cars? The manufacturers of automobiles should make some arrangements for an important matter of this kind and I should like to know what they are doing.

Newark, N. J. Prospective.

—There are several means of carrying spare tires, all of them good and some of them especially ingenious. The Rambler concern, for instance, furnishes an entire spare wheel with each of its cars. This is carried on the rear and locked in place with a special lock. The Knox company has a very neat arrangement which is shown in Fig. 4. This is a horizontally-carried tire trunk which can be easily reached and which will prevent the deadly rays of the sun from striking the rubber. It should be known that the practice of carrying the extra tubes without some kind of a protective covering over them is one of the most expensive examples of carelessness possible. The sun will take the life out of the rubber in amazingly short time on a hot day. Light is destructive to rubber, even when the direct rays of the sun are not shining upon it. A tire which is carried in an ingenious and convenient manner is also shown in Fig. 4. It will be noticed, however, that the care of the maker in furnishing a good place in which to keep the extra tire has not extended to the user of the car, who has neglected to furnish some kind of a covering for the shoe, from which he expects his full measure of mileage. A method of carrying tires which is fast becoming obsolete as the advantages of carrying them behind the body are becoming recognized is shown in Fig. 3, where the familiar brackets mounted on the side of the car are shown. On roadsters of the modern type, the rear deck furnishes an excellent support for the spare shoe. It may be stated, as far as care of the casing is concerned in carrying, the important feature is not so much where it is carried, but how well protected it is against sun and water.

Plenty of Radiating Surface

Editor THE AUTOMOBILE:—Will you please answer the following:

1. How many square inches of radiating surface are required per horsepower or how many would be required to properly cool a 4 1-4 by 4 1-2 T-head motor?

2. My radiator, which is composed of ninety-one plain copper tubes, 1-2 inch in diameter, 18 inches long, fails utterly on a hot day, in spite of an advanced spark, a good circulating pump, a tight fan belt and a clean radiator. What is the trouble?

Loudonville, O. JOHN N. GETZ.

—1. It is impossible to state how many square inches of radiating surface are required to properly cool a motor, as this depends upon the type of radiator used, the rapidity of the water circulation and a number of other factors. With the car you mention you have 89.5 square inches of tube area to each horsepower using the S. A. E. rating of 28.8 for your motor. This would be ample if everything was in proper condition.

2. There are many other things to consider other than those you have mentioned before you can positively state that the trouble is due to a radiator which does not answer the requirements of the motor. In the first place, the increased number of accessories which are being placed beneath the hood of a modern car are rendering it increasingly difficult for the fan to bring a supply of cool water beneath the engine bonnet. The hot air backed up behind the radiator cannot escape and as a result very little cooling effect is had from the radiator. Another thing that happens very often is a tear on the inside of the hose connections of the radiator. A flap of loose fabric will stretch across the opening and prevent the free passage of the water and overheating will result. Again, it might be that the cooling system is not to blame, the trouble lying in the oiling of the motor. Insufficient oil will allow the motor to run hotter than would ordinarily be the case and as a result the radiator steams. The steam will escape, thereby lessening the amount of cooling fluid in the system and the trouble will be augmented. A polished radiator will not act well because polish prevents radiation. If you have the radiator a dull black its efficiency will be markedly increased.

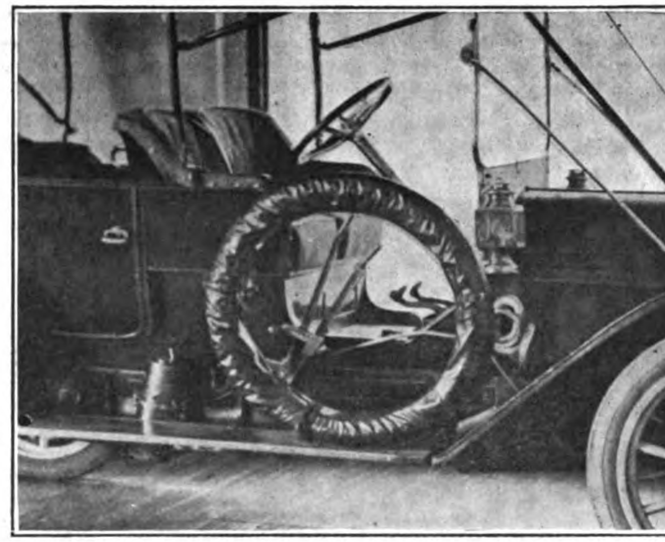


Fig. 3—Method of carrying tires on side; they are safe here, but appearance is bad

Using Car to Run Saw Mill

Editor THE AUTOMOBILE:—Is it possible to drive a buzz saw or other pieces of similar machinery by the engine in a car? How is the belting or shafting arranged when this is done? I have a rotary saw which would do a good part of the work in the preparation of wood for the winter supply of fuel if I could only drive it through the motor of my car.

Wenatchee, Wash. FARMER.

—The illustrations herewith show the method which has been used by a farmer owning a Franklin car. A stiff structure of beams was built up to assure alignment of the belting and two belts from the wheels run to two pulley wheels mounted on a shaft supported by the heavy beam structure as shown in Fig. 2. In the center of the shaft which carries the two smaller wheels at its extremities is a larger pulley wheel from which the power is carried back to the structure shown in Fig. 1. The latter holds the saw and it is here that the work is done.

Suggests Motor Driven Pumps

Editor THE AUTOMOBILE:—I am sending in a drawing of a suggested tire pump (reproduced, Fig. 7) which is attached to

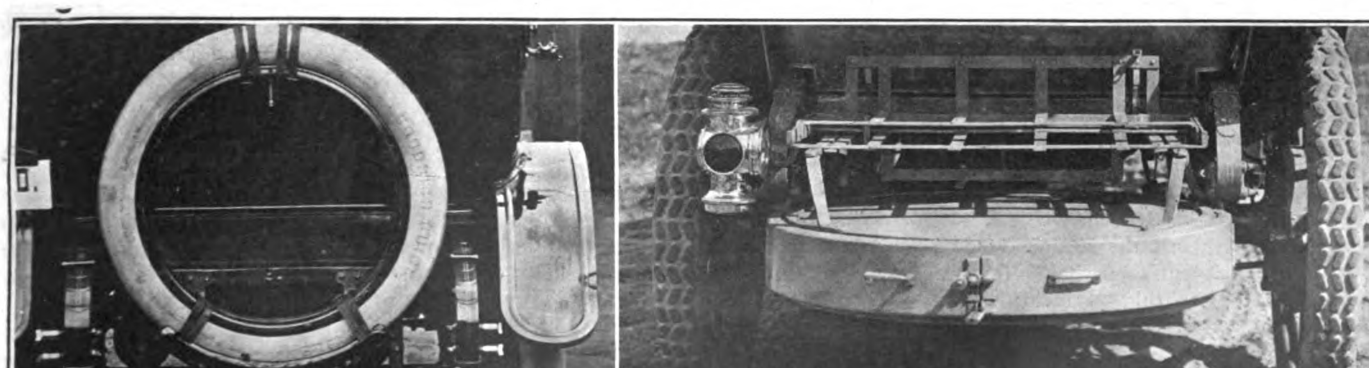


Fig. 4—Tire carried on the rear of a car. The casing should have been covered. The neat Knox tire trunk

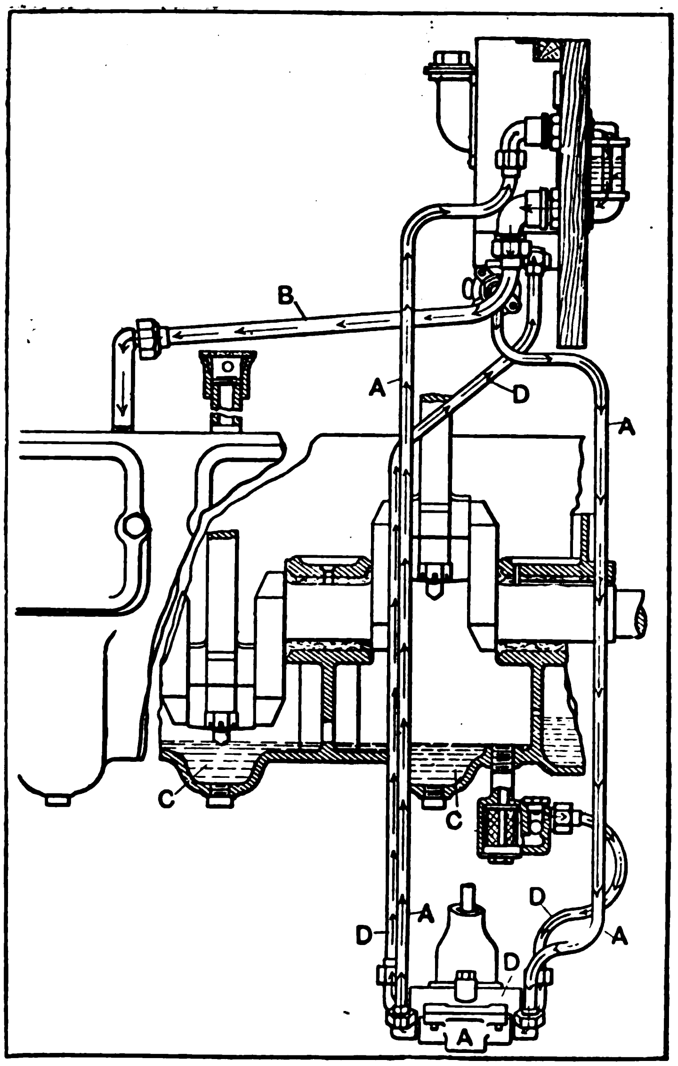


Fig. 5—The oiling system used on the Maxwell Model I cars

the spark-plug aperature of the motor. Would a pump of this kind operate?

Honea Path, S. C. ROGER R. DAVIS.

—You would not be able to put more than about 20 pounds of air into your tires with a pump of this nature. It must be remembered that the compression pressure ordinarily is only about 60 pounds and with the expansion and the work that would have to be done in working the pump and passing through the tubing from the pump to the tire you would be doing well to secure this amount without the use of a differential piston which would raise the pressure considerably. As the device stands it would not work.

Has Carbon and Axle Trouble

Editor THE AUTOMOBILE:—I have a four-cylinder model I 1911 Maxwell touring car on which the two back cylinders carbonize after running about 100 miles. Can you give me any light on the matter as to where the fault is and how to eleminate it? The two front cylinders have been cleaned once in 2,000 miles and seem to be perfectly clean after 3,000 miles of running.

Also the brake band drum where it fits up close to the rear axle end rubs against the support holding the brake rods and is commencing to cut somewhat. How can I set the wheel out far enough to stop this. I inclose a cut showing where the drum strikes.

Orangeville, Ill. H. C. S.

—To understand the trouble which causes carbonization of the two rear cylinders the oiling system used on your car must be thoroughly comprehended. The Maxwell model I is lubricated by the oil spray created by the splash of the connecting-rods into the pools of oil which are held by the series of troughs placed below the respective cylinders. The oil supply is held in the bottom of the crankcase in these splash troughs and also in the supply tank, and is kept in a state of continual circulation. This circulation is kept up by means of a gear-driven pump located on the left-hand side of the motor and operated by means of the camshaft.

The course of the oil as it passes through the oiling system may be traced by following the pipe leads starting from the tank. The oil starts from the tank which is placed at a considerable height above the pump and therefore has a head sufficient to give the oil a ready flow. The lead from the tank to the pump A, Fig. 5, is for the most part straight and leads directly into the suction port. From here the oil is forced up to the sight feed on the dash. After passing through the sight feed the oil will flow down into the crankcase through B, to replenish the supply in the splash trough C and maintain it at the proper level. After attaining this level there will be a flow into the standpipe placed at the proper height to catch the oil and lead it back again to the pump, from where it is passed up to the tank from which it started through D and is thoroughly strained before again passing through the system. All the moving parts within the motor itself are lubricated by the splash.

The standpipe through which the oil flows from the splash troughs C to the lead D, passing on its way the strainer, presents one point at which the oil supply may be adjusted. This standpipe, as stated, is fixed at the factory at the correct height for removing the oil when it reaches the level at which the connecting-rods dip into the oil. By screwing this pipe out a little the level is lowered, and smoking troubles, if there are any, will be abated. The pipe must not be screwed down too far or else the motor will be starved of oil in a very short space of time and as a result a case of seized pistons will develop. It would be unwise to attempt to reduce the supply of oil as per the above directions until you have first examined the piston rings in the two cylinders giving the trouble. It is very possible that they are either badly worn or broken, thus permitting oil to work its way past them into the cylinder heads.

2. In the live axle used on these cars, the weight is carried on the axle drive shaft. If, for any reason, the hub cap which holds the end of this shaft should become loose and should back off it would allow the end of the axle to wear the hub center to such an extent that when the latter is tightened again the wheel will go further up on the axle than it did formerly. This will bring the drum against the bracket and cause it to cut the latter. It is very possible that the hub is loose at the present moment allowing the wheel to cant in at the top, which brings the drum against the bracket in the same maner as would be the case were the whole wheel too far up on the axle shaft.

To cure this trouble, remove the hub and the axle. Examine the opening in the hub center very carefully to see if it is worn. If so, a new hub center will cure the trouble, provided no other parts are damaged. If the car has been run for an extended length of time in a damaged condition it is probable that further damage has been sustained. The parts which could be harmed by such a state of affairs are the hub center, axle shaft, outer roller bearing, taper key on axle end and the brake rod bracket.

Heating the Private Garage

Editor THE AUTOMOBILE:—I desire to learn of an inexpensive but satisfactory method of heating my garage and will appreciate any information you may be able to give me. My garage is of wood construction, shingled. Last winter we used a stove, but found that the temperature varied greatly.

Mount Vernon, N. Y. A. H. B.

—The problem of heating the private garage has long been a source of worry to the owner who does not maintain an establishment in which a chauffeur, and perhaps others, sleep. For the owner who takes care of his own car and who takes a delight in working about it during the winter months, the heating problem is a source of expense which, while necessary, must be cut down to the minimum. It is better for the car that the temperature of the garage be kept above 60 degrees, as cold weather affects both the metal in the car and the enamel upon it. If the car is to be used during the winter it is a necessity that the garage be constantly heated.

The general methods employed for heating a garage may be roughly divided into two classes. The first is where the heating system is within the garage itself and the second is where the heat is carried into the building from an external source, such as from the heating system of the residence, if the garage is on the same premises.

Where the heating system is located directly in the garage there is the choice of the regular stove, gas, hot air or the steam or hot-water apparatus. The stove has the objectionable feature mentioned in your letter and, besides, is unsafe in a frame garage. Gas heaters have the objectionable feature of being unsafe and against the underwriters' laws for garage work. Gas is in itself a dangerous thing about a garage and, although there is a type of gas stove which operates on the principle of the Davy lamp with a screen that prevents the ignition of the gas, this method has not been adopted extensively for the use of the automobilist keeping a private garage because of contrary legislation and also because the stoves of this sort, of which a few meritorious examples have been put upon the market, have never become particularly well known.

It would be impractical in the average small wood garage to have a steam or hot-water plant installed, because it would take up valuable space and would be expensive. When installed, however, it is managed the same way as in any other type of building. If the garage is of wood, care must be used in the installation of the heating plant. Most garage owners, when putting in such a plant, build a small concrete addition to the garage and make the wall thick enough to fulfill the regulations of the underwriters or the municipal fire department.

When the heat is taken in from an exterior source the heating plant of the residence or an electric heater may be used. The latter is expensive, 10 cents per kilowatt-hour being charged generally for the current. The electric heater uses so much current that the cost of running such a plant would be prohibitive.

A system which has been worked to good advantage where the residence was heated by steam, or hot water, was to run steam or hot-water pipes from the boiler in the celler of the house to a radiator in the garage. With the pipes carefully lagged the amount of heat lost through a pipe will be surprisingly small and there will be no difficulty in carrying the warm fluid 50 feet underground to the radiator, although an increased steam pressure will be necessary to take care of the added drain on the resouces of the furnace. When the level of the radiator is below the boiler there will be difficulty in getting the water back to the boiler. For this reason the radiator will have to be placed above the boiler level or the scheme will not work.

Should the hot-air system of heating be used in the house, it will be possible to lead a pipe over to a register in the garage. This will mean very careful lagging with astestos and burying the hot-air pipe in the ground. The walls of the garage will have to be very carefully chinked in order that the temperature can be kept to the required 60 degrees. The hot-air system, if carefully installed, will work well. There will be no danger of water freezing in the pipes and bursting them when the furnace accidentally goes out. Knowing the tendency of furnaces to do that very thing on some of the coldest nights it would be wise not to put entire dependency on it during the cold weather, but to also put a good anti-freezing solution into the radiator. A 30 per cent. solution of denatured alcohol and water, that is, 1 1-2 quarts of alcohol to 1 gallon of water will be safe down as far as zero.

The placing of the radiator or register is very often a matter of conditions to be met and not of choice. If the heat is brought from the residence, the pipe will be invariably led in from the nearest side of the building and the radiator will naturally be near that wall. It is a good arrangement to have the raditor near the point where the radiator of the car will be when it is in the garage for the purpose of keeping the water as warm as possible, even though the fire in the furnace or hot-water plant be low. Placing the heater near a window is also a good arrangement as the currents of cool air are warmed as they enter and an even distribution of heat is maintained.

For the small frame garage, the choice seems to lie between that of using the heating plant of the house or of building a small concrete addition and putting a heating system in this. The system used in the residence will be the cheapest and most satisfactory method in any case where the latter service is satisfactory and the garage not too far away, or if the level on which the garage stands is not lower than the hot-water or heating plant in the basement of the residence.

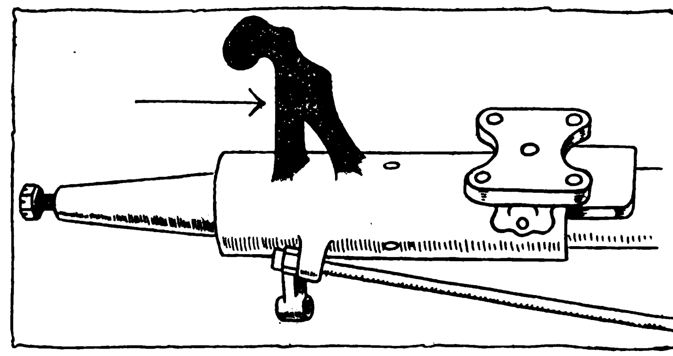


Fig. 6—Maxwell model I, rear axle. Arrow points to spot where drum rubs bracket

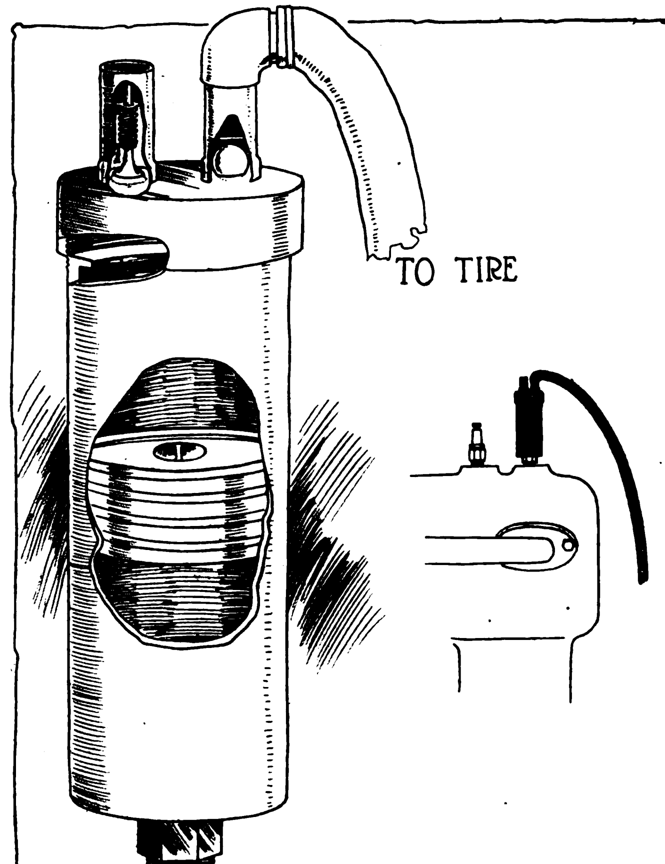
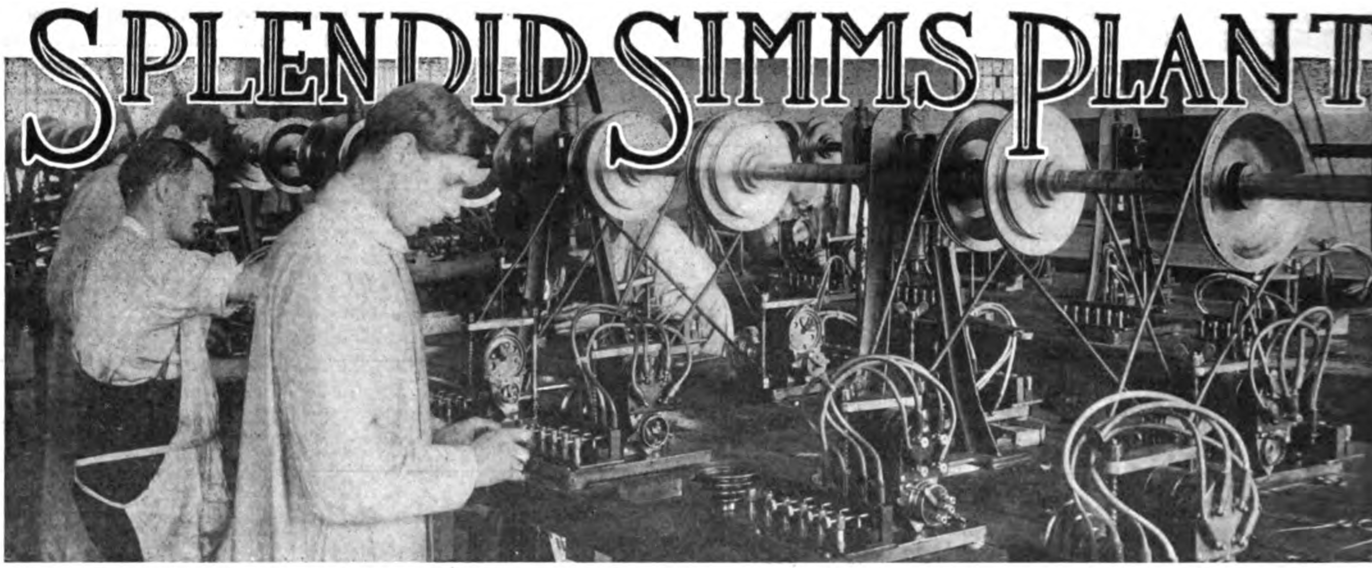


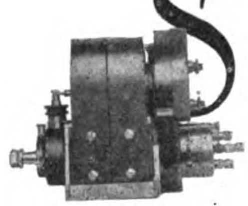
Fig. 7—Motor pump which reader has designed for putting pure air in tires

SPLENDID SIMMS PLANT



Running tests in the final testing departments in the factory of the Simms Magneto Company at Bloomfield, N. J.

Company Is Exceedingly Fortunate in Having the Advantage of a Well-Constructed Modern Factory Equipped in the Most Elaborate Manner with the Best of Up-to-Date Machinery Adapted to Its Purposes



A Simms magneto

SELDOM does a newly-organized company have the advantage of being immediately in possession of a commodious, modern plant, fresh from the hands of the builders and yet fully equipped with the most up-to-date machinery. When the Simms Magneto Company, Bloomfield, N. J., was reorganized this summer, increasing its capital from $1,000,000 to $1,750,000, it was fortunate enough to be in such a position. The old company had constructed the factory especially for the manufacture of magnetos and other automobile accessories but had done practically nothing further. The new concern, however, immediately upon effecting the reorganization, set about getting the plant into operation in an energetic way that bodes well for the future success of the undertaking.

Though practically nothing has been done so far in the way of production in quantity, the men in charge have been gradually getting things into shape at the plant, confining their efforts in the manufacturing line to the turning out of 100 magnetos designed for experimental purposes and for samples to be used in introducing the instruments.

Although at full capacity the factory will employ from 500 to 600 men, there are only about 150 now at work, the only active operations being the completion of the 100 magnetos mentioned, making some minor changes in the present design of the instrument and finishing a quantity of tools with which to carry on the work of production.

Some Overtime Work Already

Several departments are working overtime, that is, to about 8 o'clock in the evening. This is necessitated by the immense amount of preparatory work entailed by the approach of the time when the factory is to be put into regular manufacturing operation.

At full capacity, the plant will turn out approximately 50,000 complete magnetos a year together with about 150,000 spark-plugs, which the company will also include in its products. It is also more than likely that a line of carbureters will be manufactured, the company having secured a license from the British owners of the patents controlling the design of the S. U. carbureter. The company may also make some switches and other electrical devices applicable to automobiles.

The factory is situated in the outskirts of Bloomfield, on the line of the Lackawanna railroad, within half an hour of New York City, which promises excellent shipping facilities, the proximity of the metropolis being another favorable factor.

Entire Factory Is Fireproof

One of the striking features of the plant is the type of construction employed. The entire factory is absolutely fireproof, being of concrete, steel and glass, the walls giving the appearance of huge windows, so liberal is the provision for light and ventilation. In this respect, certainly, the plant is unsurpassed. The floors are all of solid concrete. In its general appearance, the whole establishment conveys an impression of solidity and efficiency.

The power house, as at present laid out, comprises a black-

PART OF THE ARMATURE-WINDING DEPARTMENT, SHOWING METHOD OF WINDING smith shop, besides the engine room in which are placed the two 125-horsepower American Ball, two-cylinder combined vertical and horizontal compound engines connected to two direct-driven dynamos generating the power for the entire plant. Two tubular boilers are employed to produce the steam for the engines. Water is pumped directly from the company's artesian well to supply these boilers.

While the buildings of the company could hardly be termed a mammoth plant as yet the two-story concrete main building, which is built in the form of a hollow square, has a floor-space of over 70,000 square feet, the outside dimensions of the building being 231 by 177 feet while the central court measures 137 by 43 feet. The structure is designed with a view to the possible future addition of a third story, the walls being constructed sufficiently strong to bear the added weight.

The most important portions of the plant are equipped with a sprinkling system as an additional safeguard against fire and the remaining parts are provided with high-pressure water pipes and reels of fire hose. For keeping records, blueprints and other valuable but perishable things, there are four steel vaults in various parts of the main building.

Three separate steel stairways, cut off from the floors by fire walls, are located in different parts of the building to give additional protection to the operatives in case of fire.

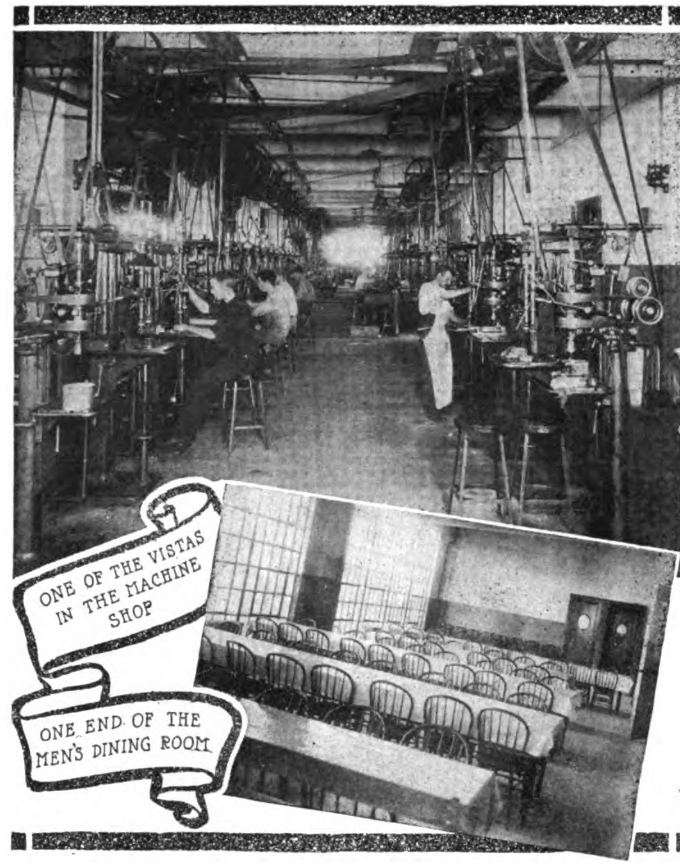
Among the departments on the first floor are the following: receiving, machine, finished parts stores, final assembly, final test and shipping, besides the machine tool department where all the tools and some of the machines used in the factory are made. On the second floor are: the general offices, engineering and drafting department, armature winding and impregnating departments, the separate dining rooms for the men and women employed by the company, the experimental and testing laboratory, etc. Coil assembling and testing departments are also situated on the second floor, together with a special spark-plug testing department and a carpenter shop.

The steel and concrete power house, which is separate from the factory proper, is of ample size for the present needs of the concern and has abundant provision for subsequent expansion.

Material Has Regular Route

In laying out the main building, the principles of system were kept in mind and, as a result, the plant was planned so that the material, after entering the receiving department in a raw state, has a regular path through the factory laid out for it, thus doing away with a considerable amount of unnecessary traveling back and forth from one department to another and a consequent waste of time, labor and expense. In fact, the best way to see the factory, especially if one desires to understand the manufacturing and testing processes through which Simms magnetos pass, is to start at the receiving platform, and then

A CORNER OF THE INSPECTION DEPARTMENT. HERE ALL PARTS ARE INSPECTED FOR SIZE, QUALITY AND WORKMANSHIP



ONE OF THE VISTAS IN THE MACHINE SHOP

ONE END OF THE MEN'S DINING ROOM

to go through the various departments in the order in which the material proceeds from its arrival to the shipping department, where it leaves the factory as a finished magneto.

All the raw material which is used at the plant is received at the platform situated at the right side of the entrance to the inside court. Here everything is carefully inspected before it is moved to the raw material stores department. This is situated at the extreme right of the front building in the big room adjacent to the general machine department.

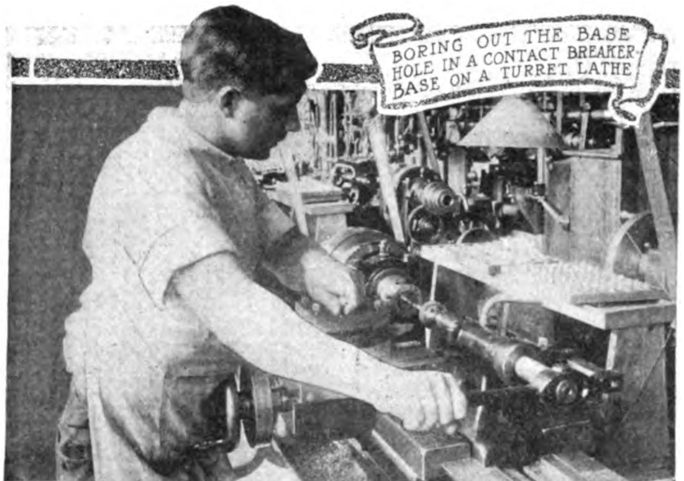
From the raw material storeroom all the material is moved by requisitions from the production department to the machine department where it begins to undergo the process of manufacture into the various component parts of the magnetos, carbureters and spark-plugs which are to form the line of the company.

Between the various steps of construction all parts are carefully inspected, as well as every time they are moved from one machine to another, and after they are completed they are finally inspected and then sent to the finished parts stores department to await requisitions distributing them to the different assembly departments, in which there are assembled into groups or complete machines, as the case may be.

The finished parts stores department is situated at the rear of the main building between the general machine department and the final assembly department and adjoining the inspection department. Consequently, only a small amount of labor and expense is entailed in handling the material to the best advantage.

Instruments Thoroughly Tested

Adjoining the final assembly department is the final test department. After the magnetos come from the assembling room, they are sent to the testing room where they undergo a very rigid test, called the high speed test. In this test, the machine is run at a speed of 5,500 revolutions per minute for a period of 1 hour. This speed is about three times as great as any it would be called upon to sustain in the most rigorous of actual service and over four times as great as the speed at which


Boring out the base hole in a contact breaker base on a turret lathe


Partial view of the assembly department at noon hour

it would run under normal conditions. After the high speed test has been completed, and if the results obtained are satisfactory, the instrument is run at a rate of 3,500 revolutions per minute for over 4 hours, the spark-gap being varied from time to time to test the strength of the spark over various distances. When this test has been carried out, if the magneto gives satisfactory results in every way it is given a slow speed test at a speed of 200 revolutions per minute. This test is also known as the compression test as it consiststs in trying out the magneto by connecting it with spark-plugs incased in an air-tight glass carrying 200 pounds pressure to the square inch. This pressure is almost three times as great as the compression obtained under normal conditions in a gasoline engine. If, after this test, the instrument is found perfect in every respect as regards performance, it is sent to the inspection department where it is carefully looked over to see that none of the screws or connections have become loose under the strain of the tests. If all parts are in good condition it is then sent to the shipping department, which adjoins the final test department, being situated at the front of the building to the left of the entrance to the cenral court.

Special Test for Vibration

In connection with the testing work there is a special test which only a few machines from each lot have to undergo as from their performance the quality of the rest of the lot may be readily determined. This is called a vibration test and consists in putting the magneto on a specially-designed machine which is mechanically vibrated to a much greater extent than could possibly be the case in actual service. The object of this test is to determine whether the condenser or other connections are being made properly and also to find out if any of the screws or bolts used in the machine can be loosened by the vibration, excessive vibration being one of the main causes for magneto troubles.

The winding of the magneto armatures is an interesting step in the manufacturing process. Specially-designed machines are used for this purpose. These are operated in the manner shown in the illustration on page 678, the workers being seated on steel stools constructed with a view to making the work as easy as possible insofar as the worker's comfort is concerned. The core of the armature is placed on the shaft rotated by the crank shown in the picture, thus winding the wire from the spool which is hung on the rack adjustably mounted on the upright shaft at the back of the machine.

After the armatures are wound they are placed on shelves in the rack in the impregnator shown in the accompanying illustration. This is then lowered into the drum which is filled with insulating varnish. This is heated by the steam coil in the sides of the impregnator drum. The cover is then carefully fastened down and the air is exhausted from the interior of the drum until a certain degree of vacuum is obtained. This insures the absolute permeation of the insulating varnish into all the interstices of the armature.

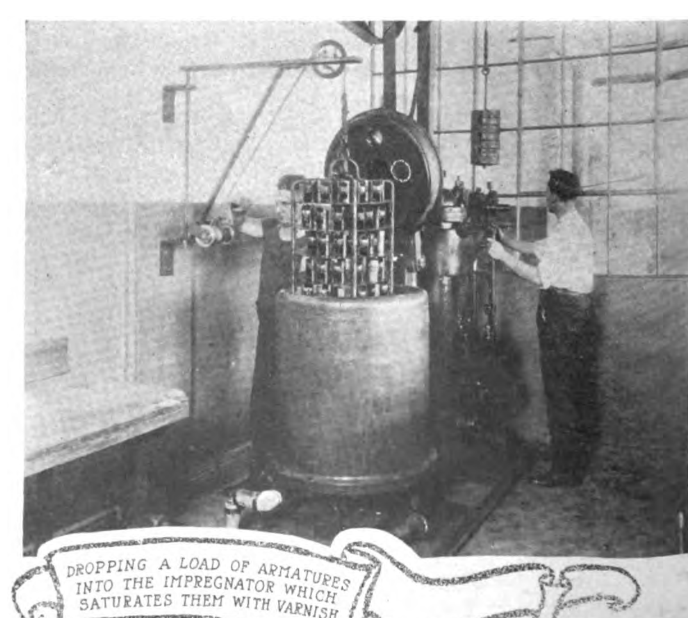
Armatures Carefully Inspected

When completed, the armatures are put to every test known to the magneto experts and then ground to size within a limit of .001 of an inch, when they are again inspected and thoroughly tested before being sent to the finished parts stores department where they are held until needed in the final assembling department.

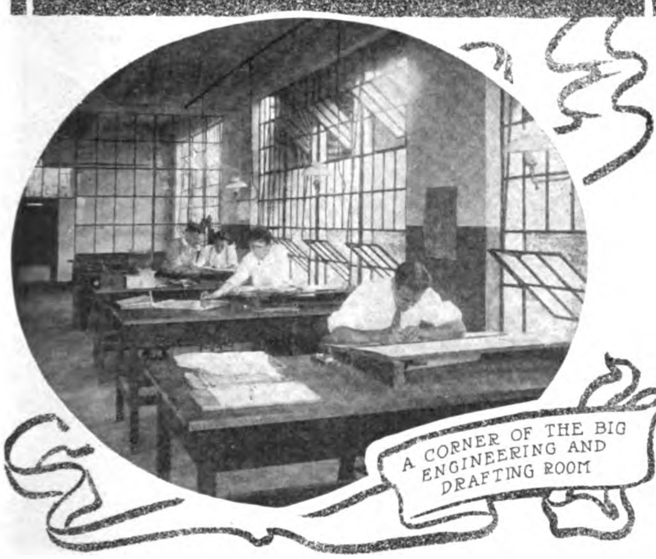
The condensers are made in the same careful manner as the armatures and of the best obtainable material, being subjected to the same rigid tests and series of inspections. The inspection must be particularly careful in regard to this part of the magneto as a single flaw in the hand-split mica, no matter how small it may be, will eventually render the condenser useless for magneto construction.

The engineering and drafting room, which is situated on the south side of the main building, on the second floor, is very large, giving ample room for the tables of the draftsmen and the desk of the man in charge, besides leaving a large open space which may be utilized for the enlargement of the department or for some other purpose as the subsequent development of the business may determine.

The experimental and test room is fitted up for all sorts of experimental work in connection with the operation of gasoline motors, being equipped with two motors, one a four-cylinder


Dropping a load of armatures into the impregnator which saturates them with varnish

EXPERIMENTAL AND TEST ROOM WHERE ALL RESEARCH WORK IS CARRIED ON



A CORNER OF THE BIG ENGINEERING AND DRAFTING ROOM

and the other a six-cylinder, mounted on steel and concrete bases. These may be used for testing magnetos, carbureters and spark-plugs, as well as anything else which the company might desire to add to its automobile accessory line. Around the walls are benches for the experimenters to work on, together with provision for whatever tools, etc., they would require in their operations.

The machine department is a delight to a good mechanic's eye, filled as it is with the most modern types of machinery, many of the machines being of special design. All of the tools and fixtures used in the manufacture of the company's product are designed and made in the plant and are so constructed that all parts turned out by them are absolutely interchangeable. It is completely equipped with drills of all the types necessary to the manufacture of tools and magneto parts, milling machines, etc., together with two rows of high-speed automatics. An idea of the splendid equipment of this room may be gained from the illustration on page 679, which is a view down one of the aisles formed by the machines. There are two of these aisles in the shop besides the small one formed by the double rows of automatics.

Grinding Equipment Complete

The grinding room, which opens off the machine shop, is well supplied with grinding machines and lathes, as shown in the illustration at the right. In this picture the method of hanging the electric lights will be noted. The cords are made extra long and then looped up, so that the workman may easily extend the lights to any part of the room immediately surrounding his machine. This idea is followed out throughout the entire factory in the suspension of the lights. Attention to details such as these means comfort for the workmen and a consequent increase in productive efficiency.

The inspection department is an interesting place. An excellent view of this is given on page 679, showing the men at their work, the chief inspectors, or foremen, consulting with the workers and instructing them. Here the parts are all inspected for size, quality and workmanship, micrometers and other accurate instruments being used to insure exactness in all measurements.

The finished parts stores department, located at the rear of the central court, is fitted up with bins for storing each part, the parts coming in from the machine shop and then being moved by requisition to the assembling department, the next step in the regular process of manufacture.

The final testing department has several long benches fitted with the necessary connections for attaching to magnetos to be tested for running qualities, durability, etc. At full capacity, this department can complete such tests on about 300 magnetos a day, due to its large bench capacity. There is also a special slow speed testing device which is employed in making the compression test.

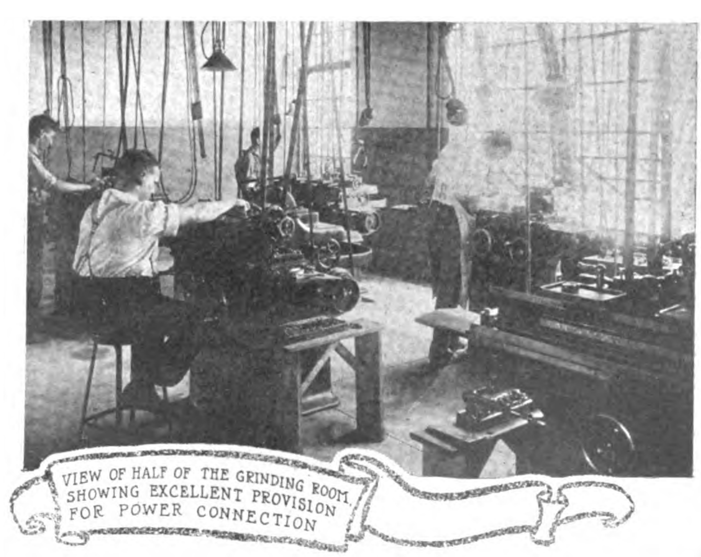
For the comfort of the employes and employees of the company, each department is provided with separate wash and locker rooms as well as a running fountain of drinking water, the stream bubbling up into the air in a delightfully refreshing way and obviating the use of the dangerous common drinking cup.

Two Dining Rooms Provided

The plant is also fitted with two dining rooms, one for the men and the other for the women, part of the men's dining room being shown in the accompanying illustration. In connection with the dining rooms is a commodious and well-kept kitchen, equipped with the necessary paraphernalia for all sorts of cooking, and a large serving pantry. The men in charge of the plant class the entire arrangement as the culinary department. This department is not yet in operation but as soon as manufacturing begins it will be put into regular service.

Steel stools are used throughout the entire plant. These are not only simple and serviceable but also are very durable, besides presenting a neat appearance. Also, they may be readily disposed of when additional space is required as their compactness renders them easy to fit into odd corners.

The Simms company appreciates the productive advantages of the most modern details of equipment, and, in accordance with the principles of systematic management, keeps everything about the plant exceedingly neat and in a well-ordered condition. As a result, the general impression gained from this particular feature of the establishment is one of careful supervision.



VIEW OF HALF OF THE GRINDING ROOM SHOWING EXCELLENT PROVISION FOR POWER CONNECTION

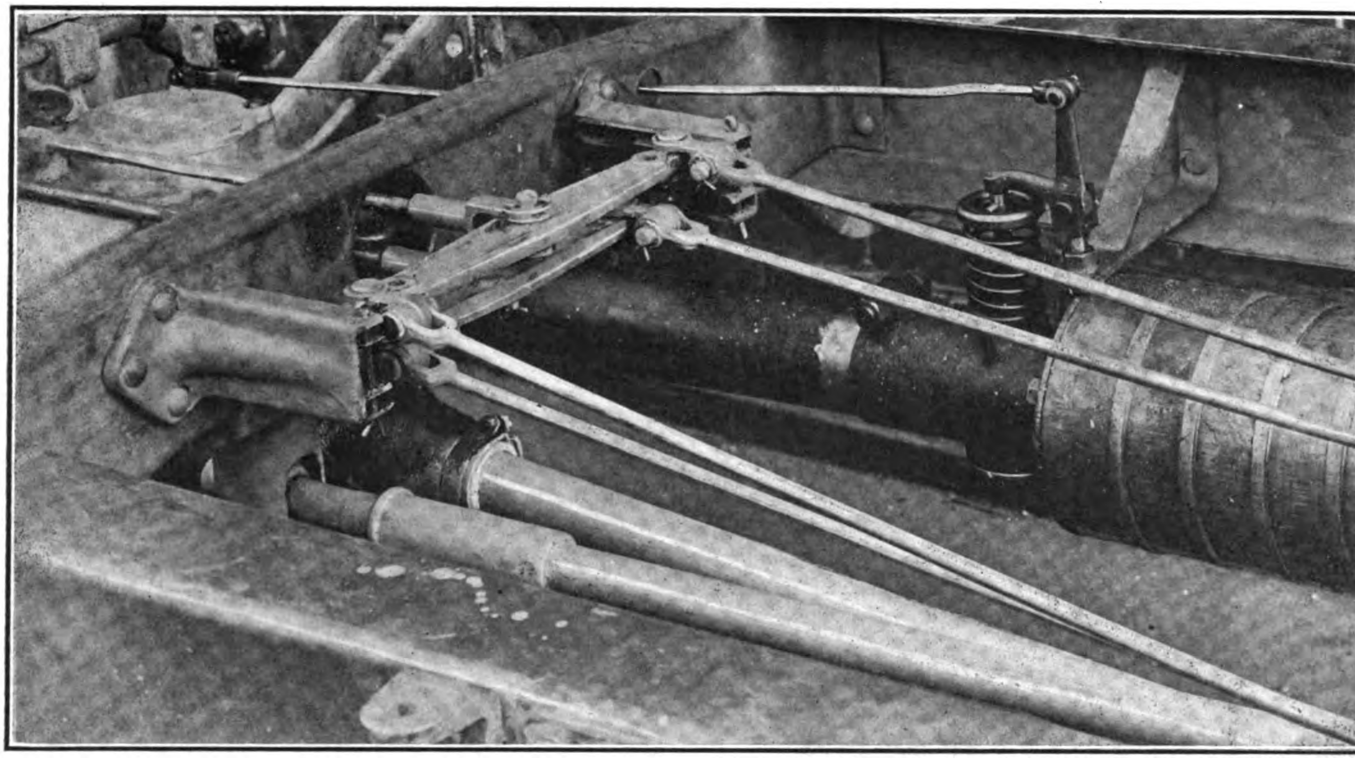


Fig. 1—Service and emergency brake linkage employed on the 1913 Premier models. Note mounting of cut-out

Premier Brings Out A Long-Stroke Six

Abandons Manufacture of Four-Cylinder Motors, Concentrating Attention on Two Six-Cylinder Models

WITH the announcement of the Premier little six for 1913 the company makes the statement that hereafter its attention will be devoted entirely to six-cylinder cars. The gradually increasing number of six-cylinder cars which this concern has had to build in response to the demand of the consumer has led to the abandoning of the four-cylinder type entirely, although service for the owners of previous models will be rigidly maintained. The first Premier six was placed upon the market in 1907 and the increase in demand for six-cylinder cars of this make has been steady even since that date.

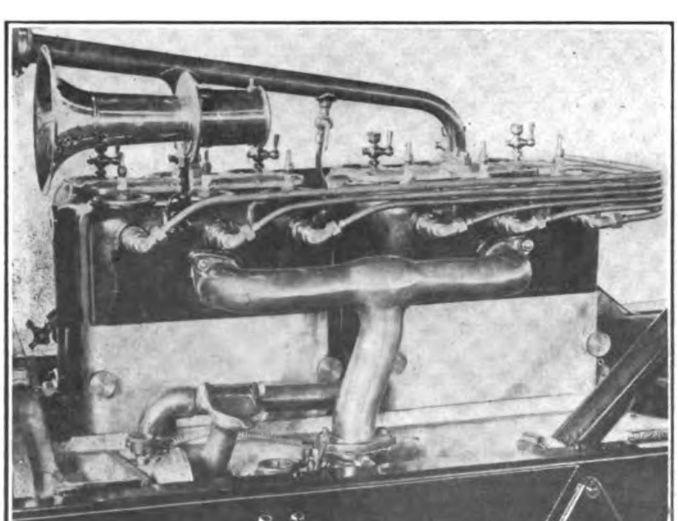


Fig. 2—Left side of little six with cylinders cast in threes

A study of the Premier product is interesting because of the great thoroughness with which the plans were laid to make the car easily kept by the owner in proper working condition. A study of the car reveals the fact that its maker has profited by its experience in reliability contests and is as well a tribute to the worth of rigidly conducted contests of this sort. The Premier concern was one of the early supporters of strict reliability contests and has used the information gained in such contests and in the results of bringing to the maker's attention weaknesses which might develop in guarding against weaknesses of assembly which would show up in use and in making all minor adjustments easy for the owner. This care is illustrated in the fact that practically every nut, bolt and screw throughout the car is permanently locked so that it is impossible for it to jar loose. There is still another point in which this attention towards easy maintenance is well illustrated and that is that on spring ends and all points where brake rods or other rods pass through the frame there are removable bronze bushings, easily replaceable in case of wear.

With this aim of easy maintenance in mind, let us look at the cars themselves. Premier cars for 1913 will appear in two models, both of them six-cylinder and known for the coming year as the Big Six and the Little Six. The Big Six car is the same car as was marketed as the model M-6 in 1912, with its motor, 4 1-2 by 5, cast in pairs, while the Little Six is a new model differing only in its motor size and arrangement and in chassis dimensions. The only change of importance in the Big Six over this year's construction is in the steering-rod connections, which instead of the ball joint used previously will be a universal joint arrangement.

The general design of Premier cars embraces a two-unit power plant consisting of a T-head six-cylinder motor and multiple disk clutch as one unit, and a three-speed sliding gearset as the other unit; a three-quarter floating rear axle and an I-beam front axle and heavy channel frame.

The motor of the Little Six has cylinders 4 inches in diameter by 5 inches stroke, and practically the same construction is used as in the Big Six except that with a smaller bore and cylinder three cylinders can be combined in a unit so that the cylinders are cast in triplets. This permits placing the three cylinders close together, making a minimum distance between end bearings and center bearings.

As with the Premiers of the past the cylinders are cast with large opening in the top of the waterjacket which is covered with a light aluminum plate. The reason for such an arrangement is that it makes the foundry work more uniform so that the thickness of the cylinder and jacket walls would be the same throughout. This also makes possible the removing of lime deposits which may accumulate from the water circulation and the makers have found that this light plate will, as a rule, give way when the motor is allowed to freeze up and will thus save the cylinder. After being cast the cylinders are pickled to remove core sand, then rough machined, heat treated to relieve the internal strains, bored, enameled and finally ground. The bore is said to be accurate to within .0005 inch. The pistons are of gray iron and the clearance between piston and cylinder is .003 inch. Each piston is fitted with three rings, which are individual castings to give increased spring and life. The connecting rods are I-section drop forgings with large bearings, the crankshaft is machined from solid drop forgings. The engine base is made of a close-grained semi-steel said to correspond to that used by the government in army coast defence mortars. The reason for using this particular material is that it is well adapted to hold thread and retain alignment, at the same time thin walls may be used with a weight but slightly greater than aluminum. The lower half of the crankcase, as an oil retainer, is aluminum.

Lubrication of the motor is a circulating system with constant level splash maintained by a gear-driven gear pump. There is a sight feed glass on the dash, located in plain view, by which the operator may watch its action. In the lower half of the crankcase are molded transverse troughs. These have partitions between them so that the dippers on the ends of the connecting-rods dip into oil on any grade below 27 per cent. The oil which overflows from the troughs drains into the reservoirs in the rear and is again forced back into the troughs, thus constituting the circulation. To the lower end of the connecting-rods are screwed brass tubes which dip into the trough and throw the lubricant up into the cylinders. The oil is supplied through a filler pipe and breather in one arm of the crankcase and its height can be judged by a petcock in the side. Pockets in the bearing journal catch the oil and feed it direct to the bearings through oil holes.

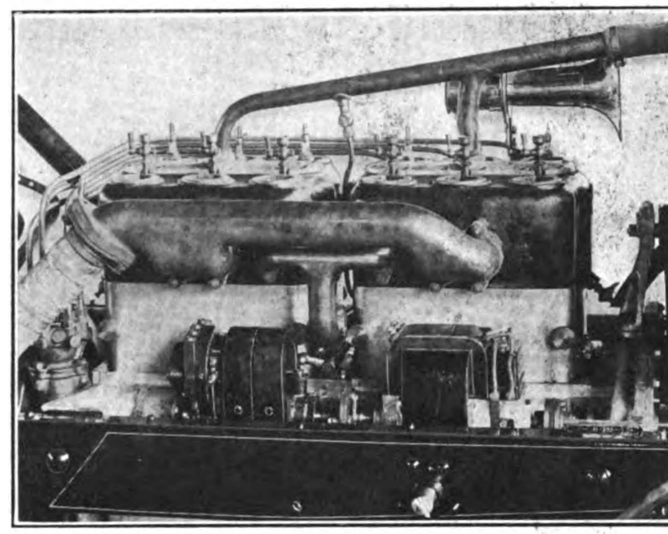


Fig. 3—Right side of little six motor, showing magneto mounting

The valves are completely inclosed and the push-rods have rollers 1 inch in diameter which are ground inside and out. The push-rod guides are die cast bear metal and are held in place by a forked clamp which, when loosened, permits two of them to be removed at once.

The cooling of the motor is by means of a gear-driven centrifugal pump and honeycomb radiator. The water is introduced at the lowest point of the waterjacket and comes out at the highest point. The pump is provided with a space on the outside of the plate so that if the pump were to become disabled the superheated water would naturally rise and the circulation would continue in a reasonably satisfactory manner. In other words, it is a combination pump and thermo-syphon

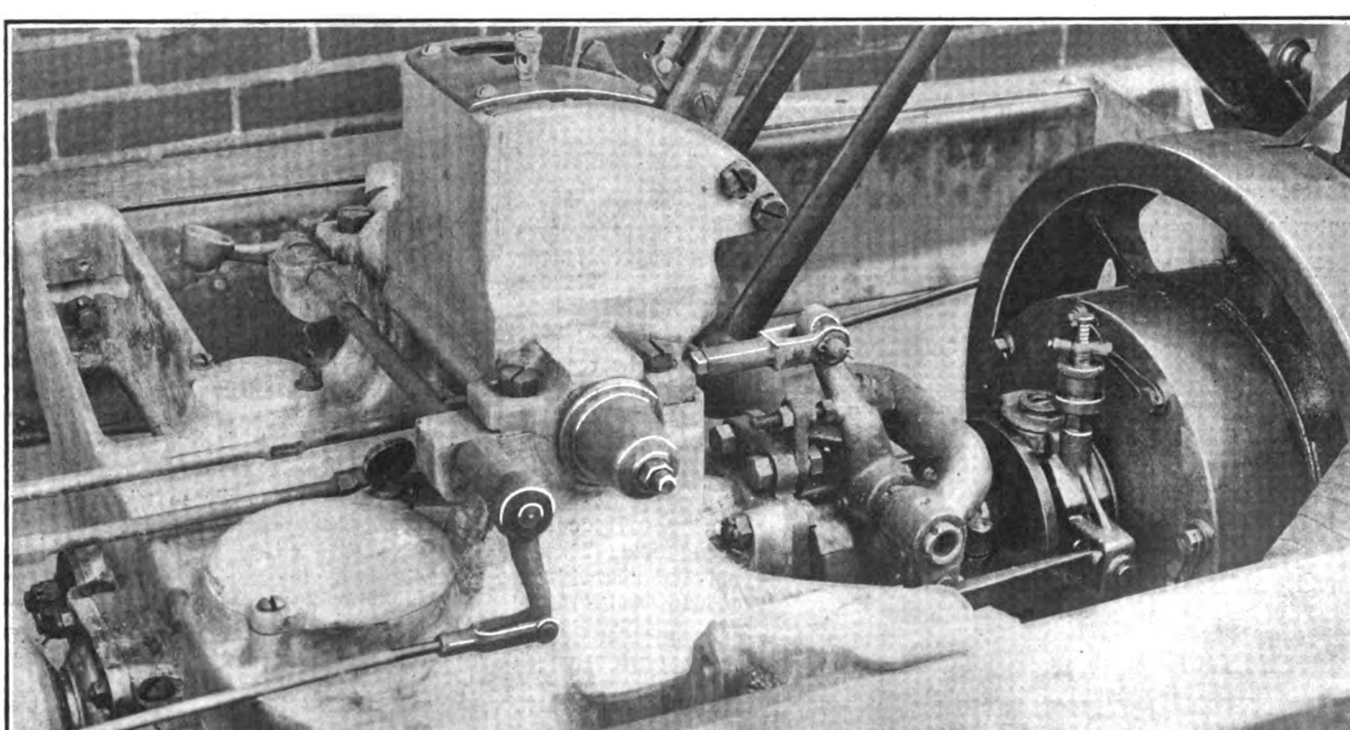


Fig. 4—View of the gearset, control mechanism and clutch, showing oiling and adjustment points and suspension

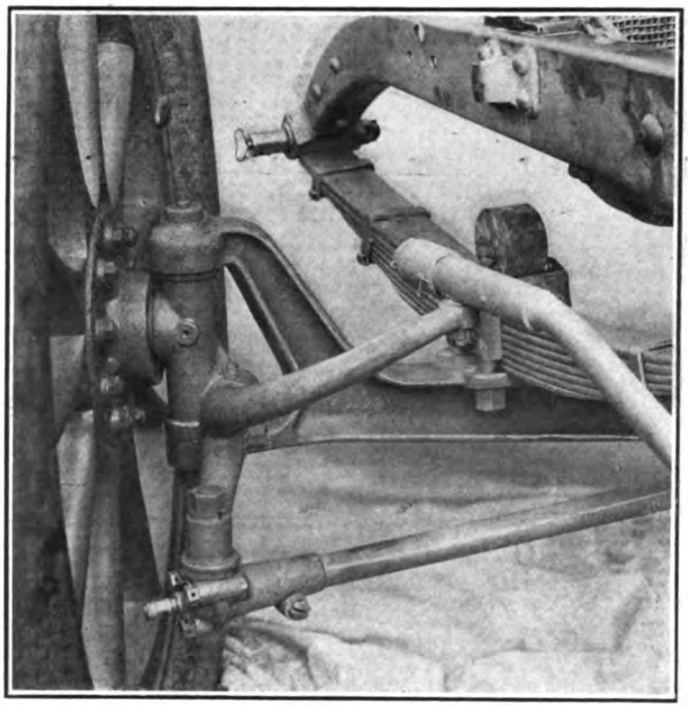


Fig. 5—Steering gear connections on left wheel of Premier six

system. In addition to the radiator there is a belt-driven fan immediately behind it which is driven from a pulley on the end of the pump shaft. The support of the radiator is unique in that it is rigidly fastened to the frame on the right side, while on the left side it is mounted on a trunnion to protect it from strains due to twisting of the frame.

Ignition is obtained by an Eisemann magneto located on the left side just behind the pump and driven from the pump shaft in the case of the Big Six and on the right side on a special gear in the case of the Little Six. On this shaft also is the magneto type electric generator which provides current for the electric lights. In the Little Six there is interposed between the magneto and the generator a fiber coupling. The lighting system consists of a ball bearing Remy magneto generator and a battery floating on the line. The generator delivers current at a pressure of 12 volts to a three-wire circuit so that 6-volt lamps are used. The system is designed to carry 68 candlepower of lighting load in the generator at a car speed of 8 miles per hour. All wiring is run through leaded cable.

Premier cars are made self-starting by means of a compressed air system consisting of a small pump on the gearset countershaft and a storage tank and lastly a distributer feeding

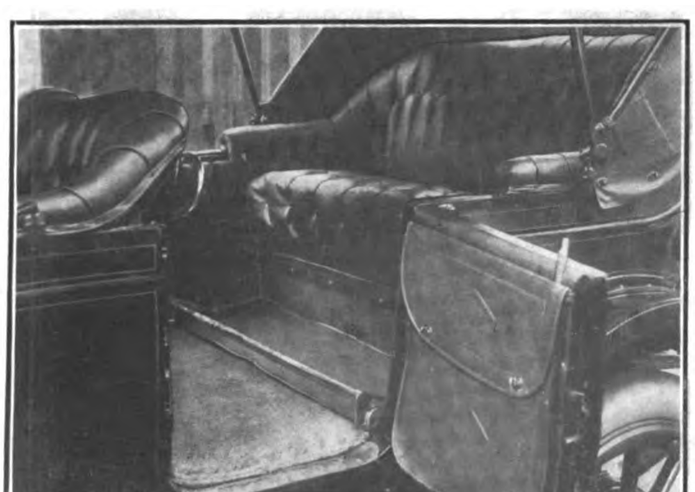


Fig. 7—View into the interior of the 1913 touring tonneau

to six ball check valves, one in each cylinder. On pressure on a foot valve in the driver's compartment air is admitted through the distributer to the cylinders in the order of firing so that the pressure forces the pistons down until the motor takes up its regular cycle. The pump is the single cylinder with air cooling flanges and has a bore of 1 5-8 inches and a stroke of 2 1-4 inches. There is an air gauge, shown at A in Fig. 4, and it is stated that a pressure of 50 pounds is sufficient to turn the motor over for starting.

The clutch is multiple disk running in oil. It has twenty-one plates, the alternate ones having cork inserts to prevent gripping. The plates have four lugs extending from their circumference and on these are attached small coil springs S to facilitate disengagement of the clutch. To make easy the removal of the clutch the shaft between it and the gearset telescopes when a collar is released. The clutch release consists of a bronze collar carrying two annular bearings which work against hardened steel disks, this being part of the release clutch cone.

Thre three-speed gearset is in an oil-tight aluminum housing which has four arms attaching it to the subframe. The gears are cut from nickel steel drop forgings and the shafts run upon five annular ball bearings. At either end of the mainshaft within the case are plates that throw back upon the gears any grease that tends to ooze out. The entire power plant is mounted upon a subframe of channel form, which is bolted to the main frame in such a way that it forms a complete box for the forward portion of the chassis. The gearset control is mounted immediately over the gearset housing so that the lever is in the center of the driver's compartment, as shown in Fig. 10.

Power is delivered from the gearset to the rear axle by shaft equipped with two combination slip and universal joints packed

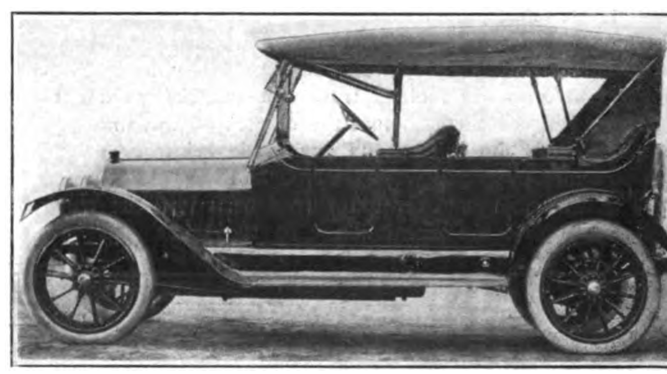


Fig. 6—Premier little six five-passenger touring car with top

in grease. The universal joints embody a feature of Premier construction at the ends of the propeller shaft. These are tapered squares which fit into tapered square holes in the universal joints in order to do away with keys and key-ways. The torsion rod is of the V-type of tubular construction and the front end is retained in a spring cushion ball joint.

The rear axle is a Premier patent and is of what may be called a three-quarter floating type. It has an internally ribbed center housing so that truss rods are dispensed with. The differential is of the bevel gear type and upon it is mounted the main driving gear. Through hand holes in the rear of the housing the gear may be adjusted laterally to take up wear. Correspondingly the pinion which transmits the rotary motion of the driving shaft to the axle gear is adjustable longitudinally so that with these two adjustments the gear can be made to mesh properly should it be necessary to change their setting. There are eight anti-friction bearings in the rear axle. Roller thrust bearings on either side of the differential, annular bearing at the outer end of the axle shaft, and four bearings in connection with the pinion, two of which are thrust bearings. At the ends of the axle housing are the brake supports rigidly attached and hot riveted. The brake drums are integral parts of the wheel hubs. The live axle shafts are square at the inner end to fit into the differential and at the outer ends are provided with three clutch jaws forged integral with the shafts themselves. These engage with three corresponding clutch jaws in the hubs of the wheels through which the drive is transmitted. The brake drum is an integral part of this clutch and hub arrangement, and the wheel is bolted to it with a bolt through each spoke. An annular ball bearing is placed in the load carrying center of each wheel. The rear axle housing itself is in four parts, the center or bell being a crucible steel casting and the taper tubes are forgings riveted to the center.

Braking surface on a Premier car represents a total of 526 square inches, and the fact that the brake drums are integral with the wheel hub makes the braking action positive. The internal brakes are operated by a foot pedal and are steel bands covered with raybestos. The emergency brakes are external and are of the same construction. Full adjustment of both brakes can be made by lifting a floor board under the driver's feet, which gives access to a turnbuckle on brake rod. Additional adjustment is provided by a take-up on the rear end of the rod, which can be done without removing the brake. Equalizing bars anchored to the center of the center cross-members of the frame assures equal pressure on both wheels.

Semi-elliptic springs are used on the front, each 36 inches long, and three-quarter elliptic on the rear with the bottom section 50 inches long and the top 26 inches in length. The forward ends of the lower leaves of the half springs at the rear are longer than the others and are curved under to cushion the blow if the spring strikes the rubber bumper. The front springs in addition to being held by spring clips have drop forged plates binding the leaves at the center. The rear corners of the channel frame are braced by pressed steel channel sections and small gusset plates. At the front there are integral gusset plates extending down to the radiator supports.

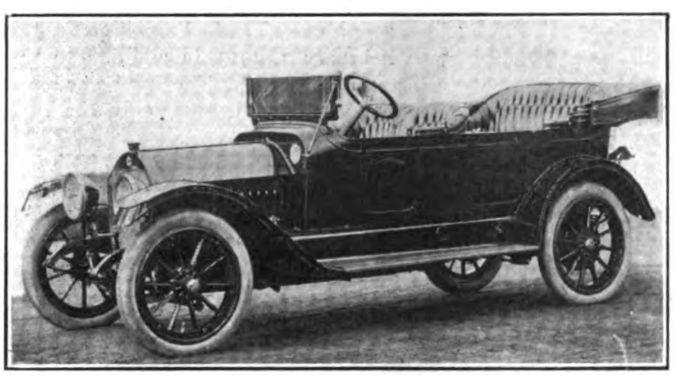


Fig. 9—Five-passenger touring car mounted on little six chassis

Premier steering gears are unique in one or two respects. In the knuckle design the load-carrying center has been brought close to center line through the king bolt constituting the steering center. Truss bearings are used in the top of the king bolt to carry the vertical load and the bottom held in hardened and ground bushings. New this year is the ball connection between the tie rod and the steering arm. This is illustrated in Fig. 5. The steering rod has universal joint connection in place of the usual ball type and is illustrated in Fig. 5. The steering gear itself is of the irreversible type with full gear and worm. This gear travels less than one-quarter of its circumference in any one position of adjustment and in case of wear can be shifted one-quarter of a turn. A further adjustment is provided between the worm and the gear by an eccentric bronze bushing within which the shaft is mounted. The steering column is mounted on the left side.

Notable among the features of the Premier 1913 cars is the clean appearance of the body, tool boxes, battery boxes and similar equipment being removed from the running board. The mahogany cabinet in the deep cowl of the dash has been provided for carrying tools; the battery is suspended in the front of the car and the spare tire carried at the rear. The bodies are of the true straight-line appearance and the door hinges are concealed. The upholstering is unusually deep, the seat springs consisting of a double row of coils, one above the other, with a wire partition between the two. The bodies are of metal and the rear fenders are bolted to flanged projections from the body.

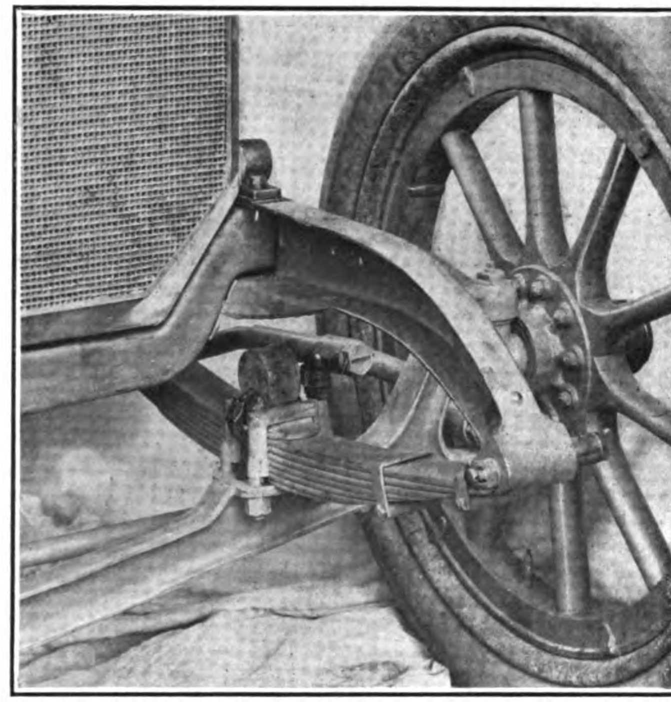


Fig. 8—Front semi-elliptic spring, showing radiator mounting

One of the most commendable features of the equipment is the arrangement for filling the gasoline tank. The latter is located below the front seat and the filler pipe opens between the two seats so that access is gained to it by simply lifting up the seat arm. This obviates the necessity of removing the cushion and seat bottom to fill the fuel tank. Behind the filler pipe is a space for small tools, and so on, which is open when the seat arm is raised.

The lighting equipment consists of electric headlights, bull's-eye port dashlights and a combination tail lamp and license plate holder mounted on the left fender.

The Premier Little Sixes appear in roadsters, five-passenger touring, limousine and berline bodies, while the Big Sixes appear in the touring, roadster and limousine bodies. The wheelbase of the Little Six is 132 inches and that of the Big Six is 140 inches.

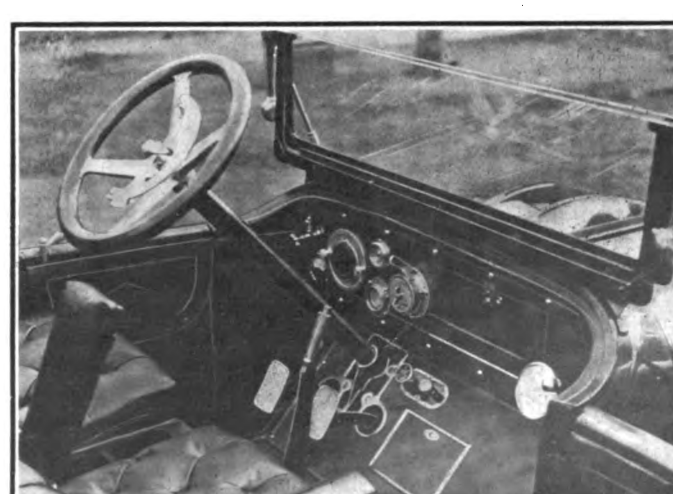


Fig. 10—Left steer and center control used on 1913 Premier

Chicago Show Spaces Assigned for 1913

N. A. A. M. Has Drawing for Pleasure Car and Commercial Vehicle Shows to Be Held Next Year—Eighty-two Gasoline Car Exhibitors—Pleasure Electrics Given Block Space in Armory—All Room Taken

OFFICIAL drawing took place this afternoon at the headquarters of the National Association of Automobile Manufacturers for the Chicago pleasure car show and also for the commercial car show to be held following the pleasure show. As formerly, the Coliseum, Coliseum annex, Coliseum basement and First Regiment armory will be used for both shows. Eighty-two car concerns have already received space and three-quarters of the center space of the armory has been reserved for electrics which have not yet drawn. In the main floor of the Coliseum are 39 exhibitors; in the Coliseum annex, 8; Coliseum annex basement, 17, and armory, 18.

In the Coliseum the exhibitors are arranged in four central spaces and also around the wall as formerly. To the left of the center aisle on entering are Peerless, Flanders, Pierce and Haynes, and on the right of this aisle from the entrance are Glide, Buick, Cadillac and Maxwell. Other center floor exhibitors are Stevens, Stearns, Winton, Stoddard, National, Hudson, Packard, Premier, Reo, Franklin, Locomobile, Studebaker, Oldsmobile, Pope, Chalmers and Overland. Around the coliseum walls or under the gallery are: Selden, Columbia, Auburn, Rambler, Fiat, Marmon, Alco, White, Cole, Case, Imperial, Mitchell, Moon, Oakland and Lozier. In the Coliseum annex are American, Kissel, Cartercar, Knox, Velie, Inter-State, Hupmobile and Garford. In the basement of the Coliseum annex are: Colby, Patterson, Halladay, Lexington, Cino, Midland, Ohio, Crow, McIntyre, Cunningham, Edwards, Herreshoff, Republic, Metz, Bergdoll, Davis, Elkhart and Mercer. In the First Regiment Armory are: Jackson, Austin, Matheson, Abbott, Michigan, Regal, Cutting, Kline, Pathfinder, Staver, Pullman, Krit, Westcott, McFarlan, Great Western, Stutz and Speedwell.

For the commercial car exposition spaces were assigned to the following companies:

Coliseum, center: Buffalo Electric, Jeffery, Studebaker, Reo, Selden, Autocar, Waverley, Adams, KisselKar, Speedwell, International, Cramm, Pope, Locomobile, Pierce, Velie, Buick, Peerless, Federal, Hupmobile, Kelly,

Coliseum, along the walls: Durable Dayton, Sternberg, Alco, Walker, U. S. Motor Truck, Garford, Rapid, Reliance, Knox, Krebs, Old Reliable, Clark, McIntyre.

Coliseum Annex: Bowling Green, Universal, Service, Standard, Transit, Dart, M. & P. Electric, Lippard-Stewart.

First Regiment Armory: Chicago Pneumatic, International Harvester, National Motor Truck, Sanford, Commerce, Four-Wheel Drive Truck, Gramm-Bernstein, Poyer, Bessemer, Harwood-Barley, General Vehicle, Avery, Packard, White, Alden-Sampson, A. L. Smith, Lauth-Juergens.

Boston's First Electric Show

BOSTON, MASS., Sept. 28—Boston's long-heralded electric show opened here tonight and the old hackneyed expression "a blaze of glory" was really a fitting one to describe it. For a distance of about a mile on Huntington avenue there are flaming arcs on each side of the street, there being 216 of these so that persons traveling along find themselves walking through a lane of brilliancy never before equaled in Boston. On the outside of Mechanic's building where the show is being held there are 45,000 lights of varying hues. Inside the building there are 200,000.

For the first time in motor history electric motor vehicles have a chance to make a comprehensive display. And the Boston representatives of these machines have taken advantage of it. In the regular motor shows the electrics were not numerous, and some of them were somwhat scattered. Now, however, for a month they will occupy the most prominent section of the electric show. Had some of the newer agencies been placed earlier all the electric pleasure vehicles would have been together. But when one looks over the list he finds that they are nearly all there.

There are sixty-two machines in the building now, and a few more may be brought in early Monday so that the total may reach seventy when the show is well under way. Of this number there is a very close division between pleasure and commercial types. More than 10,000 thronged the building, and with a month to run and special rates on the railroads from all over New England, the show should prove a success.

Two Shows for Montreal

MONTREAL, QUE., Sept. 27—That this city will see two automobile shows during the coming winter seems now assured the preliminary arrangements having been completed for the holding of the Montreal Automobile and Motor Truck Exhibition in the Drill Hall, January 25 to February 1, 1913, in addition to the one to be run by Mr. Wilcox, of Toronto. The last-named exhibition is to be conducted by and under the auspices of the local automobile dealers.

New Financing in Automobile World

Automobile and accessory incorporations of major size that were formed during September, include the following:

	Capitalization.
New York—	
($1,000,000 or over.)	
Motor and Gear Improvement Company	$1,250,000
Rondout Rubber Company	1,000,000
California—	
Michigan Motor Car Company	1,000,000
(Under $1,000,000.)	
New York—	
Continental Motors Corporation	100,000
Englebert Tire Company	100,000
Fiat Motor Sales Company	300.000
Simplex Carbureter Company	150,000
Selden Truck Sales Company	150,000
Delaware—	
Flanders Motor Company (change from Everitt) increase	750,000
L. A. W. Motor Truck Company	200,000
New Jersey—	
Reliance Speedometer Company	100,000
National Chauffeurs' Association	500,000
Maine—	
Co-operative Rubber Company	500,000
Handt Tractor Company	350,000
Ohio—	
Federal Motor Supply Company	250,000
Illinois—	
Universal Welding Company	100,000
Total	$6,800,000

Most of the companies mentioned in the foregoing list are concerns already in operation under some former shape. A few of the incorporations referred to are simply changes in the form of business organization. Some of them, as will be noted, are only incidentally connected with the automobile industry, but there are a few that represent entirely new enterprises.

Y. M. C. A. Hears Talks on Turcks

Introducing the opening of a truck drivers' instruction class by the New York West Side branch of the Y. M. C. A., the members of the association listened to two talks by experts on the subject on September 26. William C. Mack, the designer of the Mack truck, lectured on the possibilities of the motor truck, dealing in a concise way with the development of the commercial vehicle and illustrating his remarks by a large number of interesting stereopticon views. He was followed by George H. Duck, the manager of the New York Alco branch, who spoke on the opportunities of the truck driver. He showed how the number of commercial vehicles had increased rapidly during the past 2 years and dwelt on the probability of the continuance of an equally active increase. He stated that one of the largest factors in the success of a motor truck is the driver, and that consequently the good driver should be encouraged by appreciation of his good work, both in the way of better compensation than the bad driver and by a record of the maintenance cost of his car. He foreshadowed the use of a detailed record system for trucks and spoke of the advantages to the driver who puts his truck to good use. After he had closed, applauded as Mr. Mack, the audience was transported on a sight-seeing truck to the new department of the Y. M. C. A. in West Sixty-sixth street

Dates Set for Electrical Show

The sixth annual New York Electrical Exposition and Automobile Show will be held at the Grand Central Palace, October 9-19. Three floors will be used for the exhibition which promises to be the largest and most complete of its kind ever held. Trucks will be the feature of one section of the show and pleasure cars of nearly a score of types will be exhibited in another. On the third floor, a track 1-10 of a mile around will be installed for demonstrating purposes and for the instruction of customers. The electric vehicle companies that have contracted for space so far include the following: General Vehicle Company, General Motors Truck Company, Buffalo Electric Vehicle Company, Anderson Electric Car Company, Lansden Company, Studebaker Automobile Company, Atlantic Vehicle Company, Baker Motor Vehicle Company, S. R. Bailey Company, Champion Electric Vehicle Company, Cleveland-Galion Company, Ward Motor Vehicle Company, Edison Battery Company, Electric Storage Battery Company, Philadelphia Storage Battery Company and the Gould Storage Battery Company.

Ohio Farmers Buying Cars

COLUMBUS, O., Sept. 28—According to the statistics furnished by State Registrar of Automobiles J. A. Shearer, the rural sections of Ohio are buying automobiles as never before. The wheat and oats crop is being rapidly converted into motor cars as is shown in the number of applications for registration coming from the rural counties.

Of the licenses issued now about 80 per cent. come from the strictly agricultural communities. In Madison, Miami, Pickaway, Ross, Fayette, Licking, Montgomery, Fairfield and other rich agricultural counties the elevators are fairly bulging out with grain and automobiles find a ready sale.

For the first half of September the number of new automobiles registered was over fifty per day. The rule in farming sections now is early selling of grain and this aids the automobile trade.

1913 License Plates for New York

ALBANY, N. Y., Sept. 28—Automobile license number plates being issued by the New York State automobile bureau next year will be different from those now being used. Besides the figures "1913," indicating the year in which they are issued, the new plates will have the word "commercial" on plates intended for commercial motor vehicles. The state's charge for a "commercial" license is $5 while from $5 to $25 is charged for pleasure vehicles, according to horsepower of machine. Heretofore automobile owners are said to have secured pleasure plates at commercial car rates, thereby saving many dollars. Manufacturers' plates used by dealers will continue to bear the letter "M," as in past years.

Rubber Show Is Success

Third International Exposition Concludes By the Sale of the 150 Tons of Crude Rubber Exhibited

Amazonas Wins Chief Award for Wild Rubber While British Malaya Takes Plantation Prizes

DESPITE a few jarring notes the great rubber exposition ended this week in a burst of harmony. The attendance during the 10 days of the show was excellent from the viewpoint of the rubber men but would have been considered microscopic for an automobile show. It made up in quality what is lacked in quantity, according to those most interested.

The show was primarily one of crude rubber, but the original intention of the promoters was to have broadened its scope so that manufactured goods would constitute one of the most attractive features. This plan contemplated a full exhibit of automobile tires. With that end in view, contracts for space were tendered to the various major tire manufacturers and according to A. Staines Manders, organizing manager of the exposition, the contracts were accepted by several concerns.

Mr. Manders states that he obtained written word from the Motor and Accessory Manufacturers that the organization as such would not take jurisdiction of the exposition in the same way that it does of the national automobile shows and that there was nothing in its rules to prevent any of its members from exhibiting.

He states that contrary to the meaning of the letter, the association did take action to prevent the tire makers from showing and that at least one big company shipped its wares to the show but did not install them on account of the later ruling.

The association stands by its former letter and states that as far as it is concerned the tire men could exhibit if they pleased.

The result of the matter was that there were no tires shown at the exposition and the companies insist that the representations made to them when they were solicited to take part were that others in the trade had taken space; therefore the particular company should do likewise.

The United States Rubber Company had a magnificent booth on the main floor but showed no tires; the Swinehart Tire and Rubber Company had a booth but showed no exhibit. The United States Rubber Company declares that it never had any intention of showing tires and the Swinehart company says that it did not want to install its exhibit as long as its competitors were not showing.

But aside from that little jam, the proceedings passed off smoothly. The final act at the show was the sale of the crude rubber that formed the exhibits of various countries, amounting in all to about 150 long tons. The sale was not an auction as the bids were submitted under seal.

The Brazilian state of Amazonas was given the chief award for an exhibit of wild rubber for its 30-ton heap of Madeira and British Malaya was given the principal prizes for plantation rubber shown.

Ontario's Registration Large

TORONTO, ONT., Sept. 30—Ontario's revenue last year from the sale of licenses for motor vehicles totaled $50,831.25, twice the amount received during the year 1910, which was $24,394. The revenue for 1906, the first year fees were imposed, was only $15,235.15. The licenses issued last year totaled 11,339, and for 1910, 4,230, while in 1906, 1,176 licenses were issued. Fee[illegible] lected for issuing charters to automobile corporation[illegible] $235,663.10.

Road Congress in Session

Over 600 Delegates Present and More Coming—Stress Laid on Automobile As a Good Roads Factor

ATLANTIC CITY, N. J., Oct. 2—The 6-day annual convention of the American Road Congress opened on Million-Dollar Pier Monday, September 30, and will continue until Saturday, October 5, with three sessions daily. Over 600 delegates from all parts of the United States and Canada have registered to date and many more will arrive before the end of the week.

The first 2 days were given over entirely to the automobile interests, being known as Road Users' days and conducted by the American Automobile Association which arranged the program and conducted the sessions. The remainder of the week is given over to various road building organizations; Wednesday's sessions are under the direction of the American Association for Highway Improvement; Thursday is financial day in road building; Friday is construction and maintenance day and Saturday is also given over to this department.

Monday and Tuesday's programs included addresses on national systems of marking roads, automobile state laws, the farmer in road making, working state aid, federal aid, transcontinental highways and business organizations in road building.

The necessity of business activity in medium-sized cities in building modern roads from these cities into the surrounding country was emphasized by G. Grosvenor Dawe, of the Chamber of Commerce of the United States of America. Mr. Dawe showed how within the last 15 years such city organizations had actively taken up the problems of real road building and cited scores of cases of what had been done, concluding with that "Improved vehicular transportation, which finds its highest form in the automobile, and the rapid development of commercial organizations cover practically the same period of time—15 years."

Mr. Dawe said in part:

Commercial organizations, in practically every town of any size, are helping along the good roads cause in some effective way—by instigating legislative action, by educational campaigning, by co-operation with state highway commissions by appointing special committees to investigate road conditions, by holding good roads rallies and by distributing literature urging activity for good roads.

The common sense of the situation that has been recognized in rural regions as soon as presented to their consideration by commercial organizations is that good roads must lead somewhere—good roads must be provided for the main lines of travel—the main lines of travel must, in all cases, be toward a market as represented by a good-sized town or a shipping point. Consequently, apart from the improvement of a few scenic highways, the efforts of commercial organizations in the past few years have been utterly practical and have brought immediate return to the country region through increased value of land, through ease of marketing, and through economy of traction.

When I come to detailing all these activities, I am embarrassed by the varied forms of these activities and embarrassed also by the fact that I can not tell you one fraction—in the time allotted to me—of what has been done. I can simply place before you a few activities of unusual interest and ask you to assume that other activities are common the nation over. Let me refer to what has been done in Meridian, Miss., as a type of the effort to link the producing country region with the consuming city. Through the activities of the commercial organization, the Board of Trade, the city of Meridian is now the hub of an arrangement of roads like the spokes of a wheel. In eight directions highways have been improved for a distance of 5 miles. The material used for every yard of the whole distance was novaculite, imported from Illinois.

In a unique undertaking in Ellis, Kan., the Commercial Club brought men together and completed on good roads day the working of all roads leading into the city.

Another example of commercial organizations actually working roads in Kansas was that of the 6-mile road leading from Linn to Palmer in Washington county. All labor was given free; there were 150 men, fifty-seven teams and two traction engines at work The state engineer furnished a man to superintend the work and give personal attention to the building of 1 mile of model road. The two commercial clubs of these towns had the hearty co-operation of the business men and the highway officials.

The Manhattan, Kan., motor club recently held a similar meeting, and has created excellent results by giving a road drag free to each farmer who will agree to keep a piece of road in shape. There are now 100 such road drags in operation near Manhattan.

A number of organizations have been the instigators of good roads legislation. The state good roads association of Florida has prepared a bill to be presented to the Legislature in April, providing for a commission on good roads, to work out a state plan for covering the entire state with a network of hard-surfaced roads.

The Charleston, W. Va., Chamber of Commerce has appointed a committee of seven men to draft a state-wide good roads bill to be presented to the next legislature.

In Massachusetts several of the larger road problems have been advocated and pushed by the various boards of trade, as for instance, the North Adams board of trade was very strongly in favor of the new highway over Florida mountain and the legislature has just appropriated $150,000 for this purpose. Massachusetts now boasts 879 miles of state roads, built in 20 years at a cost of $8,000,000 and over.

The board of trade of Indianapolis is co-operating with the Indiana good roads association in placing before the legislature a bill providing for more effective legislation in connection with good roads.

The Oregon development league and the Portland commercial club have for several years been very active in their endeavors to secure much needed legislation. Both organizations are now backing an initiative road measure to be submitted to the people at the general election in November.

The majority of commercial organizations have done most effective work in this line by co-operation with commissions, either in the government or composed of business men united in the one purpose of securing good road conditions.

Assembly of the delegates from all parts of the state of Illinois to the convention of the Illinois Highway Improvement Associatio Influence in pr

Illinois Road Men Meet

Substantial Results Expected from Convention of Highway Improvement Association Attended by 250

PEORIA, ILL., Sept. 27—Immediate and radical steps toward a comprehensive system of improved highways are almost certain to result from the action taken today by the Illinois Highway Improvement Association in which all parts of the state were represented in convention. A fixed policy was outlined and adopted looking to a general method of procedure for the future and special action to be taken in the next meeting of the legislature. The association in a platform which was unanimously adopted, went on record as in favor of and recommending a state highway commission to devote its entire time to road construction and maintenance throughout the state, improvement by state aid of main thoroughfares through the county by the commission to be turned over to the state for perpetual maintenance; employment of prisoners in road building on an honor system similar to that employed in Colorado; a compulsory dragging of all dirt roads and the payment of all road taxes in cash with the use of the state motor car tax, together with any other funds appropriated in the improvement of highways; federal aid in the construction and maintenance of post roads and transcontinental highways; an annual good roads day to be designated by the governor, and federal aid in building interstate roads.

The report of the committee on policy sets forth that Illinois, foremost among the states in American resources, finds her general welfare retarded by a system of wretched public highways constructed, maintained and administered under a method in vogue centuries ago, which is unadapted to the problems presented by modern traffic and out of harmony with the advancement of the state in other directions. A great network of 95,000 miles of country wagon roads is left to the haphazard work of 4,800 commissioners working independently of each other, poorly paid, largely inexperienced, and provided with inadequate funds.

B. F. Harris, president of the Bankers' Association, announced that the 4,800 road commissioners in the state at present have 4,800 different ways of wasting the taxpayers' money.

Careful investigation has shown that of the $7,000,000 expended annually on the wagon roads of the state approximately 37 1-2 per cent. is wasted, and in some townships a much greater percentage is spent without permanent benefit. Highway improvement is no longer purely a local matter but one in which the citizens are interested to such an extent that the state should assist in solving the problem which the bad roads present to the people.

The recommendation of the committee on policy, which was unanimously adopted as the platform of the Illinois Highway Improvement Association, are as follows:

1. State and county co-operation in the construction and maintenance of main highways and bridges.
2. A non-political state highway commission of at least three competent members, who shall devote their entire time to their duties.
3. Improvement (in such counties as elect to come under the provisions of the law) of main, continuous, in county highways connecting county seats and important cities, principally at the expense of the state and county; such roads to be selected and improved by county authorities, subject to the approval of the state highway commission and after improvement to be turned over to the state for perpetual maintenance.
4. Improvement, maintenance and control of remaining roads (about 80 per cent. of the whole) under supervision of county and township authorities.
5. Effective measures to guarantee maintenance after roads are once constructed.
6. Use of the state automobile tax, together with all other funds as the legislature may appropriate, in the improvement of highways.
7. Extension of the employment of prisoners in state institutions in the preparation of material for road building, and the use of state prisoners —under state direction—on an honor system, in actual work when practicable.
8. Payment of all road taxes in cash.
9. Compulsory dragging of all dirt roads.
10. Safety of road users, such as "Rules of the Road," and the proper construction and guarding of crossings at railroads and intersection of streets and highways.

We favor federal aid in the construction and maintenance of post roads and national highways, and we request representatives of Illinois in Congress to work towards this end.

About 250 delegates from all parts of the state were present at the convention, representing all the varied interests of the commonwealth. All of the associations of business men, laboring men, automobile organizations, bankers' associations, chambers of commerce and agricultural granges were represented by delegations. Several of the larger cities sent large delegations of good roads boosters.

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which met last week at Peoria. About 250 delegates were present at the session, which is expected to have a widespread and increasing
moting better roads

Explains National Chamber of Commerce

H. A. Wheeler Tells Trade Press of the Foundation, Work and Purposes of New Organization

Independent Institution Aims at International Unity and Co-Operation in Commercial Affairs

NIAGARA FALLS, N. Y., September 27—Harold A. Wheeler, president of the recently organized Chamber of Commerce of the United States of America, today addressed the members of the Federation of Trade Press Association here on the organization and scope of this new power which has recently entered American commerce, and gives promise of being one of the most potent factors for good in our business atmosphere. President Wheeler had just come from Boston, Mass., where he was in attendance at the International Congress of Chambers of Commerce in which Europe, Asia, Africa and the Americas were represented with the aim of studying to promote international unity and co-operation in commercial affairs, and where 700 delegates from all parts of the world acknowledged by their attendance the interlacing of the commercial interests of all lands and where they pledged themselves on return home to petition their respective governments to substitute arbitration for warfare.

President Wheeler prefaced his remarks on the newly organized Chamber of Commerce of the United States of America by referring to the unity of world-wide action in commerce, following the examples of Germany, France and England in national commercial organizations. He said in part:

"We, in this country, have organized our chambers of commerce as individual units. We have them on the Pacific coast and through the Central and Southern states and through the East, hundreds and hundreds of organizations representing the civic and the commercial interests of a community or a state, and supplementing them we have the great national trade organizations, but in every single instance working for a specific trade or for a distinct community and in no way representing by a common voice the business demands of the country as a whole, either to safeguard them from adverse legislation or to develop those things which will make the pathway of business easier and promote a greater unity among the several interests which make up our nation's commerce. The need was so apparent in this country that we should tie up our organization as they were tied up abroad, not as a governmental institution, because that would be in a large sense un-American, but **that we should so combine our trade and general organizations relating to commerce that they might take action as a unit and that when that action was taken it could be communicated to the executive or to the legislative branches of the government and find some degree, at least, of heed; whereas in the past, as individual units, we have gone in vain for those things that we were justly entitled to.** Germany many years ago, after its federation was completed, took the old French idea and formed its chambers of commerce in every state and gave them the official sanction of the German Empire and gave them official duties with respect to the appointment of certain classes of public officers, and requested, and in fact required, that wherever it was found that one state was being adversely affected by competition with another state, either one of the German federation or a foreign state, the cause of that adverse effect should be studied by the chamber of commerce there represented, and the conclusions brought to the government, and the government acted in such a way as to preserve the prosperity of that particular line, or those particular lines, of business. That is the kind of co-operation Germany has given to her manufacturers, and that co-operation has meant the rapid spread of German products over the entire civilized world. France is likewise organized, and Great Britain is likewise organized, although not with official recognition in the matter of appointments or the matter of special governmental advice. We, in this country, have held to the idea that individual units could take care of themselves. You know the result.

"James Wilson, a member of the Federal Council, at the time of the charter convention, when the constitution of the United States was under consideration, said that there are two bad forms of government, the one that has too little power, the other that has too much; the one that fails because of its weakness, the other that destroys because of oppression. In this political campaign that is now going on it makes me sick at heart that it seems only necessary for men traveling up and down the country to attack the industrial and commercial interests of our country to find the popular applause, and to observe that whenever they open their mouths to advocate an expansion of the powers of government to a point that would oppress to the degree of destruction, they have encouraged the people to applaud and to accept those sentiments until they have definitely raised class against class, and in the unthinking minds of the people at large have created a great barrier between the two great interests, the employer and the wage earner, that never should exist. Only the other day in one of our papers, in a discussion of these limitations of government, one of the candidates made the remark that we might use whichever philosophy we pleased, but if the limitations of the government were restricted it could lead only to a chaotic scramble in the industrial life of this country to eat each other wherever it was possible and in all cases to oppress the wage earner, placing the whole industrial life of this country in that category of unrighteous organizations or institutions formed only for the purpose of destroying each other if they could, but above all things for absolutely oppressing those dependent upon them for a living. **I say to you gentlemen of the trade press that it has come high time in this country when not only the trade press but the daily press should pay heed to this agitation that is going on and should endeavor in its power to stamp it out rather than to give space in its headlines on front pages to attacks that are as unjust as they are unfounded.** If the press of the United States were to disregard these statements that are unfounded and untrue, that are made only for the purpose of awakening an unnatural and an unreasonable prejudice in the minds of the people, these men would soon cease their campaigns along those lines and come down to saner and truer topics for discussion.

"The Chamber of Commerce of the United States was formed in April, 1912, and I am going to try to give you the reasons why it ought to be formed, some of the reasons for its existence, some of the efforts that it will put forth, as a guaranty of its future. We are not political, we owe nothing to the administration now existing and owe nothing to the administration that shall come, or to any administration that may follow, except loyalty as American citizens, but we are bound to reach the point in such changes where the accusation will arise. Invitations were sent to the known chambers of commerce and the trade organizations of the country, and 700 delegates, representing all but two states, all of the insular possessions and the American chambers of Berlin, of Paris and Constantinople, gathered in Washington on April 22 to discuss the question of forming this chamber, and it was determined that such a chamber should be formed. The organization was put into the hands of a committee representing one man chosen from every state and from each of the insular possessions and ten men chosen at large representing the trades of the country that were not located so that states could be designated as their domicile. That great company met together and outlined and framed and presented the tentative by-laws which should govern the organization during its first year or until its board of directors had occasion to change them. Those by-laws were presented to the congress then in session and unanimously accepted. It then came to a question as to what should be the control, and this same great committee of more than fifty men were made a nominating committee to choose nominees for a board of directors, and again they went into conference and brought names from all sections of the United States, nominating twenty-five men territorially, so that not one single section of this great country of ours should be unrepresented in the board of directors of the chamber. That board of directors, following the adjournment of the congress in Washington, met and elected its officers, and those officers, again, became members of the board ex-officio, one from the Pacific coast, one from the Central West, one from the East, one from the South, as vice-presidents, with the treasurer in Washington, and the president.

First of all we decided that not one dollar of public funds should be asked or accepted from the United States government in the building or the control of such a chamber, that no public officer should be permitted to hold a place upon its board of directors or its official staff, that the organization should be supported by the business men of the country.

and managed by them, clear of all political affiliations and of all accusation of preference, that its officers should forever be chosen from the territorial divisions that were established, giving to each division that representation which it deserved by its numerical strength; and in the new by-laws which have been framed, based wholly upon the tentative by-laws given to us by that earlier conference, we have ever kept in mind the fact that this democracy of control shall be truly held and that no action shall be permitted to be taken simply because even the board of directors, representing all sections, may agree, but that no question shall be acted on finally by the chamber until by referendum that question shall have been put back to every constituent member of the organization, and the voice shall be truly the representative voice of those who speak.

"No membership in this chamber can be had except by organizations. Therefore individual voice has been set aside forever. No question shall be considered by the organization save it is known by the board of directors to be a national question. No question can be submitted either to the annual or to special conferences, or between the conferences, except it comes by the authority of a constituent member after a discussion of that question within the association or board of directors of the association submitting it, and by a formal communication to the chamber setting forth that it is a question which it is desired to have action upon, the reasons for it and a brief giving the argument why it should be placed before the constituent members for their action. The board of directors thereupon take the authority to determine whether or not the question is national and whether it is right that it should be submitted to the constituent members. But if the board of directors shall decide that it is not a national question, properly one to be submitted to the constituent members, there is the right of appeal for the member proposing.

"What are the questions that are to be considered? These are the questions that are closely related to politics inasmuch as they are the basis of legislation. We will take up the study of state and federal regulation of commerce. In order that that study shall be carefully made there will be a group of twenty men chosen and given the responsibility of bringing back a report upon that subject. Five men shall represent the states west of the Rocky Mountains; five men shall represent the states east of the Ohio and Pennsylvania lines; five, those north of the Tennessee line, and five, those south of the Tennessee line drawn straight across from the other north and south parallels. These groups of five men will be located not in widely scattered communities but in one single center, in order that they may get together, that we may furnish them with all of the bibliography that may be found upon a subject and that they may draw their conclusions, as to what form of report should be made to the chamber, based upon the sentiment or the viewpoint of their locality or the locality in which they live. Finally, when those four groups have reached their conclusions, have written their reports, the twenty men will be drawn together, and any differences of opinion will, if possible, be smoothed away. Thereupon, it is believed, when the twenty men agree upon a report coming from all of these sections, we will have a report that will fairly represent the general opinion of the entire country with respect to that particular subject. So the same plan will follow through as to all of the questions to be considered, such as tariff and taxation—not that we are going to touch the question of schedules. I believe there is no man related in the slightest degree to this great national movement who would contend for one moment that anything but trouble and dissolution would result from a discussion of schedules. Every line of business must take its own turn fighting for itself. Every community, where it becomes a sectional matter, must take its own place and fight for its own life. But there is one basic question that we can consider: How shall revision be made?

"On the other side this chamber of commerce will stand just as stanchly as the representative of the laborer, of the wage earner, as it will that of the employer or the capitalist. Those subjects of legislation that relate to the improvement of the workingman's condition will be guarded just as jealously and studied just as carefully as any that may relate to the special matters of regulation of commerce or to tariff revision. Education, by the same token, vocational education, will be studied with the object of making it possible for the children of men working for a living and not able to place their children in the technical schools of the country, to find a place where they may have a better foundation for their life than their fathers had, whence they may go into the activities of life not only better trained but better able to take and hold a creditable place throughout their years.

"In the matter of foreign commerce there is the great question of our over-production and the necessity of finding a permanent foreign field into which our products can be placed. Our committees will be so divided that one group will study European and North American trade; one, Latin American, and, one, Oriental; and in addition to those groups that are studying trade relations and the possibility of expanding our commerce with the world's nations, will be the group that will study copyrights, patents and trade marks, in order that we may not suffer the injustices that have been suffered in the past. There are five under domestic commerce, six under foreign commerce. Then comes that group of subjects under traffic, transportation and communication, of the railroads, of harbor and river improvement, interior, of the ocean traffic, which, of course, takes in the merchant marine; of the post office, of the telegraph, of the telephone. Then, on currency and banking, on immigration and on legislation.

"The chamber of commerce was created in April. The first meeting of its executive committee took place in May, and the first general meeting of its board of directors, yearly elected, in June. There have been filed applications from 150 of the greatest commercial organizations in this country, representing a membership of more than 100,000 firms or individuals, and mostly of firms. Of this number forty-seven are the great national trades organizations of the country. One hundred and one are the general commercial organizations and two are chambers of commerce of insular possessions. That is a very small proportion of the total number of organizations in the country, because the Department of Commerce and Labor through its Bureau of Manufactures tell us that they have a record of 4,000 boards of trade, chambers of commerce or commercial associations in the United States, and we have a record in our office of 2,300, and we know that out of the 2,300 there are probably 1,200 that are thoroughly representative, and the balance of them represent communities so small that they have comparatively little touch with national affairs. We have many months, perhaps, of hard work to do before this organization can be wholly representative, but we have made the dues so low that that little organization in Cattaraugus County, N. Y., by paying ten dollars a year, may have just as thorough a representation, upon its numerical strength, as the largest manufacturers' organization in the United States shall have. And, more, that organization shall be entitled to one delegate for its thirty-five members. The organization with 18,000 members shall be entitled to but ten delegates for its 18,000 members.

"Those are the activities we will undertake to perform. It is going to cost us some money, and we are going to find it. If the business of this country is not big enough to support its own organization, then let the organization die a natural death. If the business of this country is broad enough to look out on the horizon and see the good that can come from such a creation as I have outlined, then it will support that organization, it will be bound to no political party and to no political forces; it will be bound to no commercial party or commercial forces, but will live on to create that condition which in the last analysis must obtain if permanent prosperity and stability comes to our commerce, a condition of absolute equality and justice in the treatment of the capital of the country and of the labor of the country, and in so arranging its reports and advocating legislation that selfishness shall not obliterate from the viewpoint of the people the necessity of making prosperous the man who is doing the work at the anvil as well as the man who controls the check-book in the main office of a manufacturing plant; to give to the children of the laborer the same chance as the children of the employer; to see to it that there is a greater and a better equality of conditions in this country, in order that these things that are today being thrown about the land by our political antagonists shall not find an essence of truth anywhere in our broad country in these accusations, but that we may be able to say, such are the conditions under which the commercial interests are struggling, such are the lines of trade that have raised the standard of living of their employees to such an extent that they are not only unjustly attacked, when these statements are made, but also that it is a burning shame that conditions should be such that an attack can be made and be sanctioned by any living man in this country as applying to those advanced lines of trade which have already done so much for their own people. You gentlemen know in your own lines of work, in the industries closest to your publications, how committees of your national organizations have studied these problems and how they have improved the conditions in their shops and factories and warehouses and places of business, and you know the absolute injustice of visiting the sins of one or two upon the entire commercial community of this country."

Route for Chicago Run

Reliability to Cover 1,107 Miles in 7 Days—Contest News of the Week Alco Truck in Fine Shape

CHICAGO, ILL., Sept. 30—After a trip around Lake Michigan, blazing the trail for the Chicago Motor Club's sixth annual reliability, the Velie pathfinder which carried John G. De Long, Ronald Clark and John Brolley reached Chicago last Thursday night. The car was out 13 days but traveled only 7 days in all. The pathfinders had a rough and ready time of it, but return full of enthusiasm over the possibilities of such a route. They say that while grade 3 rules will prevail, yet the conditions will be strenuous enough to make the reliability fully as stiff a proposition as any of its predecessors. Through the woods of northern Michigan it is practically wild. Yet it can be negotiated although there will be 2 days when the mileage will not be great.

The total distance to be traveled is 1,107 miles, an average of 158 miles a day. Four states—Illinois, Wisconsin, Michigan and Indiana—will be traversed. The run from Newberry, Mich., to St. Ignace, where the cars will be ferried across the straits, is 65.2 miles in length. It is made purposely short because of the road conditions.

Entered already for the trip are two Velies, two Stutzes, a Chalmers six, Falcar, two Stavers, and a Detroiter. Two Cadillacs from the Northwestern Military and Naval Academy of Lake Geneva, Wis., are promised, while it looks now as if at least twenty or twenty-five cars will start in the affair.

Simplex Sets New 50-Mile Mark

DETROIT, MICH., Sept. 30—Louis Disbrow, driving a Simplex, set a new mark for 50 miles on a circular dirt track, when he covered that distance at the Michigan State Fair grounds here on September 29 in 45:32. The previous record of 47:21.65, made at Syracuse, N. Y., a year ago at the New York State Fair by Ralph De Palma, was cut down nearly 2 minutes. Disbrow's record of Sunday will be allowed because the meet was sanctioned by the A. A. A. and it was timed with the Warner electric timing instrument. Several exhibition races were also run off in which Endicott, Kilpatrick, and Ulbrecht participated. The meet was postponed from September 21, when it was scheduled to have been run off in connection with the State Fair. Rain and horse racing events interfered at that time, making necessary the postponement for a week.

Disbrow's race against time had a dramatic finish, the daring pilot completing the last few laps of the 50-mile run in the semi-darkness. On the last lap, he was scarcely discernible from the grandstand. About 10,000 people witnessed the events.

Cross-Country Alco in Fine Shape

Following the completion of the transcontinental trip of the 3-ton Alco truck under rated load, a detailed and thorough technical examination of the vehicle was made at Petaluma prior to loading the truck on a freight car for reshipment to its owners in Philadelphia.

The inspection showed that it was necessary to take up all connecting rod bearings, dress piston number 2, remove carbon deposits from the motor and to drain out the oil from the crankcase and transmission case.

The whole cost of the adjustments was less than $25.

The service inspector at San Francisco who made the examination reported the general condition of the vehicle as very good. This covers power, speed, carburetion, lubrication, timing gears, clutch, main shaft, bearings, springs, ignition and axles. The frame was apparently unscathed despite the series of high centers encountered. No heating was reported nor was any evidence of it apparent, according to the inspector. Following is the table showing daily performances:

TABLE SHOWING SOME ELEMENTS OF OPERATION UP TO

Date	Total elapsed time hrs.	min.	Actual operation time hrs.	min.	Number of stops
6/20	17	20	11	45	18
6/21	13	10	7	35	24
6/22	13	20	9	20	23
6/23	13	15	8	25	15
6/24	12	50	..	..	8
6/26	13	30	11	30	13
6/27	22	5	11	10	23
6/28	9	5	6	25	15
6/29	9	..	4	35	7
6/30	19	45	13	..	20
7/2	14	45	10	55	31
7/3	15	15	6	33	26
7/4	13	30	5	11	34
7/6	10	..	5	40	23
7/7	10	..	4	43	10
7/9	13	45	8	6	19
7/10	12	45	7	..	13
7/12	13	30	8	10	18
7/13	12	40	8	45	14
7/14	14	..	6	40	12
7/15	16	..	7	24	59
7/16	13	40	3	35	28
7/17	17	30	3	35	25
7/18	7	..	5	36	15
7/19	12	..	4	48	72
7/20	12	10	4	17	100
7/25	13	..	5	..	15
7/26	11	45	6	10	51
7/27	1	25	1	5	4
7/29	12	55	8	50	19
7/30	5	40	1	27	20
7/31	5	8	1	41	26
8/1	9	57	2	28	57
8/2	6	18	..	48	18
8/3	8	15	3	21	19
8/5	4	37	3	58	8
8/6	12	55	7	21	20
8/7	10	24	3	5	34
8/8	20	3	3	28	41
8/9	11	1	3	8	42
8/10	6	3	1	6	22
8/11	2	5	1	20	6
8/13	5	20	3	53	14
8/14	11	22	4	47	29
8/15	10	25	4	8	27
8/16	17	26	9	5	46
8/19	7	46	5	23	21
8/20	7	55	5	20	16
8/22	2	5	1	..	4
8/23	4	21	2	53	5
8/24	10	10	7	20	9
8/25	8	50	5	15	10
8/26	3	..	1	6	7
8/27	9	50	2	36	19
8/28	12	45	5	24	36
9/1/12	6	33	3	45	12
9/2/12	10	35	6	35	11
9/3/12	8	25	5	10	8
9/4/12	4	34	2	12	16
9/5/12	10	42	7	..	21
9/6/12	11	..	8	..	13
9/7/12	13	45	9	42	20
9/8/12	7	39	6	16	7
9/9/12	12	19	8	17	18
9/10/12	13	26	9	33	25
9/13/12	5	3	3	29	8
9/14/12	9	29	5	25	25
9/15/12	11	27	9	25	9
9/16/12	11	11	1	52	4
9/18/12	11	53	7	59	21
9/19/12	16	40	5	23	11
9/20/11	9	19	4	14	14

Totals for Entire Transcontinental Trip, Beginning June 20, Ending Sept. 20.

Actual number of days in operation	74
Total elapsed time for entire trip	772 hrs. 4 min.
Actual time in operation for entire trip	409 hrs. 21 min.
Average daily elapsed time	10 hrs. 26 min.
Total number of stops	1557
Average daily time in operation	5 hrs. 32 min.
Average daily number of stops	21
Percentage of time truck was in actual operation of the working day	52.9 per cent.

Will Map Route Across Rockies

DENVER, COL., Sept. 30—In order to open up a direct route from Denver to Salt Lake as a link in one of the transcontinental highways, a pathfinding car will leave Denver for the trip over the Great Divide on October 7. The Denver Chamber of Commerce has proposed the trip and has laid out on paper a tentative route which is believed to be entirely feasible for motor cars. The route is to be logged by John P. Dods, of the Automobile Blue Book. The pathfinding party will be carried in a White six touring car and includes C. M. Kittredge, Jr., assistant secretary of the Denver Chamber of Commerce, James A. Harris, advertising manager of the White company, John P. Dods, western manager Automobile Blue Book Publishing Company, N. Lazernick, a New York photographer, and the driver. Both the car and the driver are supplied by the White company.

The proposed route takes in Buena Vista, Leadville, Glenwood Springs, Grand Junction, Price and Provo.

Maxwells Awarded Buffalo Honors

BUFFALO, N. Y., Oct. 1—Maxwell car, No. 25, was awarded the Laurens Enos trophy or sweepstakes prize for going through the 4 days of the recent 800-mile reliability tour of the Automobile Club, of Buffalo, without being penalized. The official decision which was rendered last evening by Arthur W. Kreinheder, who was referee of the run, also returns for winner of the Vars trophy, Maxwell No. 7, which completed the run with only four points against it, these being imposed for adjusting a magneto wire on the first day of the tour. Albert W. Poppenberg's car, the Warren-Detroit, which was supposed to have come clean in the tour was found to have done 20 minutes' work on tires on the second day's run, the work being done while the motor of the machine was not in operation, which violated a rule of the contest.

No Glidden Tour for This Year

The national tour scheduled to run from Detroit to New Orleans starting October 14 has been declared off for this season but will be run over the same course in 1913 at a date to be announced later. It was decided to declare the tour off for this year at a meeting in New York City today of the A. A. A. tour committee, which gave out the following report:

"National tour committee today postponed annual reliability event until 1913. Presidential campaign activities are held responsible for the depleted entry list and suspended interest in long-distance touring. Many cities on the Detroit-New Orleans route have guaranteed teams for next year and many sections of the route at present in bad shape will have been rebuilt by that time."

The feeling is general among automobilists that a national tour should be held in the holiday months of July and August as it is almost impossible for many to get away from business after the middle of September.

Harking Back a Decade

FROM *The Automobile and Motor Review*, September 27, 1902:

Built for speed alone, the two new racing creations made by Henry Ford and Tom Cooper, of Detroit, are first-class examples of simplicity. The cars have a tread of 5 feet 2 inches and a wheelbase of 117 inches and are equipped with the most powerful automobile engines so far produced in America. The cylinders are vertical, four in number and measure 7 by 7 inches, which should deliver about 70 horsepower. The gearing is five to four and it is necessary to turn the engine over 707 times in order to cover a mile. Mr. Ford figures that the speed will be 1,200 revolutions a minute.

Alexander Winton, in Winton's Bullet, broke the 1 and 10-mile dirt track records at Cleveland last week when the car finished the mile in 1:02 3-4 and the 10-mile distance in 10:50.

The Automobile Club of America has amended the rules for the coming reliability tour to Boston by eliminating motorcycles.

The greatest show in the history of the American automobile industry will be held at Madison Square Garden, January 17-24. On the main floor the available space for exhibition purposes amounts to over 20,000 square feet and it has all been contracted for by exhibitors, despite the fact that the application blanks have been issued less than 2 weeks. The restaurant, which was occupied by the loan exhibit last year, has been thrown into the main floor by knocking out the partitions, but it is uncertain that there will be enough space, even with this addition.

Senator Clark has promised the committee in charge of the G. A. R. automobile parade at Washington, scheduled for October 6 that even if it proves to be impossible for him to take part, that his new $10,000 steamer will be in line.

Mayor Higgins, of Racine, Wis., has vetoed the proposed ordinance recently passed by council to limit the speed of automobiles to 6 miles an hour. He stated that he considered 6 miles an hour too slow for automobiles and recommended that the ordinance be amended so that the more reasonable rate of 8 miles an hour could be made within the law.

Burman Breaks World's Record

ST. LOUIS, MO., Sept. 30—Bob Burman and his big Blitzen Benz were the feature of the 2-day race meet which opened at the new St. Louis track Sunday afternoon, September 29. Burman lowered the world's record for a mile on a circular dirt track by 6-100 of a second, making the mile in 47:61.

This is the first time that automobile racing has been seen here for some years and the great interest is attested by the number of local cars that were entered in the races. The summary follows:

Car	Driver	Time
NON-STOCK CARS RACE, FOR CARS OF 301 TO 450 CUBIC INCHES DISPLACEMENT, 5 MILES		
Ohio	Raimey	2:05
Mercer	Ringler	
NON-STOCK CARS RACE, FOR CARS OF 450 TO 600 CUBIC INCHES DISPLACEMENT, 5 MILES		
Cutting	Burman	4:02
Ohio 999	Savin	
REMY-BRASSARD CONTEST, FREE FOR ALL		
1st heat	Burman	3:19.50
2nd heat	Burman	3:06.50
EXHIBITION MILE, AGAINST TIME		
Blitzen Benz	Burman	:48.80
EXHIBITION MILE, AGAINST WORLD'S RECORD		
Jumbo Benz	Burman	:47.61
FREE-FOR-ALL HANDICAP		
	Burman	4:55
Ohio 999	Savin	

Calendar of Coming Events

Shows, Conventions, Etc.

Jan. 2-10..........New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 11-25.........New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8...........Chicago, Ill., Annual Automobile Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 24-Mar. 1.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1.....St. Louis, Mo., Annual Automobile Show.
March 3-8..........Pittsburgh, Pa., Annual Automobile Show.
March 8-15.........Boston, Mass., Annual Automobile Show.
March 17-22........Buffalo, N. Y., Annual Automobile Show.
March 19-26........Boston, Mass., Annual Truck Show.
March 24-29........Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Oct. 7-20..........Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 21............National Tour American Automobile Association.

Proposed Contests

Oct. 4-5...........Sioux City, Ia., S. C. Auto Club and Speedway Association.
Oct. 4-5-6.........Peoria, Ill., Track Races, J. A. Sloan.
Oct. 12............Springfield, Ill., Illinois State Board of Agriculture.
Oct. 12............Salem, N. H., Track Meet, Rockingham Park.
Nov. 6.............Shreveport, La., Track Meet, Shreveport Automobile Club.

The Automobile

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Business Needs Good Roads

Merchant and Banker Have Come to Realize Importance of Improved Highways

"IMPROVED vehicular transportation, which finds its highest form in the automobile, and the rapid development of commercial organizations cover practically the same period of time. Within 15 years the commercial organizations of the United States have multiplied by thousands; within 15 years the most effective agitation for road improvement has come, not by initiation in the country districts, but by the recognized dependence of the cities, particularly the cities of smaller size, upon good connection with the country."

In these words G. Grosvenor Dawe, of the Chamber of Commerce of the United States of America, speaking before the American Road Congress now assembled in Atlantic City, N. J., struck a dominant chord in the road construction activities of today showing how that modern business interests have realized the utmost necessity of good roads and how that commercial clubs, chambers of commerce and business men's leagues in smaller size cities which are to a large extent dependent on their highway communication with the surrounding country, have taken up in genuine earnestness the building of modern roads from these business centers at every angle of the compass into the surrounding country.

These business organizations have realized the financial necessity of good roads; they have realized that the good roads movement no longer can be restricted to the confines of the cross-roads orator, but that it is taking its place in the financial columns with crop reports and other live factors in industrial finance.

When various civic organizations not only start talking good roads, but when they actually engineer the construction of them it is high time that the local dealers' organizations in automobiles get in line and do more than talk and add their passive presence. If good roads in a locality will help any line of business it will help the retail car dealer, the retail tire and accessory dealer.

In Illinois the state banking organization has realized the gravity of the road situation and has not only created a good roads department in its organization, but has made state-wide canvasses obtaining statistics on the road situation, on the cost of marketing farm produce and on the increase in land values due to road improvement along the front of such property or in the immediate vicinity. The keen business eye of the banker recognized the necessity of better roads; the acute business judgment of the leading industrial lights of the cities has seen the necessity of it; and the automobile agent, branch manager, garageman, repairman, tireman, accessory dealer and every person connected directly with the automobile interest should be actively on the side of local road improvement.

But it is not only the business and professional men of the towns and cities who owe it to their own interests and to the community in which they reside to foster the cause of good roads, for the great army of agriculturists all over the country should also throw its influence into the balance. For it is obvious that the greatest benefit of improved highways will be the increased facility of getting farm products to market and the improvement in communication with both town and neighbor.

The stress which is being laid on the roads situation at the present time is rapidly growing more pronounced and augurs well for the future national development in this particular. Too much stress cannot be laid upon it. The automobile and the motor truck, with their greater speed and capacity as compared with the horse-drawn vehicle, demand highways which will heighten, or at least will not lower, their efficiency. This demand is imperative.

Synthetic Rubber to Date

SYNTHETIC rubber based on isoprene and butadiene, substances having the five-carbon and four-carbon atom construction respectively, is an accomplished chemical fact. The concrete proof lies in the performance of a set of tires used by Dr. Carl Duisberg, the noted German scientist, who states that in 4,000 miles of service no puncture was suffered or material wear noted. They must be good tires to make such a showing, but it is certain that they were used carefully and with much good fortune as to the roads. As a commercial element, even Dr. Duisberg does not expect synthetic rubber to assume significant proportions in the near future. Apparently he is entirely correct in his judgment.

The factor of cost stands like a stone wall before the synthetic rubber enterprises. The two sets of tires turned out from the Elberfeld factory represent the commercial results of 5 years of research and labor and incidentally the expenditure of $250,000. Individually, the cost of the rubber in those tires might be placed at $31,250. Of course, such a cost would not apply to future production. But the matter of manufacturing cost is the barrier. The synthetic rubber enthusiasts are face to face with commerce. Their problem now is to perfect their processes so that synthetic rubber can compete with natural rubber in the markets of the world. Based upon present prices of material, the artificial rubber men hold that they can produce rubber to sell at 60 cents a pound or thereabouts. It is said that the production of 10,000 tons of synthetic rubber by the fusel oil process would require the starch from all the potatoes grown on 1,000,000 acres of land. Rating the yield per acre at 300 bushels, the potatoes needed would be worth at least $300,000,000. That would make the potato element in the synthetic rubber cost about $13 a pound. If sawdust is used, this cost would be reduced, but the availability of sawdust has been sharply questioned. If coal be the material at the foundation of the product, the cost of material would be within the bounds of reason. But in the light of cold, hard facts and assuming that polymerizing can be utilized on a large scale, a fact disputed by many experts, the cost of manufacturing synthetic rubber will always be a material item. The battle that will be fought, assuming that synthetic rubber is to be manufactured on a commercial scale, will be a fight for the market. The problem that must be solved involves a triumph over rubber grown on the plantations at a cost of from 15 cents to 25 cents a pound in limitless supply. The question that must be answered is: Can synthetic rubber, possessing equal quality with natural rubber, be marketed on a successful competitive basis?

Automobile Stone-Road Project Gets $300,000

AKRON, O., Sept. 30—The Goodyear Tire & Rubber Company has authorized Carl G. Fisher to put it down for a $300,000 subscription toward the stone road from New York to San Francisco, the material of which has to be purchased by a $10,000,000 fund subscribed by the automobile manufacturers, dealers and owners. This is one of the largest single donations to date, and coming unsolicitedly from the concern shows the wide interest already being taken in making road-building a reality by the industry furnishing the money to buy the requisite materials.

To date the following manufacturers representing Indiana have contributed, the gross amount exceeding $350,000, on the basis of each company paying one-third of 1 per cent. of its gross business for three successive seasons: Prest-O-Lite Company, Wheeler & Schebler, Ideal Motor Car Company, Premier Motor Manufacturing Company, Waverley Company, Gibson Automobile Company, American Motors Company, Marion Motor Car Company, Henderson Motor Car Company, Empire Tire Company, Remy Magneto Company, Esterline Manufacturing Company, Motor Car Manufacturing Company, Gus Habich, Gibson Automobile Company, C. Off & Company, Gates Manufacturing Company, Pumpelly Battery Company, Brown Commercial Car Company, Glover Equipment Company, G. A. Schnell, R. J. Irvin Manufacturing Company, A. M. Wasting Company, Cadillac Automobile Company of Indiana, Archey Aitkins Company and the Hoosier Motor Club. These subscriptions amount to $60,000 and downwards. This list includes many dealers and other concerns engaging in manufacturing tops, batteries and various other lines of work.

The industry is at present awaiting the action of Detroit as a unit in this road matter. Messrs. Walden and Chapin, of the Packard and Hudson companies, are enthusiastic over the plan and are working diligently to push it along. Henry Ford has issued a letter to all of his dealers and users with the aim of getting their views on the matter, which may to an extent determine the attitude of this company. Many members in the trade are constantly writing their friends so that the enthusiasm is working rapidly.

President Ancil Martin, of the Phoenix, Ariz., Board of Trade, has wired as follows regarding the transcontinental stone road, taking the southern route by way of Arizona so as to insure a highway open all the year around:

"National Highway Ocean to Ocean must be open all the year around to be fully appreciated and useful. Only route open the year around lies through Salt River Valley and Phoenix. This road endorsed by southern California and big sums appropriated to construct same. Many miles already splendid motor boulevard. We rely on your organization to see to it that this route is adopted by the nation."

Accurate data have already been gathered on the subject of cost of road construction, and the following figures show the actual cost of materials and labor for a stone road and also a brick road. The cost of concrete bridges is also given in these tables:

STONE ROADWAY 12 INCHES THICK AND 2 INCHES SCREENING, NEW YORK TO MISSISSIPPI RIVER

Cost of Material.		Cost per Sq. Yd. Cut 12 In. Thick		
Stone	$1.25 f.o.b. siding	Stone	$ .43	$2,270.40
Excavation	.50 cu. yd.	Screening	.07	369.60
Teams	5.00 per day, 10 hours	Hauling	.43	2,270.40
Labor	2.00 per day, 10 hours	Unloading	.05	264.00
		Grading	.17	897.60
		Oiling	.05	264.00
		Rolling	.10	528.00
			$1.30	$6,864.00

Roadway 9 ft. for 1 Mile=5,280 sq. yds. @ $1.30=$6,864 to $7,000.
Roadway 12 in. for 1 Mile=7,040 sq. yds. @ $1.32=$9,334 to 9,500.

BRICK ROADWAY 12 INCHES EXCAVATION FROM NEW YORK TO MISSISSIPPI RIVER

Cost of Material		Cost per Sq. Yd. Cut 12 In. Thick		
Brick	$10.00 per M. f.o.b. siding	Brick	$ .75	$3,960.00
Concrete	4.50 per yard	Hauling	.16	844.80
Excavation	.50 per yard	Grading	.16	844.80
Sand	1.00 per yard	Grouting	.12	633.60
Teams	5.00 per day, 10 hours	Foundation	.50	2,640.00
Labor	2.00 per day, 10 hours	Rolling	.05	264.00
		Cushion	.06	316.80
		Margin curb	.40	2,112.00
			$2.20	$11,616.00

Roadway 9 ft. for 1 Mile=5,280 sq. yds. @ $2.20=$11,616 to $12,000
Roadway 12 in. for 1 Mile=7,040 sq. yds. @ $2.13=$15,000

Concrete Bridges	Cost if Roadway is 9 Ft.	Cost if Roadway is 12 Ft.
6-ft. span.	$ 150.00	$ 200.00
12-ft. span	350.00	450.00
14-ft. span	400.00	500.00
18-ft. span	700.00	950.00
24-ft. span	950.00	1,300.00
36-ft. span	1,450.00	1,950.00

Cost per Sq. Yd. Cut 12 In. Thick

	Stone @	$.34	$1,795.20
	Screenings @	.06	316.80
	Hauling @	.43	2,270.40
Stone @ $1.00 per cu. yd.	Unloading @	.05	264.00
	Grading @	.17	897.60
	Oiling @	.05	264.00
	Rolling @	.10	528.00
			$6,336.00

Gathering of branch managers, distributors and representatives of the Oakland Motor Car Company, Pontiac, Mich., in front of the company's plant during their recent convention

OAKLAND Dealers Assemble—At the recent convention of branch managers, distributors and representatives of the Oakland Motor Car Company, Pontiac, Mich., there was an assembly of 125 men from all parts of the country. The above photograph shows the assembled dealers in front of the Oakland company's plant.

Fletcher Denver Locomobile Manager—R. C. Fletcher, formerly with the Van Vliet Fletcher Company, Des Moines, Ia., is now Denver manager for the Locomobile.

Bergdoll Agency in Syracuse—The Louis J. Bergdoll Motor Company, Philadelphia, Pa., will soon be represented in Syracuse, N. Y., and vicinity by a direct selling agency.

Philadelphia Tire Represented in Baltimore—The Philadelphia Motor Tire Company, Philadelphia, Pa., has opened an agency at 107 West Mt. Royal avenue, Baltimore, Md.

Owen & Company Moves—R. M. Owen & Company have moved their executive offices and the New York Reo branch to their new quarters at 19-21 West Sixty-second street.

Portland Club House Completed—The Portland Automobile Club, Portland, Ore., has just completed its new club house on the Sandy River, some 16 miles from the Rose City.

Anderson in Charge Ford Branch—W. C. Anderson is to have charge of the Ford branch which opened October 1, in Minneapolis, Minn. He will have charge also of the St. Paul, Minn., sub-branch.

State Association's Convention—Officials of the New York State Automobile Association have decided to hold their annual state convention this year in Utica, N. Y., during the first week in December.

Welland's Automobile Parade—An automobile parade was held Saturday at Welland, Ont., in connection with the Monck County fair at Wellandport, prizes being awarded to best decorated automobiles.

Toledo Building for Parking Automobiles—A building designed exclusively for the parking of automobiles, now left standing on the down-town streets of Toledo, O., will be erected at 324-326 Huron street.

Automobile Parade in Wilmington—An automobile parade, on the evening of Thursday, October 10, will be a feature of a home coming celebration which will be held in Wilmington, Del., during the week of October 6.

Omaha Wants Mail Automobiles—Two automobiles will soon be put in use for the collection of mail in Omaha, Neb., if the proper machines can be secured at a price satisfactory to the Post Office Department officials.

Chalmers Pathfinder Finished Run—The pathfinder Chalmers Six, driven by V. W. Reynolds, arrived in Des Moines, Ia., after a 5-day trip around Iowa blazing the way for the All Iowa Reliability Run which will be held early in October.

Mississippi Good Roads Tour—There were thirty-eight participants in the Southern Mississippi Good Roads Tour, who completed a trip over Covington county. The tour will be made an annual affair and next year will embrace adjoining counties.

Studebaker Branch Managers Meet—About thirty branch managers and officers of the Studebaker Corporation met at a dinner at the Pontchartrain Hotel September 26, the occasion being the annual meeting for the discussion of the coming season's campaign.

Hunziker Takes Warner Agency—J. H. Hunziker, manager of the Northwestern Shawmut Tire Agency, Minneapolis, Minn., has taken the distributing agency for the Warner autometers, formerly handled by the Standard Distributing Company. The agency is 1204 Hennepin avenue.

Minnesota's 2,700 Miles of Highway—Contracts for construction of 2,700 miles of highway in Minnesota next summer will be authorized by the state highway commission. Seven hundred miles will be absolutely new road in the northern part of the state. Surveying, stumping and sand hauling will be done in the winter. The mileage will be completed by fall.

Stoddard Company Moves—The Stoddard Motor Company, distributor of Stoddard-Dayton cars in the metropolitan territory, has moved from Fifty-seventh street to the building of the United States Motor Company at Broadway and Sixty-first street, New York City. This move is a part of the general plan of concentrating facilities for the sale of products of the United States Motor Company.

Opens Truck Station—What is claimed to be the largest truck service station in the United States has just been opened in Detroit, Mich., by the General Motors Truck Company. The building, which has space to take care of from 150 to 200 trucks, was erected at a cost of about $150,000. There is a total floor space of 50,000 square feet, which is utilized for garage, repair shops and stockroom as well as for offices.

Middleburg Club Elects Officers—James L. Baker was elected president of the Middleburg, N. Y., Automobile Club, recently organized, and other officers elected include: Vice-president, Dr. C. S. Best; secretary, Roger W. Cornell; treasurer, William J. Pindar; committee on good roads, Frank A. Sullivan, Dr. Lyman Driesbach, James C. Borst, and Asa A. Dutton; committee on by-laws, George A. Mill, Dr. Josiah Mann, William G. Deekman, and Charles C. Dutton.

Novel Street Cleaning Device—With a regard for the comfort and safety of the Los Angeles, Cal., traffic, the officers of the Automobile Club of Southern California have worked out a quicker and more efficient plan than the one now employed for cleaning the city streets. The plan involves cleaning the streets by means of air tanks fastened to the street cars. The cleaning of the streets could then be quickly and effectually done during the hours of 2 and 4 a. m. Motorists who have had trouble and accidents caused by tire skidding while the streets were being flooded under the present system are watching the outcome of the safer plan with interest.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Albany, N. Y.	Velie	Robert F. Payne
Atlanta, Ga.	R-C-H	O. C. Drew, Jr.
Birmingham, Ala.	Cole	Robertson Tire & Auto Co.
Binghamton, N. Y.	Palmer-Singer	D. V. Ashley
Bloomsburg, N. Y.	Palmer-Singer	C. W. McKelvey
Boston, Mass.	Chevrolet	Tyler Bros. Cor.
Boston, Mass.	Pope-Hartford	Fred H. Lucas
Brockton, Mass.	Palmer-Singer	Loring Motor C. Co.
Burlington, Iowa	Cole	Barton-Ford Motor Company
Cedar Rapids, Iowa	Cole	W. H. Culland & Co.
Chicago, Ill.	R-C-H	Wm. Konow
Cinthiana, Ind.	R-C-H	A. D. Barton
Claremont, N. H.	R-C-H	E. F. Cushion
Clarion, Pa.	Cole	W. H. Gulland & Co.
Clearfield, Pa.	Cole	Wallace Bros.
Coatsville, Ind.	R-C-H	Frank Johnson
Columbus, O.	Great Western	C. E. Ross Gar. Co.
Columbus, O.	Marathon	Pausch-Selbach Wagon Co.
Dallas, Tex.	Regal	Fife & Miller
Dayton, O.	Franklin	S. C. Crane
Denver, Colo.	Palmer-Singer	W. Barnett
Eau Claire, Wis.	Cole	Tanbert Auto. Co.
Fargo, N. Dak.	Kissel-Kar	William Ball
Fredonia, Kan.	R-C-H	J. W. Paulon
Gardner, Mass.	Jackson	Brown-Rawson Co.
Gardner, Mass.	Metz	Brown-Rawson Co.
Gardner, Mass.	Hyberg	Brown-Rawson Co.
Gladstone, Mich.	Palmer-Singer	Chas. Slining
Greenfield, Mass.	R-C-H	H. E. Shaw
Houston, Tex.	Palmer-Singer	Peters Bros.
Johnstown, Pa.	Cole	Daniel Statter & Co.
Kansas City, Mo.	Nyberg	A. D. Wright
London Mills, Ill.	Palmer-Singer	Zenette Groom
Lynn, Mass.	Hudson	Sibley & Green
Lynn, Mass.	Studebaker	Sibley & Green
Logansport, Ind.	Nyberg	Harms & Cragun
Maquoketa, Ia.	R-C-H	Palmer Auto & Sup. Co.
Meadville, Pa.	Palmer-Singer	Thomas & Kiebort
Medaryaville, Ind.	Nyberg	Guild & Hackley
Menessen, Pa.	R-C-H	Carmine Coccari
Miami, Fla.	R-C-H	W. V. Little
Minneapolis, Minn.	Abbott-Detroit	Andersch Brothers
Montreal, Can.	Mitchell	Bellerive Garage
Montreal, Can.	Palmer-Singer	E. Major
Mt. Carmel, Ill.	Palmer-Singer	Baumgart & Co.
Naugatuck, Conn.	Cole	Richardson Bros. Garage
Newark, N. J.	Palmer-Singer	H. Heinsheimer
Newton Highland, Mass.	R-C-H	Woodsworth Bros.
Niagara Falls, N. Y.	Cole	Arthur M. King
Niagara Falls, N. Y.	Overland	R. H. Pattison
Opelike, Ala.	Cole	Isham J. Dorsey
Philadelphia, Pa.	Palmer-Singer	Liberty Motor Co.
Pittsburg, Kans.	Nyberg	Chas. B. Hunter, Jr.
Pontiac, Ill.	Cole	Pontiac Motor Car Co.
Princeton, Ill.	Cole	S. L. Bradley & Co.
Providence, R. I.	Columbia	J. H. MacAlman
Providence, R. I.	Palmer-Singer	Pugh Bros.
Providence, R. I.	Stearns	J. H. MacAlman
Pueblo, Colo.	Palmer-Singer	Ideal Motor Co.
Richmond, Va.	Palmer-Singer	Chas. W. Shields Co.
Rockford, Ill.	Cole	Fred Carlson
San Marcos, Tex.	R-C-H	E. F. Walker
Santa Barbara, Cal.	R-C-H	B. C. Barry
Schenectady, N. Y.	Detroiter	Brenner Com.
Schenectady, N. Y.	Palmer-Singer	W. E. Berning
Scheyenne, N. Dak.	R-C-H	L. S. Rudy
Scranton, Pa.	Palmer-Singer	W. L. Perry
Springfield, Mass.	Palmer-Singer	Blue Ribbon Garage
South Bend, Ind.	Maxwell	J. W. Nikart
Syracuse, N. Y.	Flanders	Edward P. Young
Syracuse, N. Y.	Palmer-Singer	J. T. Mollard
Sulphur Springs, O.	Nyberg	D. E. Schwab
Tekamah, Neb.	Cole	Welch Bros.
Thurman, Iowa	Cole	Thurman Motor Car Co.
Toledo, O.	R-C-H	E. W. Burg
Trenton, N. J.	Palmer-Singer	H. E. Stout & Son
Washington, D. C.	Palmer-Singer	Warrington M. C. Co.
West Liberty, Iowa	Cole	West Liberty Auto Co.
Williamsport, Pa.	Cole	William Schaffer
Wilmington, Del.	Hudson	W. E. Walsh
Wilmington, N. C.	Palmer-Singer	Queen City Cycle Co.
Worcester, Mass.	Palmer-Singer	Harvey Parker

COMMERCIAL CARS

Place	Car	Agent
Auburn, Cal.	Federal	H. W. Davis
Augusta, Ga.	Federal	Lombard Iron Works
Central Village, Conn.	Federal	U. LaFrance
Dallas, Tex.	Wichita	Wm. T. Fulton Co.
Evanston, Ill.	Federal	G. C. Foster & Co.
Hammond, Ind.	Federal	E. O. Minas & Co.
Jamestown, N. Y.	Federal	Edwin Wells
Monticello, Ky.	Federal	G. O. Bassett
New Haven, Conn.	Federal	Alling Garage Co.
Petaluma, Cal.	Federal	Jos. Peoples
Pueblo, Colo.	Federal	Ideal Motor C. Co.
Richmond, Va.	Federal	Oakland Auto Co.
Rochester, N. Y.	Federal	J. Cunningham
Sacramento, Cal.	Federal	J. D. Lauppe
Schenectady, N. Y.	Federal	Sterling Garage
St. Charles, Ill.	Federal	C. S. McCornack
St. Louis, Mo.	Durable Dayton	C. D. Hathaway
Toronto, Ont.	Federal	Central Gar. & Supply Co.
Traverse City, Mich.	Federal	Traverse City Iron Works.
Vancouver, B. C.	Federal	H. J. Tucker
Washington, D. C.	Federal	Louis Hartig

ELECTRIC CARS

Place	Car	Agent
Boston, Mass.	Columbus Electric	Tyler Bros. Cor.
South Bend, Ind.	Standard Electric	F. S. Riley
Syracuse, N. Y.	Standard Electric	T. A. Reed & Co.

Farmers Using Trucks—Farmers are using motor trucks almost exclusively in Orleans County, N. Y., for delivery to cities of berries, butter, cream and produce, owing to the improvement in good roads in that section.

Welland's Orphans' Day—Orphans' Day was celebrated recently at Welland, Ont., the children of the Welland Orphans' Home being taken in automobiles to Queenstown Heights and return. Many Wellanders loaned their automobiles for the occasion and the event was highly successful.

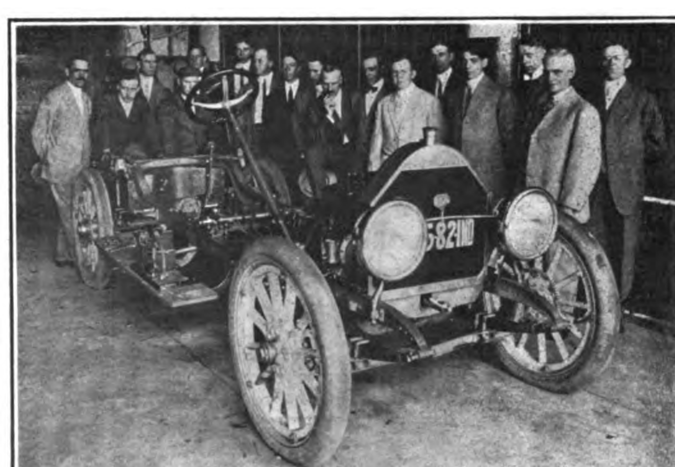
Corse Elected Secretary-Treasurer—W. M. Corse, of the Lumen Bearing Company, Buffalo, N. Y., maker of ball bearings for automobiles, was elected secretary-treasurer last week of the American Institute of Metals in the annual convention at that city. The meeting next year will be in Chicago, Ill.

Protest Rochester Light Law—The Automobile Club of Rochester, N. Y., is fighting for the repeal of the city ordinance which forbids use within city limits of strong headlights on automobiles. The officials of the Rochester association claim that several accidents have occurred because of lack of sufficient light on motor cars.

Good Crops, Good Sales—Prospects of another large cotton crop this year is the most encouraging feature of the fall and winter outlook for the sale of automobiles in the South. Even with a fairly early frost the chances favor a production of more than 12,000,000 bales. This, combined with the heavy yield of rice and corn, insures prosperity for the greater part of another year.

Cincinnati Ordinance Repealed—The traffic ordinance in Cincinnati, O., which for several years has prevented automobilists from using all kinds of warning signals except the hand-operated bulb horn, has been repealed. It has been supplanted by a new law which allows the use of any device which will produce an abrupt sound sufficiently loud to serve as an adequate warning of danger.

Co-operation in Cole Forces—The Cole Motor Car Company, Indianapolis, Ind., has divided the country in territories, with district sales managers in charge of certain allotted territory. The idea is to give Cole agents and owners stimulated co-operation in having these sales managers keeping in direct personal touch with them. These sales managers will work directly in touch with President J. J. Cole and his sales force in Indianapolis.



Agents assisting by suggestions in the construction of the Cole. Rear of chassis, President J. J. Cole, Chief Engineer Charles A. Crafford, Theodore Williams, Canal Dover, O.; Engineer J. M. Smith, C. D. Robinson, St. Louis; F. R. Schubert, Akron, O.; W. F. Blackford, Louisville; C. H. Strout (factory); J. A. Hutchinson, St. Louis; H. S. Haynes, Minneapolis; F. E. Richardson, Cleveland; J. F. Luhrman, Cincinnati; L. W. Hanley, Cleveland; N. H. Strauss, Cincinnati; Oscar Grenwist, H. E. Katrincholm, Sweden; C. H. Corkhill, Omaha; General Sales Manager C. P. Henderson

Transcontinental Alco, which is going back to work

Hopkins Sales Manager Dissette—J. B. Hopkins has been appointed manager of the sales department of the Dissette Motor Company, Toronto, Canada.

Automobile Show in Nashville—An automobile show is to displace the time honored horse show at the Tennessee state fair, Nashville, Tenn., Sept. 23, this year.

Stillman with Amplex Company—Harry Stillman has succeeded George Saltzman, factory superintendent of the Amplex Motor Car company, Mishawaka, Ind.

Delhi Club Organized—An automobile club was organized in Delhi, N. Y., recently and was immediately affiliated with the New York State Automobile Association.

Automobiles Used in Mines—Motor driven cars have been installed in the Sloss-Sheffield Steel & Iron Company's mines near Birmingham, Ala. They take the place of animal traction.

Grinnell Electrics for Antipodes—The Grinnell Electric Company, Detroit, Mich., has just shipped ten more cars to Australia, making twenty in all that have been ordered for the antipodes.

Marmon Leaves Broadway—The Sidney B. Bowman Automobile Company, New York City distributor of Marmon cars, has decided to permanently locate its sales department at its service building, 225 West Forty-ninth street.

Humphries Factory Manager Oakland—S. H. Humphries, who has been manager of the Elmore plant at Clyde, O., will take the position of factory manager of the Oakland Motor Car Company, Pontiac, Mich., succeeding the late Thomas Wilson.

Thibedeau Makes Abbott Change—J. R. Thibedeau, formerly connected with the purchasing department of the Abbott Motor Company, Detroit, Mich., has been made assistant manager of the technical and service department of the same company.

Matheson with Hayes Company—George N. Matheson, for many years purchasing agent for the National Motor Vehicle Company of Indianapolis, Ind., has accepted the position of purchasing agent for the Hayes Manufacturing Company, Detroit, Mich.

Moore Manager Tire Branch—George P. Moore has been appointed manager of the local branch of the International Rosilie Company, 1133 Main Street, Buffalo, N. Y., which concern makes a product for filling automobile tires, headquarters being in Elmira, N. Y.

Winterson Lozier Traveling Representative—J. P. Winterson, formerly connected with the Eastern sales department of the Lozier Motor Company in New York City, has been appointed special traveling representative for that company to cover territory in the Southwest.

Rhode Island Dealers' Outing—The members of the Rhode Island Automobile Dealers' Association enjoyed their annual outing last week when a run was made from Providence, R. I., to Lakeville, Mass. The start was made at noon and the place was reached in a short time.

Nashville Anti-Noise City—Nashville, Tenn., by a city ordinance, has made it unlawful to cut out the muffler within the city limits or to use any warning device other than a bulb horn or an electric bell. A fine of $25 is provided for those convicted of violating the ordinance.

Herding Cattle in Automobiles—The latest use of the automobile in Texas is in herding cattle on the Western plains. During the past week the idea of herding cattle in an automobile was tried out on a ranch in Potter county. This ranch was in fine condition and the test was satisfactory.

Aermore's Unique Selling Plan—The Aermore Manufacturing Company, Chicago, Ill., has devised a plan for quickly obtaining distribution of its exhaust horn. The plan consists of sending out to garage owners or dealers in automobile supplies, accessories, etc., one full sized Aermore exhaust horn for demonstrating purposes free.

Victor Increases Staff—The Victor Rubber Company, Springfield, O., has added to its staff Frank R. Talbott, who has been connected with prominent Akron rubber companies for a number of years. F. B. Patrick, well known in Ohio newspaper and advertising circles, has also accepted a position with the same company, and will be employed in the advertising and sales departments.

Hupp Leases New Detroit Quarters—The Hupp Motor Company has leased the large showroom at the corner of Woodward and Willis avenues, Detroit, Mich., originally leased by the Cole Motor Company, of Indianapolis, Ind. This company placed its car in an agency which occupies the former quarters of the Oakland company and has sublet the corner to the Hupp company for a term of years.

Fargo's Club House—The Fargo Automobile Club, Fargo, N. D., is seeking a site for a club house which it proposes to erect early in the spring. A committee consisting of President Seth Richardson and William Stern has been chosen to look over several proposed sites and report upon the most available. The plan is to build a club house on the banks of the Red River of the North, a few miles from the city. Golf links and tennis courts will be provided and the club will be conducted as a town and country club.

Sister City's Club House—A committee has been appointed, headed by Colonel S. E. Moss, of Dallas, Texas, to make plans for the erection of a $30,000 club house and to be known as the "Sister City's Club House." The erection of the building will be under the direction of the Dallas and Fort Worth Automobile associations. Plans are to erect the building at a point midway on the Dallas-Fort Worth pike and also easily accessible by the Interurban. An option has been secured on several acres of land. In addition a garage will be erected.

Reciprocity Law Pinches—The Springfield, Mass., Motor Club has decided to get busy when the next Legislature meets to try to have a change made in the motor law, whereby there will be a better plan for reciprocity touring in the New England states. Visitors from Vermont, Connecticut and Maine are limited to 10 days in the Bay State, but Massachusetts

Automobile Incorporations

AUTOMOBILES AND PARTS

Atlantic City, N. J.—Pierson-Harris Company; capital, $10,000; to manufacture automobiles. Incorporators: Gilbert Pierson, Edward G Harris.

Austin, Tex.—The Cleburne Motor Car Manufacturing Company; capital, $10,000; to manufacture automobiles. Incorporators: H. E. Luck, W. P. Ball, Brown Douglas.

Brooklyn, N. Y.—Mears Motor Vehicle Company; capital, $600; to deal in motor vehicles. Incorporators: J. W. Mears, E. A. Kellam, C. Mears.

Chicago, Ill.—Schillo Motor Sales Company; capital, $15,000; to manufacture and deal in automobiles, motor vehicles and accessories. Incorporators: Leonard Lorimer, E. W. Schillo, Albert G. Schillo.

Cleveland, O.—Cadillac Auto Company; capital $50,000; to deal in automobiles, parts and accessories. Incorporators: Thomas B. Bolton, William H. Marlatt, F. H. Pelton, M. Jenkins, M. D. Hayes.

Elyria, O.—Elyria Auto Sales Company; capital, $10,000; to deal in automobiles. Incorporators: W. G. Bennett, I. W. Lyon, F. S. Bates, Correll H. Smith, J. J. Dillon.

Grafton, W. Va.—Grafton Motor Company; capital, $5,000; to manufacture motors. Incorporators: Henry J. Proacht, H. D. Caomerford, D C. Peck.

New York City, N. Y.—Motor & Gear Improvement Company; capital, $1,250,000; to deal in automobiles, etc. Incorporators: Henry C. Derham, S. V. Brady, Dwight Partridge, J. Sass, G. M. Stevens.

New York City, N. Y.—Industrial & Trading Company; capital $5,000; to engage in a general commission business in motor vehicles and parts. Incorporators: A. M. Becker, John A. Lemline, E. H. Ferguson.

Raleigh, N. C.—Motor Sales Company; capital, $25,000; to sell motors. Incorporators: D. F. Fort, Jr., T. C. Powell, R. M. Merritt.

Rochester, N. Y.—Fordham Company; capital, $3,000; to manufacture and deal in automobiles, etc. Incorporators: Gerald F. Cox, Eugene A. Reinke, Richard Stanton.

Ruston, Ia.—Malbury Motor Company; capital, $10,000; to manufacture motors. Incorporators: J. D. Barksdale, W. F. Batson.

San Angelo, Tex.—S. L. Henderson Company; capital, $10,000; to engage in the automobile business. Incorporators: S. L. Henderson, J. L. Allison, George S. Allison.

Toledo, O.—Landman Griffith Motor Company; capital, $10,000; to manufacture motors.

Utica, N. Y.—Otis Motor Sales Company; capital, $10,000; to engage in the automobile business. Incorporators: Edward J. Otis, William T. Cantwell, T. Harvey Ferris.

Winnipeg, Can.—Tudhope Automobiles, Ltd.; capital, $60,000; to engage in the automobile business. Incorporators: Walter George Chater, Harry Anderson, George Huntingdon Ross, Douglass Nicholson, Harry Folliott Gyles.

motorists are not restricted in these states. There has been a lot of friction this year over the reciprocity clauses, and a change will probably be made next year in some of the states.

One Toll Road in Indiana—With the purchase of the toll road from New Albany to Paoli, Ind., by the Floyd County, Ind., commissioners, but one other toll road remains in that state.

Columbus Lozier Agent Moves—J. B. Hoover, Columbus, O., agent for the Lozier, has moved from East Broad street to 215 North Fourth street, with the Coats Motor Car Company.

Buffalo-Batavia Road Opened—The New York State Highway Commission last week opened for traffic of motorists the Buffalo-Batavia road through Williamsville and Clarence, N. Y.

Denby with Federal Truck—The Federal Motor Truck Company, Detroit, Mich., has appointed Garvin Denby secretary and treasurer with general charge over the sales department.

Resilio Tire in Columbus—The Resilio Tire Filling Company is the name of a new concern which has opened a sales room and shop in Columbus, O., to fill automobile tires by a patented process.

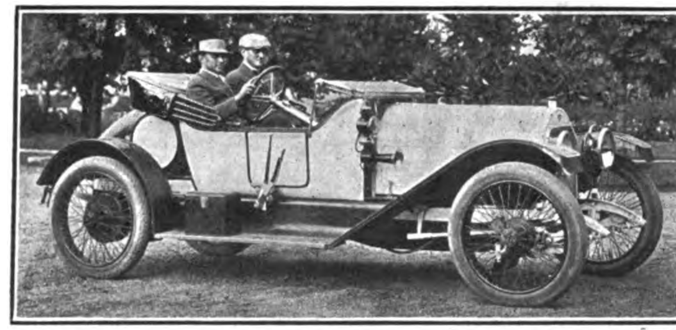
Thomas Lozier Representative—Fred W. Thomas has been appointed special traveling representative of the Lozier Motor Company, Detroit, Mich., in New York and Pennsylvania. He succeeds W. L. Davis.

Opens Rhode Island Branch—President John H. MacAlman of the Boston, Mass., Automobile Dealers Association, has opened a branch at Providence for the Stearns and Columbia with Harry Farrow in charge.

Many Automobilists Visiting New Orleans—Visiting cars are increasing steadily in New Orleans, La. The winter season this year promises to be unusually gay. Cars from other states are allowed to operate here for 30 days without the payment of additional license.

Has Philadelphia Factory Branch—A direct factory branch of the Federal Rubber Manufacturing Company, Milwaukee, Wis., has been established at 707 North Broad street, Philadelphia, Pa., in charge of Harry D. Benner.

Shreveport Taxicab Service Popular.—Taxicab service has been installed in Shreveport, La., and is proving very popular. This means of transportation about the city is in such demand that additional cars have been ordered.



H. C. Stutz in Stutz roadster with wire wheels

Moon's St. Louis Salesroom—The Moon Motor Car Company, St. Louis, Mo., has opened a salesroom in that city, to be known as the Lewis Automobile Company, 4108 Olive street, of which J. D. Perry Lewis is the president.

Firestone Philadelphia Branch Moves—The Firestone Tire & Rubber Company, now located at 256 North Broad street, Philadelphia, Pa., will upon completion of its new quarters some time during October remove to 304 North Broad street.

Tioga Company's New Quarters—The Tioga Automobile Company, 332 North Broad street, Philadelphia, Pa., distributers of the Hupmobile and National cars, will on October 1 remove to its new sales and service building, Broad and Tioga streets.

Henderson with Woods Electric—John C. Henderson, formerly with the Waverley Company, Indianapolis, Ind., and the Westinghouse Company, Pittsburgh, Pa., will from now on travel the eastern territory in the interest of the Woods Motor Vehicle Company, Chicago, Ill.

Stutz's McCue Wire Wheels—The Stutz is one of the first cars in the United States to put wire wheels on their regular models as optional equipment. The accompanying photograph shows H. C. Stutz, president of the Stutz Company, Indianapolis, Ind., with W. D. Meyers at the wheel.

Clearing House Formed—George Tolman and Edward H. Houtz, both well known in Boston motor circles, have formed the Massachusetts Automobile Clearing House with headquarters at 108-110 Massachusetts avenue, and they have arranged with a number of local dealers to handle the second-hand cars taken in trade.

Studebaker's Model Salesroom—As an object lesson to the army of dealers who annually visit its Detroit plants, the Studebaker Corporation, Detroit, Mich., is shortly to open a model automobile garage, salesroom and repair shop, in which will be embodied every advanced idea in arrangement, labor-saving devices and other details.

May Leaves G. & A. Carbureter—Fred May, who since January, 1911, was connected with the G. & A. Carbureter Company, New York City, will leave this company on October 15 to go in the accounting business for himself. He will open an office in New York City and will do business as an accountant throughout the Empire State.

Alco Going Back in Service—Upon arrival from Petaluma, Cal., where it terminated the first transcontinental haul of merchandise, the Alco truck of Charles W. Young & Company, Philadelphia, Pa., will be returned direct to service. The accompanying illustration shows the truck passing over a smooth stretch of road on its overland journey.

Start Good Roads Fund—In order to increase the good roads mileage radiating from the state capital automobile owners of Baton Rouge, La., have started a fund for this purpose. An attempt will be made to secure $100 from each owner of an automobile. Work on the roads is to begin at once. Gravel will be used as surfacing material.

Governor Dix Heeds Petition—Residents of Glens Falls, N. Y., addressed to Governor Dix a petition protesting against acceptance of the new state road between Lake George and Glens Falls, and petitioners received this statement from the executive that the road will not be accepted until after complete investigation of the condition.

White Agents Visit Factory—In a special car attached to "The Wolverine," the fast Western train, a party of New England men who handle the White in that section started for the White factory at Cleveland, O. Before starting they were the guests of Manager J. S. Hathaway, of the Boston branch, at a luncheon at the Boston Athletic Club.

Automobile Incorporations

GARAGES AND ACCESSORIES

BROOKLYN, N. Y.—Monarch Auto Trucking Company; capital, $5,000; to carry on a trucking business. Incorporators: Helen Person, Walter H. Babcock.

CHICAGO, ILL.—Automobile Accessories Company; capital $25,000; to manufacture automobile accessories. Incorporators: Frederick J. Jackson, Frank D. Narelli.

CHICAGO, ILL.—South Park Automobile Garage Company; capital, $250,000; to carry on a garage business. Incorporators: German Frank, Harry J. Lurie, John L. Anderson.

DALLAS, TEX.—Havolin Auto Supply Company; capital, $10,000; to sell automobile accessories. Incorporators: F. E. White, Edwin Hobby, J. W. Crotty.

KINGSTON, N. Y.—Taxicab Transportation Company; capital, $9,000; to conduct a taxicab service business. Incorporators: W. Hilterbrant, F. K. Hilterbrant, E. Hilterbrant.

NEW ALBANY, IND.—New Albany, Corydon and Greenville Auto & Transfer Company; capital, $2100; to operate a motor bus for passengers and freight. Incorporators: J. M. Ferguson, H. F. Rohlfing, J. Schilmiller.

NEW YORK CITY, N. Y.—Forty-Ninth Street Garage; capital, $1,000; to engage in the garage business. Incorporators Paul R. Towne, Harold C. Knapp, Richard H. McIntyre, Jr.

NEW YORK CITY, N. Y.—New York Garage Association; capital, $2,000; to conduct a general garage keepers' exchange. Incorporators: Charles H. Potter, Louis J. Joscelyn, William Burrows.

NEW YORK CITY, N. Y.—Simplex Carbureter Company; capital, $150,000; to manufacture and deal in carburetors. Incorporators: Albert L. Kull, Colcord Upton, Simon J. Mayer.

NEW YORK CITY, N. Y.—Tredvent Tire Company; capital, $100,000; to manufacture automobile tires. Incorporators: Morris Rachmill, Nathan A. Sterling, Samuel Ring.

ROCHESTER, N. Y.—Selden Motor Vehicle Company; capital $150,000; to carry on an automobile truck business. Incorporators: George C. Gordon, W. C. Barry, Jr., R. H. Salmons, C. Strong, Charles N. Stearns.

ST. LOUIS, MO.—Engineer Starter Company; capital $50,000; to manufacture a self-starting device for automobiles. Incorporators: George W. Owens, Louis A. Mesker, Fred G. Decker.

CHANGES OF NAME AND CAPITAL

CHICAGO, ILL.—Henry Lee Power Company; name changed to Old Reliable Motor Trucks Company.

MIDDLETOWN, O.—Crescent Motor Truck Company; increase of capital to $100,000.

MUSKEGON, MICH.—Piston Ring Company; increase of capital from $5,000 to $13,000.

SYRACUSE, N. Y.—C. Arthur Benjamin, Incorporated; increase of capital from $5,000 to $100,000.

Machine used for the grinding of valves in the factory of the National Motor Vehicle Company at Indianapolis, Ind. It will do the work on a four-cylinder motor in 30 minutes

Grinding in valves at the National Motor Vehicle Company's factory at Indianapolis, Ind., does not take a very long time. The machine illustrated above, which was designed and made at the National Company's plant, will do the work for a four-cylinder motor in 30 minutes. The machine grinds four valves at once. The National motor is of the T-head type, therefore it is necessary to grind valves on both sides of the cylinder. The machine grinds all the valves on one side of the cylinder at one time and then, with a simple movement, the operator swings the table carrying the cylinder castings back into position for the next set to be ground in.

It takes but 30 seconds to set up the work. The cylinder castings are lifted into the guides on the tables and centered beneath the spindles carrying the grinding tools. The machine is then started and after 15 minutes has completely finished the four valves on one side of the cylinder. The grinding machine is remarkable in that the motion imparted to the grinding instrument is not merely rotary, but consists in three complete rotations in one direction and then a complete reversal and three motions in the opposite direction. The reversal of the direction of the revolving spindle is entirely automatic. The rate at which the tool is driven calls for 40 reversals per minute or 120 complete revolutions, since there are three revolutions to a reversal. The machine is capable of operating steadily throughout the working day of 10 hours and in that time can turn out 20 complete jobs. This is more than five times the speed, according to the National engineers, than can be attained by skilled workmen. The machine requires but one man to operate it, and to set up the work as well as to maintain it in its proper condition. The result of using this machine is that better work is secured, the results being more uniform, and the cost per valve of performing the operation is considerably reduced, thus giving economy in this respect as well as in point of time.

HESS-BRIGHT'S New Factory—The new factory and office of the Hess-Bright Manufacturing Company, Philadelphia, Pa., is shown in the accompanying photograph. The frontage of the building is 200 feet and the depth is 235 feet. The second floor, to a depth of 35 feet, is devoted to offices. Back of the offices the building is one-story high with saw-tooth roof.

To Manufacture in Norfolk—C. E. Wright & Company are preparing to build a plant in Norfolk, Va., to manufacture automobiles.

Velie Erects Test Building—The Velie Motor Vehicle Company, Moline, Ill., is to erect a $15,000 road repair and test building south of the present factory shop.

Jackson May Build in Canada—The Jackson Manufacturing Company, Jackson, Mich., is considering the location of a Canadian branch of its factory in Baronville, Ont.

Russell Company Instals Machinery—The Russell Motor Car Company, Toronto, Ont., has installed in its local plant additional machinery, the total cost being $100,000.

New Truck Plant Starts—The new Gramm-Bernstein factory in Lima, O., was put into operation on September 13 and the manufacturing and assembling of motor trucks was begun.

Brockway Company Erects Plant—The Brockway Motor Truck Company, Cortland, N. Y., which was recently incorporated, will erect and equip a plant for the manufacture of motor vehicles.

Ford Factory in Minneapolis—W. C. Anderson, of the Ford Motor Company, Detroit, Mich., has gone to Minneapolis, Minn., where quarters for a large assembling plant have been located temporarily while a great building is being erected. Work on this building will start immediately, and it will take 9 months to complete. The Ford Company plans to assemble 10,000 cars at this point for 1913.

Prest-O-Lite Buys Property—The Prest-O-Lite Company, Minneapolis, Minn., has bought 80 feet by 336 feet of property at Charles and Carlton streets, St. Paul, Minn., for $8,000, and will enlarge it.

Body Company Builds Addition—The Herbert Manufacturing Company, Detroit, Mich., manufacturers of automobile bodies, will erect a new factory building at 1123-1135 Vermont avenue, that city.

Grabler Company's Foundry Addition—The Grabler Manufacturing Company, Cleveland, O., manufacturers of automobile parts, awarded contracts for the erection of a foundry addition to cost $7,000.

Goodrich Plant Reduces—The B. F. Goodrich Rubber Company, Akron, O., has laid off 1,000 of its employees. The reason given by the company is that this is considered the dull season in all rubber manufacturing lines.

Western Canadian Automobile Factory—The first automobile factory in Western Canada will be located in Moose Jaw, Sask., The St. Louis, Mo., Car Company will employ one hundred men and turn out an all-Canadian car.

Croxton Plant Finished—The erection of the structural steel work for the Croxton Motor Car Company, Washington, Pa., was completed recently. The company aims to be in operation by October 15. It will use electric power.

Bohemian Expert Sees Big Plants—Guyla Von Fisher, a Bohemian electrical engineer, stopped in Detroit, Mich., recently for inspection of the Detroit factories under escort of E. E. Moskovics, sales manager of the Remy Electric Company, Anderson, Ind.

Lamp Makers Plan Addition—The Corcoran Brothers Company, Cincinnati, O., automobile lamp manufacturers, recently gave orders to prepare plans for a three-story fireproof addition, to be erected north of the main plant. It will be 35 feet by 145 feet, and of brick and steel construction.

Ford's Body-Building Scheme—Plans to construct bodies at the various assembling plants of the Ford Motor Company, Detroit, Mich., throughout the United States will cut down the number of freight cars used in shipping the parts to these plants for assembly. Body building and painting departments are to be added to all plants.

Selden Truck Company Formed—The Selden Truck Sales Company of Rochester, N. Y., has just been incorporated with a capital of $50,000, to handle the entire truck product of the Selden Motor Vehicle Company, of that city. The object of this selling organization is to sell motor trucks direct from the factory to the user upon terms of easy payments.

Long Manufacturing Company's Addition—Another building is to be constructed as an addition to the plant of the Long Manufacturing Company, Detroit, Mich., manufacturers of radiators. The size of the new structure has not been determined upon, but it is designed by this addition to secure sufficient space to enable the company to keep pace with a rapidly increasing business.

Hupp's Large Factory Space—During the fiscal year the Hupp Motor Car Company, Detroit, Mich., has added two large units to its factory space. Several other buildings are now in course of construction. Last spring the new plant included four buildings, two stories in height, covering a factory floor space of 5 acres, and with the recent additions the space will be about doubled.

Landman-Griffith's New Building—Work on a new building to be occupied by the Landman-Griffith Motor Company, Toledo, O., will be started immediately and the place will be ready for occupancy December 1. It will cost about $25,000. There will be a 40-foot frontage. Plans for the building are unique, practically all of the two street sides to be made of glass, giving a complete exposure for the large salesroom.

Tiffin Company in Truck Field—The Tiffin Wagon Works at Tiffin, O., is preparing to enter the motor truck field and expect to place a line of these vehicles on the market next spring. Agencies are already being established and arrangements for placing the new machines on the market perfected. Superintendent Shelly stated that extensive preparations are under way for the manufacture of the trucks at the present factory.

Hupp Declares 50 Per Cent. Dividend—Papers have just been filed with the secretary of state, Michigan, increasing the capital stock of the Hupp Motor Car Company, Detroit, Mich., from $500,000 to $750,000, the increase of $250,000 being accomplished by the transfer of that amount from the company's surplus to capital account. The increase of stock forms a 50 per cent. stock dividend, also voted at the stockholders' meeting.

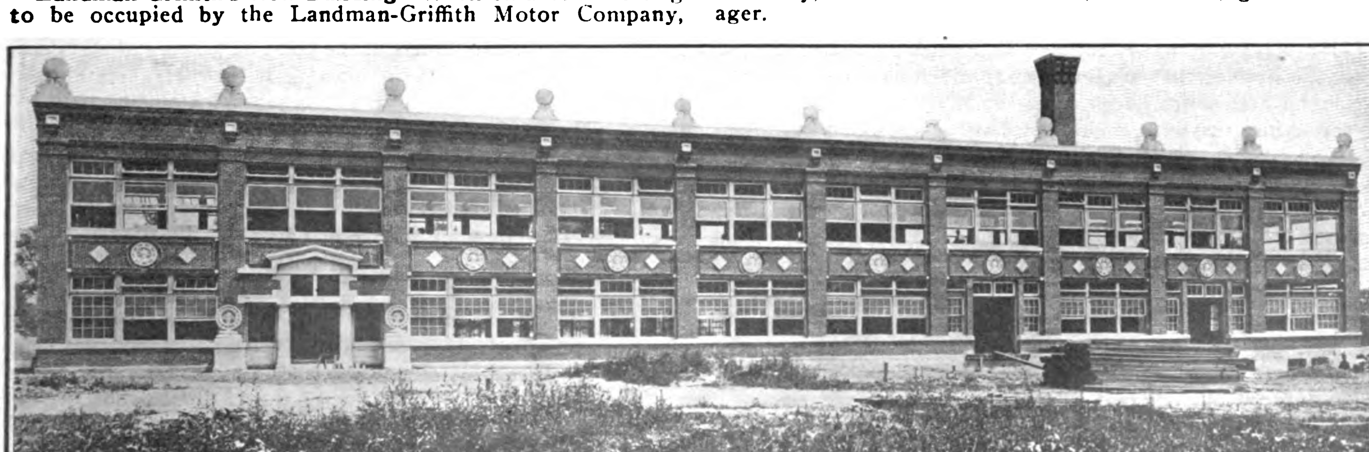
Mitchell Sells to Staver Company—To be better able to accommodate its growing motor car business, the Mitchell-Lewis Motor Company, of Racine, Wis., has sold its entire delivery, spring and mountain wagon business to the Staver Carriage Company, of Chicago, Ill. The department formerly devoted to the production of wagons of this class will be used for additions to the body, trim and paint shops of the automobile works.

Amplex to Enlarge Factory.—If plans now being formed by W. J. Mead, president of the Amplex Motor Car Company, of Mishawaka, Ind., which is the reorganized Simplex Motor Car Company, are carried out the plant will be enlarged to double its present size and all parts of the car will then be made at the Mishawaka factory, including the aluminum bodies. The company will in a short time put on a larger force of workmen.

First Suburban Car Tested—Testing of the first finished car of the Suburban Motor Company, Suburban Village, Mich., has begun. It has just been sent out on a hard trip through Huron county and is to be gone 2 weeks. The new factory of the Suburban Company is being pushed along rapidly. The company is preparing for active building operaand partially completed cars to determine the first design to be developed in the construction.

Premier Plans Plant Additions—The Premier Motor Manufacturing Company, Indianapolis, Ind., is about to let contracts for two large additions to its plant. These will be two-story brick structures, one 40 feet by 148 feet and the other 40 feet by 140 feet. The recent addition of a line of small sixes and the addition some time ago of a commercial car line, together with the increase in other lines, has made it imperative that the company enlarge its plant immediately, or in the near future.

Sterling's Six-Cylinder Engines—Six-cylinder engines for the Sterling Motor Company, which was recently incorporated by W. C. Durant and associates, will be manufactured at the Detroit, Mich., plant of the Chevrolet Motor Company until such time as the Flint factory of the Sterling Company has been completed. W. C. Durant has been elected president of the Sterling Company; Curtis R. Hathaway, of Detroit, is secretary, and William H. Little, of Detroit, general manager.



New factory and office building of the Hess-Bright Manufacturing Company, Philadelphia, Pa., makers of Hess-Bright bearings

Foreign Constructions Designs and Practices

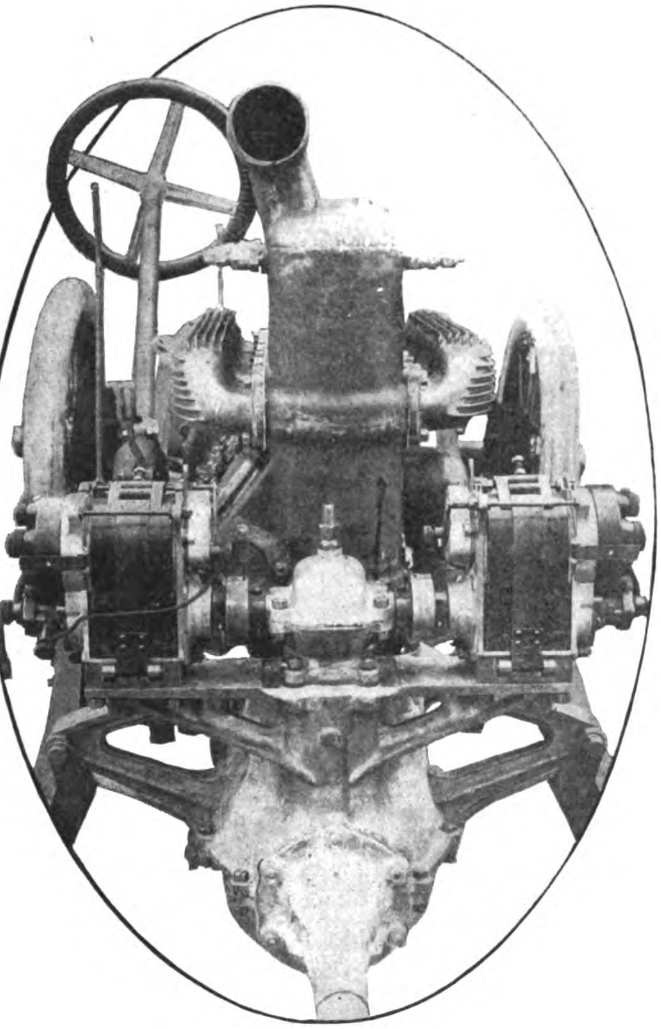


Fig. 1—End view of the Koecklin two-cycle motor

Koecklin Motor Distinct in That It Uses Sleeve Valves Although Operating On the Two-Stroke Cycle

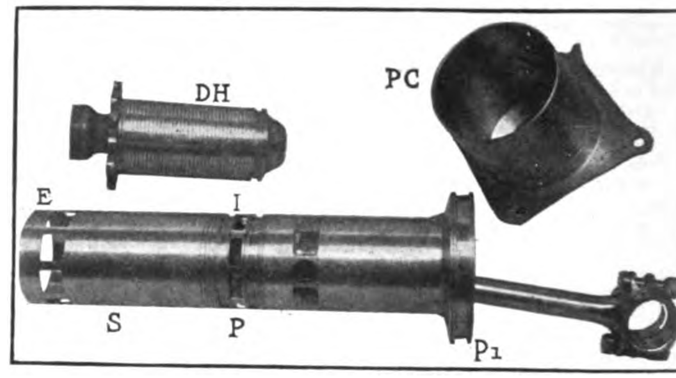


Fig. 2—Koecklin piston with the long integral sleeve carrying the two sets of parts; above is the cylinder head, DH.

THE AUTOMOBILE, through its French correspondent, W. F. Bradley, has obtained, and is able to reproduce this week the first series of photographic illustrations of the positive Koecklin two-cycle motor described in the issue of August 1. Contrary to any two-cycle practice up to the present, the Koecklin uses a sleeve valve to control the admission of gases and also employs a rotary distributer valve between the carbureter and the cylinders. Fig. 1 shows the end view of the motor with its ribbed intake and exhaust manifolds on opposite sides and with its front transverse shaft driving a Bosch magneto at each end. The two flexible motor supports at the forward end are shown as well as the unique form of integral brackets for carrying the magnetos. The position of the rotary distributer on the side of the steering column, or the right side of the car, can be noted.

As described in the August 1 article, the piston has formed integrally with it a long upward continuation sleeve carrying two series of ports, Fig. 2, the sleeve being indicated at S, the intake ports I and the exhaust ports E. The position of the combined piston-sleeve is further shown in Fig. 4 where it is coupled through the connecting-rod to the ball-bearing crankshaft.

It will be noticed that the lower part has a greater diameter than the upper part. This is the part that works in the pump chamber P C, draws in the fresh charge, compresses it and delivers it under pressure to an adjoining cylinder. D H is the removable cylinder head which is shown in a partially removed condition in Fig. 3. The tubular sleeve when at the upper end of its stroke completely surrounds the lower part of the cylinder head around which it works and is cooled owing to the water circulation through the cylinder head.

When the piston is on its lower path of travel, the sleeve is cooled all around its circumference except at the point where the distributer valve is located. The spark-plug, which is placed in the depressed center of the cylinder head, is also amply cooled, thereby recalling one of the advantageous points of design used in the Knight motor. There are also three compression rings used to insure gas-tightness at the point of passage of the sleeve around the lower end of the head. Furthermore, there are five compression rings used to provide a gas-tight joint between the piston-sleeve unit and the cylinder wall.

The crankshaft, C S in Fig. 3, is carried on 5 S. K. F. ball bearings, there being a bearing between the throws, one at the front and one at each side of the distributer pinion at the rear of the shaft. For the purposes of lubrication the shaft is bored throughout, the oil being drawn from the base chamber, through the hollow shaft to the connecting rod ends, and up the tubular connecting rods to the wrist pins. In addition to this, there are, as already mentioned, a couple of oil deliveries to opposite sides of the head of the sleeve and six leads to the rotary distributer. On the forward end of the crankshaft is a bevel pinion driving a transverse shaft with a Bosch high tension magneto at each end. Intake and exhaust taking place entirely around the cylinder, there are a pair of exhaust manifolds, to the left and right of the motor, the left-hand side one passing behind the rear cylinder and connected up to the right-hand one. The intake manifold is cast with the cylinders, the carbureter, a Vapor, being bolted up direct without the use of any piping.

So far as chassis features are concerned the car is on standard lines. The clutch is of the cone type; the gear set provides four speeds and reverse with the lever mounted directly on the box, and being operated by the left hand. The car is shaft driven, with a universal at each end, has a full floating type of live axle, and no differential. The frame, which has its greatest depth opposite the flywheel, is inswept at the front axle and outswept again at the extreme front. It is sharply upswept over the rear axle. The chassis has neither distance nor torsion rods.

Air Suction Aids Root's Muffler

A minimum loss of power in the muffler is said to characterize the design recently evolved by J. D. Roots & Company, 231 Strand, London, W. C. The new and principal feature of this design is the application of the external atmospheric air as the medium which helps to exhaust the dead gases of the motor and to silence them at the same time, this being attained by the use of an apparatus embodying the same traits which give its character to the ejector type of apparatus. The outlets of the muffler, there being a considerable number of them, are so arranged and directed that when they are moved through the atmosphere by the travel of the car, the air represents an all-surrounding jet the suction of which exhausts the interior of the muffler, very much in the manner of a water-jet condenser such as are used in steam engine practice.

While the Roots vacuum muffler, as it is called, is made in several types, the same fundamental points of design are incorporated in all. In every case the muffler consists of a central pipe into which the exhaust coming from the motor passes. This pipe is tapped with several series of holes all along its length and is surrounded with a series of gills which overlap each other and thereby provide constricted passages from the interior of the muffler to the air. The effect of this design is obvious: the waste gases are silenced by being passed through the small holes of the muffler pipe and passages formed by the gills, while the back pressure thereby encountered is compensated for by the suction of the surrounding air jet.—*The Autocar*, August 10.

Mafam Has Automatic Advance

Refinement of detail which tends toward increased efficiency and reliability gives the new German-made Mafam magneto a very favorable appearance. There are a number of original features in this apparatus, foremost among which stands the automatic advance and retarding mechanism operating on the principle of a centrifugal governor. The latter consists of two chains set at an angle of 180 degrees to one another and inclosed in a rotating drum. One end of each spring is attached to the spindle of the magneto armature and the other to the drum; and to each link of the chains is secured a short steel spring which bears against the drum and the pressure of which keeps

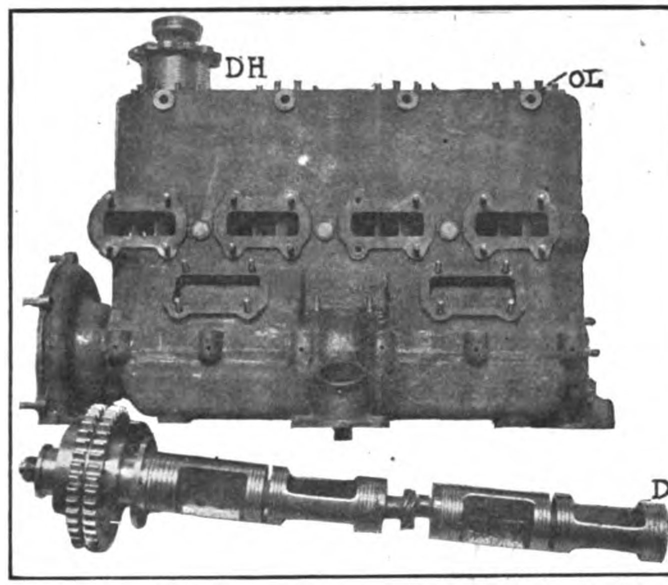
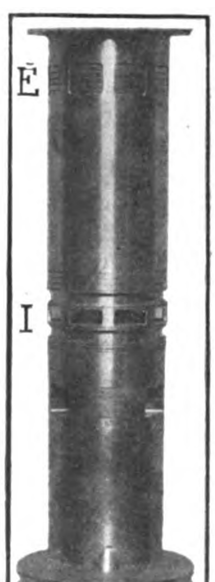


Fig. 3—Four-cylinder block casting on Koecklin motor and the rotary sleeve

the magneto in a somewhat retarded position. As the magneto speeds up, the tendency of the chains is to fly away from the spindle, but this tendency is counteracted by the increasing spring pressure, being thus kept in proper bounds.

Another nicety of construction which, according to the claims of the manufacturer, increases the efficiency of the motor is the method of attaching the pole-pieces to the magnets. The latter are mounted on a base plate, being fixed thereto by a pair of cruciform clamps each having three right-angle grips taking hold of the lower surface of the base-plate and of the end surfaces of the permanent magnets. Only one screw on each side of the magneto is required to fasten the magnets to the base. The pole-pieces are kept in contact with the magnets, however, without the use of screws, obtaining this end by shaping the pole-pieces and their base out of one piece of steel and bracing their top ends by a cross-plate. This construction permits of very high accuracy in grinding the bore of the pole-pieces. This magneto is made by the Mafam Motor Apparate, Frankfurt-on-the-Main.—*The Autocar*, August 24.

Germany has produced another pneumatic speedometer, manufactured by Peerboom & Schuermann, Duesseldorf, Rheinland. It consists of a light metal drum rotated on a flexible shaft and on whose inner end there are a number of strips of metal arranged radially. On these strips fan blades are mounted and when the flexible shaft is rotated the body of air in the drum is rotated also and moves the fan with it.—*Auto Motor Journal* Sept. 21.



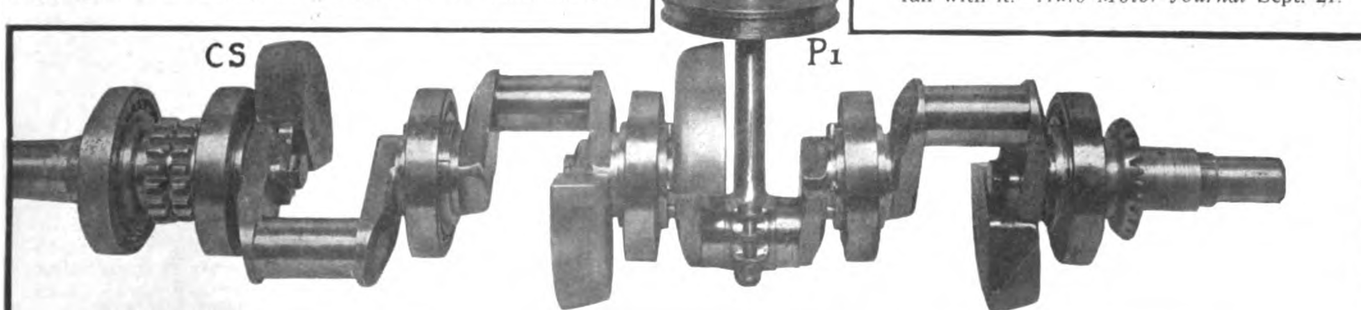


Fig. 4—Six-bearing crankshaft used on the Koecklin two-cycle motor. Note counter-weights on cranks for balancing

Ansonia Positive Lock Windshield; Rossman Casing Repair Machine; Standard Company's Q. D. and Demountable Rims; Elevating the Ford Timer; Latest Trade Literature

WHAT is claimed to be the last word in windshields is the Positive Lock type manufactured by the Ansonia Manufacturing Company, Ansonia, Conn. This company manufactures one- and two-pane shields, in which every pane may be adjusted to a variety of positions and is positively held in place after the position has been selected. This great adaptability is obtained by the use of four ball-lock joints, one pair of which is used in connecting the two panes in combination with two short vertical supports and the other pair to provide the fulcrum around which the upper pane may be turned and, if necessary, rotated.

The units of which the two-pane shields are made are the brass frame and the two plate-glass panes. The frame is composed of two rectangles embracing the panes and a pair of long stay rods by which the shield is fastened to the floorboard. The hinges or joints above referred to which constitute the principal parts of the shield are shown in detail in the sectional view, Fig 4. As this illustration shows, each joint consists principally of two cup-shaped members, C, C1 which contain steel disks S, S1 of which S is formed with semi-spherical depressions, into which suitable projections of S1 fit. The part C is fastened to a clamp C2 bearing against the tube which is part of the shield pane frame. C and C1 are provided with central holes through which the bolt B passes, the latter screwing into a thread tapped in the tube T. The end of the bolt carries a head H, the inner side of which is shaped with a cylindrical projection holding the spring S2 in alignment with the bolt B it encircles. The part C1 is fastened to the short vertical support V and it will be seen that, if the pane held in the frame of which tube T is a part is turned, the depressions and projections of C and C1 are alternately brought into and out of engagement, providing a series of positions which differ from one another by angles of 45 degrees. The head H is held in place on the bolt by a nut N locked by a cotter pin, whereby the outward movement of the head which the spring pressure tends to bring about is checked. A slight internal movement of the head on the bolt is allowed for by leaving one turn or so open toward the tube. By this expedient the head H may be screwed farther in on the bolt, thereby compressing the spring and positively locking the disks S and S1, as well as the cups C and C1 in their relative position. The spring pressure makes the engagement of the disks positive as it always causes the projections and depressions to grip each other. It is therefore necessary in order to change the position of the pane held by the tube T to first screw head H as far outward as possible, then bring the pane to the desired position and fasten it therein by closing the head upon the bolt. The tightness of the engagement of the disks is determined by the spring pressure which is adjustable.

Practically the same joint is used to attach the vertical support V to the upper corner of the lower pane frame. This joint permits the change of the angle of the support V to the upright side member of the lower pane's frame and for this purpose is made with two pieces of tubing each threaded for two bolts. Figs. 4 to 7 show the attachment of the joint to this side member and to the support V. The latter is threaded with two holes for the bolts passed through a piece of tubing integral with the joint, the side member of the frame is threaded with four holes above each other, but at varying distances. If the uppermost (first) and the third hole are used in securing the lower tubing attached to the joint the lower windshield pane is held in a vertical position, as the pane and the length of the stay rods determine two sides of a triangle, the third side being the distance from the lower edge of the lower pane to the line connecting the footboard ends of the stay rods. If the bolts are passed through the second and fourth holes of the side member and the length of the stay rods—which is adjustable by a joint connecting its two telescoping parts—is decreased, the lower pane may be inclined toward the driver.

The shield comes in widths of 38, 41 and 44 inches, the upper pane being 12 inches high and the lower one 12 or 13 inches. The standard finish is polished brass, but the company also furnishes nickel, black or other popular kinds of finish.

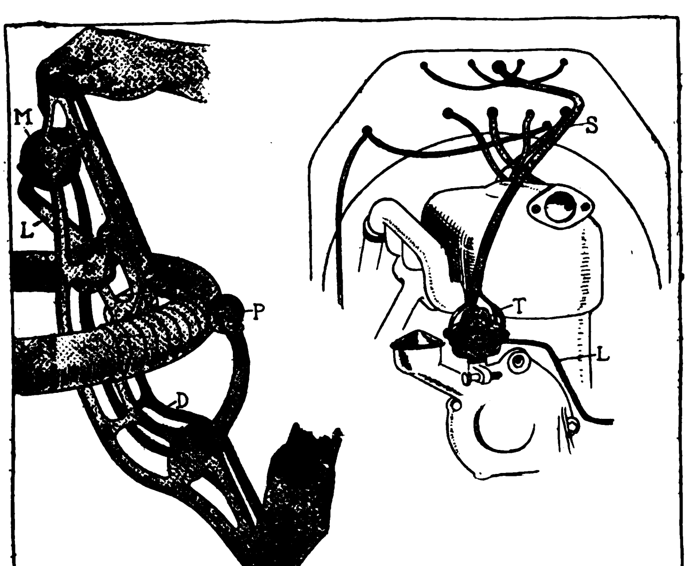


Fig. 1—Rossman tire-wrapping machine. Fig. 2—Device for elevating the timer of Ford automobiles

Rossman Tire Bandage Wrapper

Wrapping a tire casing is such a frequent and at the same time not too easy operation, that Roy G. Rossman, 707 East Pike street, Seattle, Wash., considered it a worthy end to design a machine for the application of bandage to a casing undergoing repairs and has applied for a patent of the same. The device, Fig. 1, consists of a frame which is 30 inches long and weighs about 16 pounds, being so shaped as to provide at once a mechanism for storing the wrapping material, wrapping it around the tire and tightening it thereon. The material is carried on a spool as at M and is conducted over two rollers so as to be kept straight. Tight winding of the tire is obtained by the use of the roller R against which one side of the tire bears, the other being pressed by the pulley P. A lever L whose end is shaped with a plate holds the material taut on the spool, preventing any slack.

Manifold Line of Stanweld Rims

The Standard Welding Company, Cleveland, O., has brought out a line of rims, both of the quick-detachable and demountable types. While the demountable types are specially rich in improvements over past rim practice, the Q. D. designs are by no means poor in new ideas. The following notes referring to the new products give the most important points characterizing the rims of the Standard Company. There are three types of Q. D.'s and four types of demountables, known by the name Stanweld. Types 50, 51 and 52 are of the Q. D. design, the first being a universal type adapted for straight side of clincher tires. It has two side rings, one of which is continuous and the other split, both being removable. Type 51 is designed for straight-side tires exclusively, while type 52 is a clincher rim. If, however, the detachable side ring on the last type is reversed and a rim filler is used, it may be adapted for straight-side tires. The most original detail of the construction of these rims is the detaching mechanism, Fig. 3, shown in the two lower sketches. It consists of a latch attached to the continuous ring and adapted to engage a projection on the lower side of the split ring, which is inserted in the continuous ring through a groove in the latter. If this part is engaged by the latch a projection on the free end of the latter is caught in a groove on the inner side of the continuous ring. When this is the case the split ends of the ring contact with one another, but the projection of this ring may be released and the engagement broken by prying the latch off the continuous rim, using a screwdriver for disengaging the latch projection from the hole containing it when the rim is intact for operation.

The demountable types use the same simple and efficient detaching feature. Four types of parts, the felloe band, rim base, adjusting ring and clamping members characterize the demountable types. The felloe band F, held in place by the ends of the clamping bolts B, supports the rim base B1, which is held under tension by the pressure exerted by the clamping bolts on the adjusting ring A. E is the continuous ring supporting the tire on one side, while the detachable ring D supports the other side. The adjusting ring is split transversely and fits the flange on the inside of the rim base so that the tendency, due to the weight of the car, is to force the rim toward the retaining flange which resists it on the strength of its continuous bearing against the rear of the rim base. The bolts which positively hold the adjusting ring in position carry the clamps C bearing against it. The clamp which bears upon the adjusting ring and the washer has a universal movement on the clamp nut.

Ford Timer Elevator Gear

Ford owners will be interested in the new device, Fig. 2, which serves to elevate the timer on Ford cars, thereby bringing it out of the range of water, if the cars are run through streams, etc. It is also put in a place by itself where the chance for short-circuiting is reduced. Fig. 2 shows the timer T in position close to the filler hole of the crankcase. It is driven from the timing gear by a hard-steel spiral gear with 1-2-inch face and 1 5-8 inches diameter. Attention is called to the new position of the cable suspension S, which takes this part out of the range of the fan-belt adjustment screw and makes both more accessible.

New Trade Literature

The Duryea System of Automobile Construction is the title of a 29-page pamphlet issued by the Duryea Motor Company under the authorship of Charles E. Duryea. The advantages of the Duryea car are dwelt upon at length by Mr. Duryea, who is one of the pioneers of the industry. Of special interest are his comparisons of the two and four-cycle type of motor, air cooled vs. water cooling, the distribution of weight and the control system.

The Halladay News for September, published by the Streator Motor Car Company, has arrived. It is a lively little pamphlet of eight pages containing the latest news of the Halladay selling organization and factory. In it we learn of the addition of the electric self-starter on the Halladay cars after the 15th of September, that the Streator Motor Car Company has enlarged its plant by adding that of the Streator Metal Stamping Company which adjoined it and the intention of the company to establish at least two more service stations.

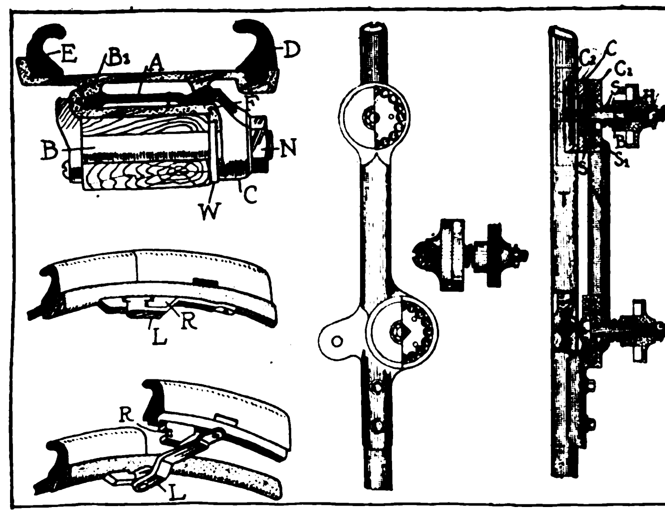


Fig. 3—Standard Q. D. and Stanweld demountable rims. Fig. 4—Section of Ansonia windshield hinge

How to Put Truffault-Hartford Shock-Absorbers on Your Car, an eight-page brochure issued by the Hartford Suspension Company, tells the user of these absorbers how to keep their efficiency at par by giving them the proper care and adjustment. This pamphlet is clearly written and well illustrated and should be of value to the automobilist using the Truffault-Hartford shock-absorber.

The Bosch News for September contains a short article on salesmanship and the fallacy of the knocking policy. It is largely a motor boat number devoted to the Harmsworth trophy races in which England took the cup and to the transatlantic voyage of the little motorboat Detroit. A description of the newer types of magneto is also given in this organ of the Bosch Magneto Company.

September is the birthday month of the B. F. Goodrich Company and therefore this month's issue of *The Goodrich* is called the birthday number. It is quite a comprehensive affair of 31 pages and is exceedingly well gotten up, containing both news and a mass of valuable data of interest to the car owner. The humorous side of the motoring situation has not been overlooked and a very interesting number is the result.

Something new in the way of instruction books is that issued by the Overland Company, which has gone a step further than usual in the preparation of the booklet, which is often seized as the drowning man seizes the proverbial straw by the perplexed motorist. Too often in the past the instruction book has proved a straw indeed containing a number of bootless generalities which, as the automobilist declared, "got him nowhere." The owner's record and identification car contained therein is also of special interest.

One of the cleverest trade-literature stunts that has been laid upon our desk is a small pamphlet in the shape of a radiator, being the menu of the "Car with a Conscience" dinner, recently given by the Oakland Motor Car Company at Hotel Ponchartrain, Detroit, Mich.

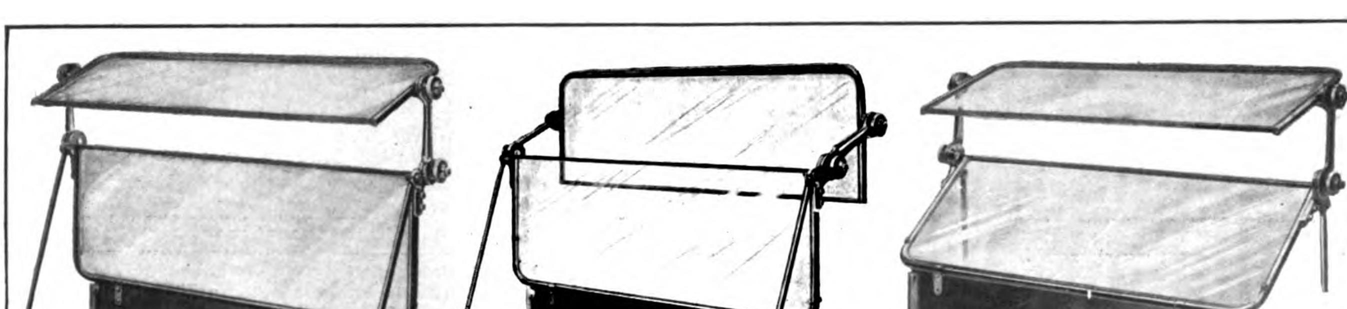


Fig. 5—Ansonia windshield with lower pane in vertical and upper in clear-vision position. Fig. 6—Upper pane in car-ventilating position. Fig. 7—Zig-zag clear-vision position

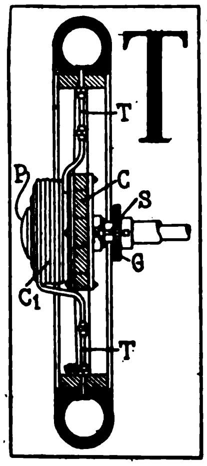


Fig. 1—Craig tire cooler

TIRE Cooling Device—In which the rim is cooled by a water current circulated by a pump through a radiator coil.

In Fig. 1, the subject matter of this patent, a tire-cooling mechanism is shown. It consists in principle of a coiled radiator pipe surrounding a wheel hub and having passages which are in contact with the rim portion of a wheel. The Coil C1 is mounted upon the casing C which is arranged around the wheel hub in the manner of a false hub. In this casing a pump is located eccentrically, the shaft of which S is driven by gearing G. The water is circulated through the coil, to the rim and back, through a system of radial tubes T. A removable plate P closes the side of the casing and affords access to the interior of the same as well as the end of the axle.

No. 1,038,092—to Andrew B. Craig, Tarkio, Mo. Granted September 10, 1912; filed January 31, 1912.

Automobile Engine Carbureter—In which additional fuel jets are brought into action when the opening of the throttle is increased by the driver.

The principal feature of the carbureter described in this patent and illustrated in Fig. 2 is the construction and location of the auxiliary fuel jets K. Reference to the figure shows that all fuel, after passing through the float chamber F flows through the passage P controlled by the needle valve N which is operated like the needle valve of the ordinary carbureter. The fuel then flows past the needle, through the conduit Q and up to the main jet J where it is sprayed. The throttle T extends across the mixing chamber M, leaving open a small portion of the latter's cross-section for the minimum air supply. As the throttle is opened to a greater extent air is drawn through the lower space M1 of the mixing chamber and the jets K are brought into action, first the one nearest to the jet J, then the next, and so on. The level in the horizontal passage H and the vertical one V is determined by the fuel level in F, as the passage P1 has the effect of insuring atmospheric pressure within the passage V.

No. 1,038,040—to Arthur J. Weiss, West Orange, N. J., assignor to Maxi Company, New York City. Granted September 10, 1912; filed January 25, 1912.

Automobile Turntable—Which is rotated by small wheels bearing on a circular track and driven by friction wheels which bear upon the floor of the establishment wherein the turntable is installed.

This patent refers to a turntable, Fig. 3, which comprises a rotary table T, a track T1 and wheels W running upon the latter and journaled to the table. Friction wheels F, which are journaled on the table, operate the wheels W, means being provided for preventing one of the friction wheels from rotating in one direction. A wheel depression D in the table is designed to hold the driving wheel of an automobile in position.

No. 1,038,309—to Albert Dellamore, Los Angeles, Cal. Granted September 10, 1912; filed April 16, 1912.

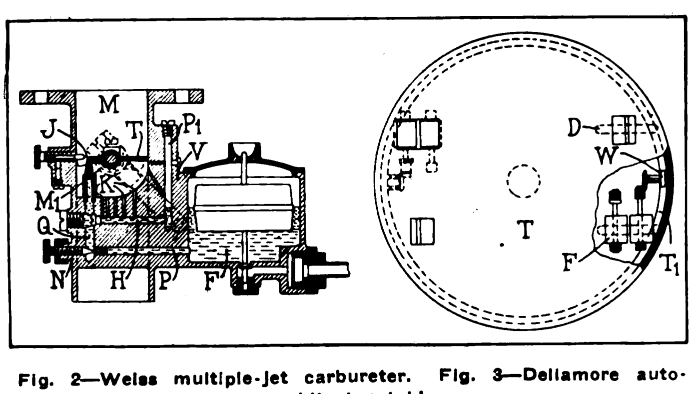


Fig. 2—Weiss multiple-jet carbureter. Fig. 3—Dellamore automobile turntable

Shock-Absorber—In which road shocks are taken up by a liquid in which a piston moves.

The subject matter of this patent, a shock-absorber, Fig. 6, consists of a cylinder C which is partly filled with a fluid in which a piston rod carrying a head is positioned and adapted to move. In the cylinder there is also a floating cage composed of a series of solid spindles, each of which passes through a passageway in the piston head and being so formed that when the piston moves through the cage the passageways in its head are constricted.

No. 1,037,052—to Frank Maxwell, New Rochelle, N. Y. Granted August 27, 1912; filed November 2, 1911.

Pipe Wrench—In which a spring holds the two jaws in positive engagement with the pipe.

This patent relates to a pipe wrench, Fig. 4, which consists of a fixed jaw F and its shank to which a handle H is hinged by a rule-joint connection. The shank has the form of a segment one side of which is faced with ratchet teeth, being engaged by a pawl P which is pressed against them by a spring S.

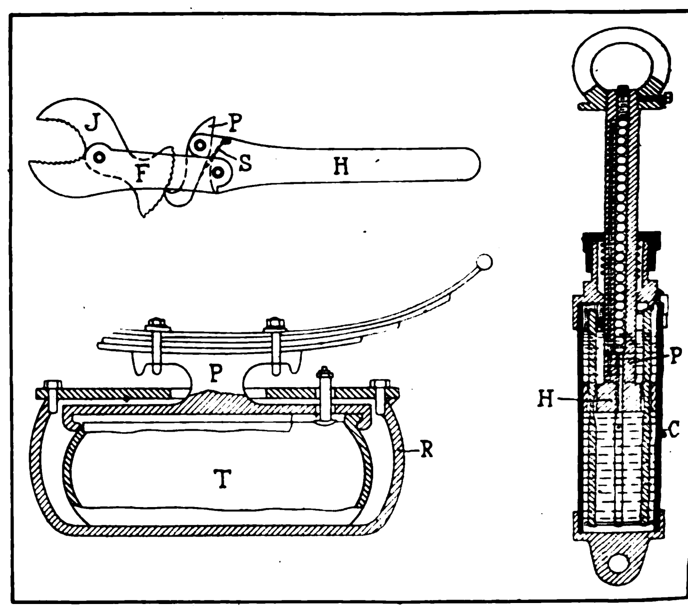


Fig. 4—Bessolo wrench. Fig. 5—Stovel suspension. Fig. 6—Maxwell shock-absorber

No. 1,037,109—to William Louis Bessolo, San Diego, Cal. Granted August 27, 1912; filed May 14, 1912.

Pneumatic Automobile Suspension—In which the springs supporting the body rest on inflatable tubes carried in a hollow axle.

The patent refers to a suspension method, Fig. 5, comcomprising an automobile axle in which a receptacle R is formed. The latter contains an inflatable tube T held in an outer casing which is provided with an opening through which the tube is inserted in the receptacle. A plunger P is mounted in the receptacle so that it reciprocates therein and fits into the opening of the receptacle. The spring which supports the body of the automobile is carried by the plunger.

No. 1,037,360—to Charles J. Stovel, San Francisco, Cal. Granted September 3, 1912; filed January 22, 1912.

FIAT Wins Grand Prize

Upper—Caleb Bragg swinging his winning Fiat around the Graveyard turn on the Wauwatosa course in the thirty-sixth lap of the Grand Prix race at Milwaukee last Saturday. Lower—The finish of the Grand Prix—Bragg slowing up at the line to tell Starter Wagner of De Palma's accident

THE SUMMARY

Position	Driver	Car	M.P.H.
1	Bragg	Fiat	69.3
2	Bergdoll	Benz	65.6
3	Anderson	Stutz	65.2
4	Oldfield	Fiat	64.8

PREVIOUS GRAND PRIZE RACES

Place	Year	Miles	M.P.H.
Savannah	1908	402	65.111
Savannah	1910	415.2	70.55
Savannah	1911	411.36	74.47

Bragg Covers 410-Mile Course at 69.3 Miles Per Hour—Benz Second—Stutz Third—De Palma Badly Hurt in Last Lap

MILWAUKEE, Oct. 6.—Fiat 41, driven by Caleb S. Bragg, won the 1912 Grand Prize race for the international trophy of the Automobile Club of America over the Wauwatosa course of 7.88 miles. The race was fifty-two laps of the course, or approximately 410 miles.

Benz 40, handled by Erwin Bergdoll, was a distant second, leading the Stutz entry across the line by a narrow margin. Oldfield's Fiat was a good fourth. The winning Fiat averaged 69.3 miles an hour.

The Fiat car driven by De Palma collided with the winner in the final spurt to the wire and was ditched when at least second place appeared certain for it.

It was a hair-raising race up to the time disaster met De Palma.

Cold type fails when it comes to describing the finish. The tables show that Bragg had 15 minutes 24 seconds over the second car, but they do not show how close Ralph De Palma, winner this year of the two big races at Elgin and the Vanderbilt Cup, came to snatching away from Bragg the international honors. Neither do they tell of how De Palma flirted with death and how lucky he was that his fate was not similar to that which robbed the motor world of Bruce-Brown. As a result of the daring attempt which he made to add to his laurel wreath, De Palma now is in the Trinity hospital in this city, suffering from abdominal injuries which will confine him to his bed for a week or more. On the final lap De Palma ran into Bragg from the rear, his Mercedes turned over, throwing out both driver and mechanician.

With De Palma eliminated in this sensational manner, Bergdoll in the Benz ran into second place after a hot finish with Anderson in the Stutz, whom he beat by 31 seconds for the position, while Barney Oldfield in a Fiat was fourth, 4 minutes

RACE OF 409 MILES AND 4616 FEET (FIFTY-TWO LAPS OF THE COURSE)

No.	CAR	DRIVER	Lap Miles	1 7.88	2 15.76	3 23.64	4 31.52	5 39.40	6 47.28	7 55.16	8 63.04	9 70.92
41	FIAT	Bragg	Elapsed Time	6:34	12:50	19:04	25:14	31:31	37:56	44:27	50:53	57:60
			Lap Time	6:34	6:16	7:04	6:10	6:17	6:25	6:31	6:26	7:07
40	BENZ	Bergdoll	Elapsed Time	6:38	13:08	19:33	25:53	32:16	38:40	49:38	57:18	64:06
			Lap Time	6:38	6:30	6:25	6:20	7:23	6:24	11:58	8:40	7:48
43	STUTZ	Anderson	Elapsed Time	7:14	14:11	21:10	28:05	35:03	42:09	49:01	55:59	62:54
			Lap Time	7:14	6:57	6:59	6:55	6:58	7:06	6:52	6:58	6:55
44	FIAT	Oldfield	Elapsed Time	8:14	15:02	21:49	28:46	36:04	45:06	52:08	58:50	65:31
			Lap Time	8:14	6:48	6:47	6:57	7:18	7:02	7:02	6:42	6:41
35	MERCEDES	De Palma	Elapsed Time	6:42	13:20	19:57	26:33	33:05	39:40	46:13	52:50	59:32
			Lap Time	6:42	6:38	6:37	6:36	6:32	6:35	6:33	6:47	6:42
39	MERCEDES	Clark	Elapsed Time	7:30	14:53	22:08	29:28	36:48	44:09	51:32	58:47	66:03
			Lap Time	7:30	7:23	7:05	7:20	7:20	7:21	7:23	7:15	7:16
42	BENZ	Horan & Burman	Elapsed Time	7:09	14:04	21:01	27:48	35:40	42:40	50:00	57:35	64:27
			Lap Time	7:09	6:55	6:57	6:47	7:52	7:00	7:20	7:35	7:52
33	FIAT	Tetzlaff	Elapsed Time	6:20	12:37	18:50	25:02	31:17	37:36	43:59	50:38	56:55
			Lap Time	6:20	6:17	6:13	6:12	6:15	6:19	6:23	6:09	6:17
32	LOZIER	Louis Fountain	Elapsed Time	7:25	14:32	21:36	28:35	35:35	42:37	49:33	56:28	63:49
			Lap Time	7:25	7:07	7:04	6:59	7:00	7:02	6:56	6:55	7:21
34	MERCER	Hughes	Elapsed Time	7:02	13:48	24:50	40:48	48:28	55:10	61:57	68:46	75:37
			Lap Time	7:02	6:46	11:02	15:58	7:40	6:42	6:47	6:49	6:51
36	MERCEDES	Wishart	Elapsed Time	6:40	13:02	19:28						
			Lap Time	6:40	6:20	6:26	Out—Broken shaft					
31	BENZ	Burman	Elapsed Time	6:58	13:50							
			Lap Time	6:58	6:42	Out—Broken piston						

No.	CAR	DRIVER	Lap Miles	28 221.64	29 228.52	30 236.40	31 244.28	32 252.16	33 260.04	34 267.92	35 275.80	36 283.68
41	FIAT	Bragg	Elapsed Time	187:21	194:00	200:34	207:04	213:40	220:17	227:02	233:32	240:02
			Lap Time	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30
40	BENZ	Bergdoll	Elapsed Time	200:26	208:29	215:12	221:57	228:38	235:13	241:58	248:40	255:20
			Lap Time	7:04	8:03	6:43	6:45	7:21	6:41	6:45	6:42	6:40
43	STUTZ	Anderson	Elapsed Time	201:40	208:56	216:04	223:11	230:19	237:23	244:28	251:35	258:41
			Lap Time	10:30	7:16	7:08	7:07	7:08	7:04	7:05	7:07	7:06
44	FIAT	Oldfield	Elapsed Time	203:42	210:52	219:29	226:44	233:33	243:39	250:37	257:36	264:34
			Lap Time	7:15	7:16	8:37	7:15	6:49	10:06	6:18	6:59	6:58
35	MERCEDES	De Palma	Elapsed Time	196:37	203:08	209:39	216:11	222:43	229:13	235:38	242:04	250:25
			Lap Time	6:45	6:31	7:31	6:32	6:32	6:30	6:25	6:36	8:21
39	MERCEDES	Clark	Elapsed Time	210:50	218:17	225:45	233:12	240:29	247:53	255:23	263:53	281:58
			Lap Time	7:19	7:27	7:28	7:27	7:17	7:24	9:30	8:30	8:05
42	BENZ	Horan & Burman	Elapsed Time	218:43	225:34	232:48	252:54	259:57	267:05	274:22	281:37	291:56
			Lap Time	6:48	6:53	7:12	20:06	7:03	7:08	7:13	7:15	10:19
33	FIAT	Tetzlaff	Elapsed Time	184:13	190:53	197:33						
			Lap Time	8:31	6:40	6:40	Out—Broken radius rod					
32	LOZIER	Louis Fountain	Elapsed Time									
			Lap Time	Out—Sprung steering knuckle								
34	MERCER	Hughes	Elapsed Time									
			Lap Time	Out—Broken gasoline line								
36	MERCEDES	Wishart	Elapsed Time									
			Lap Time	Out—Broken shaft								
31	BENZ	Burman	Elapsed Time									
			Lap Time	Out—Broken piston								

Oldfield's Fiat, which won fourth place, nearing grandstand

32 seconds back of Anderson. Clark in a Mercedes and Burman driving Horan's Benz were still running when the race was called off because of the crowd refusing to be held in check any longer. Twelve cars in all started in the race, but half of them were eliminated for one reason or another.

But it was the Bragg-De Palma struggle that stirred the crowd of 150,000 to a frenzy, and the accident at the eleventh hour undoubtedly robbed the motoring public of the greatest finish that ever had been put up in a grand prix race. Bragg always had been a factor in the race, never being worse than third and having led the field from the thirty-first lap when Tetzlaff went to the side lines for keeps. De Palma had been plugging along grimly, fifth and sixth at the start, then going up to third, then second and finally leading in the twenty-second, twenty-third and twenty-fourth laps, then dropping to third for four laps when Tetzlaff and Bragg were battling, and finally becoming runner-up to Bragg when Tetzlaff went out. It was a plucky battle that De Palma put up, for while Bragg had all the earmarks of a winner, the Italian never relinquished his efforts to catch him.

With four laps to go, De Palma was 4 minutes 19 seconds to the bad. He made a lap in 6:28 to Bragg's 7:21 and cut the margin to 3 minutes 26 seconds. The fiftieth lap was made in 6:36 by De Palma and 7:26 by Bragg and the gap was reduced to 2 minutes 36 seconds, when Starter Wagner waved his green flag for both of them. De Palma was chasing his rival with deadly intensity, and upon reciving a signal from his pit to "beat it" he stepped on the throttle and had the accelerator flat with the boards when he swung into the North Fond Du Lac road. He rushed up on the Fiat with great leaps and bounds and at station 11 he caught his rival. But it was necessary for him to do more than catch him—he had to pass him and beat him to the tape by the margin that Bragg had over him at the start, De Palma being 35 and Bragg 41.

Then came the thriller that spoiled the finish. There are conflicting stories as to just how this occurred. De Palma was trying to pass, and some say that just as he crept up to the rear wheel of the Fiat, Bragg swung over a trifle and the gray Mercedes ran into the rear of the red car. The Mercedes turned turtle and both De Palma and his mechanic, Tom Alley, were hurled to the roadside. The collision failed to disturb Bragg, who continued on his way, a certain winner now.

At the grandstand the 10,000 occupants of the seats were awaiting the finish and there was a dead silence when Bragg drove up slowly, came to a stop at the tape and whispered to Starter Wagner, telling him of the accident.

GRAND PRIX GOLD CUP RUN AT MILWAUKEE, WIS., ON SATURDAY, OCTOBER 5

12 94.56	13 102.44	14 110.32	15 118.20	16 126.08	17 133.96	18 141.84	19 149.72	20 157.60	21 165.48	22 173.36	23 181.24	24 189.12	25 197.00	26 204.88	27 212.76
76:32	83:06	89:41	96:24	102:56	109:42	116:15	122:44	129:24	140:39	141:22	153:57	160:38	161:28	114:00	180:41
6:31	6:34	6:41	6:37	6:32	6:46	6:33	6:29	6:30	11:15	6:43	6:35	6:41	6:10	6:32	6:41
83:58	90:39	99:42	106:17	112:55	119:34	126:16	132:59	139:37	146:21	153:01	159:41	166:36	173:26	182:43	193:22
6:38	7:41	9:03	7:35	6:38	6:39	6:42	6:43	6:38	6:44	6:40	6:40	7:15	6:50	8:37	10:39
83:49	90:44	97:45	104:54	111:56	118:53	126:54	133:04	140:08	147:13	154:27	161:50	169:04	176:22	183:33	191:10
6:57	6:55	7:01	7:09	7:02	6:57	8:01	6:10	7:04	7:05	12:37	7:23	7:14	7:18	7:11	7:37
85:32	92:16	99:01	105:53	112:39	119:38	126:25	133:18	140:21	147:23	154:21	167:28	174:42	181:47	188:56	196:27
6:39	6:44	6:45	6:52	6:46	6:59	6:37	6:57	7:03	7:02	o:58	17:07	7:14	7:05	7:09	7:31
79:30	86:12	92:46	99:18	105:48	112:19	118:52	125:20	131:49	138:23	144:55	151:22	157:55	167:20	177:48	189:52
6:40	6:42	6:34	6:32	6:30	6:31	6:33	6:26	6:29	6:74	6:32	6:27	6:33	8:35	10:28	12:04
87:43	95:01	102:20	109:42	117:18	124:41	132:06	139:31	146:55	154:21	161:54	169:32	177:11	188:23	195:55	203:30
7:16	7:18	7:19	7:22	7:36	7:33	8:68	7:25	7:24	7:26	7:33	7:38	7:39	11:12	7:32	7:36
85:27	92:20	108:59	119:38	127:34	134:45	145:26	154:54	162:07	169:25	176:49	183:53	191:04	198:16	205:04	211:55
6:56	6:53	6:39	10:49	7:56	11:11	10:41	9:28	7:13	7:18	7:24	7:04	7:11	7:12	6:58	6:51
77:33	83:48	89:55	96:06	102:17	111:20	117:54	124:10	130:41	138:38	145:00	151:39	158:07	164:39	171:12	177:42
6:25	6:15	6:07	6:11	6:11	9:03	6:34	6:16	6:31	7:07	6:22	6:39	6:28	6:32	6:33	6:30
84:39	91:35	98:37	105:34	112:35	119:36	126:34	133:34	146:32	206:28						
6:57	6:56	7:02	6:57	7:01	7:01	6:48	7:00	12:58	9:56	Out—Sprung steering knuckle					
95:46	102:30	109:18	122:17	129:21											
6:47	6:44	6:48	12:59	7:14	Out—Broken gasoline line										

39 307.40	40 315.29	41 323.17	42 331.04	43 338.93	44 346.82	45 354.7	46 362.58	47 370.47	48 378.35	49 381.23	50 394.11	51 401.99	52 409.88	Position	Miles per Hr.
265:07	272:01	279:02	286:05	293:11	300:42	307:53	315:16	322:33	329:54	337:17	344:38	352:04	359:27.44	1	69.3
6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:21	7:23	7:21	7:27	7:23		
280:11	283:09	294:14	301:25	308:37	316:06	326:36	333:32	340:39	347:37	354:31	361:14	368:00	374:58.38	2	65.6
6:49	6:58	7:05	7:11	7:12	7:29	10:20	7:06	7:07	6:58	6:54	6:43	6:46	6:58		
280:08	287:27	294:55	301:42	308:53	316:05	323:15	330:21	337:32	344:43	351:55	359:22	367:51	375:22.47	3	65.2
7:12	7:19	7:28	6:47	8:11	10:12	7:10	7:06	7:11	7:11	7:12	7:27	8:29	7:31		
291:24	298:16	304:55	311:45	318:39	325:39	332:18	338:54	345:24	351:58	358:52	365:45	372:49	379:54.69	4	64.8
7:11	6:52	6:39	6:50	6:54	7:00	6:39	6:36	16:30	6:34	6:54	6:53	7:04	7:05		
273:21	280:05	286:40	293:11	299:54	307:56	314:54	321:40	328:18	335:05	341:36	348:04	354:40			
10:09	6:34	6:35	6:31	6:43	8:02	6:58	6:46	6:38	6:47	6:31	6:28	14:38	Out—Accident		
307:01	314:30	322:03	329:33	337:03	344:35	352:02	359:25	367:17	375:01	382:45	391:04				
7:32	7:29	7:33	7:30	7:36	7:32	7:27	7:23	7:52	7:54	7:44	8:21	Running			
313:34	320:19	327:02	334:02	341:10	359:31	368:33	379:08	380:09							
8:25	6:54	6:43	7:00	7:08	8:21	9:03	10:35	9:01	Running at Finish						

De Palma was not the only formidable rival Bragg had to dispose of. Tetzlaff as usual was a factor as long as he was running, just as he was in the Vanderbilt. Had his car stood up it is more than likely he, instead of Bragg, would have been the winner of the race. From the start the native son was aggressive, leading for the first nine laps, then dropping to second for five rounds, leading for two, second for four, leading for one, second for three and then going into the lead, staying there for six laps, when he went out in the thirty-first because of a broken radius rod. At that time he was 3 minutes ahead of Bragg and up to that time he had averaged 71.5 miles per hour. Tetzlaff made the fastest lap of the race—6:07 in the fourteenth, an average of 77.2 miles per hour.

From start to finish none of the other nine contestants had a look-in for first place.

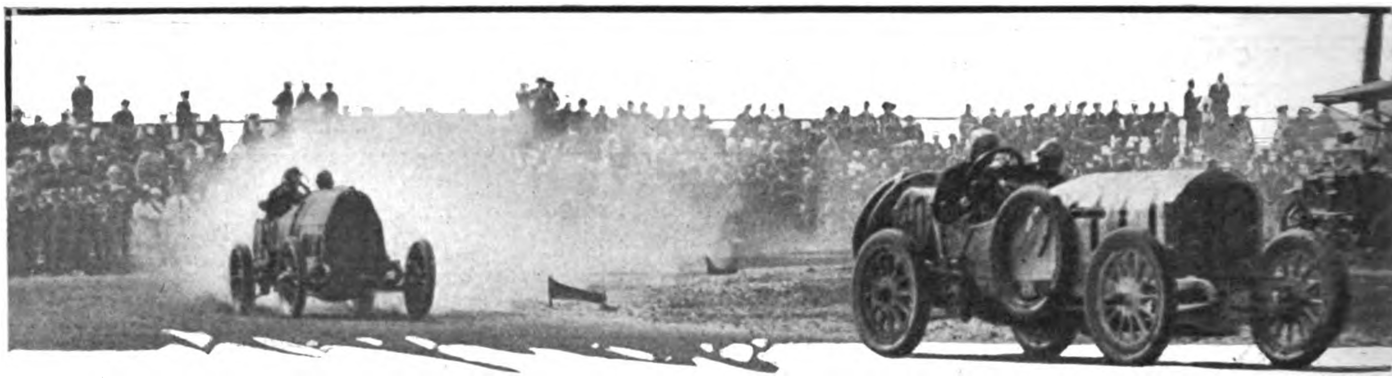
Bob Burman in the Benz went out in the third lap with a broken piston, but later on relieved Horan, his team mate, and was running at the end. Wishart in a Mercedes lasted into the fifth lap when a broken driving shaft retired him; Hughes in the Mercer quit in the seventeenth, giving a broken gasoline line as his excuse for docking his car; Fontaine, who took Nelson's seat in the Lozier, sprung a steering knuckle when he hit the straw pile on the city limits turn and he quit on the twenty-first lap; Tetzlaff went out in the thirty-first and De Palma on the fifty-second.

Standing out as a sterling performance was the work of the Stutz, driven by Gil Anderson, which was the only American car to finish. Mulford scratched his Knox because he could not get it into shape for such a gruelling grind, while both the Lozier, which was a private entry not backed by the factory, and the Mercer failed to finish. The Stutz ran consistently at all times, being in third place from the forty-fourth lap on and being beaten only 31 seconds by the big Benz driven by Bergdoll. At that it was the closest finish of the race. The Stutz averaged 65.5 miles per hour and had no mechanical trouble whatsoever, changing one tire and breaking a shock-absorber.

It rained Thursday and spoiled the small-car events, which were run, however, with only about 500 people looking on. Both the contests were made farcical by withdrawals and mishaps. In the Pabst trophy race for the 231-300 cars only two cars finished, Roberts' Mason and Hastings' Falcar, while in the Wisconsin cup Harry Endicott in a Mason was the winner with young Mason in a stripped Mason touring car second.

The Milwaukeeans now are figuring up how much it cost them to run the meet, but the outlook is much brighter than

Clark's Mercedes was still running when the race was called off



Bragg, Fiat, overhauling Bergdoll, Benz, on a sharp turn in the Grand Prix race on Saturday

anticipated. Because of the huge crowds of yesterday it is likely that Milwaukee will almost come out even, although it cost $70,000 to finance the meet, of which sum something like $28,000 was spent on the road. Undoubtedly Milwaukee would have been a big winner had it not been for its inability to collect from all those who witnessed the running of the grand prix. George Brown, one of the promoters, acknowledges now that a mistake was made in not giving property owners a percentage of the receipts as is done at Elgin. Not being financially interested, the farmers did not try to keep the crowds from getting in free. Indeed, it is related that at one of the farms the owner, armed with a shotgun, deliberately let the people onto his property at 25 cents per head and when the promoters tried to stop him he threatened to fire on them. Then again it seemed impossible to stop grafting.

Milwaukee is keen for next year's Vanderbilt and grand prix and has started negotiations to get the plums. The Badgers point out that before the next meet they will have an entirely concrete course and one that is much wider than at present. Two of the townships through which the circuit runs already have let contracts for concreting the road, while the association itself will pay for having the rest of the course fixed in a similar manner. This will require the dealers to rebuild about 4 miles of the course, but when it is done it is thought the circuit will be superior even to Santa Monica.

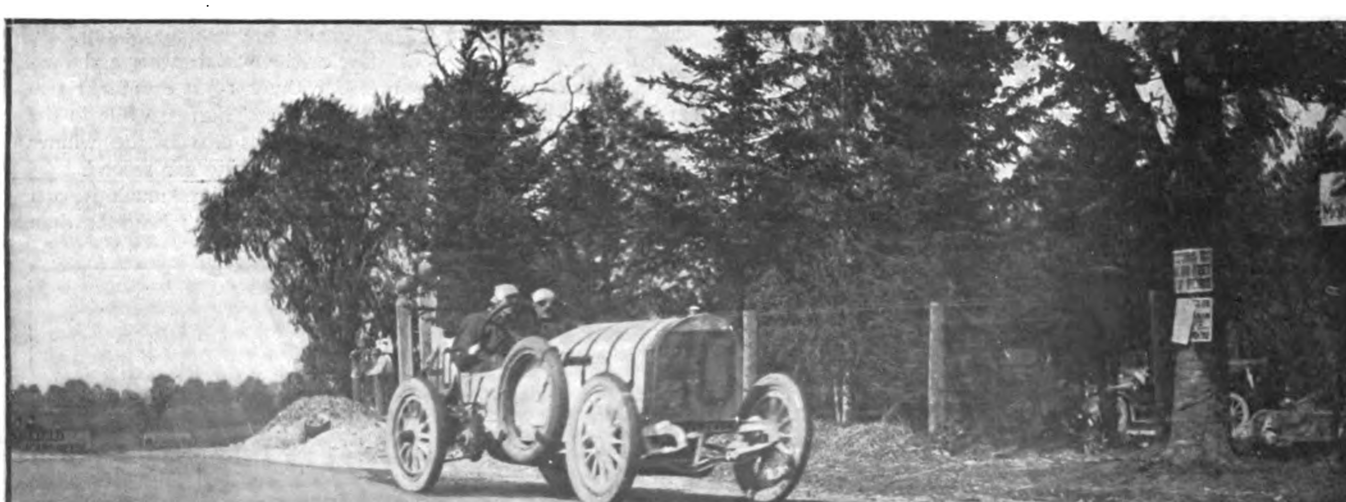
Reports from the Trinity hospital today are to the effect that De Palma passed a good night. The doctors so far have failed to find the fracture of the leg that first was reported and say that the chief injury is a punctured abdomen which is not at all terrifying. An operation was performed and it is expected that De Palma will be convalescent in a week or so. The mechanic, Alley, suffered a broken collar bone from which he will recover.

Very Little Tire Trouble

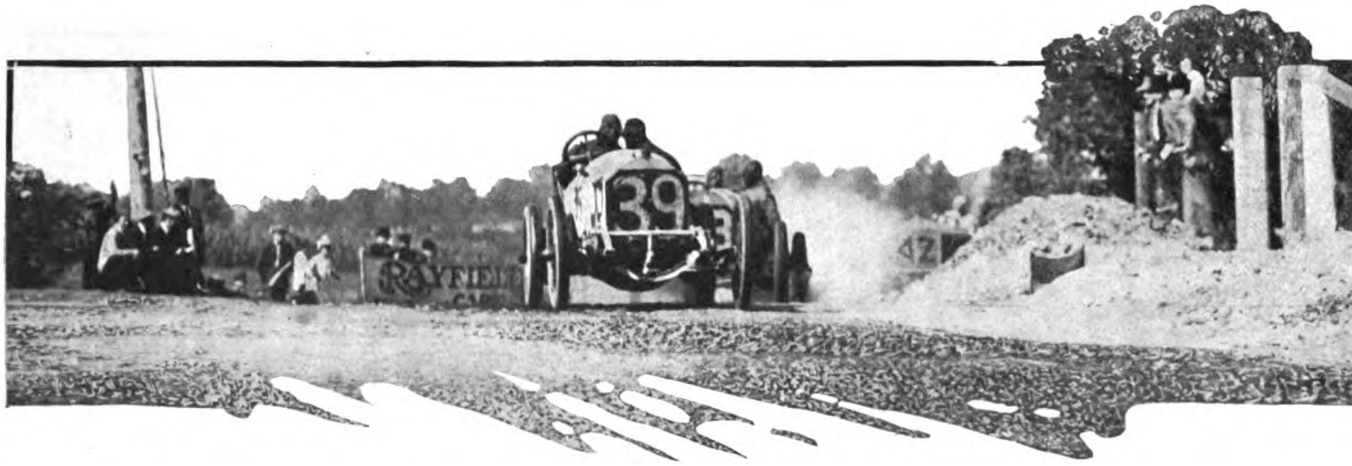
IN few of the big road races have there been so many different makes of tires represented as in the Milwaukee grand prix, and seldom has so long a contest been run with so little tire trouble. Michelin, Firestone, Miller, Goodyear and Fisk were represented in the grind. Bragg, De Palma, Fontaine, Wishart and Clark rode Michelins; Oldfield, Horan and Hughes wore Firestones; Tetzlaff had the Miller; Bergdoll the Fisk, and Anderson the Goodyear. Only twenty-four cases of tire trouble were reported.

"My count shows that Clark in the Mercedes went through without a change," says R. B. Tracey, manager of the Chicago Michelin branch. Wishart did not have any trouble, either, nor did Burman, but neither went very far. Bragg changed three shoes, De Palma two, Anderson one, Bergdoll eight, Fontaine one, Hughes one, Horan two and Oldfield three.

"Bragg used steel-shod tires all around, while De Palma had them only on the rear. The latter used the buffed tires in the Vanderbilt such as we made up for the 500-mile race at Indianapolis, and he had nine cases of trouble. For the grand prix I got him to use steel-shod tires on the rear and advocated them all around, but he wouldn't put them on in front. One of his changes was made on the road and the other, a front, at the pits. In the latter change he used only 28 seconds in switching. The tire Bragg changed in the pit was changed only as a precaution, for he really did not need a new casing. He was taking on gasoline and oil and improved the opportunity to also change the tire. The other change was made on the road. Passing the stand, the steel-studded strip on his left rear came off and he stopped in the back stretch to switch."



Erwin Bergdoll, who took second place, in his big Benz, rounding the Graveyard turn on the forty-sixth lap



Tetzlaff's Fiat crowding Clark's Mercedes in the Grand Prix race on the graveyard turn of the Wauwatosa course

Work Done at the Pits

ANNUAL grand prix races are unique from the standpoint of the observer of work at the pits, as they are international, while the others are national events. They are run therefore under the rules of the Automobile Club of America instead of the A. A. A., which governs the national contests. The A. C. A. rules do not permit the pit men to render any assistance to the contestants. That is, the driver and his mechanic must do all the work that becomes necessary about the car during the race. They must make all tire changes and fill oil, water and fuel tanks as well as make the actual mechanical adjustments. In the national races, pit attendants are permitted to change tires and replenish the supplies.

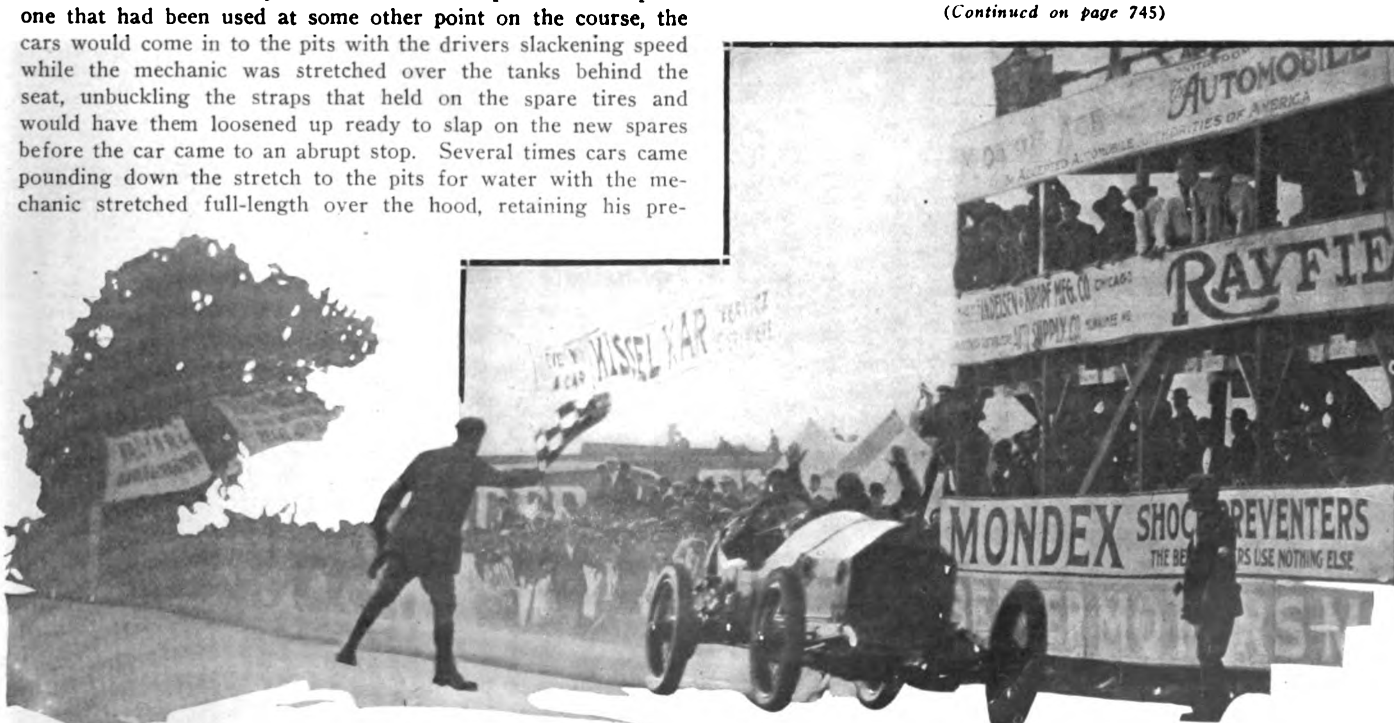
The fact that the drivers and mechanics were forced to do all the work about the car resulted in the stops at the pits requiring more time than is usual and probably cut down the average speed of the race quite materially. On the whole, however, the cars got away from the pits in shorter time than was to be expected under the circumstances, for the contestants worked like demons to cut down the time of the enforced stops. The grandstands had a chance to see the teamwork of expert racing drivers and mechanics.

When it was necessary to take on another spare tire to replace one that had been used at some other point on the course, the cars would come in to the pits with the drivers slackening speed while the mechanic was stretched over the tanks behind the seat, unbuckling the straps that held on the spare tires and would have them loosened up ready to slap on the new spares before the car came to an abrupt stop. Several times cars came pounding down the stretch to the pits for water with the mechanic stretched full-length over the hood, retaining his precarious position with one hand on the hood strap while with the other he removed the radiator cap in order to save as many precious seconds as possible.

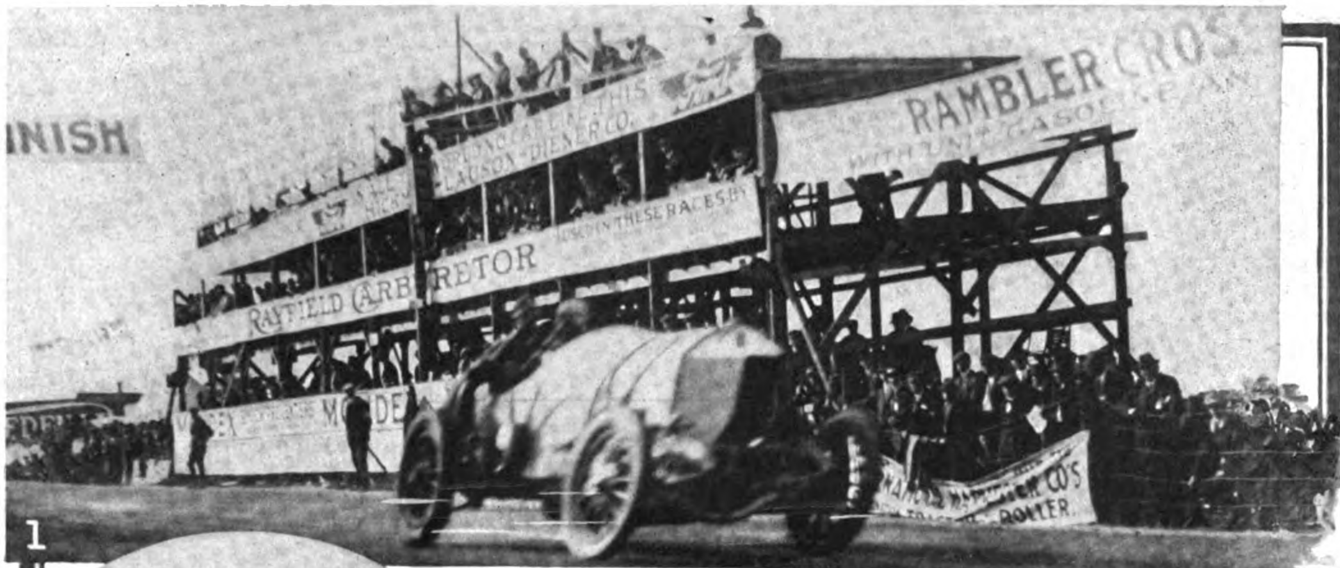
The necessity for quick work at the pits resulted in several interesting arrangements for filling the fuel tanks. Bragg had the gasoline stored at his pit under pressure with a hose from the storage tank which was slipped into the fuel tank of his Fiat. Some of the others had small gasoline cans which could be up-ended into the tank without requiring a funnel. Two of the cars, the Stutz and Hughes' Mercer, were equipped with wire wheels in the hope of cutting down the number of tire changes and the time required to make them. Nor was any time lost in stopping and getting under way again, for the mechanic usually had leaped to the track before the car had come to a stop and nearly always had to make a flying leap to regain his seat after the driver had started.

Pit stops on the whole were fewer than were to be expected in a race of 410 miles at the speed maintained Saturday. There were in all thirty-eight, three of which were permanent, the cars withdrawing from the race, and can hardly be counted. Of the thirty-five temporary halts, only six were for tire replacements alone, although in twenty of them advantage of the enforced stop for other causes was taken to replace worn tires or spares, or other things were done when tire changes became necessary. As might be expected, the majority of the tire

(Continued on page 745)



Gil Anderson, in his Stutz racer, who finished third in the Grand Prize event, driving across the tape at the end of the race



1

Vanderbilt Cup

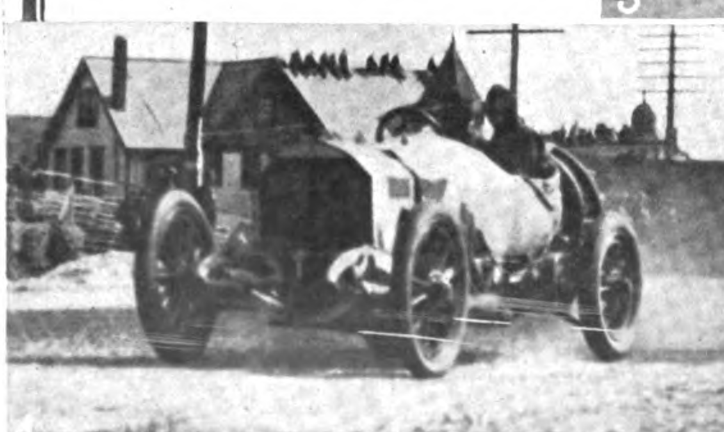
2

1—De Palma in Mercedes, the winner, passing official stand at the beginning of the last lap

2—Cars lined up for start of Vanderbilt Cup race, October 2. Eight cars started and five finished the 300 miles.

3—De Palma's Mercedes traveling at full speed on the backstretch

3



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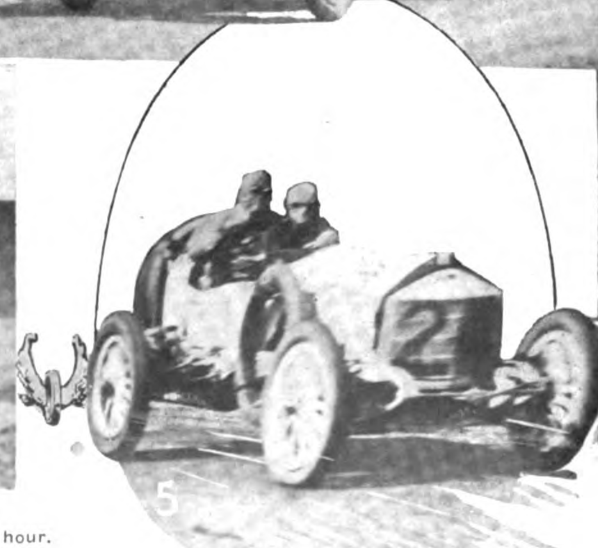
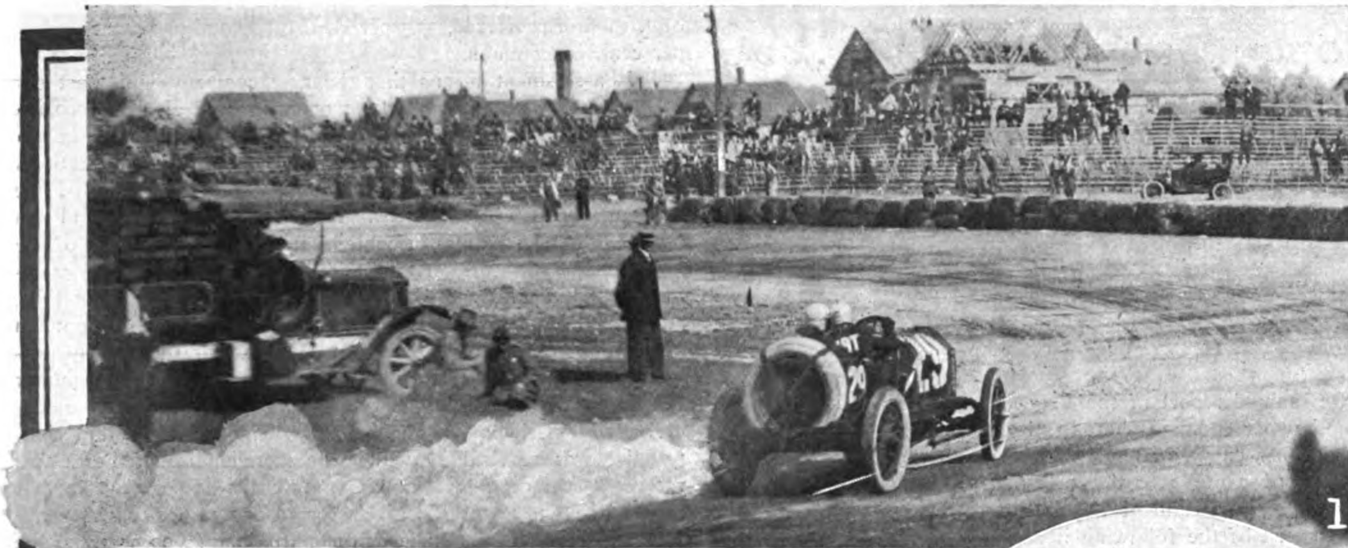


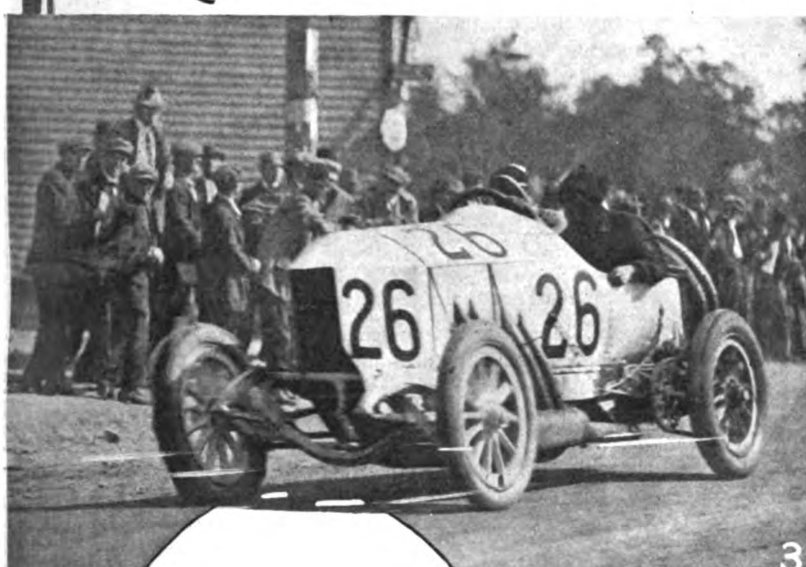
5

4—The Clark Mercedes finished fifth at 61.6 miles per hour. It is here shown on the home stretch

5—Ralph Mulford's Knox which was eliminated in the third lap



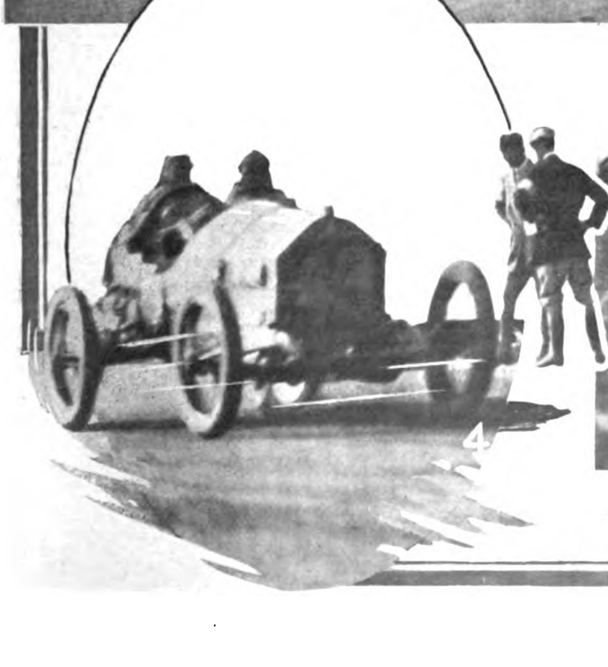
Race by Photograph



1—Tetzlaff in Fiat on hairpin turn. Tetzlaff set the pace of the race until eliminated in lap 28

2—Hughes in Mercer Special, winning second place, less than a minute behind De Palma. His speed was 68.8 miles per hour

3—Wishart in Mercedes on backstretch. He won third place at a speed of 64.9 miles per hour



4—Anderson in his Stutz winning fourth place at 64.2 miles per hour

5—Nelson in Lozier, who made twenty-six laps of the course

Pope Earnings $251,290

Gross Receipts During Fiscal Year Amounted to $3,734,112—New Truck Is Success

Final Plan of Reorganization Adopted By U. S. Motors—New Securities to Replace Old Stocks

THE annual report of the Pope Manufacturing Company for the year ending July 31 has been issued. It shows that the company has enjoyed net earnings during the past year amounting to $251,290 on a gross business of $3,734,112.

According to President Pope's report, the assets of the company consist of the following items:

Real estate, patents, good will, etc.	$5,781,293
Construction	36,276
Additions, adjustments and installation	243,681
Cash items prepaid	534,177
Inventories	1,477,312
Good accounts	396,608
Cash and cash items	253,829
Total	$8,723,176
Less deductions for reserves, replacements, etc.	440,998
	$8,282,178
The liabilities are as follows:	
Capital stock issued	$5,989,000
Two-year 6 per cent. gold bonds	1,000,000
Accounts payable, payrolls, deposits, etc.	260,098
Contingent liability	20,159
Surplus, 1911	936,430
Net earnings, 1912	251,293
Total	$8,457,070
Less dividends	174,892
	$8,282,178

The surplus of the company stands over $1,000,000 after writing off $440,000 for reserves and for future replacements, scrapping of machinery and deterioration. No doubtful accounts are included in the statement.

The company paid 6 per cent. on its preferred stock and made one payment of 1 per cent. on the common.

President Pope says that the plants have been kept in the most efficient condition and the cost of up-keep charged to operations. The inventory was made at actual cost and the item of accounts payable covers invoices that had not matured on July 31. All bills have been discounted.

The truck has met with success, according to the report and a 5-ton model will be added to the present output of 3-ton commercial vehicles.

U. S. Motors Plan Settled

The plan of reorganization of the United States Motor Company has been settled.

All the existing securities of the company amounting to about $11,500,000 of preferred, $12,200,000 common and $6,000,000 debentures will be wiped out and new securities will be issued in their places. In addition, $13,000 of the preferred stock of the Columbia Motor Car Company and $118,000 of the common will be subjected to the same treatment.

The basis of the new issue will be an assessment of $24 a share on the common and preferred stocks of the United States Motor Company and the Columbia company as outlined. The total capitalization will be scaled down as follows:

For and in consideration of the payment of $24 a share, the new company will issue in exchange for the preferred certificates, 24 per cent. of new first preferred, 25 per cent. of second preferred and 30 per cent. of common.

For the common certificates outstanding on payment of the assessment of $24 a share, the new company will issue 24 per cent. of first preferred, 17.5 per cent. of second preferred and 30 per cent. of common.

This assessment means that the new company will start out with a clear capital for working operations of about $3,000,000.

It is proposed to raise by this method the sum of $5,720,000. The remainder will be used for funding the matured obligations.

At this time there is still remaining in the treasury of the company the sum of $1,000,000. The disposition of this fund was one of the chief matters in contention in the deliberations of the merchandise creditors. At first it was proposed that the creditors of the various companies that had supplied parts, materials, etc., should not receive any cash allotment. Then the proportion offered was raised to 10 per cent. Neither of these early proposals was considered as equitable by the creditors and a counter demand was made for 30 per cent. This was refused by the general creditors, including the banking claim-holders and a compromise was reached by which the merchandise creditors will receive 25 per cent. of their claims in cash; 25 per cent. in first preferred, 25 per cent. second preferred and 15 per cent. in common, thus making a settlement of approximately 90 cents on the dollar.

The return day of the suit filed in the United States District Court has been fixed as October 28 and it is considered likely that the plan will be approved as presented and the embarrassment of the company relieved at that time.

To Build Knight Motors for Trade

The F. B. Stearns Company, Cleveland, O., has announced that it is prepared to manufacture Knight type sleeve valve motors for the trade.

When the Knight licenses were first granted to American manufacturers, the Atlas Engine Works, of Indianapolis, succeeded in securing one of them, the understanding being that they were to build motors for automobile manufacturers. As soon as this

Automobile Securities Quotations

Automobile and accessory securities were dull and featureless in the markets as a general thing throughout the past week. The one spot that had some appearance of life was International Motors common which broke sharply at the same time that the dividend was paid on the preferred shares. The volume of selling was not large but the market was not well supported and was marked down rapidly under small offerings.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	150	175
Ajax-Grieb Rubber Co., pfd	..	..	90	98
Aluminum Castings, pfd	..	..	100	102
American Locomotive, com	34½	35	43¼	44
American Locomotive, pfd	105	105½	107	108½
Chalmers Motor Company	..	..	145	155
Consolidated R. T. Co., com	6	10	13	15
Consolidated R. T. Co., pfd	10	20	50	60
Firestone Tire & Rubber com	175	180	270	275
Firestone Tire & Rubber, pfd	106½	108	107	109
Garford Company, preferred	..	..	99	100
General Motors Company, com	38	40	36¼	37½
General Motors Company, pfd	76	79	80	81½
B. F. Goodrich Company, com	*238	*242	†74½	†75
B. F. Goodrich Company, pfd	*118	*119	†106	†106¼
Goodyear Tire & Rubber, com	225	230	336	340
Goodyear Tire & Rubber, pfd	105	107	104	105
Hayes Manufacturing Company	..	..	..	92
International Motor Co., com	..	..	19	21
International Motor Co., pfd	..	..	78	81
Lozier Motor Company	..	..	43	50
Miller Rubber Company	..	..	..	140
Packard Motor Company, pfd	104	106	105½	107
Peerless Motor Company	..	..	115	120
Pope Manufacturing Co., com	55	60	37	38
Pope Manufacturing Co., pfd	73	75	73	75
Reo Motor Truck Company	8	10	9½	10½
Reo Motor Car Company	23	25	23	23¼
Studebaker Company, com	..	..	41½	43¾
Studebaker Company, pfd	..	..	94½	97
Swinehart Tire Company	..	..	99	101
Rubber Goods Mfg. Co., com	85	95	100	..
Rubber Goods Mfg. Co., pfd	102	105	105	110
U. S. Motor Company, com	28	29	1⅛	1½
U. S. Motor Company, pfd	69	70	4	4½
White Company, preferred	..	..	107	109

*Old. †New.

announcement was made the Atlas people booked an enormous number of orders for motors, and up to the time of the failure of the Atlas Engine Works a number of prominent American manufacturers planned to use Atlas-Knight motors. With the failure of this pioneer firm, however, the car manufacturers who had so confidently counted upon using the Knight type motor were left stranded, and for some time speculation has been rife as to where they would turn for motors, inasmuch as no more licenses are to be given out in America to manufacture motors direct.

The Stearns people, under their agreement with Knight & Kilbourne, have the right to manufacture motors for the trade, and they have been laying plans for the past 6 months to put this idea into force.

Atlas Attached for Accessories

SPRINGFIELD, MASS., Oct. 7—The Atlas Motor Car Company, of Springfield, Mass., which was forced to suspend operations some weeks ago because of the failure of the Atlas Motor Car Company in the West, preventing the former company from securing motors, has been attached again. Three suits were filed against the company during the week. The Hampden Brass Company, of Springfield, Mass., filed an action for $1,500; the R. E. Dietz Company, of New York, one for $200 and the Firestone Tire & Rubber Company, Akron, O., one for $200 also.

The Havers Motor Car Company, Port Huron, Mich., has just closed its fiscal year, which is the second year it has been engaged in building the Havers six-cylinder car and have declared a stock dividend of 40 per cent. and a cash dividend of 5 per cent. This pleasant news to the stockholders came on the completion of an audit by R. H. Hollis & Company, chartered accountants of Detroit.

Market Changes for the Week

The most important changes in the market during the past week was the gain in price of Bessemer steel and open-hearth steel. Both rose $1.00, closing on Tuesday at $25.00 and $26.00 respectively. Up-river Para rubber experienced a decline of $.02 owing to the annual auction of plantations. Tin dropped in price to $4.97, a loss of $.06 per hundred pounds, caused by the freer offerings by speculators. Copper and lead remained at their old quotations. Antimony and beams and channels were constant throughout the week.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb..	.09	.09	.09	.09	.09	.09	....
Beams and Channels, 100 lbs....	1.51½	1.51½	1.51½	1.51½	1.51½	1.51½	....
Bessemer Steel, Pittsburgh, ton......	24.00	25.00	25.00	25.00	25.00	25.00	+1.00
Copper Elec., lb..	.17½	.17½	.17½	.17½	.17½	.17½	....
Copper, Lake, lb..	.17¾	.17¾	.17¾	.17¾	.17¾	.17¾	....
Cottonseed Oil, Oct., bbl........	6.20	6.28	6.30	6.38	6.42	6.45	+ .25
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	....
Fish Oil (Menhaden) ...	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @.....	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime...	.85	.85	.85	.85	.85	.85	....
Lead, 100 lbs.....	5.10	5.10	5.10	5.10	5.10	5.10	....
Linseed Oil......	.68	.68	.68	.68	.68	.68	....
Open-Hearth Steel, ton......	25.00	26.00	26.00	26.00	26.00	26.00	+1.00
Petroleum, bbl., Kansas crude...	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa., crude......	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine, Up-river Para...	1.09	1.09	1.09	1.09	1.07	1.07	— .02
Silk, raw Ital....	....	4.15	....	....	4.15	....	....
Silk, raw Japan..	....	3.95	....	....	4.02½	....	— .07½
Sulphuric Acid, 60 Beaumé.....	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs......	5.03	5.03	5.06	5.03	5.03	4.97	— .06
Tire, scrap.......	.09⅛	.09⅛	.09⅛	.09⅛	.09⅛	.09⅛	....

Will Reorganize Knox

Tentative Plan Is to Sell the Property to a New Corporation, the Knox Motor Car Company

To Fill Present Orders Factory Must Be Operated for 4 Months—W. E. Wright Resigns

SPRINGFIELD, MASS., Oct. 5—The outlook for the Knox Automobile Company, of this city that made an assignment to Edward O. Sutton and Harry G. Fisk last week for the benefit of its creditors looks much more hopeful now than it did a few days ago. Edward O. Sutton today made an emphatic denial of the rumor that 130 men had been discharged and that the pay-roll had been cut down one-half. He stated that the company had started along the lines of intrenchment, and so it had been necessary to lay off eighty-five employees. According to Mr. Sutton, who is the superintendent and general manager, and therefore knows the real facts, the number laid off represented but 20 per cent. of the force instead of fifty as alleged. He was not prepared to say what further reductions might be made for it all depends upon business conditions.

Mr. Sutton stated that the prospects are more encouraging than could have been expected for the continuation of the business. He pointed out that at the time of the assignment there were orders on the books for seventy-one vehicles, and since that time eight more were received, two of which reached the company yesterday. To fill these orders it will be necessary to operate the factory for at least 4 months, and as the indications are that the business will be coming in as usual no necessity for a shut-down is expected.

Agents and old customers have been sending in letters to show their loyalty to the company, assuring the firm of their continued business and support. In addition to this the majority of the creditors have not been inclined apparently to press their demands, and this friendly attitude gives a brighter outlook for the future operation of the plant. Some thousands of dollars are owed the company in many cities and towns and it will eventually be paid, but the collection of these debts takes time and the pressing demands are ready cash for working capital.

Plans for the reorganization of the company have not been completed yet, but they are under way. It is the wish of the officials to continue operation until capital can be interested. The support of the Board of Trade will be solicited to aid in the reestablishment of the company on a sound basis and this will be of much help. Mr. Sutton stated that by figuring in the real estate owned by the company the assets would amount to more than the liabilities and that this would be of much value in bringing about a plan for continued operation. He added, however, that the officials would be willing to sell outright if a fair price could be secured.

SPRINGFIELD, MASS., Oct. 9—Trustees of the Knox Automobile Company have announced that negotiations are under way to reorganize the company. The tentative plan under consideration is to sell the property to a new corporation to be known as the Knox Motor Car Company. Details of the plan have not been outlined so far to the public.

W. E. Wright, vice-president and general manager of the Knox Automobile Company, Springfield, Mass., has resigned as one of the results of the financial embarrassment of the company and the new management. Mr. Wright has been a prominent figure in the automobile world for a number of years. His plans for the future have not been announced.

Exports At High Level

July Report Shows 50 Per Cent. Increase Over Last Year and 65 Per Cent. 7 Months of 1912

WASHINGTON, D. C., Oct. 7—Reports for July of the Department of Commerce and Labor, bureau of foreign and domestic commerce, show that the value of domestic automobiles and automobile parts exported from the United States is steadily growing. The total for July, 1912, was $2,096,933, as compared with $1,360,089 in July, 1911. The total for the seven months ending July, 1912, was $18,311,925, as against $11,096,271 for the 7 months ending July, 1911.

The bulletin shows that in July, 1912, the value of automobiles and parts imported was but $173,261, as compared with $197,451 in July, 1911. The total for the 7 months ending July, 1912, however, is somewhat larger than for the same period in 1911, although a big falling off for 1912 is shown by comparison with the same period in 1910.

Under the heading of exports of foreign merchandise from the United States it is shown that but three automobiles, of a total value of $7,000, were exported in July, 1912, as against six machines of a total value of $12,095, in July, 1911.

Rubber Show's Daily Attendance 3,500

WITH a banquet held at the Plaza Wednesday night and an auction of the prize-winning plantation rubber exhibit at the Grand Central Palace, on Thursday, the Third International Rubber Exposition came to an end. It was a big success in its way, although compared with the attendance at an automobile show the crowds were small.

The banquet was attended by representatives of the rubber industry in the United States as well as the exhibitors at the show, the exhibitors numbering about 120. John Barrett, director of the Pan-American Union, was a guest of honor as was also Baron da Gama, Brazillian ambassador. Mr. Barrett said that the world was just entering an era of tremendous development that will see typical expression in the rubber industry. Baron da Gama said that Brazil as the largest producer and the United States as the largest consumer of rubber would inevitably be drawn closer together in a commercial sense.

The crude rubber shown in the Brazilian space at the show was all sold to American manufacturers before the show opened, the prices ranging up to $1.15 a pound for up-river fine and correspondingly lower for the other grades on exhibit. The total amount of the sale was not announced. The plantation rubbers shown by Ceylon and Malaya, amounting to something under 30 tons, brought an average of $1.10 1-2 a pound, the top of the market being for the gold medal winning lot, $1.19 a pound.

The attendance at the show, including all visitors, averaged over 3,500 a day. This would make the total 31,500.

N. A. A. M. Elects Seven Members

The following companies have been elected to membership in the National Association of Automobile Manufacturers: Borland & Grannis Company, Flanders Electric Company, Speedwell Motor Car Company, Michigan Buggy Company, McFarlan Carriage Company, Argo Manufacturing Company and the Broc Manufacturing Company.

Past Fortnight Showed Big Car Shortage

According to the fortnightly bulletin of the American Railway Association for the period ending September 26, there was a net shortage of freight cars in the United States of 17,790. This is an increased net shortage from September 12 of 9,170 cars. Along in March of this year the unofficial figures showed that

ARTICLES	JULY— 1911 Quantities	Values	1912 Quantities	Values	SEVEN MONTHS ENDING JULY 1910 Quantities	Values	1911 Quantities	Values	1912 Quantities	Values
IMPORTS OF MERCHANDISE										
Automobiles, and parts of Automobiles..No..dut.	80	175,741	64	155,251	634	1,253,997	492	1,067,091	467	1,082,301
Parts of (except tires) dut.	......	21,710	......	18,010	......	548,136	......	211,671	......	164,348
Total automobiles, and parts of............	......	197,451	......	173,261	......	1,802,133	......	1,278,762	......	1,246,649
EXPORTS OF DOMESTIC MERCHANDISE										
Automobiles, and parts of Automobiles.......No..	1,025	1,104,807	......	......	5,314	7,369,486	8,935	9,194,564	13,860	13,715,535
Commercial.......No..	......	....	78	156,458	......	....	......	....	78	156,458
Passenger........No..	......	....	1,557	1,546,179	......	....	......	....	1,557	1,546,179
Total...........No..	1,025	1,104,807	1,635	1,702,637	5,314	7,369,486	8,935	9,194,564	15,495	15,418,172
IMPORTS BY ARTICLES AND COUNTRIES										
Cars, Carriages, etc. Automobiles—										
France...........No..	22	56,142	36	95,433	373	670,340	178	383,959	252	617,242
Germany.........No..	14	33,080	6	18,063	77	196,805	88	193,092	36	87,149
Italy.............No..	10	14,578	6	11,111	94	176,470	50	82,610	46	74,965
United Kingdom...No..	10	21,469	5	8,810	45	113,955	78	190,740	88	209,186
Other countries...No..	24	50,472	11	21,834	45	96,427	98	216,690	45	93,759
Total...........No..	80	175,741	64	155,251	634	1,253,997	492	1,067,091	467	1,082,301
EXPORTS BY ARTICLES AND COUNTRIES										
Cars, passenger and freight, and automobiles Automobiles—		*Dollars*		*Dollars*		*Dollars*		*Dollars*		*Dollars*
France...........No..	33	45,544	36	31,843	181	567,788	273	326,800	430	333,063
Germany.........No..	16	14,357	22	21,188	78	227,546	73	91,283	252	199,726
Italy.............No..	32	20,508	36	26,795	96	333,230	137	169,914	176	169,252
United Kingdom...No..	229	219,153	345	230,924	979	1,903,186	1,875	1,653,995	3,676	2,739,948
Other Europe.....No..	60	70,522	147	124,672	316	495,949	508	492,222	1,023	859,446
Canada...........No..	289	365,989	462	686,889	2,645	2,600,604	3,724	3,925,265	5,197	6,253,889
Mexico...........No..	7	18,285	9	14,683	177	330,055	147	258,064	125	183,020
West Indies and Bermuda..........No..	21	21,454	13	12,166	133	216,033	175	210,432	196	208,303
South America....No..	48	69,105	180	198,798	180	205,487	444	604,229	1,071	1,288,543
British Oceania...No..	168	156,951	209	184,034	252	173,278	938	858,196	2,128	1,948,505
Asia and other Oceania No..	91	75,106	133	124,086	102	122,439	477	428,119	843	878,678
Other countries...No..	31	27,833	43	46,559	175	193,891	164	176,045	378	355,799
Total...........No..	1,025	1,104,807	1,635	1,702,637	5,314	7,369,486	8,935	9,194,564	15,495	15,418,172

there was no surplusage of cars during one fortnightly period but later the official figures revealed the fact that the actual surplus was 3,043. At the time the condition shown was a record of railway activity but the September showing sets an entirely new mark.

At this season of the year the shortage of freight cars is not so serious to the automobile industry as it would be in the shipping season. The cause of the present condition is the extraordinary movement of the great crops, together with general activity of business in other lines.

The prospects for the next few reporting periods are for a steadily increasing shortage, not only due to the crop movement but also chargeable to the coal mining industry, which has made new high marks all along the line. It is said that the probabilities point to the crest of the movement in November, after which the volume of shipment will gradually recede until March.

At this time last year there was a net surplus of over 50,000 cars.

S. A. E. Made $3,499 in 1912

According to the report of the Finance Committee of the Society of Automobile Engineers, submitted to the organization at the last meeting, the income of the society during the past fiscal year was $27,388 which is about $2,700 less than was contemplated in the budget. The expenditures amounted to $23,888, which is $561 less than was provided in the budget for the year.

The expenses were divided into salaries, $8,123; interest on notes, $160; office expenses, $7,259; publications, $5,674; other expenses, $2,671.

The budget for 1913 amounts to $30,000, the principal increases over the past year being in the items of postage, publications and reserve for doubtful debts.

The profits for 1912 amounted to $3,499, taking up the deficit of 1911 and leaving a surplus of over $200.

The fiscal year of the Society of Automobile Engineers ended October 1 and a preliminary statement of the membership growth of the organization shows that 505 members were added during the past season. On October 11, 1911, the S. A. E. had 900 members of all grades. On October 7, 1912, the roll had been increased to 1,405 and there is a list of applicants numbering fifty-five persons, which will be acted upon at the forthcoming meeting of Council.

While members are elected to the society at all times during the year, its period of greatest accessions is from October 1 to January 1, owing to the operation of the by-law which provides for no division of the dues charged to new members.

Big Show Indicated for Chicago

Chicago show allotments made by the N. A. A. M. last week forecast the largest automobile show ever held in the Windy City. While the total number of companies supplied with space on first allotment was slightly less than the total exhibit of last year, the overcrowding in some parts of the show building will be corrected by enlarging the spaces, thus accounting for the difference. At that, there are a dozen applicants waiting for space.

The number of pleasure vehicle companies is about equal to last year, the decrease so far being noted in the commercial vehicle section of the show. All the standard companies are represented, the absentees being mostly defunct.

Honors for Alco Truck Crew

Honors for the crew of the Alco transcontinental truck were paid October 7 when a formal dinner was tendered by the American Locomotive Company to the travelers, E. L. Ferguson, Frank Morin, Walter Dick and John Cambon. There were about sixty-five persons in the party. Harry S. Houpt, sales manager of the company made the address of welcome. George L. Sullivan acted as toastmaster.

Coroner Blames the Road

Investigating Death of Bruce-Brown, Official Finds Milwaukee Course Too Narrow for Safety

MILWAUKEE, WIS., Oct. 8—*Special Telegram*—The verdict of the coroner on Bruce-Brown's death today, holds no one to account but blames the condition of the course for the accident. It says if the course had been constructed on more solid foundation, if the crown had been smoother and harder, the course wider and the edges more even, the catastrophe might have been avoided. It recommends that the American Automobile Association be compelled to formulate laws governing the construction of road racing courses which must be at least 6 months old. Must have roadway of at least 25 feet, every foot usable; must have proper physical position edges; must be surveyed, the crown smooth, hard and even, and curves built to a safe angle. It also recommends the appointment of a commission of competent drivers and road constructors to inspect track as well as racing machines before racing is permitted on any given course.

Scudalari, Brown's mechanic, died Tuesday. Despite a deficit between $17,000 and $30,000, Milwaukee dealers will ask to run the four races again next year. The coroner's inquest testimony showed $40,000 were expended on construction of the course.

Despite announcements made in the press that a contract has been made between the Milwaukee Automobile Dealers' Association and the Motor Cups Holding Company which controls the Vanderbilt Cup and the Grand Prize Gold Cup, providing for the holding of the classic American road races at Milwaukee for a term of years, the report is flatly denied by William K. Vanderbilt, Jr., of the holding company, donor of the Cup.

MILWAUKEE, WIS., Oct. 9—*Special Telegram*—Ralph De Palma's condition this morning was reported to be favorable at Trinity Hospital. The crisis has not yet been reached but his physicians are hopeful of recovery unless further complications arise. Tom Alley, De Palma's mechanic left the hospital Sunday.

18 Elected Members of M. A. M.

The following new members have been elected to the Motor and Accessory Manufacturers:

Bijur Motor Lighting Co.—Manufacturers of electric generators for automobiles and motor boats, etc., 250 W. 54th St., New York, N. Y.

Endurance Tire & Rubber Co.—Manufacturers of Automobile Inner Tubes, 1789 Broadway, New York, N. Y.

Edward G. Budd Mfg. Co.—Manufacturers of steel bodies for automobiles and for auto-trucks, 807 N. American Building, Philadelphia, Pa.

Brown & Sharpe Mfg. Co.—Manufacturers of gears and transmissions, Providence, R. I.

Hartford Machine Screw Co.—Manufacturers of spark plugs, automatic tire pumps and all manner of special turned parts used in automobile construction, as well as screws, bolts, nuts, taper pins, etc., Hartford, Conn.

The Simms Magneto Co.—Manufacturers of magnetos, carburetors and spark plugs, 1780 Broadway, New York, N. Y.

Ignition Starter Co.—Manufacturers of gas and electric starters, electric generators, 264-268 Jefferson Ave., Detroit Mich.

Walpole Rubber Co.—Manufacturers of automobile tires and tubes, mechanical goods and accessories, 757 Boylston St., Boston, Mass.

New Jersey Car Spring & Rubber Co.—Manufacturers of casings and inner tubes for automobiles; hose, belting, packing, valves, mats, mattings, moulded springs, tubing and general mechanical rubber goods. Wayne and Brunswick Sts., Jersey City, N. J.

The Hess Steel Castings Co.—Manufacturers of wrought iron and steel castings, Bridgeton, N. J.

Schoen-Jackson Co.—Manufacturers of Feps carburetors and Schoen-Jackson flexible metallic tubing, Medina, Pa.

Gould Storage Battery Co.—Manufacturers of storage batteries, 347 Fifth Ave., New York, N. Y.

New Miller Carburetor Co.—Manufacturers of carburetors, 512 N. Capitol Ave., Indianapolis, Ind.

Marathon Tire & Rubber Co.—Manufacturers of pneumatic tires and tire accessories, Cuyahoga Falls, Ohio.

The Electric Auto-Lite Co.—Manufacturers of electric lighting and starting devices for automobiles, 133 Michigan Ave., Toledo, Ohio.

Baldwin Steel Co.—Manufacturers of Clay crucible steel castings, high-speed steel, tool steel, magnet steel, automobile steel, roller bearings steel, 30 Church Street, New York, N. Y.

Pittsburg Model Engine Co.—Manufacturers of gasoline engines, transmission and clutches, Pittsburg, Pa.

Garage Equipment Mfg. Co.—Manufacturers of auto accessories, 742-48 S. Pierce St., Milwaukee, Wis.

Salesmen Experts Gather

Convention at Indianapolis Attracts the Attendance of 400 from the Ranks of the Automobile Industry

INDIANAPOLIS, IND., Oct. 8—**Special Telegram**—Four hundred automobile dealers, members of the selling organizations of the automobile concerns of the country, and advertising agents, gathered in the auditorium of the Claypool Hotel, this city, at the opening session this afternoon, of the first general sales convention of automobile dealers, following a luncheon tendered to the visitors by the Mahin Advertising Company. Many prominent automobile dealers, manufacturers and advertising men are here for the 2-day meeting believing that the future of the motor car industry hinges upon the sales education of the dealer and on the ability of both the selling organizations and advertising departments to intensify retail sales. Men in this field of the industry responded eagerly to the suggestion of J. J. Cole, of the Cole Motor Car Company, that a convention of this nature be launched in Indianapolis, second only only to Detroit in the automobile field.

Intensity is the slogan of the gathering. Naturally, everything rests with the dealer, for if he fails, all fail. And, so, the main objects of the convention are to teach the dealer how best to increase his sales, and to impress upon him the need for absolute co-operation with the factory whose car he sells.

Almost all American cars of today are good ones and will stand rigid investigation, and it only remains to get them before the people in a business-like way.

An enormous growth of the motor car industry should result from the present concerted movement for a combined effort to sell machines to the people.

W. D. Nesbitt presided at the session, during which six speeches were heard, the first of which was an address of welcome by J. J. Cole in behalt of the city of Indianapolis. "The idea of helping the dealer in all his problems is worthy of all the effort the car manufacturer can give," he said. H. O. Smith, president the Premier Motor Mfg. Co., was the next to talk. "The selling problem is the big one, not only with the automobile but with every branch of business," he said. "A good dealer can hold up a poor car a good while, but a poor dealer cannot uphold a good car very long." Mr. **Smith stated emphatically that there is nothing today which even promises to rival the automobile as a solver of the transportation problem. To increase sales, educate the salesmen. It is most important for the dealer to select the best selling line for his particular territory. Further, he must have confidence in his line, else he cannot hope to enthuse his prospects over what he has to sell.**

C. F. Kettering, of Dayton, O., spoke on some of the human interest sides of salesmanship. "Automobiles have become so common," he said, "that we have slipped somewhat away from calling to the attention of him, who does not know about such things, what wonderful pieces of mechanism they are. Thousands still look upon them as experiments and to sell to such it is necessary to get them interested in the motor car development. Relate in a human interest way the story of the manufacture of a tire, of a gear, or of any other part of the car make up, and you have the man interested. Do not say that he must lubricate a certain part, but show him the result of not doing so. Get the novice to understand the mechanical reasons for doing this or that, and you not only have a satisfied customer, but he will return to you when in the market again."

Leroy Pelletier of the Flanders Company gave a most entertaining talk on the co-ordination of advertising and sales. He is strongly in favor of conventions such as this. The main idea of the gathering is for every man to learn to get in and boost for the product in the sales of which he is interested. The company competitor who gives him the greatest run is the one he admires most. Mr. Pelletier believes that when we get a perfect co-ordination between the advertising and sales ends of a concern, there is nothing which that concern cannot do. It is hard for the dealer to realize that the national advertising campaign is for his benefit, but this is the case, although it is a selfish interest which the car maker has in him for dealers' sales mean factory sales. It is important for the dealer to know just what has been said in the advertising, otherwise he cannot talk intelligently to those who come in response to such advertising.

There is not a large percentage of good salesmanship in the automobile business according to Pelletier. The adding machine and the cash register salesmen are much better at it, for the only reason which the factories will recognize for not securing an order from a prospective customer is the death of the customer.

The repair man should be a consummate salesman and not a knocker, as is too often the case.

Speaking further of the convention, he said that the idea cannot fail because it is a good one. Next year the attendance will be much greater.

Charles A. Bookwalter, ex-mayor of the city, was the next to speak. He traced the evolution of the automobile from the ancient means of transportation down to the present almost perfect car, he characterized the automobile industry as being one of the great strong, red-blooded businesses of today. It is so great as to be inestimable in dollars and cents. It has been for many years the backbone of the industrial growth of Indianapolis, and in 1907 was the one thing which prevented the panic of that year from seriously affecting the city. He also advocated the boosting of the products of others, for by so doing confidence in the products of all makers is infused in the minds of the buying public. Mr. Bookwalter also talked on good roads and their value to the farmer. It is the accessibility of lands to markets that fixes the value of such lands, and there is nothing which offers such accessibility as good roads and automobiles in addition to electric railroads. Good roads are also educational for they offer a means of getting about and seeing what is going on in the world.

There is no one in the industry who would not benefit by Carl G. Fisher's proposed trans-continental highway.

Elbert Hubbard, of East Aurora, N. Y., was the last speaker of the day, his topic being "Ideal Salesmanship." He was glad to see harmony and good fellowship displayed at such a convention. A few years ago automobile salesmen had trade secrets, but today they are all pulling together for the common good. Mr. Hubbard said, "When you sell a man a car you do him a favor, for you give him an opportunity to get out into the great out-of-doors, which is to his advantage."

At 5:30 a speedway dinner was given to the visitors in the banquet hall of the Claypool. Following the dinner the crowd marched to Thompson Hall where Elbert Hubbard again talked, on "Sentiment in Business."

On Wednesday morning the convention will convene at 9:30, at which session talks by John G. Jones of the Alexander Hamilton Institute, New York, on "Headwork in Salesmanship"; T. J. Zimmerman, Chicago, on "The Opportunity of the Motor Car Dealer"; John L. Mahin, Mahin Advertising Co., on "How to Use Advertising in the Retail Game"; B. F. Lawrence, Indianapolis, on "How to Get the Co-operation of Your Local Newspapers," and John Wetmore, New York *Evening Mail*, on "How to Spend Your Advertising Appropriation," will end the business of the unique convention, which bids fair to be held again next year.

Ready Graphic Method for Finding Proportions for Intermediate Gears Giving Most Convenient Operation and Best Utilization of Power—Summary of German Army Experience with Trucks and Trailers Expressed in New Rules

FREIGHTER'S Equipment on Army Plan—The demands of the German military authorities with regard to the construction and equipment of motor trucks with trailers which are to be accepted as suitable for the freighting work of the army in case of war, and which on this basis are to be subsidized while used for private purposes in time of peace, command a widespread interest in so far as they exemplify a full set of rules by whose observance it is believed that a maximum of reliability—with some sacrifice of other considerations—in heavy freighting by motor power may be secured. The rules are expressed partly in the legislative traffic regulations of the empire, to which all vehicles must conform, partly in drawings which illustrate types of construction and which are kept on file in the experimental department of the general staff, and, finally, in specific rules. The drawings and the rules are changed from year to year to keep pace with increasing experience and technical progress. The new rules, which begin to apply to vehicles submitted for approval after April 1, 1913, have just been published and comprise 90 paragraphs. They refer only to trucks intended to be used with a trailer, for the so-called army freight train, in the heaviest hauling service, and this work presents some parallels with the requirements in that extension of railway freight service by means of motor trucks and trailers which is said to be contemplated in the United States in several instances, as well as with private heavy freighting in the Far West and in the Canadian Dominion. The following brief extracts from these provisions may be of interest:

EXTRACT OF RULES FOR 1913

The army train consists of one motor truck and one trailer. [It has been found impracticable, so far, to use more than one trailer.]

The truck must be capable, winter and summer, with two men up, full equipment (as specified in other rules) and a payload of 4,000 kilograms (4 long tons) to draw a trailer with one man up, full equipment and 2,000 kilograms payload over hard roads with grades of up to 1 in 7.

The vehicle speed at normal maximum motor speed must not exceed 16 kilometers (11 miles) per hour, subject to a 15 per cent. increase by use of the accelerator, the action of the accelerator pedal being limited by a governor. The operation of the vehicle must be as noiseless as the state of the art permits Double spring suspension of the axles is desirable (meaning an extra set to go into action for heavy loads).

The weight of the complete vehicle must not exceed 4,000 kilograms, including its normal equipment, spare parts, etc., and must not exceed 8,000 kilograms with load and crew. The rear axle load is limited to 5,500 kilograms. The width of the vehicle must at no point exceed 2 meters. The track is limited to 1.55 meters, the wheelbase to 4.5 meters. The wagon box must have a volume capacity of at least 6 cubic meters and must not be more than 3.6 meters long. Rear and side boards of the box must be hinged at the floor level, opening outward and downward. To protect the load, removable iron tilts, affording a waterproof roof, must be attached to the top of the wagon box by means of staples, rings, chains and lock. The total height from the ground must be within 4 meters.

Three commodious seats for the crew must be protected against the weather. A removable dustshield is to be arranged between the truck and the trailer to protect the brakeman of the latter. A reliable signaling device for mutual use between the truck driver and the brakeman must be provided. Every part of the loaded wagon, excepting only the wheels and steering knuckles, must be at least 28 centimeters (11 1-5 inches) above the ground. The tie rod of the steering system must be behind the front axle.

The fuel feed may be by gravity (but not affected by a grade of 1 in 7) or by pressure. If exhaust gases are used, the valve regulating the pressure must be of a prescribed pattern (drawings on file). Noise from the exhaust must be reduced to a minimum. A cut-out close to the motor and controlled from the driver's seat is to be so attached that it may be removed in case of war. Lost motion in the steering system must be reduced to a minimum by suitable construction.

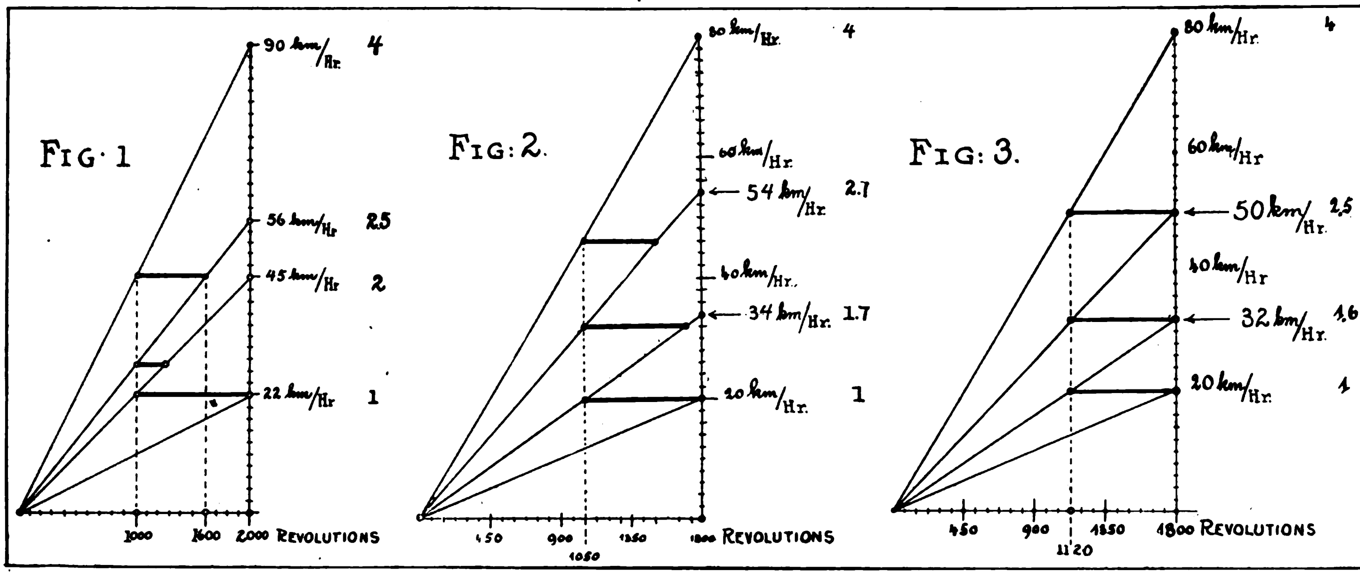
Rear wheel brakes must be compensated, internal and lockable. In a chain-driven truck the brake drum should be 450 millimeters (18 inches) in diameter and 80 millimeters (3 1-5 inches) broad. The transmission brake must be water-cooled and actuated by a pedal. It shall be possible to brake the trailer from the truck driver's seat. To this end a crank to the left of the latter connects with a rigid rod extending rearward under the middle of the truck and connecting by easily removable chain attachment (of a prescribed pattern) with the brakes of the trailer.

A two-armed sprag must be mounted so as to be secure against being overrun by the vehicle. When it is drawn up, its lowest point must not be below the rear axle. A lettered device on the dashboard must always show the position of the sprag. The sprag of the trailer must be so connected with the truck driver (in a prescribed manner) that he can work it.

The design of the coupling between truck and trailer is specially prescribed. It is at a height of about 32 inches, cushioned against both pull and thrust and so dimensioned that there is a distance of 12 inches between the nearest parts of the two vehicles when the trailer stands at right angles with the truck. The truck must be able to turn on a radius of 6.5 meters for the inside wheels. To safeguard driving on icy, snow-covered and slippery roads only solid-rubber tired wheels are allowed, and these must be provided with facilities for the attachments of traction chains, especially a sufficient number of lugs or pins projecting laterally from the felloes. The wheels must be of steel.

The front wheel tires must be 830 millimeters in diameter and 120 millimeters broad, and the rear tires 1,030 to 1,040 millimeters in diameter and either 280 millimeters broad with a deep central groove (prescribed design) or of the twin type with each tire 140 millimeters broad.

On the front member of the frame there must be two strong



Figs. 1 and 2—Diagrams of unsatisfactory gear proportions in four-speed cars with high and low gears in 1 to 4 ratio. Fig. 3—Diagram of correct gear under similar conditions

hooks for drawing the whole train of truck and trailer out of a predicament and at the rear similar hooks for the attachment of the trailer. Large sandboxes must be secured to the frame in front of the driving wheels with convenient arrangements for filling and discharging. There are further to be secured to the outside of the vehicle, with easy access from the outside, a box for traction chains, a toolbox, a baggage box and a box for firearms. The box for chains must have a perforated bottom to permit water to drain off; the others must be tight and lockable.

The motor hood must be provided with a lock and must not shut off the view of the road more than is unavoidable. Gates in the crankcasing must permit the handy replacement of connecting rod bearings. The carbureter must function properly with benzol and benzine (gasoline) of any grade as well as with other equivalent fuels. An arrangement must be provided for the use of heavy fuels which do not ignite easily. Ignition must be by high-tension single-spark magneto easily replaceable. A spare magneto must be supplied and carried. An electromagnetic motor starter which can be operated by hand must be secured to the dash, or else an equivalent device. Lubrication must be by force feed with an indicator observable at night as well as in the day time; for which purpose a lamp must be provided. The amount of oil used must be so large that its temperature will never rise above 80 degrees centigrade. Its fluidity during cold weather must be secured. The water in the radiator must never boil or run over. All low points in the water system must have drains. The connection hose must be of 22, 30 or 40 millimeter inside diameter. The fan must be driven by belts of at least 32 millimeter width.

The clutch must have an external leather facing at least 60 millimeters broad. The possibility must be established of mounting upon a shaft which revolves at the same speed as the motor shaft two separate belt pulleys of each 300 millimeters (12 inches) diameter and 80 millimeters width. The change-gear, of the sliding-gear type, must be stamped to show the lever position for each gear. Clutch and brake pedals must be independent. The gears must at normal motor speed give the following vehicle speeds: Low gear, 3 to 4 kilometers; second, 5 to 7 kilometers; third, 9 to 13 kilometers, and high, 16 kilometers. [It will be noticed that these gear ratios do not correspond very closely with those indicated as correct by Von Löw in the preceding article.—Ed.] Departures within 10 per cent. of this schedule are allowed.

The drive system—by shaft, chain or worm—is optional, but if chains are used the pattern is prescribed. The distance from the central plane of tires to that of chains should be 225 millimeters (9 inches). Sheet iron shields should be attached between the wheel fellies and the chains to protect the latter against the coarsest dirt and to prevent interference with the traction chains. Closed chain casings may be allowed on application, but must be easily removable, and shields are in such cases to be supplied as spare parts. The screw threading of the chain adjuster must be protected against rust.

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Most of the remaining provisions in the new rules relate to the equipment and to the details of the trailer.—From *Zeitschrift des Mitteleuropäischen Motorwagen Vereins*, middle of September.

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PROPER Proportions of Gear Speeds—The highest and the lowest gear speeds of an automobile are determined by the demands to be made of the vehicle. The required capacity for climbing hills must decide the low gear and the required maximum speed on the level decides the high gear. In this the consideration of variable loads is to be included, of course. The selection of the intermediate gears, however, should properly be decided mathematically when the extreme gears have been chosen. But a review of the gears actually used in German cars of 1912 manufacture reveals many variations from the proportions which should be observed, and these variations in every case involve a loss of convenience in managing the car. [The author here gives a tabulation of the gears in many German cars.—Ed.] When a builder is asked why he makes the interval between the high speed and the third speed greater—as he usually does—than between the third and the second, the answer is frequently that nowadays, with direct drive on the high speed, there is a saving of power from doing away with gear friction on the high speed which justifies this arrangement, but this is not in reality the most important reason for dividing the gear ratio unevenly. The author can offer a better one from his personal experience. He has driven two H cars and three A cars about 30,000 kilometers. One of the H cars weighed with normal load about 1,200 kilograms; the other H car and the three A cars 1,400 kilograms. The gear ratios were in the H cars 1—2—2.49—4 and in the A cars 1—1.7—2.7—4.

With the H cars it was always pleasant to go from the fourth to the third gear. After the third gear was in the car jumped right ahead. But in going from the third to the second the motor would hang back and, as a rule, it soon became necessary to go from it to the low. The second speed was consequently very little used with these cars; this result was unavoidable with the lighter car of this type as well as with the heavier one, which both had the same reduction (1 to 3.2) in the rear axle. Probably for this reason the builder of these cars chose the second speed considerably lower, as mentioned above, in the A cars which he built later. On the other hand, while the H cars pulled excellently on the third speed, the A cars do not share this property, although their gear ratio for the third speed really does not lie much higher than in the H cars. With the A cars it is necessary to drop to the second very soon, and on this gear the cars then work nicely again.

These experiences can be explained very clearly by diagrams. In Fig. 1 the oblique lines represent the relations between motor speed in revolutions per minute and vehicle speed in kilometers per hour for the four gear speeds of the H cars. Let it be assumed that the gear is lowered whenever the motor speed drops to 1,000 revolutions. By looking at Fig. 1 it is now seen that by going from the high to the third the motor goes from 1,000 to 1,600 revolutions, and the latter is a speed close to that at which the motor does its maximum of work. But in going from the third speed at 1,000 revolutions to the second the motor goes only to 1,200 revolutions, which is not close to its best speed, and consequently it does not pull the car so well, and if the grade of the road rises a little, pulling the motor speed down to 1,000 again, it soon becomes necessary to drop to the low gear. And by this last change a very high motor speed is reached, as the diagram shows, so that it becomes desirable to throttle down, and the diminished efficiency of the motor under the throttle has again no favorable influence on the car.

Fig. 2 applies to the A cars and shows the favorable transition from the third to the second speed in accordance with the actual experiences above referred to, it being understood that 1,800 revolutions and not 2,000 revolutions is the speed at which the motor operates most efficiently.

THE SIMPLE GRAPHIC TEST OF CORRECT GEAR RATIOS

These diagrams have shown what demands must be made of a good change-gear mechanism. In any diagram representing it the heavily drawn horizontal lines must be of equal length. Speaking without reference to the graphic mode of expressing it, the transition from one gear to another must in all cases be accomplished between the same limits of motor speed. A gear corresponding to this requirement is represented in diagram Fig. 3. Here it is seen that every time the gear is changed—at 1,120 revolutions in this case—the motor goes to 1,800 revolutions on the lower gear. This diagram therefore also supplies the correct gear ratios. Under the supposition that the low and the high gears are in proportion of 1 to 4, the intermediate gears should be at 1.6 and 2.5. Unfortunately not a single gearbox among those examined in the German cars conforms to this requirement. And were the friction loss on the lower gears to be considered, the figures 1.6 and 2.5 would be reduced even a little more, and the gear ratios used in practice, being too high, would be found still a little farther removed from the correct ones.

That the diagrams presented have been based upon revolutions alone, and not upon curves of efficiency or torque, is no error, since the favorable portion of the torque curves naturally lies between the motor speeds chosen as limits.

If a gear is to be designed for a car in which the low and high gears must be farther apart than 1 and 4 and should be, for example, in the proportion of 1 to 6, which would be suitable for a car used in hilly districts, the correct gear proportions are those shown in diagram Fig. 4; namely, 1—1.8—3.3—6.

CHECKING RESULTS BY ANOTHER METHOD

These proportions for the intermediate gears, as given in the foregoing, have been arrived at by investigating actual driving experiences with different cars by the graphic method. The results are confirmed by reasoning in another way. Let it be assumed that the gears in a car are proportioned as 1, 2, 3 and 4 and that they are intended for vehicle speeds of, respectively, 0 to 15, 15 to 30, 30 to 45 and 45 to 60 kilometers per hour. With these limits for each gear range, the number of revolutions of the motor may vary 50 per cent. from the maximum on the second speed and only 25 per cent. on the high speed. Here is the error which prevents the proper utilization of the motor power on every gear. Every motor has a favorable working range which lies between two motor speeds, for example 1,800 and 1,200 revolutions. Above 1,800 revolutions the inertia of the reciprocating parts becomes a disturbing factor, and below 1,200 revolutions the horsepower drops so low that the gait of the car is influenced too strongly by variations in the road and load conditions as well as by variations in the condition of the motor itself. If now the second gear of a car were intended for vehicle speeds from 15 to 30 kilometers per hour, the favorable working range of the motor would be materially transgressed, while the object of the gear distribution is exactly to enable the driver to utilize the favorable working range of the motor on each of the gears. Relations between gear and vehicle speeds which approximately correspond to this requirement, in the case of a motor whose best working range lies between 1,200 and 1,800 revolutions, would be the following. (Exact numerical conformity with the requirements is excluded for constructive reasons, as, for example, it is physically impossible to have a fractional number of gear teeth):

Low gear	for 10 to 15 kilometers per hour.
Second gear	for 16 to 24 " "
Third gear	for 26 to 39 " "
High gear	for 40 to 60 " "

In this schedule, it will be seen, the limit figures of the vehicle speeds are always in the same proportion as 1,200 to 1,800, or as 2 to 3.

In order to try out the results obtained by the graphic method, this schedule may be compared with the gear proportions shown in Fig. 3. By multiplying 15, which is the upper limit for the vehicle speed on the low gear in the schedule, by 1.6 and 2.5, which are the ratios of the intermediate gears in Fig. 3, the following schedule of vehicle speeds is obtained:

Low gear	for up to 15 kilometers per hour.
Second gear	for 15 to 24 " "
Third gear	for 24 to 37.5 " "
High gear	for 37.5 to 60 " "

That these figures do not correspond precisely with those in the previous schedule is due to the fact that the values of 1.6

(*Continued on page* 741.)

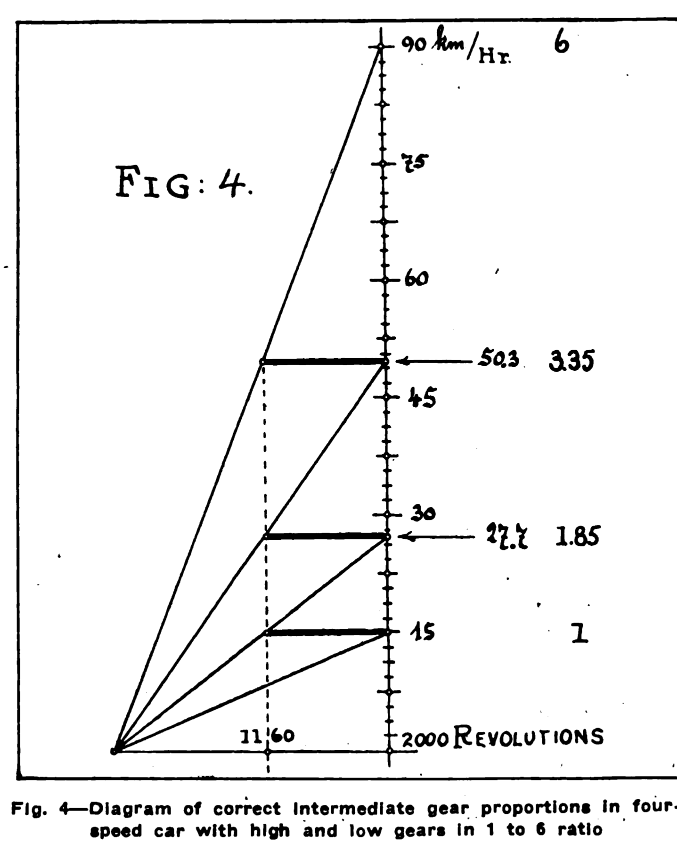


Fig. 4—Diagram of correct intermediate gear proportions in four-speed car with high and low gears in 1 to 6 ratio

Foreign Constructions Designs and Practices

Cylinder Casting of Germany, France and England Compared—German Design Leads—Flares and Bulges Used

HAVING thoroughly looked into the art of casting and machining cylinders for automobile motors, beginning in England, and, after a month of diligent effort, transferring the investigation to France for fully a month, it was not so difficult to run down the German practice, whereas, in Austria there is little to be learned that is not already covered in the practices of the other countries named. The main point in view is to observe with the minutest care any differences that may exist between the practices in these countries and the cylinder work which is being done in America. It is a well-appreciated fact among American automobile engineers that good cylinders are hard to get. The question is, have we the reasons at our finger's end? Do we know why we have troubles in this important department?

Were it possible to say that all cylinder work which is being done in America presents substantially the same measure of trouble; if it might also be said of foreign cylinder work that it is equally troublesome in every way; then, as an obvious deduction, the conclusion might be reached that the difficulties observed are natural and unavoidable either at home or abroad. We are deprived of the right of reaching this conclusion for three reasons:

One—There is a wide variation in the results obtained by various designers for their cylinders in a given foundry in America.

Two—There is a marked variation in the quality of cylinder work from given patterns run off in different foundries in America.

Three—There are disconcerting deviations from expected results, using patterns which are proven to be good for the purpose, these variations taking place from time to time in the same foundry, referring again to American practice.

Do Foreign Cylinders Vary?

That there are a plurality of reasons for the variations of quality of cylinders for American practice is apparent from the statements of the actual facts as presented. Naturally, the next question is, Are foreign-made cylinders subject to the same variation; if not, why not? If so, what is to be done to improve the foundry art of making cylinders for the purpose of the automobile trade?

In answer to the first question: Foreign-made cylinders are more or less subject to the same variations as the American product, but the extent of troubles experienced in the respective directions differs from the American expectation. French foundries are capable of producing better castings from inferior designs of cylinders than the cylinders of poor design that are likely to be obtained elsewhere. It may be on this account that so many French cylinder designs are faulty. In Germany the design is always more nearly perfect than on other European countries. As a matter of fact, some of the best German cylinder designs are quite up to the best work in America. In England, while there are some conspicuously good cylinder undertakings, there is such a swarm of mediocre work done, not only in designing but in the country as well, that the good examples are difficult to pick out.

There is a great lack of uniformity in practice in the several countries referred to, as this class of work is being done. These differences are: One—In America, on account of the low standard of foundry practice, designers are compelled to pay great attention to the details of designs and the pattern work.

Two—In England it is extremely difficult to reach any conclusion that may be stated as a rule. Observation tells that some of the foundries do first-rate work; more of them must be consigned to a lower level. In matters of design it is fair to state that designers calculate upon getting first-rate foundry work, and they reduce their efforts to place a close limit on cost accordingly.

Three—In France the foundry work is so fine that designers

Preferred Cylinder Jacket Design

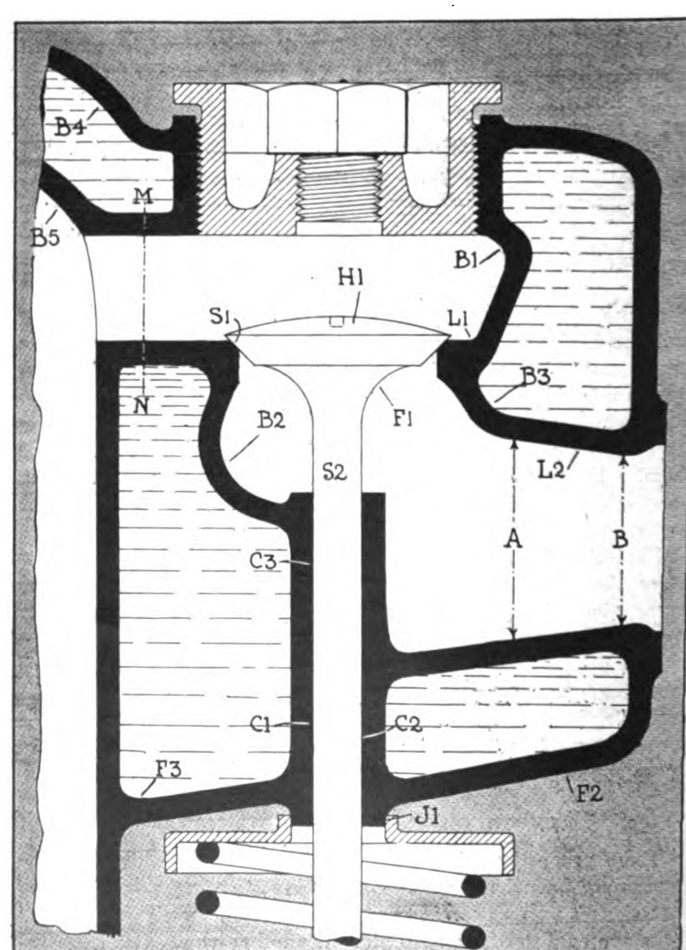


Fig. 1—Section of a poppet-valve type of cylinder through the exhaust-valve chamber, showing (slightly exaggerated) bulging and flaring walls, and a "choke" in the exhaust port

offend principle without suffering the consequences to be expected.

Four—In Germany the designs are painstaking and the foundry work is also good.

What are the hidden features of design which are only present in the best examples of cylinders?

Good Features of Design

The answer to this will be vague unless the points are brought out by illustration. Fig. 1 is a section through a valve of a cylinder. The precise difference, or difference in principal of design, between the cylinder shown in Fig. 1 and cylinders which do not perform so well in service may be noted by referring to Fig. 2, and comparing it with Fig. 1.

Referring to Fig. 1, attention is called to the uniform thicknesses of walls and to the avoidance of fillets which gather metal at intersections of walls. But these points are uppermost in the mind of the average designer when he undertakes a task of cylinder designing. If he fails to realize uniformity of section within narrow limits the fault lies between the pattern maker and the foundryman. However, there are points of design which the average designer prefers to evade. To begin with, the design principles of Fig. 1 evade all diagram effects; the walls at the respective points are anything but parallel to each other, excepting the walls of the bore of the cylinder, parallelism is unavoidable in this situation. Following the lines of the section, Fig. 1, attention is called to the bulges at B1, B2, B3, B4 and B5. In satisfaction of the same principles the walls are flared at F2 and F3. Again, the section through A-B which is not illustrated is

Non-Preferred Cylinder Jacket Design

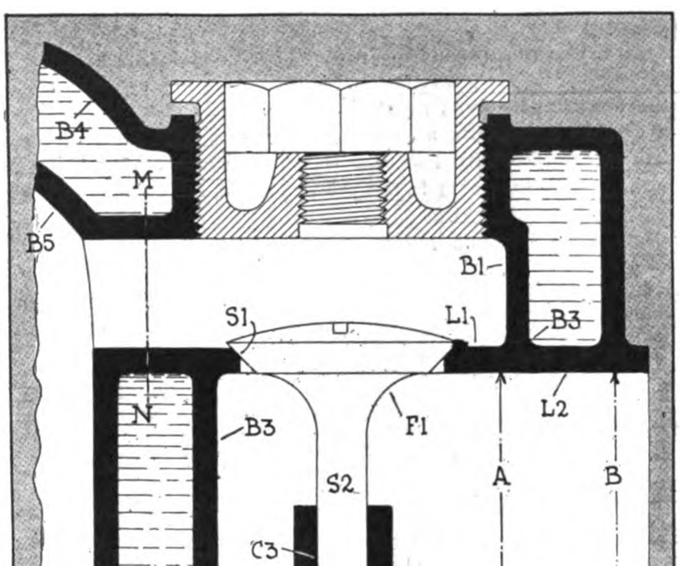


Fig. 2—Section of a conventional design of cylinder with parallel walls and a poor condition of cooling around the valve-seat metal as compared with that in Fig. 1

elliptical; just enough so to depart from parallelism. A little further observation shows a valve with a stout stem S2, with a big fillet F1, joining the stem to the head. The 45-degree seat S1 is slight; the pressure per unit area of the metal of the seat is considerable.

The mass of metal in the head of the valve is great in comparison with the flame-swept surface of the same. The idea is to conduct the heat away by the stem to the water in the jacket, limiting the increase in temperature of the head to the minimum. The water in the jacket surrounds the stem at C1 and C2, and it reaches S2, half way around the stem at C 3, Fig. 1. The stem is shown without a separate bushing for the guide.

The idea is to avoid the poor heat conductivity of a joint, as between the bushing and the bore in the cylinder metal. The valve is made of the purest steel, or, better yet, iron, possible to procure by any process, it being the expectation, founded upon research, that pure iron is the best possible conductor of heat, and impure steel is in the reverse direction. The seat of the valve is cemented or case hardened to afford great hardness, not so much due to any demand for hardness beyond that afforded by nearly pure iron, but in order to realize the polish which is assured when an otherwise pure iron is nearly satuated with carbon. Before case hardening, the valve is copper plated, excepting the seat surfaces, the idea being to prevent hardening penetrating excepting at the seat. However, any observations respecting the valves used must be taken with a grain of salt; this is on account of a wide variation of valve practice. Heat is prevented from annealing the valve spring S1 by using a thin saucer 2, which serves its purpose because of the poor heat conductivity of the joint J1 and also due to the large amount of surface of the disk in comparison with its mass. The cylinder walls W1 are about 6 millimeters thick in cylinders of the largest bore in use, and the port and jacket walls are slightly thinner, ranging between 4 and 5 millimeters.

In this particular example of cylinder the diameter A of the port is slightly more than the diameter B of the same port. This choke of the port referring to the exhaust port is not general practice. A very limited number of mostly French engineers seem to give a choke to the exhaust. It is a practice which originated in gunnery. At all events fouling of the combustion chamber due to re-entering products of combustion or visiting products from adjacent cylinders, is avoided if a choke is introduced. The gases are compacted as it traverses the length of the choke, and, like the tail of a comet, they scatter again, but in the case of the motor not before they pass to the muffler. They are beyond doing harm by the time they reach the muffler.

Returning to Fig. 2, remembering that it is of value in a comparative sense, corresponding letters of reference are used, and instead of avoiding diaphragm effects they enter at every point of surfaces in juxtaposition. Instead of bulges B1, B2, B3, B4 and B5, as shown in Fig. 1, the only bulges used in the design Fig. 2 are for the dome B5 and the jacket above the dome B4. Instead of flares F2 and F3, as in Fig. 1, flat surfaces F2 and F3 are used in Fig. 2. Instead of a choke due to the difference of A and B in the port, see Fig. 1, A and B dimensions are identical in Fig. 2. The result is, outside of any advantage due to choke, that the walls are again parallel to each other and the principle which dictates flares and bulges is again defeated.

Cooling the Valve Stem

Fig. 2 differs from Fig. 1 also in the way the valve stem is cooled. The section M-N is rectangular instead of elliptical, and, looking at Fig. 1, the position of the valve seat wall L1 is well above the wall L2 of the port, whereas in Fig. 2 the two walls L1 and L2 are in the same place, one being a continuation of the other. The result is that in Fig. 2 proper cooling C4 of the valve seat and metal surrounding the seat is impossible. Not a few French motors develop cracks and fissures of the valve seat on this account. Nor is this type of trouble confined to French motors. In other respects there is a certain similarity between Figs. 1 and 2.

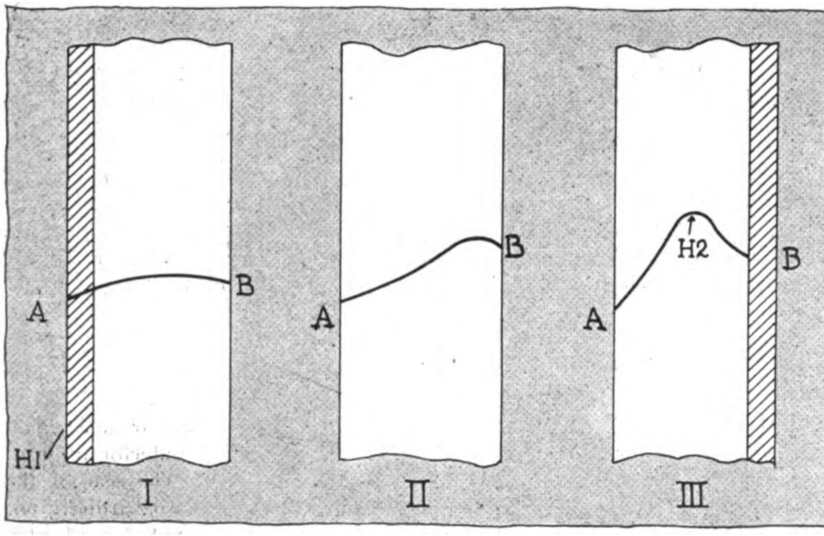


Fig. 3—A thick cylinder wall, showing how heat piles up, either in the mass of metal or in the crust and scale formed on the surfaces

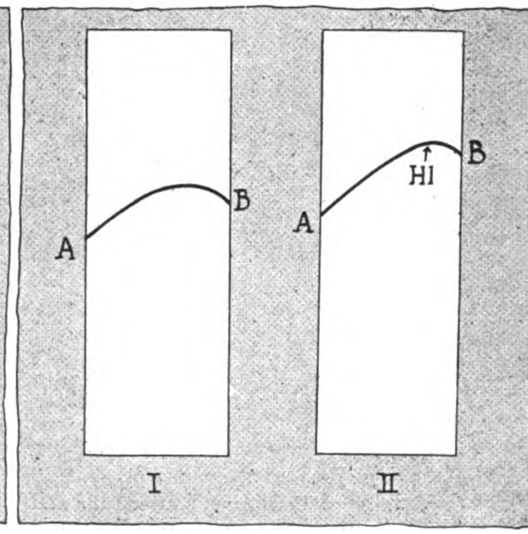


Fig. 4—Presenting three conditions of a thin cylinder wall in order to show how pre-ignition takes place

There are two prime reasons why stationary internal combustion motors deliver much less power per cubic inch of piston displacement than automobile motors. The most important of these reasons is that the cylinder walls of stationary motors are so thick that heat cannot pass through the section of metal as fast as it penetrates the flame-swept surface of that metal. The second reason is that the heat conductivity of the metal used is relatively very low. Of course, were stationary motor cylinders properly designed and were more power to be realized as a sequence, the inertia forces in these designs attending considerable speed increases would exert themselves and trouble would come from this quarter. But our story lies in the automobile field. From what has been said it must be concluded that wall thickness is a factor, but the ability of the metal to conduct heat is also of primal importance. The amount of heat that will have to be absorbed by the cooling water in the jacket can never be more than the number of heat units which will penetrate the flame-swept and contiguous surfaces in the time afforded in each case. *To limit the area of the flame-swept surface, then, is the first care of the designer. This point is given great attention, especially in Germany, but it does not go begging in any of the European haunts of the designer.*

All the heat which gets through the flame-swept surface, unless it makes its exit without loss of time through adjacent surfaces, will heat up or raise the temperature of the metal of the wall. If the wall is thick the time required for the heat to travel from face to face will be great. If the metal is of low heat conductivity, the amount of heat in heat units per unit of sectional area and per unit of time for a given difference in temperature between surfaces will be accordingly low.

Work Europe Is Doing

These points are being given fair attention in Europe, and the work already done is showing up in the better performance of the motors. It has been repeatedly shown that hot motors that pre-ignite because the cylinders get too hot are largely due to overheating of the metal, either because the cylinder walls are too thick or on account of scale, which, residing on the flame-swept surfaces, has its temperature raised to the glow point, when it serves as an igniter, or that cannot be timed: or scale which resides on the water-swept surfaces, preventing the heat from escaping to the water. But some motors heat when they are clean and even in the face of the fact that the cylinder walls are thin. In such examples it will doubtless be found that the metal of the cylinders is of very low heat-conducting powers. Figs. 3, 4 and 5 will serve to indicate the characteristic of the heat wave in cylinder walls, suggesting the distortions of the heat wave for the different conditions met with in practice.

In Fig. 3 the cylinder wall is represented as thick, as in stationary motor or inferior automobile motor practice, with conditions as follows:

Example 1—A deposit of scale, carbon, silicon and oil residuum, inside of the cylinder is shown as sectioning. The heat wave W1 rises from A, ending at B. Pre-ignition will be due to excessive heat at H4.

Example 2—The walls are represented as devoid of any scale inside or out. Pre-ignition will be due to the re-entering of the high heat shown at H3 of the curve W2; at the higher speeds of the motor this re-entering heat will be considerable.

The curve W2 shows the characteristic of the wave at customary working speeds of stationary motors.

Example 3 presents a condition of deposit on the exterior surfaces of the wall. The heat wave W3 starts at A2, reaches maximum at H2, which is the pre-ignition point, and the motor quickly shows distress.

Example 4 presents a state of deposit on the exterior and scale on the flame-swept surfaces of the cylinder wall. The heat wave 2A and 2B is almost flat; pre-ignition is due to glowing of the inner scale at H1.

Referring to Fig. 4, the cylinder wall is represented as thin—good automobile practice.

Example 1—The scale is within the cylinder. The heat wave A to B is but slight. Trouble follows at high speeds or under heavy loading of the motor and reduced speeds, due to glowing of the scale at H1.

Example 2—The walls are shown devoid of scale or deposit. The heat wave entering at a raiser to maximum just before the exit takes place at B. The performance of the motor should be good.

Example 3—Deposit is shown outside—over the water-swept surfaces. Pre-ignition follows high speed or heavy loading at reduced speeds taking place at H2 in the curve. Reaction of heat stored in the metal, as shown by the upward sweep of the curve A, B, is responsible for the trouble.

Referring to Fig. 5, this is a case showing thin cylinder walls, but there is a marked difference in heat conductivity of the metal in the respective walls to consider.

Example 1—This is representative of metal of high conductivity. The heat wave A to B, even at very high speeds, shows but a slight hump. Pre-ignition is not eminent in this example.

Example 2—The metal is of low heat-conducting ability. The heat wave A, B sweeps upward, bringing pre-ignition at H1. Increasing speed or heavy loading at reduced speeds aggravates this type of trouble.

The automobile engineer requires strong, pure gray iron for cylinders. The walls must be thin in order that heat may not be stored up in the section or body of the metal. The mixture must be strong in order that thin walls will sustain under the forces offered in service. The heat conductivity of the metal must be high. To realize high-heat conductivity, it is necessary to use pure (as nearly as possible) metal, it being true of iron, and steel also, that the purer it is the greater is the heat conductivity. But it is feared that the average foundry is ill fitted to cope with this considerable problem, and yet, in Europe, just this phase of the cylinder-casting problem gets its measure of laboratory attention. But this is not to say that all of the countries in Europe are doing so well; indeed, not a few of them are content to just turn out castings.

American Castings Are Strongest

Analysis on numerous occasions discloses a big difference in the chemical composition of cylinder castings from the several sources of supply. As a rule American-made cylinders are stronger than the imported products. When the American foundryman discovers that his castings are the strongest, he puffs up. Were he told that the heat conductivity of his metal is too low to use, his state of mind would become so dazed that no amount of persuasion would have any further effect upon him. Referring to the average American foundryman, to be sure, it may not be out of place to say that foreign foundries deliberately sacrifice tensile strength to get heat conductivity of metal. It may come as an incident, but these purer castings are free from internal strains to a marked degree.

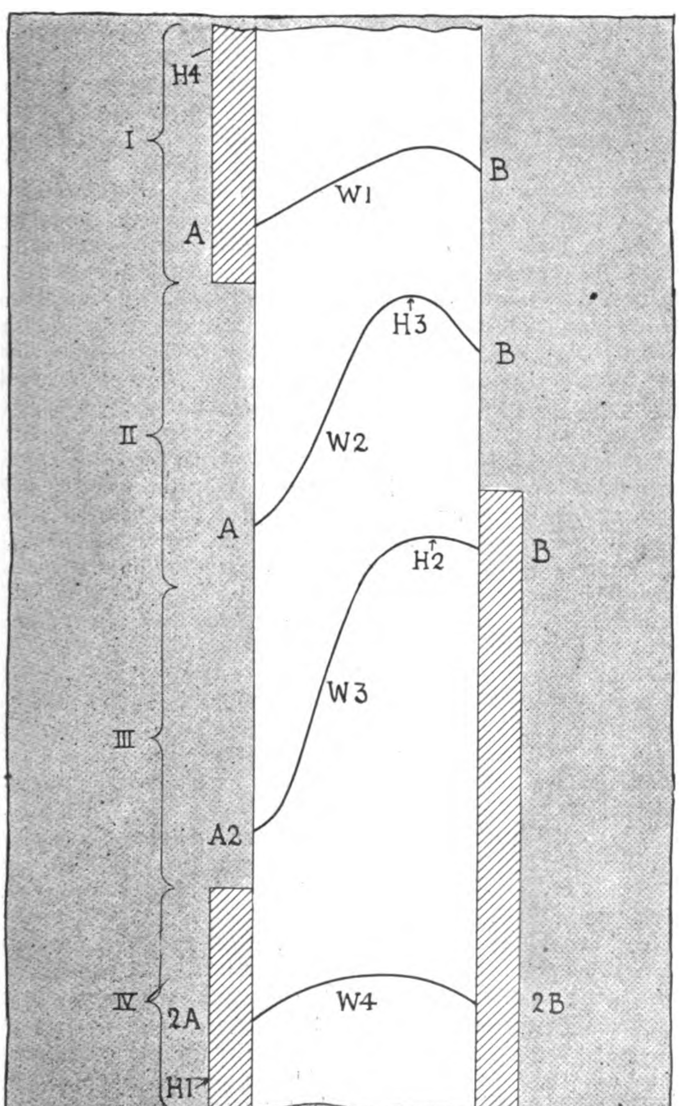


Fig. 5—Offering two conditions of a thick cylinder wall, showing the heating effect with metal of both good and bad heat conductivity

so that the actual available strength of the finished product is greater than in the other case of castings showing maximum tensile strength.

Reverting to Fig. 1, remembering that the walls of the parts and jacketing are flared and bulged in the manner before alluded to, it is the purpose now to point out wherein this practice helps the foundryman. The fact that a test proof of cast iron shows a tensile strength of 25,000 pounds per square inch, or even 28,000 pounds, is no assurance at all that the iron lodging in an actual cylinder will have the same available tensile strength. If the internal residual strains amount to, say, 10,000 pounds per square inch, this value must be deducted from the initial strength to derive the available strength. In order to coax the internal strains to subside, it is the idea of the German designer to avoid parallelism of walls in juxtaposition and to substitute a series of curves, bulges and flares, so interrelated as to afford a sufficient give to the metal as to relieve the internal strains. It is not unreasonable to expect that this plan affords compensations greatly in excess of the equivalent of 10,000 pounds per square inch of initial tensile strength of metal. Under these circumstances, if purer iron offering a higher heat conductivity, even with a considerably lowered initial tensile strength, is actually used, the gain will be two-fold: First, the available tensile strength will be higher, and, second, the motor will not overheat.

—

A CORRESPONDENT to *The Motor,* England, states that during the last few years when automobile racing has demanded the necessity of an engine that will give an extraordinary power relative to its size, designers have been faced with the question, "Are we, in designing an engine for general use to be influenced by the results of freak machine performances?"

There are cars on the market today, the correspondent goes on to state, with the stroke of the engine the same as the bore, and also with the stroke double the bore. The makers of each car state why their machine is superior to those of their competitors. Each is satisfied and each sells cars.

Let us look at it from the theoretical point of view.

Two cases must be considered, namely, the best diameter of the cylinder and the best length of stroke corresponding, taking into account the minimum weight per horsepower and high efficiency.

We know the power of a cylinder increases with the square of the diameter, and that, approximately, the weight increases with the cube. Therefore, the smaller the cylinder, the greater the indicated horsepower per pound. Considering then the small weight of a small cylinder, the necessary power must be derived from other sources than the bore-size if the engine is to be compact. The only possible means available is to increase the compression by employing a long stroke. And this not only increases the power, but increases the efficiency. These two, by the way, are not the same thing, for an engine may be powerful yet not efficient. The thermal efficiency of an engine is:

$$\frac{\text{Heat converted into work}}{\text{Heat available}} \times 100$$

or the ratio of the heat converted into work to the heat available.

The increase of compression naturally brings about a higher temperature of the compressed gas, which in turn naturally aids the efficiency of the engine by rendering itself more easily ignited. If then all this is true, the longer stroke we get, the more efficient and powerful engine will be the result.

Now, take the other side of the practical point of view. Two engines of 3-inch bore are made, but whereas one has a stroke of 3 1-2 inches, the other has a stroke of 5 inches. Run them both at 2,500 revolutions per minute and see which runs the smoother and more evenly of the two. And after constant use see which one has worn its big end crankshaft bearing away most.

As far as one can gather, the car that is required nowadays is one that will run from 5 to 50 miles an hour on high gear, and be efficient as a good car should be.

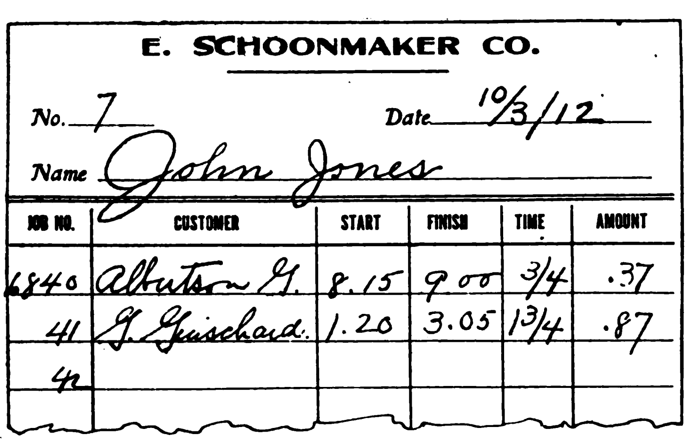
Tire Repairing Shop Cost Keeping Systems

Used Labor and Material Records Are Beginning to Enter Establishments Where Casings and Tubes Are Overhauled for Service

FEW tire repairmen recognize the value of cost-keeping systems at this day. This accounts for the fact that only a small percentage of them have adopted them and that, where systems have been introduced, they are very simple, though sufficient for the needs. Most shops do not keep records continually of the cost of every individual job, but the progressive among them do so until they arrive at a fair standard cost of a repair job, or, rather, of the various kinds of jobs handled in the shop. After this, the detailed cost-keeping system on every job is reduced to a more lenient process, consisting but in the time-checking of the men, this being carried on for reasons of policy, as one of the most successful tire repairmen of New York remarked.

Repair systems in tire shops are somewhat similar to those used in recording costs in an automobile repair department. They comprise two or three blanks, a receipt to the customer who brings in a tire to be repaired, an order specifying the work to be done on the tire accompanying the same to the shop and a time card, on which the men doing the work enter the time spent on each job. Clock cards for stamping time in and out of the workmen are also used in many shops. Furthermore, some companies keep a record of the materials used every day, itemizing it by the numbers of the jobs on which they are used. An inspection of a number of shops, however, indicates that records of material are kept by few of the shop managements. The reason therefore is that it is rather a difficult matter to measure and note the small quantities of vulcanized and unvulcanized Para rubber, cotton strips, cement, etc. The opinion seems to be that the continued recording of every small quantity of material used in the shop is too formidable to be carried on. Despite this, modern shop managers who recognize the value of cost standards, do conduct such records, at least for some time, when it is possible to formulate standards of actual material costs. The unit cost of material of each particular type of repair having been fixed, it is an easy matter to find out at the end of the week whether these standards have been kept up or not, or if they have been raised, without continuing individual material-cost records for every job done in the shop.

The records are in all cases kept by shop workers and office force combined. The adjuster or his clerk fills out the first card or slip which serves as receipt to the customer and as a work order, while the records of labor spent on each job are filled in on the cards by the men doing the work. The correctness of these records is checked by continued inspection of the shop work, this supervision being carried out by the foreman of the shop. In this way, as well as by the sparse use of used materials records, the personal equation is permitted to enter into tire repair work to an extent far exceeding that influencing ordinary automobile repairs. It is a simple fact, easily reasoned out and easily proven, that the lack of system due to the discomforts arising from its use in this particular field is a detriment to the commercial success of a tire repair enterprise. There is no doubt that where complete all-around records are inforced, the economy of the shop operations may be increased to no small extent.



E. SCHOONMAKER CO.

No. 7 Date 10/3/12

Name John Jones

JOB NO.	CUSTOMER	START	FINISH	TIME	AMOUNT
6840	Albutson G.	8.15	9.00	3/4	.37
41	G. Guischard.	1.20	3.05	1 3/4	.87
42					

Fig. 1—Time distribution card used by the repair workers in Schoonmaker Company's shop

The leading tire repair establishments of New York City have used cost-keeping systems for a number of months, and, after some experimenting with the types of forms put to use in this connection, a good many have arrived at what they consider to be final standards of system blanks. At any rate, the forms now in use are almost without exception very simple and well adapted to their purpose, being as few as possible and yet giving the office and the shop workers a chance to record all essential data on tire repairing.

Description of Firestone System

TWO representative systems which contain every feature of cost-keeping and repair recording used in New York tire overhauling shops are described below. They are used by the Firestone company's metropolitan branch and by the E. Schoonmaker Company, one of the leading tire repair shop operators of the city. The Firestone concern uses one card, Fig. 2. printed black on yellow cardboard. The card is 3 1-3 by 8 1-2 inches and consists of three sections which serve as work order, customer's receipt and receiving slip. When the tire is received by the adjuster who is in charge of the firm's repair department, the card, Fig. 2, is filled out. The date of receipt, name of customer, size of tire and the work to be done on it, and what other particulars are essential and may be seen by referring to the illustration, are entered on the card, which is then separated in its three sections by tearing the perforations. The middle section, the so-called claim check, goes to the customer and is later exchanged against the repaired tire, casing or tube. The receiving slip is kept by the adjuster until the repair has been completed, after which it is filed away under the name of the customer, names being, of course, arranged alphabetically. The bottom section goes to the repair shop with the casing or tube. There the time spent by the men is recorded on the form, specifying the periods spent on cutting, buffing, cementing, vulcanizing, etc. The Firestone company does not specify the names of the men who do these operations, as the shop has been so organized that each man does but one class of work. It is for the same reason that no time-distribution cards are used in this shop, for, while the men stamp their time in and out, the way it is used is obvious upon examining the repair cards. Furthermore, the company relies to a great extent on the foreman to keep his men busy at all times.

The repair being completed, the tire and the disposition records, as the company calls the bottom section of the card, are returned to the adjuster's office, who directs the bookkeeper to make out a bill which, together with the tire, is given to the customer in exchange for the claim check. Naturally, some customers are required to pay cash for their jobs. The bookkeeper enters the work in the ledger, whose records serve as the basis for monthly statements, so that the three sections of the cards are not required by the company after the tire has been delivered to the owner. But to avoid any possible complication, which might arise in the future, the three sections are filed away together under the name of the customer.

A system different in its details is the one used by the Schoonmaker company. It consists of three forms, one of which is designed similar to the one of the Firestone company, the second as a worker's time-distribution card and the third as a material record. The clock card is also used in this shop.

Fig. 3 shows the first-mentioned blank which also consists of three sections, with perforations between them, representing customer's receipt, shop order and office record. The process of using these blanks is identical with the one prevalent in the Firestone repair department. The worker's time-distribution card, Fig. 1, is a simple but efficient design and gives the office of the company all the information which may be desired with reference to the repair work done by each man employed in the shop. Every time-distribution order is marked with the number of the workman, his name and the date on which the card is used. In the lower portion of the form he enters the number of the repair job which appears printed on the work order, the name of the customer for whom the work is done, the make of tire upon which he works and, finally, the nature and quantity of the material used in connection with every repair job. The material records are kept in the form of a large book or ledger, and every workman is required to enter all the material in this book, which is kept in the office of the shop foreman. Exactness of the material records is a condition, the importance of which is impressed on all the men, while the distribution of their time is not checked except by the general inspection work of the foreman, no time-clock mechanism being employed. The reason for this course is stated to be due to the many small jobs done in the shop and the consequent loss of time which would be incurred by the men running to a time-clock every few minutes. The superintendent of the Schoonmaker company, however, was emphatic in stating that, in his establishment, standard costs of repair operations have been arrived at long ago, so that from the workman's time-distribution card it becomes fairly clear whether the man wasted any time or not.

Practical Value of a System

It should be remembered that the arrival of standards of cost for all operations done in a shop are the purpose of all cost-keeping systems. These records again form a basis for many improvements, as, if it is once found that the men use on the average, say, 1 hour for a job which could be done in 45 minutes, the course which should be taken can be made clear to the foreman. It is his business to see that the time consumed on a given job should be reduced from the actual, present standard to the ideal one; it is, furthermore, his business to devise ways and means as to how to do this. The effect of such a course is that the unit cost of the work done in the shop is reduced in proportion to the time consumed, so that with the same force a larger volume of business may be handled, which will naturally flow to the establishment if a little of the saving in labor cost is used for reducing the retail price of the repair jobs. This being essentially equal to an *increased supply of repair work* caters to an increased demand, if the price is slightly lowered to invite a larger number of customers.

It has been the curse of the repair business, automobile and tire trade as well, that the operators have either thought that there is no chance to make money in their business or that they used it to exploit their customers without any remorse. Only lately these branches of the automobile business have been put upon a saner and, in the long run, more profitable basis. By and by repairmen began to see that their business is like others and that the same principles of work and trade policy must, as elsewhere, be applied if a lasting success is preferred to a spontaneous inflow of cash.

FIRESTONE TIRE & RUBBER CO.
NEW YORK BRANCH
Tag No. 10979 Recvg. Slip No. ....

FIRESTONE TIRE & RUBBER CO.
NEW YORK BRANCH
CLAIM CHECK
FOR GOODS DELIVERED TO US
No Goods Delivered Without This Check
Tag No. 10979 READ CONDITIONS ON OTHER SIDE

DISPOSITION RECORD
TAG NO. 10979 RECVG. SLIP NO. ....
CASE TUBE ....
WORK DONE ....
COMPLETED ....
.... LBS. .... AT .... $ ....
MATERIAL COST . . . . $
.... HRS. EMPL. .... AT .... $ ....
.... HRS. EMPL. .... AT .... $ ....
.... HRS. EMPL. .... AT .... $ ....
.... HRS. EMPL. .... AT .... $ ....
.... HRS. VULCANIZING .... AT .... $ ....
LABOR COST . . . . $
TOTAL COST . . . . $
INWARD FREIGHT OR EXPRESS CHARGES . . . . $
GENERAL REMARKS: ....

Fig. 2—Firestone's repair form

No........ Date................
E. SCHOONMAKER CO.
112 West 54th Street, New York
Owner................................
Address................................
Make........................Size..............
Repairs................................

E. SCHOONMAKER CO.
112 West 54th St., New York
No.......... Date..........
Name..........
Make.......... Size..........

E. SCHOONMAKER CO.
Name..........
Address..........
No..........

Fig. 3—Combination of owner's receipt, work order and office record used in the tire repair shop of E. Schoonmaker Company

Accelerometer—Its Use and Value

Rate of Speed Increase Depends Upon Torque Continuity and Reduction Between Motor and Driving Wheels

Graphic Form Valuable in Examination of the Automobile's Accelerative Powers on a Time Basis

THE acceleration of any given motor car at any moment depends primarily upon two factors—1, the engine torque; 2, the gear ratio in use. The former is governed by the total cubic capacity of the cylinders of the engine, and the latter by the gear-box ratio corresponding to the gear in use at the moment. The proportionality of torque to cylinder volume is based upon the experimentally ascertained fact that the mean pressure is not appreciably affected by cylinder dimensions in any four-stroke petrol engine as usually built. Given this constancy of mean pressure, it follows that the mean torque must depend upon the product of cylinder area by crank throw, that is upon D^2L, the cylinder displacement. An interesting corollary to this is the deduction that for any given gear ratio on a given car the car speed and the brake horsepower will be identical for all engines of equal volume which may be fitted to the car.

A graphical construction affords the readiest way of tracing the relationship between acceleration, torque and gear ratio. Thus in Fig. 1, A B is the torque curve on top gear, C D the torque curve on second gear, and E F that on bottom gear (taking the case of a three-gear car). These torque curves are plotted with car speed horizontally and pounds per ton of equivalent tractive effort vertically. A definition of the vertical co-ordinate would be that it is the number of pounds of tractive effort per ton weight of vehicle at the road wheels equivalent to the engine torque at that speed. On the same diagram, and to precisely the same scale, it is possible to plot the curve G H, representing at each speed the total resistance to motion, including the friction of any internal gearing between the clutch and the road wheels.

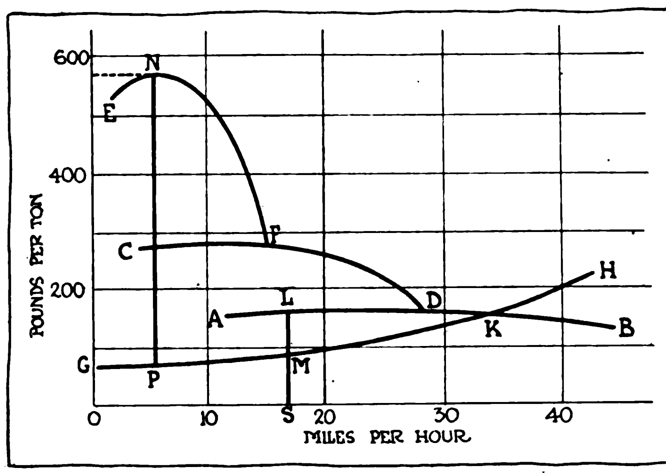


Fig. 1—Diagram of automobile torque and resistance curves

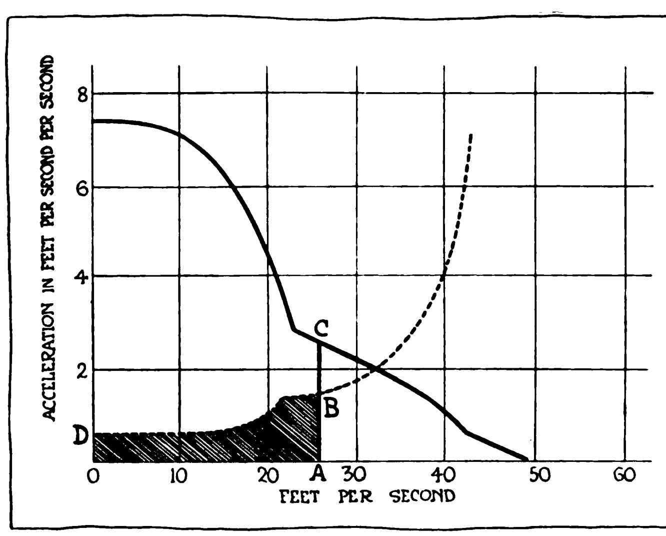


Fig. 2—Method of predicting the acceleration-time graph

Now, at the point K two of these curves cross, showing that at that point the tractive effort due to the engine is exactly balanced by the resistance to motion. This point therefore gives the speed—some 32 miles per hour—at which the car would travel with throttle open on a level road. The effect of climbing a gradient is to increase the resistance to motion by an amount proportional to the gradient, and the resistance curve G H rises, keeping parallel to itself, by this amount, so that the point K moves in to the left, showing that the steady speed will be less. At the speed O S the resistance is only M S, whereas the engine effort is equal to L S; the excess force L M produces acceleration if the road be level, or a combination of accelerations and hill-climbing ability if the road be rising. When the road is level the whole of M produces acceleration, and the amount of that acceleration can be directly scaled off by the length of L M (1 foot per second is very nearly equivalent to 70 pounds per ton).

The relationship between the three torque curves shown in Fig. 1 is very simple. A B is the torque curve on top gear plotted directly from a bench test diagram. C D is the same curve compressed horizontally and expanded vertically. The ratio of this compression and expansion is the ratio of the engine revolutions per minute at any given car speed when on top gear to the engine revolutions per minute at the same car speed when on second gear. It will be readily seen that coresponding points on the torque curves will lie on the same rectangular hyperbola, and this gives an easy graphical construction for drawing the curves E F and C D when A B is given and the gear ratios of each gear are known. The rectangular hyperbola which just touches each of these curves touches them at the points of maximum horsepower.

Each of the torque curves thus obtained requires, properly, its own resistance curve, since the frictional loss between clutch and road wheels will depend upon which of the gear wheel combinations in the gearbox is in use—most of the gearbox friction arises from the churning up of the grease or oil in use, is not sensitive to the amount of torque transmitted, but rises rapidly with speed. There should, therefore, be three resistance curves, each a little higher than the last. But it is found to be far simpler to keep to the one resistance curve and to lower the curves E F and C D by the amount of this extra friction. This convention greatly simplifies the diagram. Thus, on bottom gear the maximum possible acceleration can be directly scaled from the length N P. In this manner it is possible to predict the acceleration on each gear at any car speed, and from the figures so obtained to make a graph of predicted acceleration on a car speed base.

When such a graph has been obtained it is sometimes desired to convert it into one based on time instead of on car speed. To do this we must plot on the car speed base the reciprocal of the acceleration and measure the area between this curve and the horizontal axis; these areas will give the time in seconds corresponding to each acceleration value, and the acceleration and time graph can then be constructed. The exactitude of this procedure follows from the relationships

$$\int \frac{1}{a} \, . \, dv = \int \frac{dv}{\frac{dv}{dt}} = \int dt$$

The curves in Fig. 1 have been drawn to represent to scale the case of a 15-horse-

*Paper read before the British Association at Dundee by Mr. H. E. Wimperis, M.A., inventor of the Wimperis accelerometer.

power (R. A. C. rating) touring car with hood and screen in use. From this we will proceed to predict the acceleration-time graph. The first difficulty that arises lies in the fact that the car does not start with the engine in gear and the curve E N F does not meet the vertical axis. For reasons explained later this is met by drawing the dotted line T N and treating it as a part of the bottom gear torque curve. The acceleration speed graph shown by the firm line in Fig. 2 is obtained from Fig. 1 by direct scaling, as already explained. The dotted curve gives the reciprocal of the acceleration, and the shaded area measures the time taken from rest to attain an acceleration equal to A C. The acceleration-time graph thus predicted is shown in Figs. 3 and 4, allowing an interval of one second to effect the gear changes from bottom to second and from second to top. The distinction between Figs. 3 and 4 is that in the former the driver is assumed to change gear at 2,000 revolutions per minute and in the latter at 1,600 revolutions per minute; also that in the former the gearbox friction has not been allowed for, while in the second it has. It will be seen from Fig. 2 that the maximum possible acceleration is about 1.1 foot per second per second on top gear, 3.0 feet per second per second on second gear, and 7.0 feet per second per second on bottom gear.

Experimental Measurements—The above is a simple method of predicting the acceleration of a motor car; it remains to describe how this acceleration can be experimentally measured, and then to compare the curves given by experiment with Figs. 3 and 4.

Two methods are in use for the measurement of the car acceleration: 1, by deduction for a space-time graph; 2, by the direct indications of an accelerometer. Of these two methods the former has the attraction that none of the measuring apparatus is carried on the moving vehicle. It is, moreover, a simple matter to measure the distance traveled at the end of equal time intervals; the slope of this space-time graph at any point measures the velocity, and a velocity-time curve can then be constructed. And the slope at any point of this velocity-time curve measures the acceleration. This process is, however, both long and inaccurate, particularly at the gear change points. The same data could have been treated equally well by an analytical process based on the calculus of finite differences; such a method has been used at Brooklands, but it suffers from the alternative disadvantages that, if a large number of terms in the infinite series (given by the method of the calculus) be taken, the process is exceedingly laborious, and that if few are taken the method fails in accuracy, particularly when the acceleration is changing rapidly. It is far more difficult to measure the acceleration of a car than of any other vehicle, owing to the discontinuity of motion in the gear changing.

The use of an accelerometer avoids these lengthy and troublesome calculations, but has certain disadvantages peculiar to itself. It is open to the objection that the measuring instrument is carried on the moving vehicle, and is therefore subjected to a good deal of vibration, and possibly to zero-error should the floor of the car change appreciably in its upward or downward tilt relative to the road. Vibration gives little trouble in a suitably designed instrument, and is actually useful in that it helps to overcome any statical friction there may be in the mechanism. The difficulty due to change of tilt cannot, however, be avoided by any attention to the mechanism of the accelerometer. But its amount has been the subject of careful study on a variety of cars, and been found to be less than can be measured in practice; were it otherwise, it would be necessary to take the precaution of first blocking the car springs.

Acceleration tests were made with one of the recording accelerometers above mentioned on the car for which Figs. 3 and 4 were predicted. The results are shown in Figs. 5 and 6. The former was taken on Brooklands track, when the driver was instructed to accelerate as rapidly as possible, and the latter on the road on the way to Brooklands without the driver knowing that any test was in progress. In both cases the road was pretty nearly level, rising about 1 in 80 in the case of Fig. 5, and falling about 1 in 100 in the case of Fig. 6. There is a striking difference between the test and non-test starts, and the latter was, of course, much the more comfortable for the passengers, the rate of change of acceleration being far less.

It is interesting to compare the prediction and the reality. On second and on top gears the predicted acceleration agrees very nearly with the actual figures, but on bottom gear the reality is some 2 feet per second per second, or about 30 per cent. below the prediction. Now, the following are factors which all influence acceleration, particularly when on bottom gear as the car starts from rest.

a—The momentum stored in the rapidly rotating flywheel is suddenly liberated when the clutch is let in.

b—The carbureter is liable to choke with the rapid change in engine output.

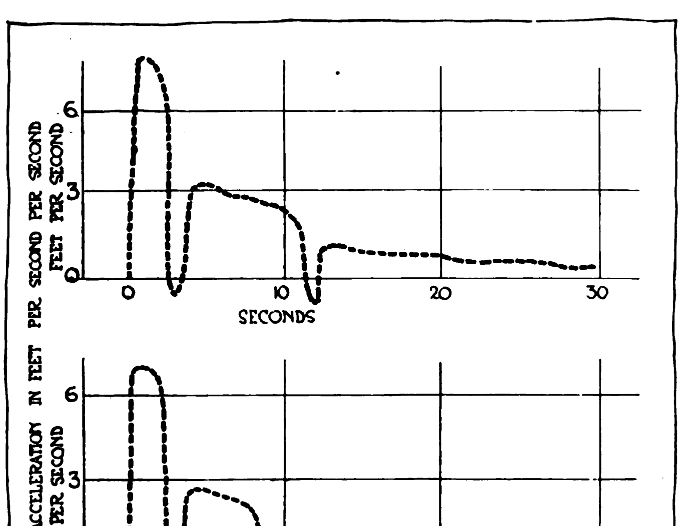
c—during the engagement of the clutch the engine is exerting torque.

d—The road wheels are liable to slip.

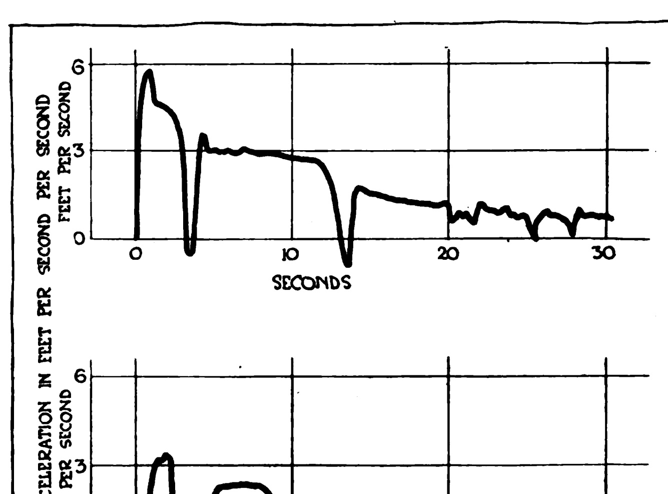
e—The momentum given to the car is partly absorbed in giving momentum to the rotating parts.

As regards *a*, the momentum stored in the flywheel of this car was 1 1-2 per cent. of that stored in the car when the top gear was in. Before starting the driver may spin his engine and flywheel at a rate—say, 2,000 revolutions per minute—equal to that equivalent to running 40 miles per hour on top gear. And if this momentum be given to the car, it will produce in it a speed of 1 1-2 per cent. of 40 miles per hour—or 0.6 miles per hour—corresponding to about 1 foot per second per second if the operation were completed in just 1 second. During the same time interval, whatever it may be, the engine is also exerting torque and this *c* is a further reason why the starting acceleration should exceed the predicted value. It is difficult to assess the engine torque during the clutch engagement when the engine speed falls rapidly from 2,000 revolutions per minute to only a few hundreds. In the limiting case we may take the torque during this brief interval as equal to the maximum torque on that speed, and draw the dotted line T N shown in Fig. 1. Cause *b* has probably—with *d*—much the most important influence on the acceleration—enough influence, in fact, to neutralize the factors tending to make the predicted acceleration higher than the true and to reduce the actual substantially below the prediction, for it is not to be expected that when the load on the engine is changing so rapidly as it does during the starting of the car that the carbureter will be able to supply fuel exactly proportional to the load, as it undoubtedly does in a good engine when running on

(*Continued on page* 740.)



Figs. 3 and 4—Showing predicted acceleration



Figs. 5 and 6—Showing the acceleration as realized

Electric Lighting System Requirements

Dynamo Should Be Geared to Give Full Output at a Speed of 15 to 18 Miles Per Hour

Design of Lamp Reflector a Potent Factor in Determining Illuminating Efficiency

IN determining the necessary qualifications for a dynamo lighting system for any particular use, the following points immediately become of importance:

1—The lamps to be used.

2—The dynamo output needed.

3—The dynamo speed and the method of driving the dynamo.

4—The proper size storage battery to be used with the dynamo selected.

5—The type of wiring.

The most important of these is the first, that is, "What lamps to use." After determining the lamps to be used we immediately become of importance:
from this the other points can be readily deduced. There are only three size bulbs now in general use for headlight work, these being respectively 16, 21 and 25 candlepower.

For small motor cars, which travel at comparatively slow speed, and where the owner would be satisfied with light that while better than acetylene lights usually supplied with these small cars, is still not the most powerful, and where he will not be likely to compare his lights with those of friends who have higher power, to the detriment of the 16-candlepower lamps, 16 candlepower is undoubtedly ample.

On the higher-powered cars the 21-candlepower bulbs are in almost universal use to-day. These will give ample light for driving up to a speed of, say, 40 miles an hour at night, illuminating the road far enough ahead that any object may be observed in time to stop almost as well as in daylight; in fact, give all the light that is needed.

Such lamps when used with a shallow parabolic reflector will light a road 50 feet wide for the full width of the road from the front of the car to a point over a quarter of a mile away. A deep parabola of the same focus will light the road even further, but will not give as much light at the sides close to the car. Where extremely high-powered cars running at very high speed are used and where very large reflectors can be used, 25-candlepower bulbs are sometimes used.

It must be realized that with small reflectors built to take a 16-candlepower bulb the insertion of a 21-candlepower bulb will not give a proportionately larger amount of light on the road, and similarly a 25-candlepower bulb in a reflector built for 21 candlepower will not give sufficient additional light to warrant its use. **The reflector should be adapted to the particular size bulb used; for this reason there is little benefit in using large candlepower bulbs in small reflectors.** With a commercial reflector having the greatest diameter of 8 inches a 16-candlepower bulb is about all that can be focused economically. With one of 10 inches diameter a 21-candlepower bulb should be used, and there is little use in using a bulb larger than 21 candlepower except with a 12-inch reflector, which is very seldom seen on account of the large size.

We can therefore safely assume that the bulbs to be chosen for the headlights will be of 21 candlepower, these being almost universal for cars of over 25 horsepower to-day. The side lamps and rear lamps are for signaling only, and bulbs of small candlepower can be used. Four-candlepower or 2-candlepower bulbs are adequate. It is customary to use 4-candlepower side lights and 2-candlepower rear lights. The amount of current taken by these side and rear lights is so small that there is no objection to using 4-candlepower bulbs for all three or 2 candlepower for all three, but the desirability of having a brilliant light at the side, for appearance's sake, has led to the use of 4-candlepower bulbs. Frosting the bulbs in the side lights gives a very pleasing appearance, and I think will be very largely adopted in the near future.

In addition to the head, sides and rear, the car will probably be equipped with such current-consuming devices as a speedometer light and electric horn, very possibly a cigar lighter, a light in the tonneau or limousine, and similar lights. None of these lights, however, is used for a very long period of time, and in designing the balance of the system after having decided on the five main lamps it may be safely assumed that the overload capacity of the outfit will take care of these additional loads, which are run for a short time only.

We have therefore assumed that the lamp load on an ordinary car should be two 21-candlepower headlights, two 4-candlepower sidelights and a 2-candlepower rear light. The two headlights will take 7 amperes, the two side lights 1.7 amperes, the rear light .6 ampere, making a total lighting load of 9.3 amperes.

The second point we have to determine is the dynamo output needed. We have already assumed the light load to be 9.3 amperes. In order to make sure that we have ample overload capacity to take care of the many short loads made by the horn, speedometer light, etc., the dynamo should be capable of delivering to the storage batterly slightly more amperes than required by the lamp load. For this reason **an output of 10 amperes of the dynamo has been accepted almost universally as the proper amount when such a lighting equipment is used.** This will keep the storage battery always up to the best efficiency and at the same time it is small enough that the storage battery will not have to have too large plates in order to run without undue deterioration.

Dynamo Speed Needed

The dynamo should be so geared to the car as to give its full output at from 15 to 18 miles an hour, and any speed above this. At a speed lower than 15 to 18 miles an hour the car will not be driven for more than a very few miles with all the lights lighted, and the reserve capacity of the storage battery will more than make up for this short time. Of course, when the car is being driven in the city where the headlights are not being used, it often runs more slowly than this, but at these lower speeds the dynamo is generating a proportionately smaller amount and will give ample current to take care of the two side and rear lamp, which take only a total of about 2.3 amperes. A shunt-wound dynamo which will deliver 10 amperes at, say, 15 miles an hour will deliver 2.3 amperes at 8 to 9 miles an hour, so that whenever the car is running it will supply ample current for the side and rear lamps.

What shall be the ratio of speed between the dynamo and the engine, and what shall be the method of driving the dynamo? These two points are so interrelated that logically they should be considered together. The size, weight, and consequently, the cost of the dynamo, are determined not only by the ampere capacity, but also the speed at which the dynamo will deliver the stated ampere capacity into a 6-volt three-cell lead battery. I will not treat of the relative size, weight and cost of shunt, series, compound or magneto type of dynamos, but limit my statement to the fact that in dynamos of any one type the size, weight and cost are determined by the ampere capacity and the speed at which this number of amperes can be put into a three-cell lead battery.

The cost of a dynamo which will deliver 6 volts and 10 amperes at 1,500 revolutions per minute is 30 per cent less than of one which gives the same output at 1,000 revolutions per minute, and less than half the cost and of about half the weight of one designed for the same output at 500 revolutions per minute.

A shunt-wound dynamo designed to put 10 amperes into a three-cell battery at about 1,000 revolutions weighs approximately 21 pounds and can be made approximately 8 inches long by 5⅝ inches high by 4¾ inches wide. If we reduce the speed to 500 revolutions the weight becomes approximately 33 pounds and the dimensions approximately 9¼ inches by 7½ inches by 4¾ inches. This 1,000-revolution dynamo should be run at engine speed for the best results.

The question immediately comes up whether, as a matter of judgment, there is sufficient advantage in running at the lower speed to make up for the added weight and the added cost. It will be found in general that where a shaft is provided on the engine to which the dynamo can be coupled, and this shaft runs at engine speed, the added weight and cost of the engine-speed dynamo are warranted, because the cost and complication of sprockets and chain for driving are eliminated. But where such a shaft would have to be put in the engine specially and driven by gears, or when some shaft already projecting runs at engine speed but is not so located that the dynamo could be directly coupled to it, and consequently either gears or sprockets and chain have to be used, there is little question but that a dynamo delivering its full

NOTE—From a paper by Leonard Kebler in the S. A. E. Bulletin for September.

output at 1,000 revolutions per minute and running at about twice engine speed is the happy mean in weight, cost and size.

A dynamo which will put 10 amperes into a three-cell battery at 1,000 revolutions, driven at twice engine speed on a car with 36-inch wheels, geared 3¼ to 1 on the back axle, will start to charge the battery at from 6 to 7 miles an hour, and will give enough current to supply all the lamps, that is, about 10 amperes, at 15 miles per hour.

The same dynamo on a car geared 3 to 1 with 36-inch wheels, starts to charge the battery at 9 miles per hour, and will deliver enough current to take care of all the lamps at 18 miles per hour.

Such a dynamo I believe to be the ideal one where there is no provision made for driving directly at engine speed. A machine running at higher speed than this has not sufficient advantage in weight and cost to warrant the higher speed of the chain and the higher speed in revolutions per minute of the armature and the additional wear on the bearings and additional chance for noise. At the same time the use of a dynamo at less than twice engine speed to get a reduction in chain speed and wear on the bearings has not sufficient advantage to warrant the use of a larger, heavier dynamo running at, say, engine speed and driven by chain gears.

On a dynamo driven by ⅜-inch pitch silent chain at twice engine speed, sprockets of 30 and 15 teeth would be used. At 45 miles per hour this chain would run 1,500 feet per minute and at 60 miles per hour 2,000 feet per minute. These speeds are not excessive, but if a dynamo giving its output at 1,500 revolutions per minute were used running at three times engine speed, we would use 45 and 15-tooth sprockets and the chain speed would become 2,250 feet per minute at 45 miles per hour, and 3,000 at 60 miles per hour, which is too high for efficiency or long life. We may therefore decide not to run our dynamo at over two times engine speed.

On the other hand, where it is possible to drive at engine speed through an Oldham coupling the ideal case is undoubtedly reached, and in this case the additional weight and cost of the dynamo are warranted, as we save the cost of sprockets and chain and eliminate the necessity of oiling them, etc.

Method of Dynamo Driving

Having determined the lights to be used, the dynamo output, and the relative speed of the dynamo to the car, the next point to determine is the method of driving the dynamo. **A very useful method of driving the dynamo is to extend the pump-shaft through the pump, leaving an extension back of the pump to which the dynamo can be coupled directly by means of an Oldham coupling.**

In other cases it is possible to have the armature shaft of the dynamo extend through both ends and drive from the timing gears through the dynamo armature to the magneto, having the magneto and the dynamo lined up in tandem.

In each of these cases a dynamo running at engine speed is used for a four-cylinder car and one and one-half times engine speed for a six-cylinder machine.

When neither of these methods is possible, and it becomes necessary to drive the dynamo by gears or silent chains, we will then use the higher speed machine, running at about twice engine speed, and this can be driven in a number of different ways. Where the pump is driven separately from the magneto, it may be driven at twice engine speed and the dynamo can be run directly from the pump-shaft through an Oldham coupling. **Where a shaft running at twice engine speed can be installed projecting from the timing gear case or from the gearbox it can be driven by gears or chain running in oil, and then the dynamo can be directly coupled to the shaft. This gives a noiseless and almost wearless drive.**

A sprocket on the pumpshaft or magnetoshaft driving a sprocket on the dynamo by silent chain at twice engine speed is quiet, efficient and satisfactory. It is, of course, better if the chain can be enclosed and run in oil. Any one of these methods has been proven to be entirely satisfactory in practice, to have long life and to be quiet.

Size of Battery Needed

Having determined all the necessary features of the dynamo regarding output, speed and method of drive, we turn to the storage battery. The first thing to determine is the proper size to use with the dynamo selected. It must fulfill two conditions:

A. If the car owner runs entirely in the daytime the battery must have sufficient square inches of plate surface to be charged, whenever the engine is running, at the maximum dynamo amperes without injury to the battery.

B. If the car is standing still with all lights lighted, the battery capacity should be sufficient to keep all the lights burning for 6 hours; and when only the side and rear lights are on, it should be capable of keeping these lighted for, say, two nights, or 24 hours.

Considering A, experiment shows that a battery having 160 square inches of positive plate surface and 200 square inches of negative plate surface will not be injured by use with a dynamo giving 10 amperes output on an engine. Such a battery would undoubtedly be ruined if 10 amperes were put into it continually on the test bench, but the conditions in motor car service are so different as to require some comment.

There are two things that cause rapid deterioration of storage batteries when they are charged continuously at a high rate: The first is that the heating of the battery due to continuous charging softens the plates so that they become readily disintegrated. The second is that large bubbles of gas form on the negative plates, and when these bubbles break away from the plates they take particles of the active material, especially when this has become softened due to heating.

In motor car work, in the first place, it is very seldom that a battery is charged continuously at the maximum rate for more than two hours at a time. There are always stretches of a few minutes when the engine is slowed down, so that the dynamo does not deliver its full output, or when the engine is stopped entirely, and the battery has a chance to cool off. As a result the service is not at all analogous to tests made on a bench where the current is put into the battery continuously. On a test bench the battery would get hot, but on a car it will not. In fact, in a battery with the plate surface already decided upon there is little or no heating in ordinary service and no excessive heating in the most severe service. In the second place, the large air bubbles do not have a chance to form on motor car batteries, due to the jarring and jolting that a motor car gets in going over the road. Before the bubbles have time to become large enough for them to take off a serious amount of active material they are jolted loose and do not injure the plates to any material degree. As a result it will be found that storage batteries can be run at almost double the charging rate without undue deterioration on a motor car that they can when standing still on a bench. The mechanical agitator, now often used for large stationary batteries to keep bubbles from forming, is replaced by the jolting of a motor car, and the various methods of cooling often adopted for large stationary plants is taken care of in this case by the occasional slowing down and stopping of the engine.

On a motor car a battery is run under ideal conditions, because it is being constantly charged and discharged under ideal conditions as regards agitation and coolness. A battery having the plate surface mentioned above will light all the lamps, that is, discharge at a 9½ to 10-ampere rate for about 3¼ hours, and will light the side and rear lamps for 24 hours. Such a battery does not light all the lamps long enough, so that if batteries of this size are used there should be two of them, or a larger capacity battery, having at least 80 ampere-hour capacity at a 10-hour rate, can be used.

Any battery made by a reputable maker and having 80 ampere-hour capacity at a 10-hour discharge rate will fulfill all requirements. This latter battery will fulfill all the specifications and has ample plate surface, ample capacity to run all lamps for at least 6 hours and the side and rear lamps for 24 hours.

Method of Wiring System

The use of a bayonet lock socket has now become universal for practically all connection plugs and all lamp plugs, so that there is little need of discussing this. One point, however, that is not entirely cleared up is the type of wire which should be used for motor car work.

The cable to be used for motor cars must stand a test of 12 hours immersion in oil, 12 hours immersion in gasoline and 12 hours immersion in water, and then stand 500 volts applied between the two conductors without breakdown.

Such a wire has ample insulating capacity and will take care of any oil, gasoline or water that it may get in motor car use. Wherever there is any abrasion the cable should be armored either by a light woven metallic armor or by conduit, loom or some similar material. There is no use armoring against heavy abrasion such as might be had by the wire rubbing against the flywheel, as any armor will wear through rapidly in this case, but the armor should take care of the abrasion that occurs on the leads of the lamps as they swing against the frame or some similar part, and almost any of the woven metallic armors will do for this purpose.

Wherever rubber or material that would be dissolved by gasoline or oil is used for insulation it should be protected by another covering impervious to oil or gasoline so as to render it impossible for the insulation to be ruined.

Hardening Difficult With the Facilities of the Small Shop; Vibration Changes Position of Carbureter Stop Screw; American Progress of 10 Years; Peugeot Car Has No Torque Rods; Use of Plastic

Case-Hardening in the Shop

EDITOR THE AUTOMOBILE:—Please tell me how to case-harden with crushed bone, using the tools to do the work that may be found around a machine and blacksmith shop.

Rochester, N. Y. SUBSCRIBER.

—None but very small parts could be treated with the facilities to be found about the ordinary machine or blacksmith shop. The parts to be case-hardened are packed in the bone meal and inclosed in a cast-iron box. The entire box has to be heated.

With iron or soft steel the heating of the box is then carried on until an intense red heat has been reached. This will be close to the melting temperature of the box. The part to be hardened is then chilled in cold water. After carbonizing, as the case-hardening process really is, the metal if it is to be carefully prepared should be annealed at 1,625 degrees Fahrenheit and allowed to cool slowly. It is then reheated to about 1,400 degrees and quenched in water. The temperature to which the box and its contents are raised should be about 1,500 degrees with ordinary steels. Nickel-chrome steels carbonize at 2,000. degrees and tungsten steels at 2,200 degrees. Good work cannot be expected without the facilities of the hardening room.

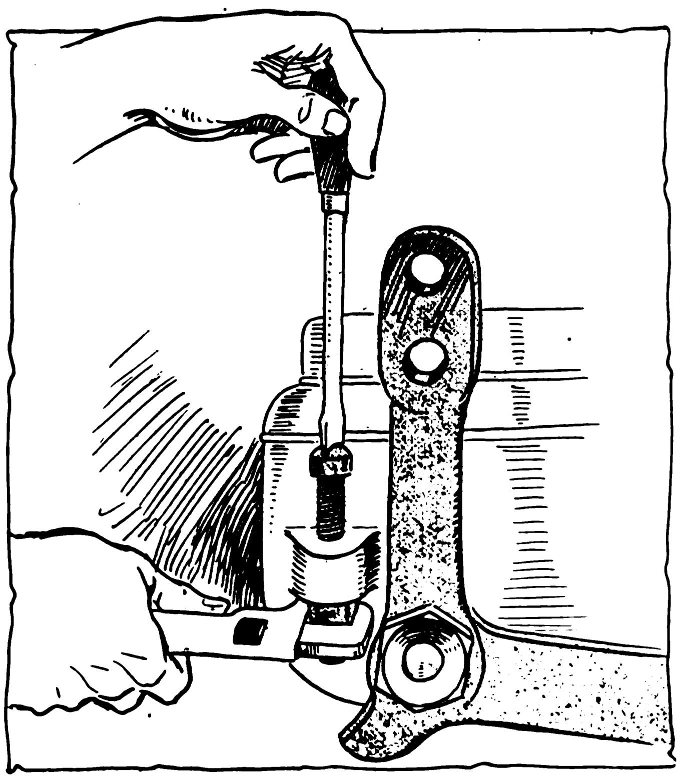


Fig. 1—This screw to be adjusted so motor will run with throttle closed

Motor Won't Throttle Down

Editor THE AUTOMOBILE:—I have just returned from a 400-mile run. During the latter part of the tour, I noticed that I could not get my motor to throttle down in spite of the fact that I had the lever turned as far back as it would go. I thought at the time that the trouble was due to the fact that the motor was somewhat overheated, having run continuously for a great length of time and having passed through some very hilly country. After returning to the car yesterday, however, I found that the motor went so fast when I started it that it could almost be said to be racing. This showed me that it could not be overheated and I am at a loss to account for it. I have not had occasion to run the car since and would like to know what the trouble can be before I start out again.

Worcester, Mass. CHAS. JENKINS.

—The carbureter throttle stop screw has been vibrated out of position. On your carbureter at the point where the control linkage is attached, you will notice a small screw similar to that shown in Fig. 1 which permits the throttle to go back just so far that it will be impossible to stop the motor by means of the throttle alone but which will permit it to run idle at very slow speed without choking up and stopping. This screw should have a lock nut upon it as shown in the illustration which will prevent its working loose and doing the very thing that has happened on your car. On account of the close proximity of the carbureter stop screw to the motor, the vibrations are severer at this point and no doubt you will find that the lock nut has become loosened and permitted the stop screw to turn in so far that the motor cannot be throttled down. In fixing the screw in its proper position its purpose must be kept in sight. Start the motor and slowly turn the stop screw keeping the throttle valve lever close up against it until the motor turns over regularly as slowly as possible. The lock nut is then tightened being sure that the position of the stop screw is not changed when turning the nut.

How We Stood Ten Years Ago

Editor THE AUTOMOBILE:—On page 479-80 of THE AUTOMOBILE for September 5, you have published a selection from a French magazine, which probably represents French conditions of 10 years ago, but it does not do justice to American conditions of that date. I, therefore, wish to call attention to a few things wherein we were much in advance of the French at that time. The writer of that article is wrong about engine speeds, for Duryea three-cylinder engines designed in 1897, 15 years ago, had speeds up to about 2,000 and developed maximum power at about 1,200 r.p.m. This engine was also a monobloc having the three cylinders in a single casting. Prior to this for some 4 years, the two-cylinder casting was used on American vehicles. The throttle control was used in 1895-96, and regularly thereafter; the last governors being applied in the winter of 1895, and although made up and on the engines, were taken off because the throttle control gave such perfect results.

Lubrication by large reservoir cups, which fed by the pressure in the cylinder, was applied about 1889, and was used in conjunction with splash. The automatic air valve was applied to American engines in 1899, and American patents taken out about that time. Low tension dynamos were designed as early as 1893, and made and fitted to vehicles in 1896-97. They not only gave current for ignition, but provided an electric headlight. Tie rods were always behind the axle on Duryea vehicles, even as early as 1892, and one company I was connected with in 1898, owned what seemed to be a basic patent on a worm drive for electric motor vehicles which patent has since expired, and which drive is gaining in popularity. In many other features America was not behind, but instead led foreign inventors; but American capitalists were not willing to take up the new business, and American buyers too busy while at home to see anything but dollars, had to go abroad to be convinced of the merits of the new transportation, in which matter they were greatly assisted by the better qualtiy roads in foreign countries.

In the same issue Mr. Heffly, page 484, hits the nail on the head when he gives as a reason for using the metric system in their American factory, "that our parts could be interchanged with the parts made by European factories." In short, although the American market is almost wholly dominated by supplies made to inch measurements, he would not change, because of the bother of doing so; and this is the meat of the cocoanut. It will never pay American makers to change their sizes simply to conform to a theoretical standard. Foreign buyers have no care whether their goods are measured by inches or some other way, so long as they do the work required of them at the proper price, and American makers must avoid any changes which add to the expense of production, for this would lessen, instead of increase, foreign sales, and do no good at home.

Saginaw, Mich. CHAS. E. DURYEA.

Regarding Peugeot Suspension

Editor THE AUTOMOBILE:—In your interesting description of the Peugeot racer, which THE AUTOMOBILE published recently, it was stated that this remarkable car has neither radius nor torsion rods, all the propulsive effort being transmitted through the rear springs. This being the case, please explain why the above devices are used in practically all pleasure cars, if it is possible to construct a shaft-drive system which will successfully transmit the 175 horsepower of this racer without them.

2—In the same issue mention is made of a governor that will not permit the speed of a vehicle to run above what the owner deems is safe. Has any such governor ever been perfected and if so, where can one be purchased?

East Canaan, Conn. DEWEY C. CANFIELD.

—In the first place, it must be remembered that the suspension of a racing car must be considerably stiffer than of the ordinary touring car. The Peugeot is a pure racer. It has been built for speed, not for comfort. Every bit of extra weight that could be removed without weakening the car has been taken off. With this in view, the attachment of the springs to the frame may be noted Fig. 2. It will be seen that the joint is not a shackle, but merely a rigid connection to the frame by a pivot which permits of motion in but one direction. The torque strains fall entirely on these pivots, which are made heavy enough to stand the stresses imposed. In addition to the rigid support at the frame it will be noticed that two extremely heavy straps are placed one on each side of the differential case, which is also heavily braced by the steel housing not shown in the illustration. The straps are capable of absorbing the entire torque strain if necessary and with the differential housing and heavy spring connection besides, the support is ample. In the case of an ordinary touring car, the springs are made as light as is consistent with strength, to make the riding as easy as possible. The added duties of torque strains would compel the spring designer to make the springs to meet both the strains of suspension and torque and the easy riding qualities would suffer in consequence. The springs in a light touring car are thus made

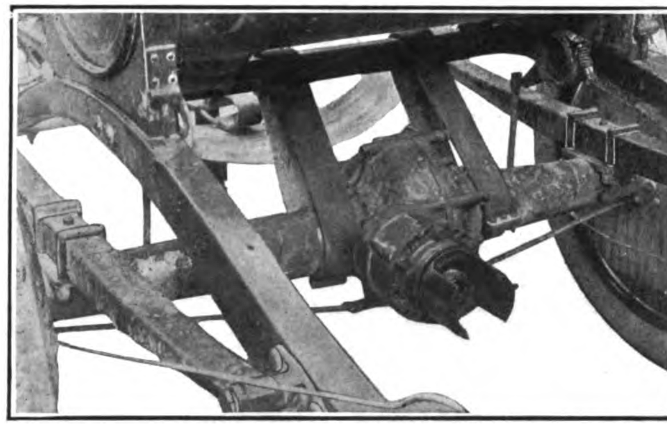


Fig. 2—Rear suspension of the Peugeot. Note heavy straps in place of torque rods

with as flexible a connection as possible and the torque strains are taken up by independent members.

2—A large number of highly satisfactory governors of this type are on the market. Indeed, it is not too much to say that any manufacturer of commercial vehicles in the United States will apply such a governor to his output and will guarantee the correct action of the same within reasonable limits of speed. Any large supply house will carry such a device or will secure one for you at any time.

Using Plastic Tire Mender

Editor THE AUTOMOBILE:—I have purchased a small outfit put up by one of the leading tire concerns, consisting of a can of cement and another can of a stiff plastic preparation which is used to fill cuts in the casing. I would like to know if such a preparation is good to use on tires, if it really does the work and what is the best method of using it. I am sure many others have bought preparations of this kind and then hesitated to use them in the thought that perhaps they were doing the tire more harm than good by their use.

New Rochelle, N. Y. OWNER.

—The preparation you speak of is in common use and it is a very meritorious product. The repairs made with its use are second only to the jobs done by the use of a vulcanizer as far as efficiency goes. If you will carefully go over the tire every little while, seeing that every cut is filled you will get a much greater mileage from a shoe than you would were you to neglect

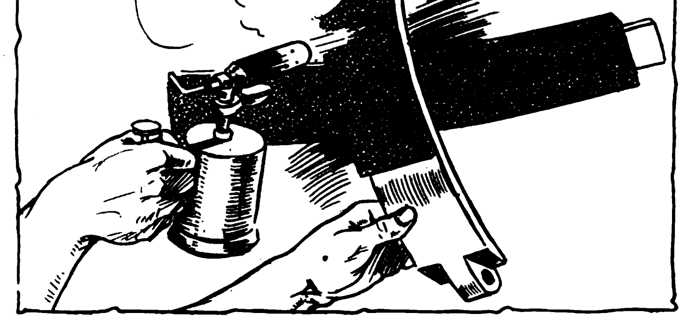


Fig. 3—A very gentle flame applied to the brake will fry out the grease

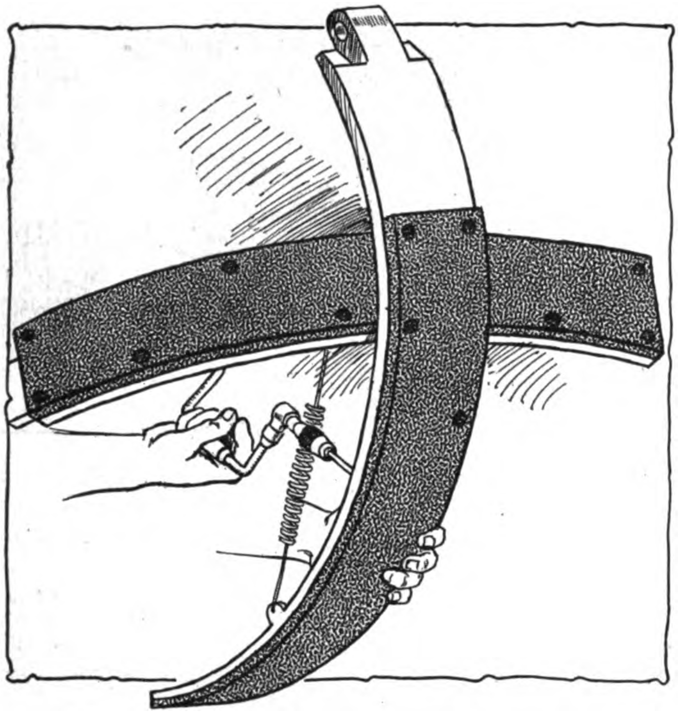


Fig. 4—Holes in the shoe can be used as a guide in drilling the lining

it. The method of using these preparations is practically the same in all of them. The first step is to see that the cut is scrupulously clean. A little gasoline which is applied by soaking a small piece of cloth in the liquid and winding it about a match and then inserting the latter in the cut, rubbing it around the walls, will take out the dirt which will have been forced in by traveling with the tire in that condition. After the cut has been thoroughly cleaned out a coating of the fine cement is applied and allowed to become thoroughly dry. A piece of the plastic, a little larger than the cut, is then taken and kneaded between the fingers. Now apply a second coat of the cemnet to the cut and when this becomes tacky, press in the plastic which has been kneaded until very sticky. Press the plastic firmly into the cut, being sure that it fills it completely. It will attach itself to the tread and will effectually prevent the entrance of water or grit which would end to destroy the fabric and body of the tire. It would be well to make a rule to go over the tire thoroughly every week looking for cuts in the side or face of the tread which would prove a source of weakness and cut down the tire mileage.

Putting Brakes in Condition

Editor The Automobile:—I am about to make a trip through somewhat mountainous country and I wish to put my brakes in the best possible condition; will you kindly tell me through The Automobile exactly what I should do?

Goshen, N. Y. Tourist.

—There are three things which must be particularly noticed in taking care of the brakes and in putting them in condition for a trip such as you mention. These items are as follows:

1—There must be no grease on the shoes.

2—The fabric must be in the best of condition.

3—The brake linkage must apply the brakes when the pedal is depressed.

These will be taken in order and the method of procedure in fulfilling the three requirements will be shown.

1—The grease which penetrates to the brake shoes works through from the differential. In some cases the grease applied to the bearings in the neighborhood of the brakes will get through to the fabric. Regardless of how the grease has worked its way into the bands, the damage resulting will be the same The coefficient of friction of the material will be so cut down that the brakes will not hold as they should and for a tour in a mountainous country will be very dangerous. To treat this trouble, the rear wheel should be removed and the brakes taken off. This will be a simple operation regardless of what car you are driving, consisting merely in the removal of the nuts which will be in plain view when the rear wheel is taken off. The next step is to inspect the material with which the brakes are lined and see if the treatment will fall under the head of number 1 or 2, in the list above. Should the trouble be that there is a coating of grease over the surface of the fabric, there will be two methods of procedure. The first is the removal of the grease by the application of gasoline. The gasoline will cut the grease and remove it from the surface very well. The method has one drawback, however, and that is that it does not take the grease from below the surface of the fabric. An inspection of Fig. 3 will show the method employed in some of the large New York repair shops for taking the grease from below the surface of the fabric. The flame of the torch must

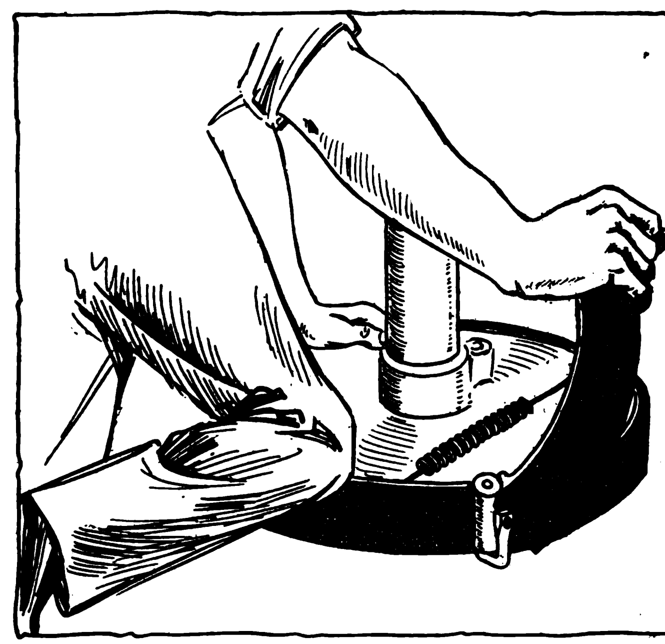


Fig. 5—Step in the assembly of an expanding brake. Spring put on first

be very gently applied so as not to char the fabric itself. After the heat has been directed against the surface of the brake for a short length of time it will be noted that the grease will literally fly out of the fabric leaving it upon the surface in the form of a black carbonaceous deposit. In this state it is readily removed by a cloth steeped in gasoline. The surface of the brake will now be in good condition if the lining has not been worn out. A careful inspection should be made to determine the cause of the leakage of oil or grease to the brakes if it is noted that such leakage is excessive. The differential housing, when the car is in motion is literally filled with flying grease and oil a large part of which works its way along the drive axle. In order to prevent it from working its way out to the end of the axle housing and then into the brakes, a thick wadding of felt is placed around the drive axle and acts in the nature of a stuffing box. In time, the felt will become worn away in some cars where the installation has not been as carefully made as in others. It can readily be replaced and should be, if the driver of the car notices that the brakes exhibit a tendency to slip after a short space of time and examination shows that this is due to the continual passage of grease into the brakes. A slight coating of oil will cause a remarkable falling off in the coefficient of friction and will reduce the efficiency of the brake materially.

2—Assuming that the brake material has been found badly worn. The material may not be torn, but merely worn until it is flush with the rivet heads. This may be due in a certain number of cases to the fact that the rivet is not sufficiently countersunk and this can be cured by flattening it out further by means of a hammer and riveting iron. In lieu of a regular riveting iron, a nail punch or small chisel will serve excellently. Where the brake lining is torn or worn down so far that it is evidently useless and cannot be restored by cleaning to good condition, it must be replaced. To do this, the fabric is first pried away from the shoe as shown in Fig. 6. The rivet is then cut off by means of a cold chisel and hammer as shown in the same illustration and the rivet then punched out. It will be often very difficult to get the rivet out after the head is cut off, owing to the burr which is placed on the end of the rivet in cutting it. If the brake is placed across the jaws of a vise which is opened just sufficiently to allow the rivet to be punched through, the rivet can be readily removed with a small punch assisted by light blows of a small hammer. Care must be taken in the operation not to spring the shoe out of shape, for to do this would cause the brake to drag later and this would mean an immense loss of power and at the same time the rapid wear of the new fabric. In ordering a new piece of fabric from the factory, it will only be necessary to state the model and year of your car, giving the serial number as additional information. The brake lining will be sent you already punched so that it is only necessary to rivet it in place again and the repair will be made. In some cases, the fabric will be purchased from another dealer and in this instance it is necessary to give the length of the piece of fabric required. This is done by measuring with a tape measure around the periphery of the band to which it is to be applied, or, if the old fabric be carefully removed, this can be measured and will serve admirably as a pattern. When the right length of fabric has been secured, lay it around the drum and, with a drill

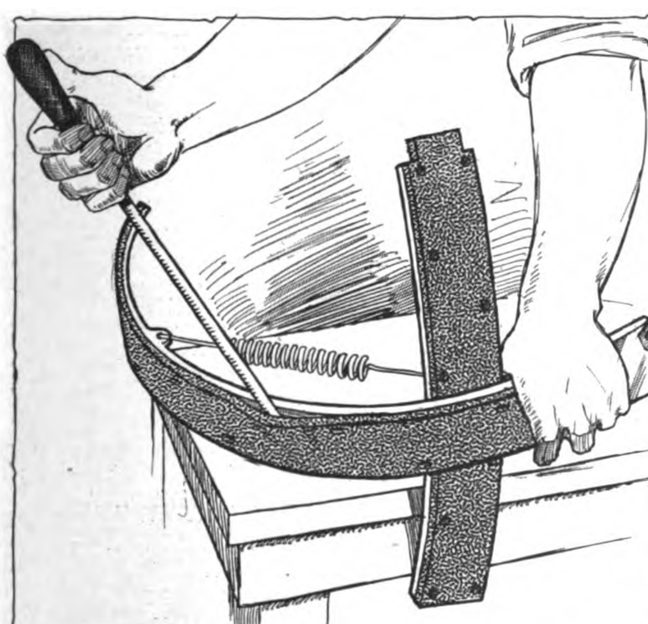


Fig. 6—Before cutting off rivets, pry fabric away from the metal shoe

as in Fig. 4, pierce the holes for the rivets through the new lining. The holes which are already through the metal will serve as a template in marking out the new holes. The holes drilled through the fabric are then countersunk to allow of the head of the rivet being below the surface of the material so there will be no possibility of a metal-to-metal contact between the rivets and the brake drum. The rivets are put through from the fabric side, leaving the head on this side. and riveting them over from the other side. The head of the rivet will be at least 1-16 inch below the surface of the fabric when the work is done.

Replacing the brake upon the drum, if it is of the internal expanding type, will not be an easy matter if the knack is not understood. The drag spring should be first placed on the brake shoe. It can then be sprung over the drum as illustrated in Fig. 5. If the operator tries to place the spring in position after the shoes are in position over the drum, he will have to work entirely against the tension of this spring which amounts to about 20 pounds ordinarily and sometimes more. The best method is to carry the assembly as far as possible without putting the shoes over the drum. One shoe is then placed in position and the other sprung over and immediately fastened. The aid of a second person in slipping the bolt or pin which holds the second drum in place will be a great convenience to one who has not had much experience in the assembling line.

3—The adjustment of the brake links is easily understood and, although the details will vary on every car, any American-made car will use the same method for regulating this part of the brake mechanism so that the brakes will be applied when pressure is placed upon the pedal or pull upon the emergency brake lever. Should the examination of the brakes fail to disclose either wear or grease upon the surface of the shoe, the linkage can be called upon to cure the slip. At each joint in the brake control rods, as they are traced from the pedal or lever to the brake itself, will be found a Y-shaped piece called a clevis. These clevises are capable of being turned to left or right, screwing them off or on the rod which carries them. Screwing the clevis off the rod tends to lengthen the rod while screwing it further on the rod will shorten the total length. When one of the rods is shortened the bell crank lever which applies the brake will be pulled back and the drum pulled closer to the shoe. As a result, when the pedal is all the way down or the lever all the way back the brake is applied with greater force. In some cars a turnbuckle takes the place of the clevis adjustment.

Oakland Uses Northway Motor

Editor The Automobile:—Will you kindly give me the following information: Is the Oakland car an assembled car, and does that company build motors for any other firms?

I have been told that they build the motors for the Cartercar and Cole, and would like to know if they are connected in any way with the Buick Motor Car Company?

Gatesfield, Neb. H. Blanchard.

—The Oakland motor car is an assembled car in that it employs the work done by specialists in each line. The motor is a Northway, the rear axle is a Weston-Mott, etc. The Oakland Motor Car Company does not build motors for themselves or for any other concern. The same power plant is used in other cars of which the Cole is an instance. The Northway concern is a constituent company of the General Motors merger which also includes the Buick company and the Oakland, and the two latter companies are thus constituents of the same merger.

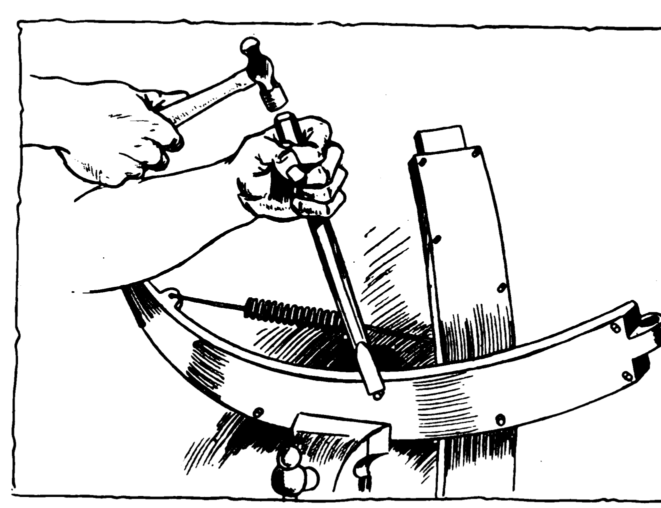


Fig. 7—Be careful in chipping off rivet heads that shoe is not bent

New York, Chicago and Boston Show Space Allotted

Lists Show Big Increases in Representation Over Those of Last Year, Including 405 Exhibitors Comprising All Branches of the Automobile Industry

ALLOTMENTS of space for both weeks of each of the national automobile shows and also for the Boston show have been made by the Motor and Accessory Manufacturers. The lists show a large increase in representation as compared with those of last year and include all told 405 exhibits.

The allotments for each of the shows appear below:

MADISON SQUARE GARDEN, NEW YORK, FIRST AND SECOND WEEKS

Ajax-Grieb Rubber Co..........New York, N. Y.
Automobile Supply Mfg. Co........Brooklyn, N. Y.
Badger Brass Mfg. Co..............Kenosha, Wis.
Baldwin Chain & Mfg. Co........Worcester, Mass.
Bijur Motor Lighting Co.........New York, N. Y.
Bosch Magneto Co............New York, N. Y.
Bower Roller Bearing Co..........Detroit, Mich.
Bowser & Co., S. F............Fort Wayne, Ind.
Briggs Magneto Co....................Elkhart, Ind.
Brown-Lipe Gear Co...........Syracuse, N. Y.
Buda Co., The.......................Harvey, Ill.
Budd Mfg. Co., Edward G.. ....Philadelphia, Pa.
Byrne, Kingston & Co..............Kokomo, Ind.
Carnegie Steel Co.....................Pittsburg, Pa.
Champion Ignition Co...................Flint, Mich.
Chicago Drop Forge & Fdry. Co.......Chicago, Ill.
Coes Wrench Co...............Worcester, Mass.
Columbia Nut & Bolt Co........Bridgeport, Conn.
Connecticut Telephone & Electric Co..Meriden, Conn.
Consolidated Rubber Tire Co......New York, N. Y.
Continental Caoutchouc Co.........New York, N. Y.
Cook's Sons, Adam.............New York, N. Y.
Cotta Transmission Co...............Rockford, Ill.
Cramp & Sons, Wm., Ship & Engine Bldg. Co., Phila.
Diamond Chain & Mfg. Co......Indianapolis, Ind.
Diamond Rubber Co....................Akron, O.
Dixon Crucible Co., Jos.........Jersey City, N. J.
Edison Storage Battery Co....West Orange, N. J.
Edmunds & Jones Mfg. Co..........Detroit, Mich.
Eisemann Magneto Co..........New York, N. Y.
Electric Storage Battery Co......Philadelphia, Pa.
Empire Tire Co.................Trenton, N. J.
Findeisen & Kropf Mfg. Co..........Chicago, Ill.
Firestone Tire & Rubber Co..........Akron, O.
Fisk Rubber Co............Chicopee Falls, Mass.
G & J Tire Co...............Indianapolis, Ind.
Gabriel Horn Mfg. Co.............Cleveland, O.
Garage Equipment Mfg. Co.......Milwaukee, Wis.
Gemmer Mfg. Co...................Detroit, Mich.
Globe Machine & Stamping Co......Cleveland, O.
Goodrich Co., B. F....................Akron, O.
Goodyear Tire & Rubber Co............Akron, O.
Gray & Davis....................Amesbury, Mass.
Harris Oil Co., A. W..........Providence, R. I.
Hartford Rubber Works Co......Hartford, Conn.
Hartford Suspension Co.......Jersey City, N. J.
Havoline Oil Co..............New York, N. Y.
Heinze Electric Co..................Lowell, Mass.
Hess-Bright Mfg. Co...........Philadelphia, Pa.
Hess Steel Castings Co...........Bridgeton, N. J.
Hyatt Roller Bearing Co............Newark, N. J.
Janney-Steinmetz & Co...........Philadelphia, Pa.
Johnson & Co., Isaac G............New York, N. Y.
Jones & Co., Phineas..............Newark, N. J.
Kent Mfg. Works, Atwater......Philadelphia, Pa.
Kokomo Electric Co..................Kokomo, Ind.
Lefever Arms Co...................Syracuse, N. Y.
Light Mfg. & Fdry. Co............Pottstown, Pa.
Link-Belt Co...................Philadelphia, Pa.
McCord Mfg. Co....................Detroit, Mich.
Manufacturers Foundry Co.......Waterbury, Conn.
Michelin Tire Co...................Milltown, N. J.
Morgan & Wright...................Detroit, Mich.
Mosler & Co., A. R. ....Mt. Vernon, N. Y.
Motsinger Device Mfg. Co..........Pendleton, Ind.
Motz Tire & Rubber Co...................Akron, O.
Muncie Gear Works...................Muncie, Ind.
National Tube Co...................Pittsburg, Pa.
New Departure Mfg. Co.............Bristol, Conn.
New Miller Carburetor Co.......Indianapolis, Ind.
N. Y. & N. J. Lubricant Co.......New York, N. Y.
Oliver Mfg. Co......................Chicago, Ill.
Pennsylvania Rubber Co............Jeannette, Pa.
Pittsburg Model Engine Co.............Peru, Ind.
Remy Electric Co................Anderson, Ind.
Republic Rubber Co...............Youngstown, O.
Rose Mfg. Co...................Philadelphia, Pa.
Ross Gear & Tool Co...............Lafayette, Ind.
Royal Equipment Co..........Bridgeport, Conn.
Schrader's Son, Inc., A..........New York, N. Y.
Schwarz Wheel Co...............Philadelphia, Pa.
Sheldon Axle Co.................Wilkes-Barre, Pa.
Smith Co., A. O..................Milwaukee, Wis.
Spicer Mfg. Co....................Plainfield, N. J.
Splitdorf Co., C. F..................Newark, N. J.
Standard Roller Bearing Co......Philadelphia, Pa.
Standard Welding Co..................Cleveland, O.
Stewart & Clark Mfg. Co..............Chicago, Ill.
Stromberg Motor Devices Co..........Chicago, Ill.
Stutz Auto Parts Co..............Indianapolis, Ind.
Swinehart Tire & Rubber Co............Akron, O.
Texas Co., The.................New York, N. Y.
Timken-Detroit Axle Co..............Detroit, Mich.
Timken Roller Bearing Co., The.......Canton, O.
Turner Brass Works, The..........Sycamore, Ill.
United Rim Co.......................Akron, O.
U. S. Light & Heating Co.......New York, N. Y.
Vacuum Oil Co................New York, N. Y.
Valentine & Co................New York, N. Y.
Veeder Mfg. Co., The............Hartford, Conn.
Vesta Accumulator Co.............Chicago, Ill.
Warner Gear Co......................Muncie, Ind.
Warner Mfg. Co........................Toledo, O.
Weed Chain Tire Grip Co.........New York, N. Y.
Weston-Mott Co.......................Flint, Mich.
Wheeler & Schebler............Indianapolis, Ind.
Whitney Mfg. Co...............Hartford, Conn.
Willard Storage Battery Co.........Cleveland, O.
Williams Co., J. H...............Brooklyn, N. Y.
Wolverine Lubricants Co.........New York, N. Y.
Young, O. W.....................Newark, N. J.

MADISON SQUARE GARDEN, FIRST WEEK ONLY

American Ball Bearing Co..........Cleveland, O.
American Bronze Co..................Berwyn, Pa.
American Hardware Corp......New Britain, Conn.
Auburn Auto Pump Co............Boston, Mass.
A-Z Co.........................New York, N. Y.
Batavia Rubber Co.................Batavia, N. Y.
Borne Scrymser Co............New York, N. Y.
Chase & Co., L. C..................Boston, Mass.
Columbia Lubricants Co. of N. Y..New York, N. Y.
Cowles & Co., C..............New Haven, Conn.
Doehler Die Casting Co...........Brooklyn, N. Y.
Double Fabric Tire Co................Auburn, Ind.
Dover Stamping & Mfg. Co.....Cambridge, Mass.
Dykes Co., John L. G................Chicago, Ill.
Endurance Tire & Rubber Co.....New York, N. Y.
Esterline Co......................Lafayette, Ind.
Hartford Machine Screw Co.....Hartford, Conn.
Haws, George A...............New York, N. Y.
Hayes Mfg. Co.....................Detroit, Mich.
Hess Spring & Axle Co...............Carthage, O.
Hoffecker Co. ....Boston, Mass.
Ignition Starter Co.................Detroit, Mich.
International Acheson Graphite Co...Niagara Falls.
Kellogg Mfg. Co................Rochester, N. Y.
Leather Tire Goods Co........Niagara Falls, N. Y.
Lee Tire & Rubber Co..........Conshohocken, Pa.
Lovell-McConnell Mfg. Co..........Newark, N. J.
Marathon Tire & Rubber Co......Cuyahoga Falls, O.
Mezger, C. A.................New York, N. Y.
National Coil Co....................Lansing, Mich.
New Jersey Car Spring & Rubber Co., Jersey City.
Noera Mfg. Co...................Waterbury, Conn.
Pantasote Co..................New York, N. Y.
Piel Co., G.............Long Island City, N. Y.
Randall-Faichney Co................Boston, Mass.
Sager Co., J. H................Rochester, N. Y.
Schoen-Jackson Co......................Media, Pa.
Seamless Rubber Co............New Haven, Conn.
Shaler Co., C. A....................Waupun, Wis.
Simms Magneto Co............New York, N. Y.
Sparks-Withington Co..............Jackson, Mich.
Springfield Metal Body Co........Springfield, Mass.
Standard Thermometer Co..........Boston, Mass.
Voorhees Rubber Mfg. Co.......Jersey City, N. J.
Walpole Rubber Co..................Boston, Mass.
Western Tool & Forge Co........Brackenridge, Pa.
White & Bagley Co..............Worcester, Mass.

GRAND CENTRAL PALACE, FIRST AND SECOND WEEKS

Buda Co..............................Harvey, Ill.
Cramp & Sons, Wm., Ship & Engine Bldg. Co., Phila.
Gould Storage Battery Co........New York, N. Y.
Gray & Davis...................Amesbury, Mass.
Hartford Suspension Co..........Jersey City, N. J.
Muncie Gear Works ....Muncie, Ind.
Ross Gear & Tool Co..............Lafayette, Ind.
Schrader's Son, Inc., A..........New York, N. Y.
Simms Magneto Co.............New York, N. Y.
Texas Co......................New York, N. Y.
Timken-Detroit Axle Co..............Detroit, Mich.
Timken Roller Bearing Co.............Canton, O.
Vesta Accumulator Co...............Chicago, Ill.
Warner Gear Co.....................Muncie, Ind.
Warner Instrument Co.................Beloit, Wis.
Wheeler & Schebler Co..........Indianapolis, Ind.

GRAND CENTRAL PALACE, FIRST WEEK ONLY

American Hardware Corp......New Britain, Conn.
Aurora Automatic Machine Co........Chicago, Ill.
Continental Rubber Works Co.............Erie, Pa.
Esterline Co....................Lafayette, Ind.
Herz & Co.....................New York, N. Y.
New Departure Mfg. Co.............Bristol, Conn.
Schoen-Jackson Co......................Media, Pa.
Spacke Machine Co., F. W.....Indianapolis, Ind.
Standard Thermometer Co...........Boston, Mass.
Warner Mfg. Co..........................Toledo, O.

CHICAGO, FIRST AND SECOND WEEKS

Ajax-Grieb Rubber Co............New York, N. Y.
American Bronze Co...................Berwyn, Pa.
Auto Parts Mfg. Co....................Muncie, Ind.
Badger Brass Mfg. Co.............Kenosha, Wis.
Baldwin Chain & Mfg. Co........Worcester, Mass.
Bosch Magneto Co..............New York, N. Y.
Bower Roller Bearing Co...........Detroit, Mich.
Bowser & Co., S. F............Fort Wayne, Ind.
Briggs Magneto Co...................Elkhart, Ind.
Brown-Lipe Gear Co.............Syracuse, N. Y.
Buda Co. ....Harvey, Ill.
Byrne, Kingston & Co..............Kokomo, Ind.
Champion Ignition Co.................Flint, Mich.
Chicago Drop Forge & Fdry. Co......Chicago, Ill.
Consolidated Rubber Tire Co......New York, N. Y.
Continental Caoutchouc Co.......New York, N. Y.
Continental Motor Mfg. Co.......Muskegon, Mich.
Cotta Transmission Co..............Rockford, Ill.
Cramp & Sons, Wm., Ship & Engine Bldg. Co., Phila.
Detroit Lubricator Co..............Detroit, Mich.
Diamond Chain & Mfg. Co.......Indianapolis, Ind.
Diamond Rubber Co....................Akron, O.
Dixon Crucible Co., Jos.......Jersey City, N. J.
Edison Storage Battery Co...West Orange, N. J.
Edmunds & Jones Mfg. Co..........Detroit, Mich.
Eisemann Magneto Co..........New York, N. Y.
Electric Storage Battery Co......Philadelphia, Pa.
Empire Tire Co....................Trenton, N. J.
Esterline Co......................Lafayette, Ind.
Findeisen & Kropf Mfg. Co.........Chicago, Ill.
Firestone Tire & Rubber Co...........Akron, O.
Fisk Rubber Co...........Chicopee Falls, Mass.
G & J Tire Co...............Indianapolis, Ind.
Gabriel Horn Mfg. Co..............Cleveland, O.
Garage Equipment Co..........Milwaukee, Wis.
Gemmer Mfg. Co....................Detroit, Mich.
Globe Machine & Stamping Co.......Cleveland, O.
Goodrich Co., B. F.....................Akron, O.
Goodyear Tire & Rubber Co...........Akron, O.
Gould Storage Battery Co........New York, N. Y.
Gray & Davis...................Amesbury, Mass.
Harris Oil Co., A. W..........Providence, R. I.
Hartford Rubber Works Co.....Hartford, Conn.
Hartford Suspension Co.........Jersey City, N. J.
Havoline Oil Co..............New York, N. Y.
Heinze Electric Co..................Lowell, Mass.
Herz & Co....................New York, N. Y.
Hyatt Roller Bearing Co.............Newark, N. J.
Imperial Brass Mfg. Co..............Chicago, Ill.
Johnson & Co., Isaac G.........New York, N. Y.
Kent Mfg. Works, Atwater.......Philadelphia, Pa.
Kokomo Electric Co..................Kokomo, Ind.
Lefever Arms Co...................Syracuse, N. Y.
Link-Belt Co...................Philadelphia, Pa.
McCord Mfg. Co....................Detroit, Mich.
Morgan & Wright...................Detroit, Mich.
Motsinger Device Mfg. Co.........Pendleton, Ind.
Motz Tire & Rubber Co., The..........Akron, O.
Muncie Gear Works...................Muncie, Ind.
National Coil Co...................Lansing, Mich.
National Tube Co...................Pittsburg, Pa.
New Miller Carburetor Co......Indianapolis, Ind.
N. Y. & N. J. Lubricant Co.......New York, N. Y.
Oliver Mfg. Co......................Chicago, Ill.
Pennsylvania Rubber Co...........Jeannette, Pa.
Remy Electric Co.................Anderson, Ind.
Republic Rubber Co..............Youngstown, O.
Ross Gear & Tool Co..............Lafayette, Ind.
Royal Equipment Co...........Bridgeport, Conn.
Sheldon Axle Co.................Wilkes-Barre, Pa.
Smith Co., A. O...................Milwaukee, Wis.
Spicer Mfg. Co...................Plainfield, N. J.
Splitdorf Co., C. F..................Newark, N. J.
Standard Roller Bearing Co......Philadelphia, Pa.
Standard Welding Co................Cleveland, O.
Stewart & Clark Mfg. Co.............Chicago, Ill.
Stromberg Motor Devices Co.........Chicago, Ill.
Stutz Auto Parts Co............Indianapolis, Ind.
Swinehart Tire & Rubber Co...........Akron, O.
Texas Co., The.................New York, N. Y.
Timken-Detroit Axle Co.............Detroit, Mich.
Timken Roller Bearing Co.............Canton, O.
Turner Brass Works................Sycamore, Ill.
United Rim Co........................Akron, O.
U. S. Light & Heating Co........New York, N. Y.
Vacuum Oil Co.................New York, N. Y.
Veeder Mfg. Co.................Hartford, Conn.
Vesta Accumulator Co..............Chicago, Ill.
Warner Gear Co.....................Muncie, Ind.
Warner Instrument Co................Beloit, Wis.
Warner Mfg. Co........................Toledo, O.
Waukesha Motor Co.............Waukesha, Wis.
Weed Chain Tire Grip Co.........New York, N. Y.
Western Motor Co...................Marion, Ind.
Weston-Mott Co.......................Flint, Mich.
Wheeler & Schebler............Indianapolis, Ind.
Whitney Mfg. Co...............Hartford, Conn.
Willard Storage Battery Co.........Cleveland, O.
Williams Co., J. H...............Brooklyn, N. Y.
Wolverine Lubricants Co.........New York, N. Y.

CHICAGO, FIRST WEEK ONLY

American Ball Bearing Co..........Cleveland, O.
Auburn Auto Pump Co..............Boston, Mass.
Automobile Supply Mfg. Co........Brooklyn, N. Y.
Batavia Rubber Co., The..........Batavia, N. Y.
Coes Wrench Co...............Worcester, Mass.
Connecticut Telephone & Electric Co..Meriden, Conn.
Cook's Sons, Adam.............New York, N. Y.
Cowles & Co., C..............New Haven, Conn.
Doehler Die Casting Co...........Brooklyn, N. Y.
Double Fabric Tire Co...............Auburn, Ind.
Dykes Co., John L. G................Chicago, Ill.
Endurance Tire & Rubber Co......New York, N. Y.
Federal Rubber Mfg. Co.............Cudahy, Wis.
Haws, George A...............New York, N. Y.
Hayes Mfg. Co.....................Detroit, Mich.
Hess Spring & Axle Co..............Carthage, O.
Hoffecker Co.......................Boston, Mass.
Ignition Starter Co.................Detroit, Mich.
Internat'l Acheson Graphite Co. Niagara Falls, N. Y.
Kellogg Mfg. Co...............Rochester, N. Y.
Leather Tire Goods Co........Niagara Falls, N. Y.
Lee Tire & Rubber Co..........Conshohocken, Pa.
Michelin Tire Co..................Milltown, N. J.
New Jersey Car Spring & Rubber Co..Jersey City
Pantasote Co...................New York, N. Y.

Piel Co., G..............Long Island City, N. Y.
Racine Rubber Co..................Racine, Wis.
Randall-Faicheny Co...............Boston, Mass.
Sager Co., J. H................Rochester, N. Y.
Schoen-Jackson Co....................Media, Pa.
Seamless Rubber Co...........New Haven, Conn.
Shaler Co., C. A..................Waupun, Wis.
Simms Magneto Co..............New York, N. Y.
Sparks Withington Co.............Jackson, Mich.
Standard Thermometer Co...........Boston, Mass.
Universal Tire Protector Co... ....Angola, Ind.
Valentine & Co..................New York, N. Y.
Voorhees Rubber Mfg. Co.....Jersey City, N. J.
White & Bagley Co.............Worcester, Mass.

BOSTON, FIRST AND SECOND WEEK

Ajax-Grieb Rubber Co...........New York, N. Y.
Automobile Supply Mfg. Co........Brooklyn, N. Y.
Borne, Scrymser Co...............New York, N. Y.
Bowser & Co., S. F.............Fort Wayne, Ind.
Champion Ignition Co....................Flint, Mich.
Coes Wrench Co...............Worcester, Mass.
Consolidated Rubber Tire Co......New York, N. Y.
Continental Caoutchouc Co........New York, N. Y.
Cramp & Sons, Wm., Ship & Engine Bldg. Co., Phila.
Diamond Rubber Co....................Akron, O.
Dixon Crucible Co., Jos..........Jersey City, N. J.
Edison Storage Battery Co....West Orange, N. J.
Electric Storage Battery Co.......Philadelphia, Pa.
Firestone Tire & Rubber Co.............Akron, O.
Fisk Rubber Co.............Chicopee Falls, Mass.
G & J Tire Co...................Indianapolis, Ind.
Goodrich Co., B. F.....................Akron, O.
Goodyear Tire & Rubber Co............Akron, O.
Gray & Davis...................Amesbury, Mass.
Harris Oil Co., A. W............Providence, R. I.
Hartford Rubber Works Co.........Hartford, Conn.
Hartford Suspension Co.........Jersey City, N. J.
Heinze Electric Co...................Lowell, Mass.
Morgan & Wright...................Detroit, Mich.
Motz Tire & Rubber Co..................Akron, O.
National Tube Co...................Pittsburg, Pa.
Pennsylvania Rubber Co............Jeannette, Pa.
Remy Electric Co.................Anderson, Ind.
Standard Welding Co.................Cleveland, O.
Stewart & Clarke Mfg. Co............Chicago, Ill.
Swinehart Tire & Rubber Co............Akron, O.
Texas Co. ....New York, N. Y.
United Rim Co., The....................Akron, O.
U. S. Light & Heating Co........New York, N. Y.
Vacuum Oil Co....................New York, N. Y.
Veeder Mfg. Co..................Hartford, Conn.
Warner Instrument Co..................Beloit, Wis.
Willard Storage Battery Co..........Cleveland, O.
Wolverine Lubricants Co.........New York, N. Y.
Voorhees Rubber Mfg. Co........Jersey City, N. J.

BOSTON, FIRST WEEK ONLY

Auburn Auto Pump Co.............Boston, Mass.
Batavia Rubber Co................Batavia, N. Y.
Columbia Lubricants Co. of N. Y..New York, N. Y.
Connecticut Telephone & Electric Co..Meriden, Conn.
Cook's Sons, Adam...............New York, N. Y.
Double Fabric Tire Co..................Auburn, Ind.
Dover Stamping & Mfg. Co......Cambridge, Mass.
Endurance Tire & Rubber Co.....New York, N. Y.
Empire Tire Co....................Trenton, N. J.
Federal Rubber Mfg. Co.............Cudahy, Wis.
Havoline Oil Co...................New York, N. Y.
Haws, George A..................New York, N. Y.
Hoffecker Co., The....................Boston, Mass.
Internat'l Acheson Graphite Co.Niagara Falls, N. Y.
Leather Tire Goods Co........Niagara Falls, N. Y.
Lee Tire & Rubber Co..........Conshohocken, Pa.
Lovell-McConnell Mfg. Co...........Newark, N. J.
Michelin Tire Co..................Milltown, N. J.
National Coil Co....................Lansing, Mich.
New Departure Mfg. Co..............Bristol, Conn.
N. Y. & N. J. Lubricant Co......New York, N. Y.
Pantasote Co.....................New York, N. Y.
Piel Co., G..............Long Island City, N. Y.
Randall-Faichney Co.................Boston, Mass.
Republic Rubber Co..............Youngstown, O.
Schoen-Jackson Co....................Media, Pa.
Seamless Rubber Co...........New Haven, Conn.
Shaler Co., C. A....................Waupun, Wis.
Splitdorf Co., C. F.................Newark, N. J.
Simms Magneto Co.. ....New York, N. Y.
Standard Thermometer Co...........Boston, Mass.
Stromberg Motor Devices Co..........Chicago, Ill.
Valentine & Co...................New York, N. Y.
Weed Chain Tire Grip Co........New York, N. Y.
White & Bagley Co..............Worcester, Mass.

BOSTON, SECOND WEEK ONLY

Baldwin Chain & Mfg. Co........Worcester, Mass.
Whitney Mfg. Co..................Hartford, Conn.

New York Show Spaces

Car Allotments at Madison Square Garden and Grand Central Palace Made

ALLOTMENTS of space for the automobile show in 1913, which will be held at Madison Square Garden and Grand Central Palace under the auspices of the Automobile Board of Trade during the week commencing January 11, were made Thursday. The members of the Automobile Board of Trade will be housed at the Garden and the other manufacturers will be represented at the Palace.

There will be eighty-seven different makes of automobiles shown, including forty-six at the Garden and forty-one at the Palace. Those who drew space at the Garden are as follows:

Olds, Lozier, Stoddard-Dayton, Oakland, Flanders, Franklin, Stearns, Pope, Stevens-Duryea, Peerless, Locomobile, Mitchell, Winton, Cadillac, Buick, Packard, Hudson, Maxwell, Overland, Pierce-Arrow, Chalmers, Reo, White, Cartercar, Warren, Marmon, Garford, Columbia, Moline, Thomas, Premier, Pullman, Alco, Jackson, Mercer, Auburn, Haynes, S. G. V., Cunningham, Knox, Moon, Matheson, Selden, National, Abbott-Detroit, and Velie.

It will be noted in the list above that the Alco, Auburn and Abbott are listed as members of the Automobile Board of Trade as they were elected to membership recently and have qualified. A number of additional applications for membership have been made and acted upon, but no announcement has yet been made as to who are included in the new list.

The companies that will show at the Palace are as follows: Imperial, Cole, Inter-State, Case, Herreshoff, Krit, Cutting, Kissel, Paige-Detroit, Speedwell, Pathfinder, Austin, Regal, Buffalo Electric, Flanders Electric, Columbus, Metz, Studebaker, Fiat, Hupmobile, Kline, Henderson, Michigan, Benz, R. C. H., Bergdoll, Stutz, American, Rambler, Ohio, Crow, Edwards, Atlas, Lenox, Davis, Paterson, Marathon, Havers, Westcott, Only Car and Marion.

Salon Dates January 2-11

As has been the case for several years past the 1913 automobile show season in this country will be inaugurated by the Annual Salon of Imported Cars, held in New York. The dates for the coming salon are January 2-11 and it will again be staged in the grand ball room of the Hotel Astor. Among those who have already arranged to have Paris exhibits shipped to this country are, De Dion Bouton, Isotta, Fraschini, Lancia, Mercedes, Metallurgique, Minerva, Panhard and Renault. This list represents five nations, France, Germany, England, Italy and Belgium.

Motor Trucks Cause Strike

Chicago Company's Teamsters Quit When Motor Trucks Are Used With Them

FOR the first time since the introduction of the motor truck in the Chicago commercial field teamsters struck during the day because the trucks had been used in part to replace team service by the Consolidated Bottling Company. The company installed six motor trucks, each of which will do the work of two teams. Thirty regular teamsters walked out. The teamsters wanted each motor truck restricted to do the work of only one team.

"The company called for the police to guard its property and threatened to shut the teamsters out for good unless they return to work. George Lomax, president of the concern, said the men violated their agreement."

The above, from the Chicago *Tribune*, October 4, shows something of the attitude assumed by certain branches of the teamsters' unions toward motor transportation, and shows also how, through ignorance, a man or bunch of men may stand in their own way.

The trouble arose over the fact that a motor driver made a delivery and collection at a point on another man's route. Since drivers are paid for the amount they sell off the wagon, the man whose territory was invaded made objection and was upheld by his mates.

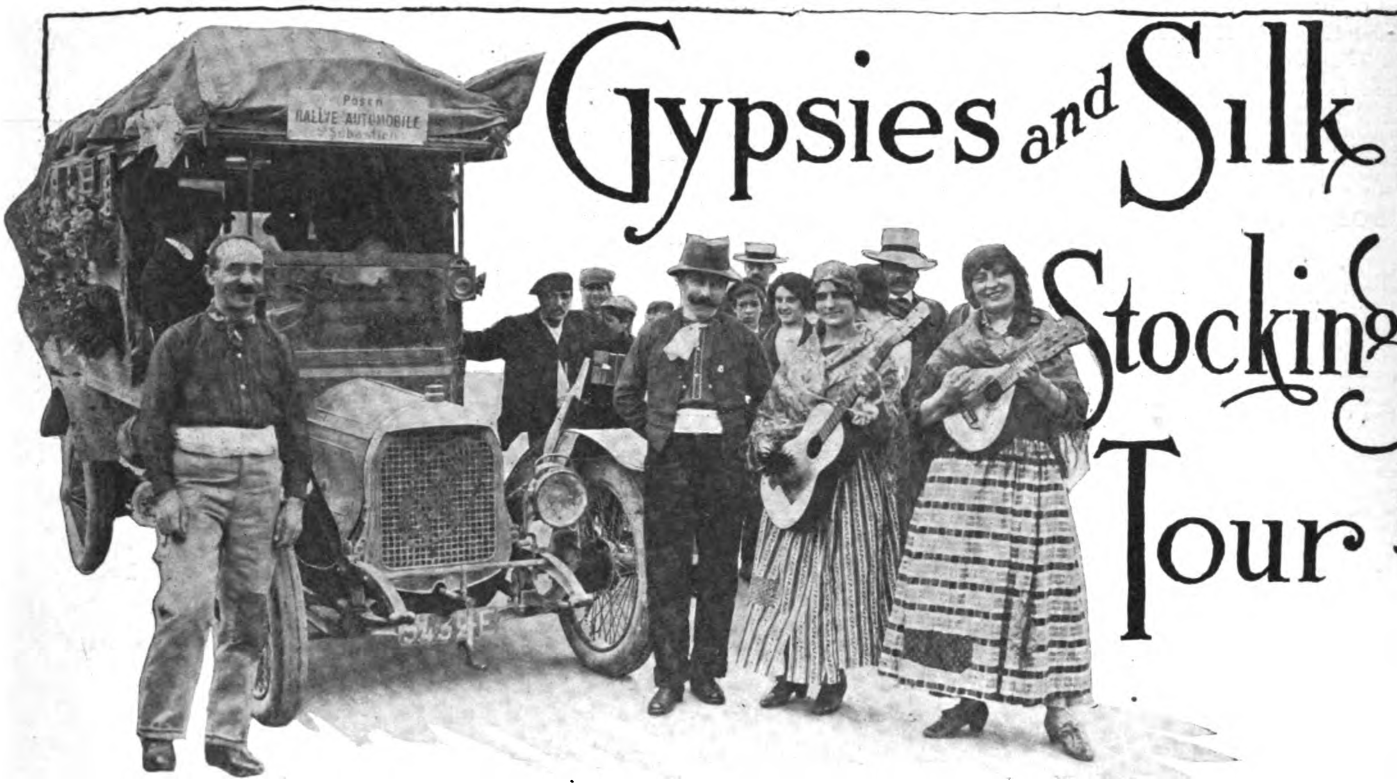
Their general attitude toward their work in this district is shown by an incident on visiting the bottling works in question. To reach the works one must pass under a railway bridge about a block long, dark and damp. Under this bridge, on the trip in, a team and wagon was noticed standing on the far side of the wide roadway, the horses with heads drooped and the driver sound asleep on the seat.

On account of the teamsters' attitude, according to Mr. George Lomax, president of the bottling works, it has been necessary to have three men on some of the trucks. In hiring a driver the teamster refuses to give up his wagon and, upheld by the union, must ride on the motor truck, make the sales and receipt, while a boy is taken along to help in the unloading. This is only on heavy routes.

The motor trucks make as high as 80 miles a day, the longest run made daily being 38 miles out and back to Joliet, Ill. Several of the machines make two runs a day of 40 miles each. Thirty-five stops are made per trip of 10 to 15 minutes each. Drivers take back empty cases.

One hundred cases are carried to a load, weighing 40 pounds each. The trucks are of 2-ton capacity and are built by the Consolidated Company for their own use. Trucks run full both ways.

Gypsies and Silk Stocking Tour



The Gregoire car of Monsieur Picard, first of the general classification A, showing the passengers costumed as Gypsies

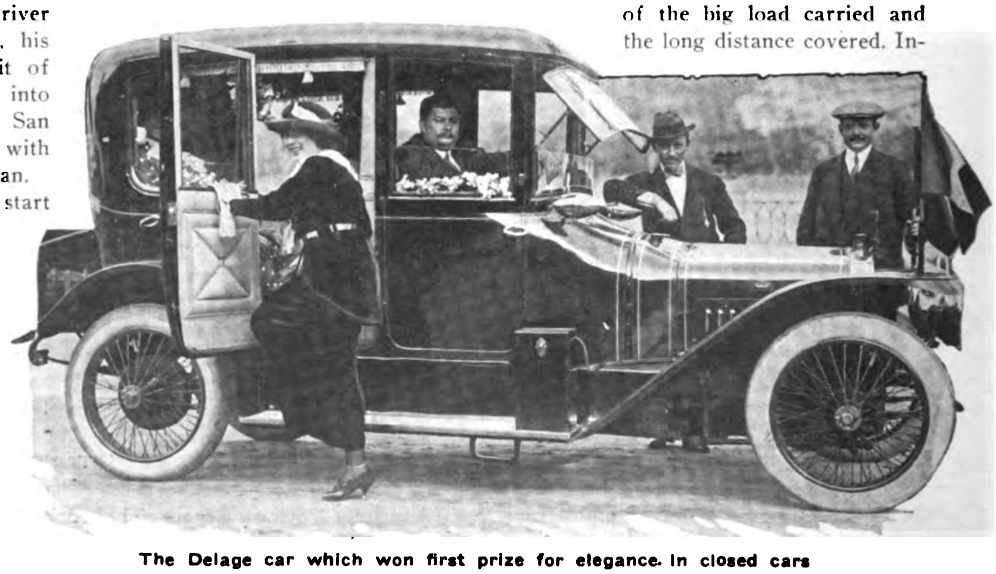
SAN SEBASTIAN, Sept. 27—Out of about 100 competitors a Gregoire caravan won first place in the European rally ending at San Sebastian. The Gregoire people were wise enough to see that in order to win this competition they must carry the greatest possible number of passengers, travel the greatest distance and have the smallest possible motor. They therefore selected one of their semi-racing types of chassis, having a high-efficiency grand prix type of motor and sent it to Posen, in Poland, to make a run of 1,470 miles ending at the Spanish holiday resort. The chassis was specially trussed with a view to carrying eleven persons, representing with their baggage, accessories and bodywork a load of about 3 tons.

With a keen eye to business the Gregoire company equipped this chassis with a caravan body bought for a few dollars from a band of wandering gypsies. With all the accessories, such as chimney, flower pots, bird cages, sweeping brushes, bundles of rags, etc., the combination was so strange that the police were required to keep the spectators back in nearly every town passed through. The crew, consisting of race driver Porporato, the Gregoire agent in Berlin, his wife and relatives, entered into the spirit of the movement, transforming themselves into wandering gypsies, and on arrival at San Sebastian driving through the town with banjoists seated on the roof of their caravan.

The rally regulations provided that a start should be made from various European cities on given dates, the competitors uniting at Bordeaux, then proceeding in a group to San Sebastian. They had to maintain a commercial average of 19 miles an hour and about 240 miles a day. For every 100 kilometers (62.5 miles) they received 4 points; for every passenger, 5 points; for every 100 kilograms (220 pounds) in weight, 1 point; for a closed body, 8 points, and for an open body, 3 points. To equalize chances deductions were made as follows: for every liter cylinder area, 10 points; for every kilometer less than the average imposed, 2 points.

To get advantage of the mileage points nearly all the competitors sought to start as far away from San Sebastian as possible. Results showed that the rules were such that the short-distance tourists had little chance of being well placed. The necessity of running out to a distant starting point necessarily increased the mileage, many of the cars covering 1,000 miles before officially beginning the run. There were exceptionally few failures to meet the minimum requirements, for over sixty cars made the trip from such points as St. Petersburg, Warsaw, Berlin, Amsterdam, Vienna, Milan, Brussels, etc., without a loss of points, and their final position could only be determined after careful weighing and calculation. The Gregoire, heading the list with 144.9 points, was followed by a Hispano-Suiza with 116.6 points, a Berliet with 108.7, a Laurent-Klement with 104.5, an Apollo with 101.1 and sixty others in decreasing value.

The feature of the tour was the small size of the motors in view of the big load carried and the long distance covered. In-



The Delage car which won first prize for elegance in closed cars

A closed car with inside drive ascending one of the mountain traversed

tended primarily as an advertising scheme for the town of San Sebastian, the rally had the valuable quality of showing up the regularity of cars under long-distance touring conditions and of revealing what can be done with motors of really very small dimensions. The accompanying table, giving the particulars of the first ten cars only, shows the distance covered.

In addition to these, fifty-two others were classed, among them being a Ford car, the only American competitor in the rally. A few days before the start of the event some changes were made in the rules; as notification of these could not reach Russia before the departure of the competitors from St. Petersburg a separate list of awards was made for all those having started the run from Russian territory. Under this heading the winner was a Metallurgique car of 3.5 by 5.5 inches bore and stroke, covering a distance of 2,225 miles in its run from St. Petersburg, and securing 163 points, the highest number given to any competitor. The car had a torpedo touring body with five persons aboard. The second under the heading was a Russo-Baltique, of 4 by 5.1 inches bore and stroke, with seven persons aboard, also coming from St. Petersburg, and winning 152 points. The third was a similar car with only two passengers, also from St. Petersburg, and winning 96 points.

On arrival at San Sebastian an elegance competition was held, when the inside steering Delage, having won eighth place on the general list, was awarded the first prize for elegant appearance being followed by the Metallurgique coupé hailing from Brussels, a similar car from Berlin, a Scap, a Gregoire inside steering, and a Scar. In the open-car section the first prize winner was M. Aschoff's Metallurgique torpedo, followed by two other Metallurgique torpedoes, Paul Garnier's La Buire torpedo, a Mercedes torpedo, a La Buire, a Berliet, and an Anasagasti.

A hill-climbing competition was also open to all the rally competitors divided into three classes, two of them being for open cars, two for closed cars and one for cars without any limitation. In the small section of the open cars the fastest was Porporato's Gregoire, which with its caravan body had carried eleven persons across Europe. It covered the 3 kilometers of winding gradient averaging 10 per cent., and having a number of difficult turns, in 4 minutes 31 1-5 seconds. Second was a Scar in 4 minutes 47 seconds; third, a Gobron in 5 minutes 17 seconds; fourth, a Rolland-Pilain in 5 minutes 17 2-5 seconds; fifth, a Gobron in 5 minutes 20 3-5 seconds, and, sixth, inside steering Delage in 5 minutes 33 3-5 seconds.

In the big touring car class the first prize winner was a Rolls-Royce in 4 minutes 33 4-5 seconds, second being a Delaunay-Belleville, followed by a Turcat-Mery, a Scap and a Renault.

In the touring car section the first four were Mathis, 4:24 2-5; Ford, 4:32; Crespelle, 4:32 3-5; Sava, 4:47. The fastest big touring car was a Benz in 4:06 1-5, followed by Rolls-Royce, 4:07; Graft & Stift, 4:17 2-5; Metallurgique, 4:47 1-5; Lorrain-Dietrich, 4:53 3-5.

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Gaillon Climb

PARIS, FRANCE, Oct. 6—Cable—This year's Gaillon hill-climb was won by Fritz Erle's Benz in 22 seconds, 1 second less than last year. His performance means a speed of 101.5 miles per hour up the 1 kilometer with 9 per cent. gradient. The other times were:

Car	Driver	Time	Car	Driver	Time
	Crespelle	:36	Alcyon	Barriaux	:41
Anasatti	Guyot	:37	Bugatti	Pouget	:45.3
Hispano-Suiza	Bara	:37.3	Buzatti		:53.2
Bedelia*	Bonville	:39.3			

*Renault aviation motor.

Touring cars which climbed the hill and their drivers were:

Car	Driver	Time	Car	Driver	Time
Hispano-Suiza	Derny	:80	Motobloc	Delpierre	:50.4
Benz	Erle	::43.3	Barre	Ravaud	:52
Scap	Mollet	:47	Scap	Launais	:55.1
Sunbeam	Rigal	:47.4	Bugatti	Tonello	:58
Scap	Charles	:48	Panhard-Knight	Artault	:58

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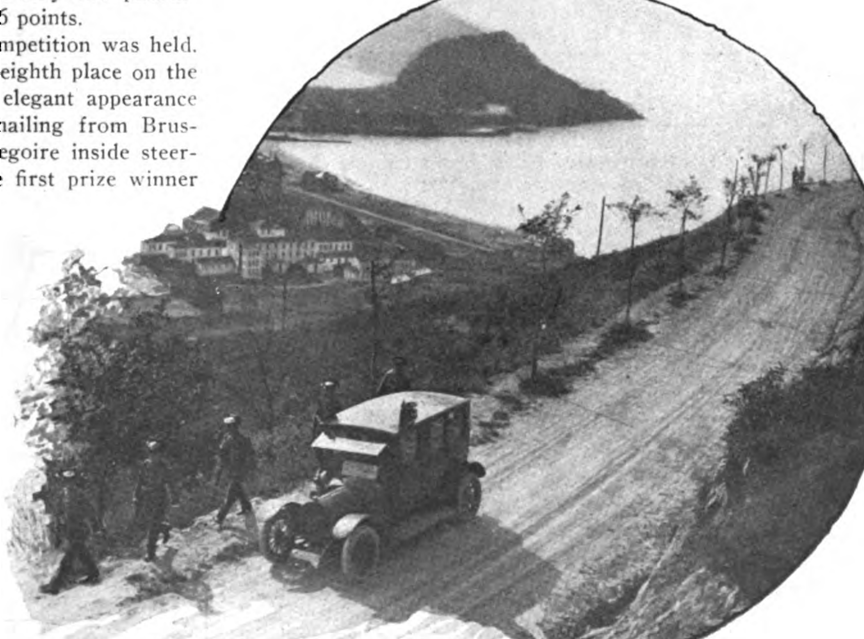
Car	Bore & Stroke	Start. point	Miles	Body	Passengers	Points
Gregoire	3.1 by 5.9 ins.	Posen, Poland	1470	caravan	11	144.9
Hispano-Suiza ..	3.1 " 7 ins.	Warsaw	1640	torpedo	4	116.6
Berliet	2.7 " 3.9 ins.	Berlin	1304	berlin	4	108.7
Laurin-Klement .	2.7 " 4.3 ins.	Vienna	1320	torpedo	4	104.5
Appolo	3 " 4.6 ins.	Koenigsberg	1660	touring	6	101.1
Berliet	3.9 " 5.5 ins.	Vienna	1320	limousine	4	98.1
Simplicia	2.7 " 3.9 ins.	Berlin	1304	touring	4	97.1
Delage	2.9 " 4.7 ins.	Amsterdam	1052	berlin	4	88.5
Sava	3.1 " 5.5 ins.	Brussels	907	torpedo	6	77.58
Metallurgique ...	4 " 5.9 ins.	Brussels	907	coupe	5	77.55



Showing the Gobron car descending a steep grade

Harking Back a Decade

Alexander Winton Set New Track Marks at Providence—73 Entered in New York-Boston Run

FROM *The Automobile and Motor Review,* October 4, 1902: The Right Honorable Arthur J. Balfour, M.P., is considered one of the most enthusiastic users of the automobile in England. The British premier uses his cars for business and relaxation.

The rules for the hill trials and tire tests recently held under the auspices of the Automobile Club of Great Britain and Ireland were entirely different from those in effect during the New York-Buffalo run of last year. As far as the entered cars were concerned they were classified according to their listed prices and their manufacturers guaranteed to supply duplicates of the entered cars to customers who place orders before a specific date.

The Detroit Automobile Club, which was organized last June, now has a membership of sixty. F. H. Newberry is president.

Alexander Winton, in his Bullet, set new gasoline automobile marks from 2 to 5 miles at the race meeting held in Providence, September 24. The turns were not banked and the rear wheels of the car slewed around with such abandon that after Mr. Winton had made 5 miles of the scheduled assault on the 10-mile record held by Fournier, he slowed down and abandoned the attempt. Up to 5 miles his time was faster than ever before made on a circular dirt track. The 2 miles were covered in 2:12 1-4; 3 miles, 3:18 3-4; 4 miles, 4:25, and 5 miles, 5:30 3-5. This ranges from 1 to 2 seconds faster for each of the distances. The Cannon steam racer established a new mark for steamers when it covered the mile in 1:05 1-4.

The German Emperor used his automobile frequently during the field maneuvers of the army, just concluded. The Crown Prince acted as driver on more than one occasion.

Exports of automobiles and parts for the week ending September 27 were valued at $13,435.

The New York aldermen are considering the enactment of an ordinance to tax hacks and public conveyances from $2 to $5 for license to operate, including automobiles in its terms. Private conveyances are to be taxed $10 a year. The automobile fraternity is solidly arrayed against the proposed measure.

Entries have closed for the New York to Boston and return reliability run and seventy-three contestants are indicated. The original rules drafted called for an average speed of 15 miles an hour, but the Automobile Club of America has amended them so that the average speed limit must be 14 miles an hour. First-class certificates will be issued to those contestants who maintain an average of from 12 to 14 miles an hour. The entries consist of fifty-five gasoline automobiles, seventeen steam vehicles and one electric. The cars range in rated horsepower from 4 to 24, the latter being an Ohio and a Pope.

Accelerometer—Its Use and Value

(Continued from page 729.)

the bench test from which the torque curves in Fig. 1 are derived. In short, the carbureter is likely to choke and so cause loss of torque. This explanation is borne out by the fact that when grade climbing on bottom gear the carbureter has time to act, and it was found that the car in question was capable of climbing a grade steeper than 1 in 5, equivalent to an acceleration reading exceeding 6 1-2 feet per second per second. Some carbureters have better starting qualities than others and curves such as these bring out the differences. As regards *d*, an initial starting acceleration of about 7 would, with, say, two-thirds of the car weight on the rear axle, correspond to a ratio of tractive effort to axle load of about one-third; this should not cause slipping if the clutch is let in gently, but with suddent starting the momentary acceleration may rise enough to cause slipping to begin, and once begun it is liable to continue.

Ideal acceleration would require to conform to the following conditions: It should at any moment absorb the full output of which the engine is capable, that is, the horsepower exerted should be constant, and it should be graduated so that the acceleration does not increase or decrease faster than a certain rate.

It may be said at once that neither of these conditions can be fulfilled by the motor car as at present made. Material alterations would be necessary. To yield a constant horsepower throughout the starting period—and when hill-climbing—it would require to be fitted with an infinitely variable gearbox; instead of there being three torque curves, as in Fig. 1, there would be only one, viz., the rectangular hyperbola, which would be the envelope of an infinite number of such curves. The limit to the vertical height to which such a hyperbolic torque curve could usefully be taken would be the limiting torque at which the rear road wheels would slip. The curve corresponding to these conditions is that shown at A B C in Fig. 7. Modification is needed even in this curve, however, if the acceleration is to be graduated with time. To provide for the acceleration not growing faster than a certain number of feet per second per second in a second it is necessary to replace the vertical line O A with the parabolic arc shown dotted.

To conform to these ideals the car would probably need either electric or hydraulic transmission. Both of these have been shown to be capable of giving a hyperbolic torque curve, and the former has been found able to give a graduated acceleration. Any successful application of them should therefore find a wide use both on road and rail.

Court Enjoins Devious Route

ALBANY, N. Y., Oct. 7—Supreme Court Justice Rudd on Saturday issued an injunction restraining C. Gordon Reel, state highway superintendent, and the highway commissioners from letting a contract for a proposed state road between Trenton and Remsen, Oneida County. The restraining order was obtained at instance of Lester G. Wauful, a taxpayer of Oneida County, who declared that under the original highway scheme, a straight road between the two towns was provided for, but this was changed by the Highway Commission last March by deviating so that the village of Prospect, N. Y., would be included. His lawyer argued that Prospect is being taken care of by a county road and that if the Highway's Commissioner's order were observed, residents of the direct route would be the sufferers.

MILWAUKEE, WIS.—To reduce the number of accidents due to collisions between street cars and automobiles in Milwaukee, the Milwaukee Electric Railway & Light Company is using large display space in the daily newspapers, warning drivers as well as passengers to use more caution. The campaign was carried on heaviest during the period of the Vanderbilt cup races, when thousands of outside motorists brought their cars to Milwaukee.

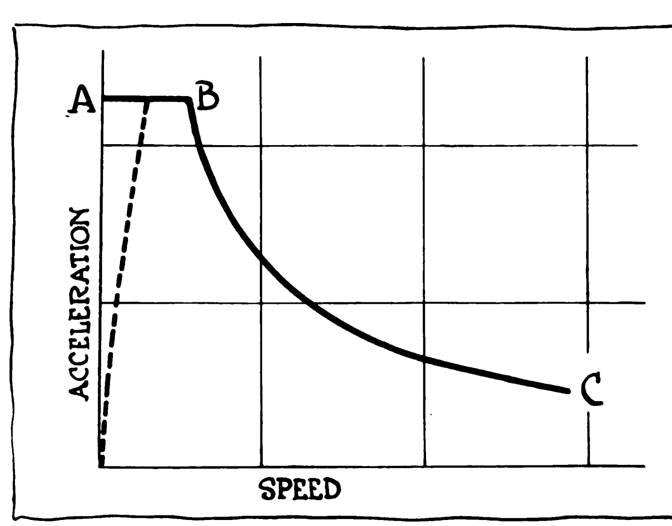


Fig. 7—Curve showing ideal acceleration

Nagent Wins Ardennes

Makes High Score in 269-Mile Race of Much-Mixed Elements, Including Speed, Reliability and Hills

SPA, BELGIUM, Sept. 27—Speed, regularity, and endurance were the determining factors in the 269-mile race held in the Belgian Ardennes. Unable to obtain the exclusive use of the set of roads, the route was divided into twelve sections, of which eight had to be covered on a regularity basis according to cylinder area, and four at speed; of these four there were three straight sections and one rather difficult hill-climb. Some very high speeds were maintained by the small racing and touring cars, and under the formula the small motors had an advantage over the big ones, for although these latter were the fastest they did not succeed in winning high places on the list of awards.

In the racing section highest points were won by a Nagent, a four-cylinder of 2.7 by 4.8 inches bore and stroke, whose time for the four-speed sections of respectively 7, 9, 4, and 8-mile stretches were 63.1, 64.1, 63.3 and 52.1 miles an hour. This last time represents the hill-climb. Second place went to a Mathis of 2.7 by 4.7 inches bore and stroke, third to an Alfa-Legia of 2.5 by 3.9, and fourth to Christiaens six-cylinder grand prix Excelsior. This car was the fastest in the meeting, its highest average being 93 miles an hour, but it was at a disadvantage on the regularity sections, where an unusually high average speed had to be maintained on roads open to all kinds of traffic.

In the touring classes Germany had all the glory, an Opel winning first place, followed by a Benz. French cars were not very well represented, and two Flanders were classed respectively twenty-first and twenty-sixth.

LOS ANGELES, CAL., Oct. 4—With the annual Los Angeles to Phoenix road race less than 1 month away the indications point to ten entries. Entry fees have been received for only six cars but others are certain to come in.

The changing of the route will make the course even sportier than before as the cars will again have the heavy sand of the California desert with which to battle.

The distance is 450 miles and is over part of the old route, used prior to last year, and part of that of last year. Out of Los Angeles the cars will follow the boulevard to Pomona and, from a spectacular standpoint, the race will prove as attractive as ever.

For the first 100 miles the cars will have good roads. Then will come the first taste of desert and for the next 50 miles there will be many dangerous places. Beyond Mecca more sand will be encountered and from there on to Clamys and Brawley the race becomes a true desert battle. The Mammoth Wash will prove the undoing of more than one contestant and the cars will be put to their best before reaching Yuma where the machines will be placed in a control for the night.

Unless the time of starting is changed the cars will have a long wait over in Yuma as the first machine is due to reach there well before noon. The first cars will leave Los Angeles about 10 o'clock and the last at midnight.

The prize money will amount to about $3,500 and for the track races in Phoenix $4,000 has been offered.

Crowd of 4,000 at Asheville Climb

ASHEVILLE, N. C., Oct. 3—Under ideal weather conditions, the first sanctioned A. A. A. hill-climb in Asheville was held today, 4,000 people witnessing the cars climb the steep French broad avenue hill, a grade of 12 per cent. for nearly 5 miles, the distance of the climb. The summaries are: Cars under 161 cubic inches: First prize, cup—won by Studebaker 20; time 55 3-5 seconds. Second prize, $5—won by Studebaker 20; time 1 minute 10 2-5 seconds.

Second event, for cars with piston displacement of 161 to 230 cubic inches: First prize, cup—won by Ford; time 52 2-5 seconds. Second prize, $10—won by Studebaker 30; time, 56 1-5 seconds.

Fourth event, for cars with piston displacement of 301 to 450 cubic inches: First prize, cup—won by Buick; time, 49 4-5 seconds. Second prize, $5—won by Nyberg; time, 56 2-5 seconds.

Sixth event, free-for-all: First prize, cup—won by Nyberg; time, 53 1-5 seconds. Second prize, $10—won by Ford; time, 54 1-5 seconds.

Seventh event, cars with bodies valued at $1,600 and under: First prize, cup—won by Studebaker 20; time, 56 1-5 seconds. Second prize, $5—won by Chalmers; time, 64 3-5 seconds.

Sunbeam Breaks World's Record

LONDON, ENG., Sept. 30—New marks were made at Brooklands, when a 15.9-horsepower Sunbeam lowered the world's records for 900 miles, 12 and 13 hours, and the 1,000 miles. A 30-horsepower, six-cylinder Sunbeam put up new figures for the world's record of 50 miles in 32 minutes 16.4 seconds from a standing start, thereby reducing the record by almost 35 seconds. The Sunbeam company attempted to lower the figures recently put up by the 12-horsepower Star car for 12 hours. The engine dimensions for the two cars were identical, namely 80 millimeters by 150 millimeters. The speeds of the Star car ranged from 66 3-4 miles per hour, to 67 3-4 miles per hour. The average speed for the 12 hours, was 66.82 miles per hour. The first few miles ranged from 76 to 85 miles per hour.

Again on September 21, this same firm put up new figures for the distances mentioned at the beginning of these notes. The 15.9 horsepower, four-cylinder Sunbeam added 3 miles, 203 yards to the 12-hour record, which is now 910 miles, 1,738 yards, and by covering the 1,000 miles in 13 hours, 8 minutes and 25.1 seconds, reduced the old time by 1 hour, 45 minutes, 50 3-5 seconds. When the final burst was made, the official time was returned for the 1,000 miles as 13 hours, 8 minutes and 25.1 seconds, thus creating a world's record.

DES MOINES, IA., Oct. 7—The annual reliability run of the Iowa Automobile Association which was to have started from Des Moines Monday, October 7, for a circuit of the state has been postponed until October 14.

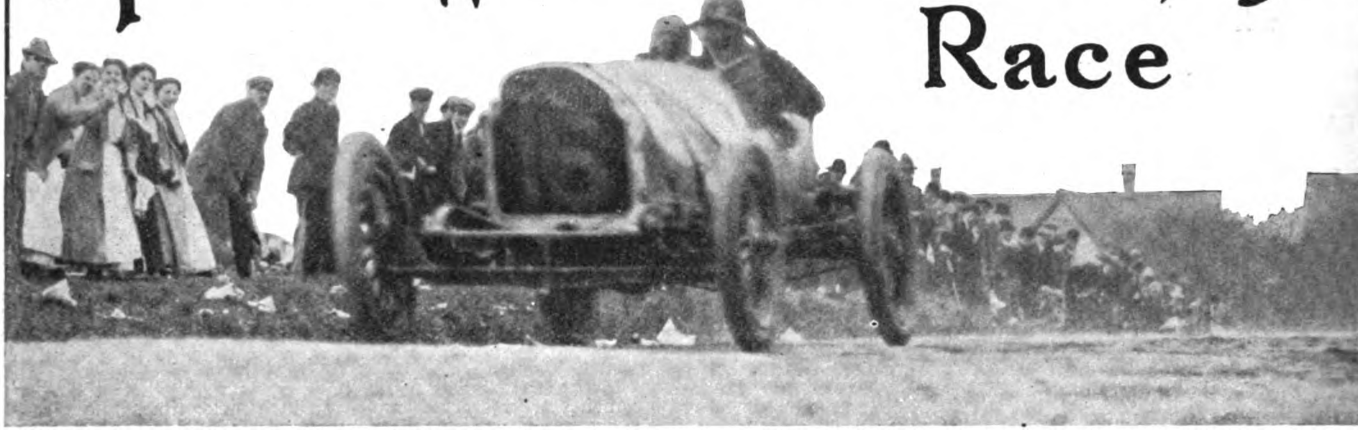
Digest of the Leading Foreign Technical Journals

(Continued from page 721)

and 2.5, taken from Fig. 3, do not result from a range of useful motor speeds running from 1,200 to 1,800, but from one running from 1,120 to 1,800. It is rather an advantage that now the range of the high speed, extending from 37.5 to 60 kilometers per hour, has been somewhat enlarged, because with the direct drive the friction losses of the gearbox are switched out and it therefore becomes possible to drop the motor speed a little lower without feeling the effect in the running of the vehicle.

By checking the results it is thus confirmed that with a four-speed gear ranging over the ratio of 1 to 4 [and, it should have been added, with a motor whose best working range lies between 1,120 and 1,800 revolutions per minute.—ED.] the intermediate gears should be proportioned as 1.6 to 2.5, and rather a little lower than higher. And at the same time the applicability of the easy graphic method to other gear combinations has been demonstrated—From article by Von Löw in *Zeitschrift des Mitteleuropäischen Motorwagen Vereins,* end of August.

Mason Wins Pabst Trophy Race



Bill Endicott skimming the high spots during one of his bursts of speed in the race for the Wisconsin Challenge Trophy

MILWAUKEE, WIS., Oct. 5—The small car races which were run off on Thursday, Oct. 3 were a sort of anti-climax to the big Vanderbilt Cup classic of Wednesday. These races were the Pabst Blue Ribbon Trophy race for 28 laps, or 220 miles 3,704 feet, and the Wisconsin Motor Challenge Trophy event, which is for 22 laps, or 173 miles 2,156 feet. Mortimer Roberts, driving a Mason Special, romped away with the longer run, while the Wisconsin Challenge went to Harry Endicott, also driving a Mason car. Only two cars finished the Pabst race, these being Roberts' Mason and Hastings' F. A. L. Special, the latter having averaged 52 miles an hour for the entire distance, while Roberts averaged 58.8 miles an hour.

Although there were four prizes offered for the Pabst race, only three awards were made, the third place being given to Chandler, also driving a F. A. L. Special, after he had completed twenty-three of the twenty-eight laps. There was no other car running to which the fourth award could have been accorded. It was nearly dusk when Hastings' F. A. L. crossed the tape for the twenty-eighth time, and it would have been impossible for Chandler, still 50 miles behind, to have driven the remaining five laps owing to the growing darkness. Consequently, Starter Wagner gave him the checkered flag at about the same time that he signaled the other F. A. L. on its final lap.

The Wisconsin Motor Challenge Trophy race had five entries, but at the appointed time only the three Mason cars lined up for the twenty-two-lap run. Two of them finished the race, Endicott's No. 5, which came in first in the time of 186 minutes 44.79 seconds, and Mason's No. 3, which required 222 minutes 40.35 seconds to cover the distance of nearly 174 miles. After going for three laps, Snyder's Mason developed clutch trouble, which put it out of the race. In this race, too, an award went begging.

Eight cars lined up for the start of the Pabst Blue Ribbon Trophy event, which was run simultaneously with the Wisconsin Trophy race. Nikrent, driving a Case, was the first to be sent off, following him Rooney in a Bergdoll. Then came Spencer Wishart driving the first of the three Mercers entered in the event. After him Hastings in a F. A. L. Special, while Roberts in Mason No. 16 was the fifth. Pullen, piloting the second Mercer, was next away, then Chandler in F. A. L. No 18 got the word. Hughes was the last to get away in the third Mercer.

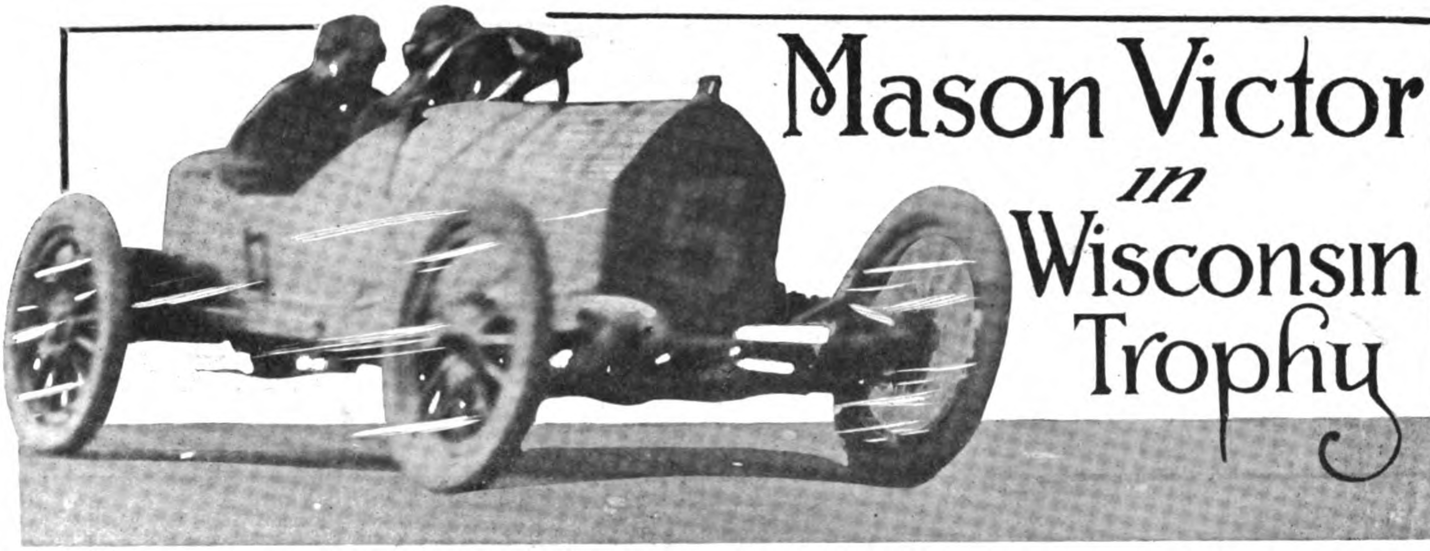
Hughes drove the same car which he used on Wednesday in

RACE OF 220.64 MILES FOR THE PABST BLUE RIBBON

No.	CAR	DRIVER	Lap Miles	1 7.88	2 15.76	3 23.64	4 31.52	5 39.40	6 47.28	7 55.16	8 63.04	9 70.92	10 78.80	11 86.68	12 94.56
16	MASON-Special	Roberts	Elapsed Time	7:35	14:49	22:12	29:28	36:48	44:05	51:21	58:34	65:43	77:48	93:05	100:20
			Lap Time		7:14	7:23	7:16	7:20	7:17	7:16	7:13	7:09	12:05	15:17	7:15
15	FAL-Special	Hastings	Elapsed Time	10:06	19:49	32:45	42:26	51:29	60:16	69:12	77:50	86:34	95:06	103:39	112:13
			Lap Time		9:43	12:56	9:41	9:03	8:47	8:56	8:38	8:44	8:32	8:33	8:34
18	FAL-Special	Chandler	Elapsed Time	9:32	18:25	27:13	35:58	44:16	53:32	62:20	71:07	79:52	88:31	97:11	105:49
			Lap Time		8:53	8:48	8:45	8:18	9:16	8:48	8:47	8:45	8:39	8:40	8:38
17	MERCER	Pullen	Elapsed Time	7:59	15:32	23:02	30:34	38:06	45:29	52:58	60:21	67:55	75:23	82:52	90:22
			Lap Time		7:33	7:30	7:32	7:32	7:23	7:29	7:23	7:34	7:28	7:29	7:30
19	MERCER	Hughes	Elapsed Time	7:45	15:08	22:29	33:03	40:37	47:50	54:59	62:09	69:11	76:15	83:16	90:18
			Lap Time		7:23	7:21	10:34	7:34	7:13	7:09	7:10	7:02	7:04	7:01	7:02
14	MERCER	Wishart	Elapsed Time	11:50	19:47	27:39	35:24	43:07	50:45	58:22	66:00	73:41	81:30	89:15	96:57
			Lap Time		7:57	7:52	7:45	7:43	7:38	7:37	7:38	7:41	7:49	7:45	7:42
12	BERGDOLL	Rooney	Elapsed Time	8:16	16:17	25:26	34:57	43:06							
			Lap Time		8:01	9:09	9:31	8:09	Out with broken connecting rod						
11	CASE	Nikrent	Elapsed Time	8:09	15:43	23:09	30:53	44:43							
			Lap Time		7:34	7:26	7:44	13:50	Out with broken crankcase						

RACE OF 173 MILES AND 2156 FEET (TWENTY-TWO LAPS) FOR WISCONSIN

No.	CAR	DRIVER	Lap Miles	1 7.88	2 15.76	3 23.64	4 31.52	5 39.40	6 47.28	7 55.16	8 63.04
5	MASON-Special	Endicott	Elapsed Time	12:15	20:11	27:59	35:38	43:07	50:51	59:04	67:40
			Lap Time		7:56	7:48	7:39	7:29	7:44	8:13	8:36
3	MASON-Special	Mason	Elapsed Time	13:04	26:35	36:11	46:17	55:48	65:13	74:32	84:05
			Lap Time		13:31	9:36	10:06	9:31	9:25	9:19	9:33
2	MASON-Special	Snyder	Elapsed Time	10:57	21:10	29:11					
			Lap Time		10:13	8:01	Out with clutch trouble				



Roberts driving his Mason Special to victory in the last lap of the 220-mile race for the Pabst Blue Ribbon Trophy

the Vanderbilt, but in order to do this he was obliged to change motors. The Vanderbilt Cup race is limited to cars having piston displacements between 301 and 600 cubic inches, while the Pabst Trophy race required that the piston displacement should not be over 300 cubic inches. The motor which Hughes used in the Vanderbilt race had a bore only .017 inch greater than that of the engine used for the Pabst race.

On the first lap Roberts took the lead, making the distance of nearly 8 miles in 7 minutes and 35 seconds.

In the following circuit the leader retained his position, and the only change in the eight cars was Wishart's nosing of Hastings out of the seventh position.

In the fourth lap Hughes slipped from second place to fourth, owing to his being forced to stop at the pit for water. One of the water connections of his Mercer had been jarred loose, heating up his motor considerably in the run from the point on the course where the break occurred to the pit. Pullen, who had made the lap in 7:32, now assumed second place, while Nikrent was a close third, being only 19 seconds behind. Wishart, in this lap, nosed Chandler out of sixth position.

After filling his radiator Hughes was off again at a lively clip, cutting down his rivals' lead at every turn. In the fifth lap he snatched third place from Nikrent, who was having trouble, while Chandler came into fourth place. The fifth lap was the undoing of both Nikrent and Rooney, both of whom were forced to give up the struggle after completing about 40 miles. Nikrent's car was disabled by a cracked crankcase, while Rooney's Bergdoll snapped a connecting-rod.

By this change of fortune Wishart came into fourth standing, while Hastings became sixth, Chandler fifth, Hughes remained third, Pullen stayed second and Roberts was first.

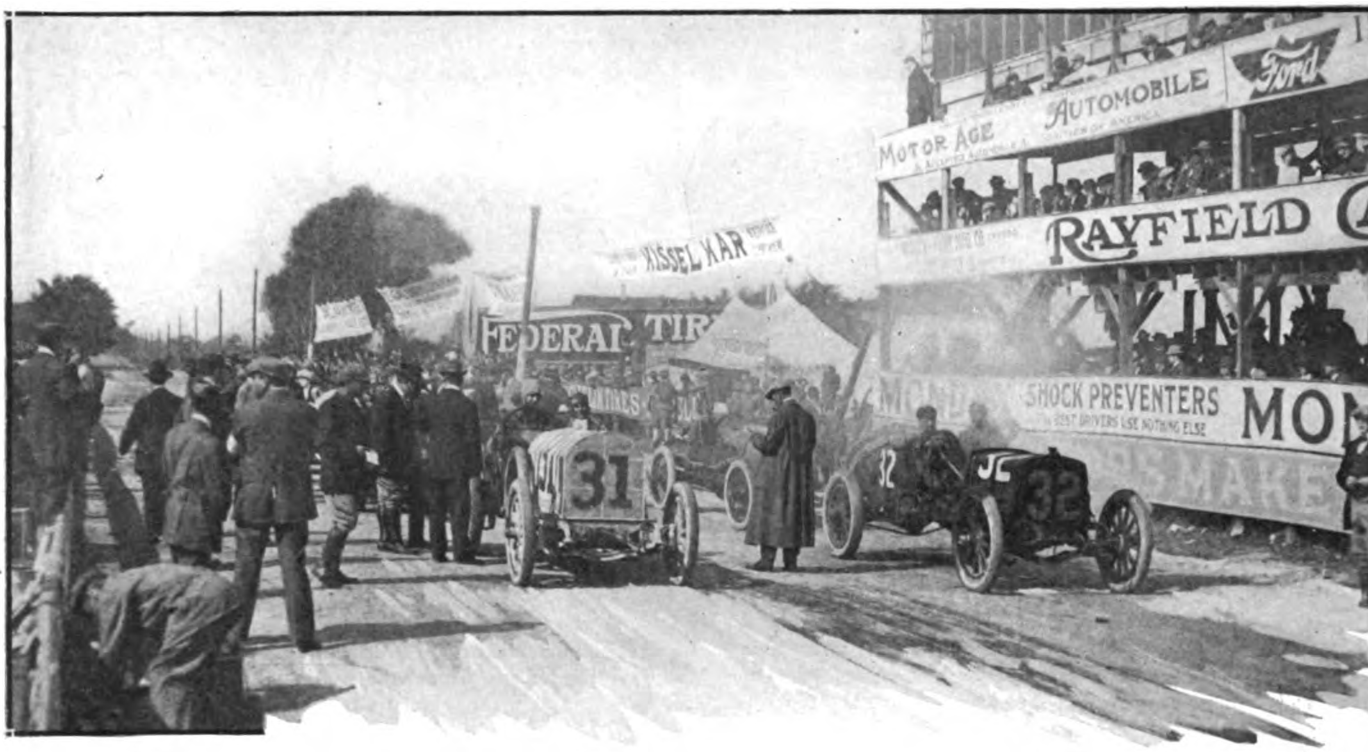
For the sixth, seventh, eighth and ninth laps there was no change in the places of the contestants. Roberts was still leading, Pullen second, Hughes third, Wishart fourth, Chandler fifth and Hastings sixth. Hughes made the ninth in 7:02, which helped to put him in second place when Roberts was forced to stop on the backstretch to repair a break in the gasoline supply pipe of his Mason. Pullen then succeeded to the premier position and for the next ten laps the race was a duel between Hughes and Pullen. At the end of the tenth lap the order was Pullen, Hughes, Roberts, Wishart, Chandler and Hastings. For four laps, often repairing the gasoline line, the eleventh, twelfth, thirteenth and fourteenth, Roberts remained in fourth position, but was gaining on the leaders every mile.

TROPHY RUN AT MILWAUKEE, WIS., ON OCTOBER 3, 1912

13 102.44	14 110.32	15 118.20	16 126.08	17 139.96	18 141.84	19 149.72	20 157.60	21 165.48	22 173.36	23 181.24	24 189.12	25 197.00	26 204.88	27 212.76	28 220.84	Position	Miles per Hr.
110:16	117:27	124:34	131:44	138:50	145:58	153:05	160:10	167:10	174:18	181:29	189:08	197:38	207:08	216:32	225:08.71	1	58.8
9:56	7:11	7:07	7:10	7:06	7:08	7:07	7:05	7:00	7:18	7:11	7:39	8:30	9:30	9:24	8:36.71		
120:36	128:59	137:25	145:44	154:10	162:29	170:48	179:09	187:23	195:47	204:16	212:57	223:27	233:25	245:07	255:05.1	2	51.9
8:23	8:23	8:26	8:19	8:26	8:19	8:19	8:21	8:16	8:24	8:19	8:41	10:30	9:58	11:42	9:58.1		
114:26	123:11	131:54	140:42	150:27	173:45	199:10	211:41	223:12	235:25	248:08							
8:37	8:45	8:43	8:48	9:45	23:18	25:25	12:31	11:31	12:13	12:43 Stopped and given third place owing to darkness							
97:53	105:18	112:42	120:08	127:53	135:31	144:07	151:43	159:09	166:42								
7:31	7:25	7:24	7:26	7:45	7:38	8:36	7:36	7:26	7:33 Out with broken transmission								
98:27	105:38	112:36	119:29	128:08	135:05	142:00	149:02	156:24									
8:09	7:11	6:58	6:53	8:39	6:57	6:55	7:02	7:22	Out with broken universal joint								
104:43	112:32																
7:46	7:49	Out with broken crankshaft															

MOTOR CHALLENGE TROPHY RUN AT MILWAUKEE, WIS., ON OCTOBER 3

9 70.92	10 78.80	11 86.68	12 94.56	13 102.44	14 110.32	15 118.20	16 126.08	17 133.96	18 141.84	19 149.72	20 157.60	21 165.48	22 173.36	Miles per Hour
77:01	85:17	93:30	101:58	110:12	118:38	127:03	135:30	145:06	154:21	162:29	170:39	178:52	186:44.79	55.6
9:21	8:16	8:13	8:28	8:14	8:26	8:25	8:27	9:36	9:15	8:08	8:10	8:13	7:52.79	
93:29	102:55	112:18	121:38	133:35	142:48	152:19	162:29	172:16	181:54	193:03	202:28	213:11	222:40.35	46.7
9:24	9:26	9:23	9:20	11:57	9:13	9:31	10:10	9:47	9:38	11:09	9:25	10:43	9:29.35	



Getting ready for the Grand Prix—The technical committee inspected the cars very carefully up to the start of the race

Meanwhile, Hughes and Pullen were fighting it out to a finish, although the former was gaining rapidly on his team mate. At the end of the tenth lap Pullen was in the lead by 52 seconds. On the next round Hughes cut this down to 24 seconds, and on the twelfth circuit he had passed his rival and was 4 seconds ahead. Hughes' average speed for eleven laps, or nearly 87 miles, was 62.12 miles an hour, while Pullen covered the same distance slightly faster—62.6 miles an hour.

It was in the fifteenth lap that Spencer Wishart's Mercer gave out. From the eleventh lap up through the fourteenth he had been in third place about 6 minutes behind Pullen and Hughes, and was making these rounds in good time, well over a mile a minute. But on the fifteenth round he was obliged to give up the struggle, for the crankshaft of his motor broke on the backstretch.

At the end of the sixteenth Pullen was less than a minute behind Hughes and was pushing the leader to the limit. But in the next round Hughes blew a tire, which put Pullen in the lead again by 15 seconds.

Hughes lasted for three more laps, which he made in fast time. The nineteenth was made in 6:55, and it put him a little over 2 minutes ahead of Pullen. Barring accident, it looked as though Hughes would repeat his Eigin victory. But in the twenty-second lap he had to give way to the other Mercer driver, as his No. 19 Mercer had broken a universal joint, a damage which prohibited immediate repair.

Pullen was now an easy leader, being 8 minutes ahead of Roberts, who did not fare much better than did Hughes, for after going only one more lap, something went wrong with his transmission and the trouble was of large enough proportions to prevent his finishing the race.

After Pullen and Hughes went out, Mortimer Roberts, who had previously been running third, came into the limelight.

In the twenty-third lap the three cars running were the two F. A. L.'s and the Mason, Hastings' F. A. L. running a poor second to Roberts. Chandler was far in the rear.

Roberts finished the race in 225 minutes 8:71 seconds, averaging 58.8 miles an hour for the 220 miles, while Hastings finished in 255 minutes 5:1 seconds, averaging 52 miles an hour. When Hastings finished it was getting dark and the judges decided to flag Chandler and to give him third place without waiting for him to finish.

Anderson's Stutz car rounding a curve in the Grand Prix

Race for the Wisconsin Trophy

LITTLE interest centered in the Wisconsin Motor Challenge Trophy race, which was all Harry Endicott. At the same time he drove a heady race and made good time with his little Mason. Mason, also driving a Mason car, ws the only other car to finish the race, coming in far behind Endicott. Although there were five entries for the event, Kulick, who was to have driven a Ford Special, withdrew, as did Heber, whose entry was an E-M-F.

At the start only the three Mason Specials were in evidence. Snyder in Mason No. 2 being the first to be sent off. Then Mason was started, while Endicott, in entry No. 5, was off last. Snyder's running was better than that of his two teammates for the first lap, but Endicott did not take long to head him off, and at the end of the second lap he was way ahead of the other two. Mason was third, and the second place would undoubtedly have gone to Snyder, whose car is much faster than Mason's, which is a remodeled touring car, had the former not developed clutch trouble in the fourth lap, which trouble proved to be so serious that Snyder had to withdraw in favor of the other two Masons.

Endicott's fastest lap was his fifth, which was run in 7:29, and which is good going for a small machine. He made only two stops during the entire run of 173 miles, the first being on his first lap, when a spark-plug was replaced.

The Falcar was the only one to finish without trouble of any kind. Not a stop was made at the pits by Hastings, even to fill his tanks. Wishart in the Mercer ran 100 miles without a stop till he went out for good. Robert's Mason special, the winner of the larger class, made one stop on account of a broken gas lead. This was repaired by putting in a piece of hose. When he started out again the car stopped after a few yards because he had forgotten to turn on the gasoline again at the tank.

Endicott, the winner of the small-car race, made two stops, the first after one circuit when a spark plug was changed. The other was in the seventeenth lap for gasoline. Mason, driving the Mason No. 3, an old stripped touring car, held the record of the day for stops, making five during the 173 miles of the Wisconsin Motor Challenge Trophy contest.

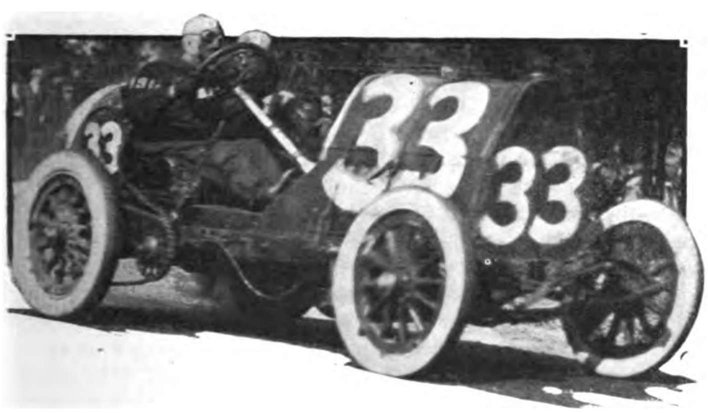
There were eight stops at the pits in the Pabst Trophy race, two for tire troubles. There were two cases of mechanical trouble. The other stops were for fuel, water and oil.

Fiat Wins Grand Prix at Milwaukee

(*Continued from page 711*)

changes were on the right rear wheel which has the hardest service. Refilling fuel, oil and water tanks were responsible for more stops than any other cause, and mechanical difficulties were comparatively few, necessitating only ten stops altogether, three of which put the cars out permanently.

Anderson with his Stutz holds the palm for the longest non-stop run of the day. He made only two stops during the entire 410 miles of the race and ran the first 215 miles without a halt.



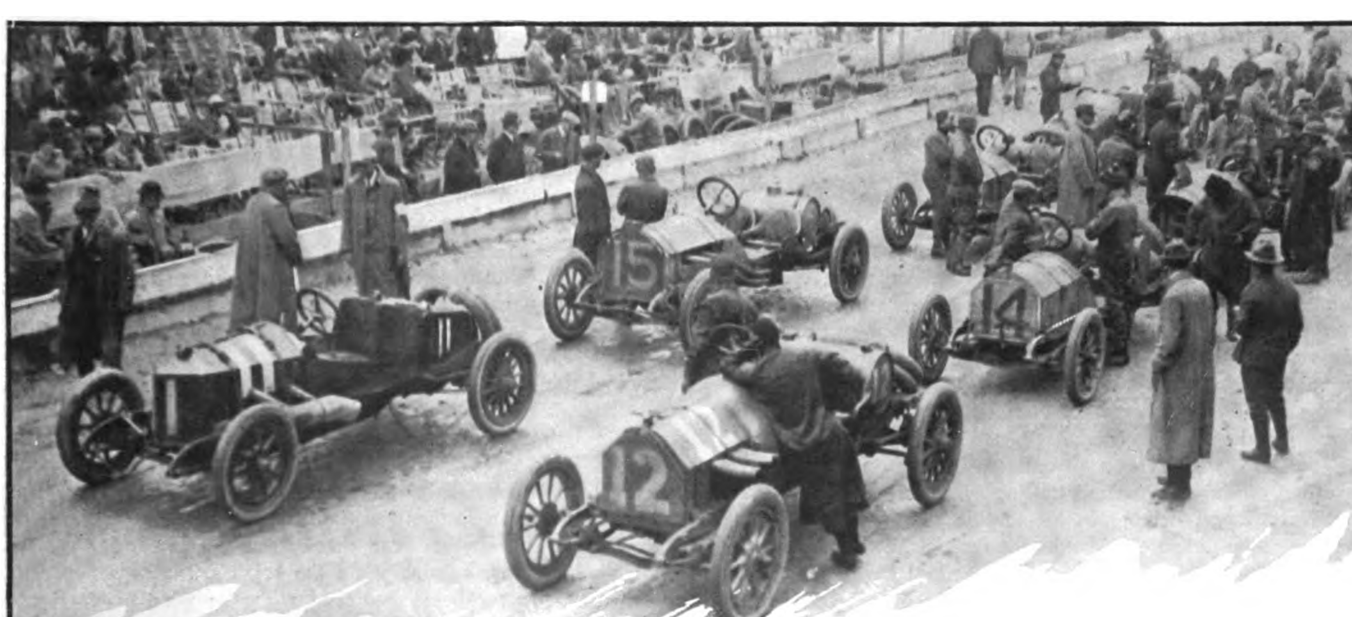
Tetzlaff speeding his Fiat on the Town Line straightaway

He had no mechanical trouble, and he changed but one tire throughout the race, replacing the demountable wheel on the left rear in the twenty-seventh lap. At the same time he took on gasoline and oil. His only other stop was on the next to the last lap, when he refilled his gasoline tank and was away again in 40 seconds.

Like Anderson, Bragg made only two stops, the first being after he had run 166 miles, when he changed both rear tires and took on gasoline and oil. His other stop was at the end of the thirty-seventh lap when he refilled his supply tanks and changed the left rear tire. Bergdoll made but four stops, the first to take on gasoline and replace a spare tire which had been changed on the back stretch, getting away in 46 seconds. When the race was half over he lost 3 minutes and 40 seconds at the pits in changing tires, renewing his supplies and tightening up shock absorbers. After running 30 miles more he stopped 45 seconds to put a strap around the fuel tank which was beginning to work loose. He stopped again for gasoline and a spare tire in the thirty-eighth lap and in the forty-third to put on two rear tires.

Barney Oldfield started the ball rolling at the pits, when after his first circuit of the track he replaced a rear tire. He had not gotten away when Burman pulled up after completing 15 miles and adjusted the valves of his engine. He had not had time to properly tune up the engine before the race; in fact, the start had been delayed 10 minutes to give him a chance to get it in order. Hughes stopped in his third lap to change spark plugs and again in the fourth for the same purpose. Then there was a lull at the pits till Oldfield drew up for another tire change. Tetzlaff stopped twice for tires and fuel after running 80 miles. Before he got away Horan pulled up to replace a spare and take on gasoline, but waited to change a right rear tire. He had started out when the shouts from his pit told him that the jack had been left in the track in the excitement, and the mechanic did a record-breaking sprint back to pick it up. Even at that, Horan was away in less than 2 minutes. When the race was two-thirds over Horan lost 6 valuable minutes for Burman, who relieved him, by running in on the rim from the back stretch where he had blown a tire. This damaged the wheel so that it had to be replaced by one from Burman's Benz before a tire could be put on.

De Palma holds the record for rapid tire change, when at his first stop in the twenty-fifth lap he replaced a tire in 37 seconds. At the end of his next circuit of the course the Italian stopped again, this time to put oil on the rocker arms. After another 15 miles he halted again and worked at his motor for nearly 4 minutes adjusting the valves. His last stop was made in the



Lineup of the contesting cars for the Pabst Blue Ribbon Trophy race, showing a typical morning scene of road race preparation

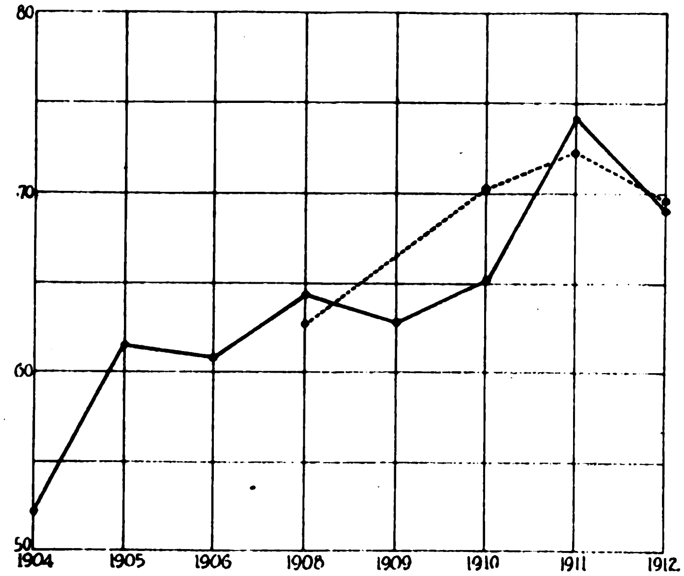


Diagram showing average speed in each year. Heavy line—Vanderbilt cup race. Dotted line—Grand Prix

thirty-seventh lap when he changed a tire and took on water.

The record of Clark's Mercedes is nearly as good as that of the Stutz. Clark made but two stops, the first one being after running 190 miles, when he took on gasoline and oil. His second and last stop occurred in the thirty-fifth circuit of the course, when he lost over 10 minutes in repairing a leak in the water cooling system. Clark was the most fortunate so far as tire troubles were concerned, as he did not change a tire throughout the race.

Bob Burman, in Benz 31, was the first to get away, followed by Fountain in a Lozier. Fountain is a Milwaukee pilot, and he drove the same car which Nelson, its owner and entrant, drove in the Vanderbilt Cup race of Wednesday. Next came Teddy Tetzlaff, demon driver of them all, at the wheel of Fiat 33. He was trailed by Hughie Hughes in the sturdy Mercer. The ill-fated De Palma was off 30 seconds later in his Mercedes 35. Spencer Wishart, who drove a Mercer in the Pabst race of Friday, was in command of another Mercedes, entry number 36. Clark was next off in Mercedes 39. Bergdoll, at the wheel of the immense Benz 40, followed. After him was Bragg, Fiat 41, who had withdrawn from the race following Bruce-Brown's death, but who was persuaded at the last minute to compete. Benz 42, which was scheduled to be driven by Joe Dawson, winner at Indianapolis in June, was sent away by Horan instead. Gil Anderson in the Stutz, which looked small beside the immense foreign machines, got the word next, and finally came Oldfield in Fiat 44. Although a favorite with the crowd, no one expected Barney to go the distance. He has never finished a road race before. More than that, he finished in the money.

Tetzlaff took the lead in the first lap, with Bragg second and Bergdoll third. Wishart and De Palma were in fourth and fifth places, respectively, while the others came around in the following order: Burman, Hughes, Horan, Anderson, Fountain, Clark and Oldfield. The latter would no doubt have shown up better on this first circuit had he not been delayed by tire trouble. This was the first stop at the pits, but the crowd spurred the veteran driver on.

The second lap saw only two shiftings of positions among the cars in the rear position. Wishart took Bergdoll's place in third position, while Hughes overtook Burman, forcing the latter into seventh position, and putting Hughes in sixth. All this time Tetzlaff was driving in his terrific slam-bang style, much the same as he did in the Vanderbilt race of Wednesday. After completing his second lap, Burman stopped at the pit with engine trouble, the same trouble, by the way, which delayed the start of the race for 10 minutes. In his third lap Burman was permanently out of the race, his big Benz having succumbed to a broken piston.

Burman out, Anderson came from ninth into seventh place. Hughes, who had to stop at his pit on his third lap to change a spark plug, went back to last place at the end of the third. The shift brought Clark up to tenth, Oldfield having passed him. Fountain was running now in eighth place, while Horan became sixth. The leaders retained the same position which they had held during the second lap.

The third was Wishart's last lap; in the fourth his motor was disabled by a broken crankshaft, a break which prohibits quick repair. Bergdoll now became third, while De Palma moved up to fourth place. Horan succeeded to fifth place, Anderson to sixth, Fountain to seventh, Oldfield to eighth, Clark to ninth and Hughes to tenth. Tetzlaff, way in the lead, was reeling off the miles at a lively clip. Bragg was a good second.

The fifth saw no changes in the positions of the leaders, the only difference in the ten contenders being that both Anderson and Fountain passed Horan. Hughes, running last, came to the pit again in the fifth lap with more spark plug trouble.

In the sixth lap Clark passed Oldfield, who was obliged to stop to replace a right rear tire. The veteran driver made quick work of the change, but he did not regain his lost ground until the ninth lap. There was no other change in the line-up in the sixth lap, Tetzlaff still leading by a good margin and hotly pursued by Bragg, Bergdoll and De Palma.

It was in the seventh lap that De Palma snatched third place from Bergdoll, who stopped for fuel and an extra supply of tires to replace those used on the backstretch. This wait put Bergdoll into sixth place, Fountain and Anderson passing him as well as De Palma. Tetzlaff and Bragg were still running first and second, respectively.

The eighth lap brought out no differences in the line-up, while in the ninth the only position change was in Oldfield's taking eighth place from Clark. In this lap Fountain went through the straw bales on the Fond Du Lac road turn, but he was soon on the road again, no one having been hurt, and the car apparently none the worse for the mishap.

In the eleventh Tetzlaff made his first stop at the pit, thus giving his lead to Bragg, who was running nicely, and whose car had performed so far without a hitch. Tetzlaff changed a right rear tire and was soon away again in pursuit of Bragg. In this lap Horan, who had been running seventh, passed Anderson, Bergdoll and Fountain and took fourth position momentarily, only to drop back on the following round. The Stutz car then took fifth place, Bergdoll sixth and Fountain seventh. Bragg retained the lead over Tetzlaff from the eleventh through the fourteenth lap, closely pursued by the former. All this time De Palma was running third, and Anderson, except for the thirteenth lap, when he was momentarily nosed out by Bergdoll, was in fourth position. In the fourteenth lap Bergdoll blew a tire on the backstretch at station 4 and the delay put the Benz entry into seventh position, both Oldfield and Fountain passing it. Hughes was still worrying along in last place.

The fourteenth lap was Tetzlaff's fastest and also the fastest lap ever covered over the Wauwatosa course, he making the circuit in 6 minutes 7 seconds, at the average speed of 77.2 miles an hour. This hitting it up gave Teddy the lead again, which he held through the next lap, Bragg running consistently and but a few seconds behind. On lap seventeen Tetzlaff made a pit stop which cost him 2 minutes and 22 seconds, and put Bragg in the lead.

At the end of the seventeenth lap the cars stood Bragg, Tetzlaff, De Palma, Anderson, Bergdoll, Fountain, Oldfield, Clark, Horan. The Mercer car 34, Hughie Hughes, went out for good in this lap, leaving only nine cars still running. Hughes' car was disabled by a broken gasoline line. Two laps previous to his withdrawal, Hughes' car threw a wheel at station 7, but controlled the car, keeping it on the road. Another wheel was substituted, his car being equipped with the wire type. Bragg averaged 67.5 miles an hour for the seventeen laps.

Through the twentieth lap nothing of note took place, although on the next round Bragg lost his lead, which he had held from the seventeenth lap. He was obliged to stop for gasoline and he changed both rear tires at the same time, losing in all 2 minutes. De Palma and Tetzlaff were both so close that they passed Bragg while he was stopped, putting the Cincinnati driver into third place, Tetzlaff into the lead again and De Palma second. Tetzlaff was also forced to change a rear tire, so that, in the twenty-second circuit, De Palma was leading, with Tetzlaff second and Bragg still third. The other cars maintained practically their same positions in the nineteenth, twentieth, twenty-first and twenty-second laps. De Palma, then leading, had averaged 72 miles an hour for twenty-two laps.

De Palma retained the lead through the twenty-fourth lap, with Tetzlaff second, Bragg third, Bergdoll fourth, Anderson fifth, Oldfield sixth, Clark seventh and Horan eighth. But in the next lap Tetzlaff succeeded in nosing De Palma out of first position, while the positions of the rest of the cars remained the same. De Palma had been forced to stop at the pit to change the left front tire and to take on water and gasoline. His pit stop consumed 2 minutes and 9 seconds. More delay at the pit on the twenty-sixth lap allowed Bragg to take second position from De Palma, while Tetzlaff was still in the lead. No change in the positions of the other cars took place in the twenty-sixth lap, nor in the next four laps.

In the thirty-first lap it was seen that something was wrong with Tetzlaff, who, since he had regained the premier position, had been going at a lively pace. Finally the car was seen coming down the track at a slow pace, and it was found that he was out of the race with a broken radius rod, practically repeating his performance of Wednesday in the Vanderbilt Cup race.

Bragg succeeded to first place again, De Palma second, Bergdoll third, Anderson fourth, Oldfield fifth, Clark sixth and Horan seventh. The rest of the race for first place was simply a struggle between Bragg and De Palma, Bragg with the newer car having the best of the argument. Bergdoll was third up to the forty-third lap, although there was plenty of excitement for the crowd in the closeness between this car and Anderson's Stutz, which was the only American remaining in the battle.

Through the fifty-first lap Bragg was leading De Palma by over 2 minutes, while Anderson was third, Bergdoll fourth and Oldfield fifth. In the last lap, after De Palma had gone into the ditch, second position went to Bergdoll and third to Anderson. Burman was driving for Horan up to the forty-eighth lap when the car was flagged by the officials.

Calendar of Coming Automobile Events

Shows, Conventions, Etc.

Jan. 2-10..........New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 11-25.........New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8...........Chicago, Ill., Annual Automobile Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 11-15.........Ottawa, Ont., Annual Automobile Show.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 24-Mar. 1.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1.....St. Louis, Mo., Annual Automobile Show.
March 3-8..........Pittsburgh, Pa., Annual Automobile Show.
March 8-15.........Boston, Mass., Annual Automobile Show.
March 17-22........Buffalo, N. Y., Annual Automobile Show.
March 19-26........Boston, Mass., Annual Truck Show.
March 24-29........Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Oct. 14...........Reliability run, Iowa State Automobile Association.
Oct. 19...........Track, Brighton Beach, N. Y., Motor Dealers' Exhibit Company.
Oct. 21-25.........Reliability Run, Chicago Motor Club.
Oct. 24-26-27......Track—San Antonio, Tex., San Antonio Auto Club.
Oct. 26...........Track—York, Pa., York Motor Club.
Oct. 26-28.........Los Angeles to Phoenix Road Race, Maricopa Auto Club.
Oct. 31...........Track—Phoenix, Ariz., Maricopa Auto Club.

Proposed Contests

Oct. 12...........Track—Salem, N. H., Rockingham Park Co.
Oct. 12...........Track—Springfield, Ill., Illinois State Board of Agriculture.
Oct. 12...........Interclub Run, Chicago Auto Club vs. Chicago Athletic Association.
Oct. 12...........Track—Poughkeepsie, N. Y., E. W. Powell.
Nov. 15-16.........Track—Richmond, Va., Richmond Automobile Club.
Oct. 19...........Track—Fort Smith, Ark., Fort Smith-Van Buren Auto Club.
Oct. 19...........Narberth, Pa., Frank D. Hall.
Nov. 3-5-6.........Track—Shreveport, La., Shreveport Auto Club.
Nov. 28...........Road Race—Visalia, Cal., W. H. Linton.
Oct. 26...........Track—White Plains, N. Y., Geo. T. Long.

MECHANICAL DETAILS AND SPECIFICATIONS OF CARS IN THE MILWAUKEE RACES

No.	Car	Driver	Bore	Stroke	Piston Displacement	Magneto	Carbureter	Shock-Absorber	Tires	Oil	Spark-Plugs
					VANDERBILT						
22	Mercedes	DePalma	5.2	7.06	644.6	Bosch	Rayfield	Mercedes	Michelin	Monogram	Bosch
23	Mercer*	Hughes	4.39	5	309.0	Bosch	Rayfield	Hartford	Firestone	Monogram	Bosch
24	Knox	Mulford	4.8	5½	597.0	Bosch	Rayfield	Mondex	Michelin	Oilzum	Bosch
25	Lozier	Nelson	5⅜	6	549.0	Bosch	Rayfield	Mondex	Michelin	Wadham	Bosch
26	Mercedes	Wishart	5⅛	7.06	590.0	Bosch	Rayfield	Mondex	Michelin	Monogram	Bosch
27	Stutz**	Anderson	4⅜	5½	389.9	Splitdorf	Schebler	Hartford	Goodyear	Monogram	Bosch
28	Mercedes	Clark	5⅛	7.06	590.0	Bosch	Rayfield	Mercedes	Michelin	Mobiloil	Red Head
29	Fiat	Tetzlaff	5	6⅞	589.0	Bosch	Rayfield	Hartford	Miller	Oilzum	Bosch
					GRAND PRIZE						
31	Benz	Burman				Remy	Benz		Firestone	Oilzum	Bosch
32	Lozier	Fountain	5⅜	6	549.0	Bosch	Rayfield	Mondex	Michelin	Wadham	Bosch
33	Fiat	Tetzlaff	5⅞	7⅞	589.0	Bosch	Rayfield	Hartford	Miller	Oilzum	Bosch
34	Mercer*	Hughes	4.39	5	309.0	Bosch	Rayfield	Hartford	Firestone	Monogram	Bosch
35	Mercedes	DePalma	5.2	7.06	644.6	Bosch	Rayfield	Mercedes	Michelin	Monogram	Bosch
36	Mercedes	Wishart	5⅛	7.06	590.0	Bosch	Rayfield	Hartford	Michelin	Monogram	Bosch
39	Mercedes	Clark	5⅛	7.06	590.0	Bosch	Rayfield	Hartford	Michelin	Mobiloil	Red Head
40	Benz	Bergdoll	6.2	6.3	670.0	Bosch	Benz		Fisk	Oilzum	Bosch
41	Fiat	Bragg	5⅞	7⅞	850.0	Bosch	Rayfield	Mondex	Michelin	Monogram	Bosch
42	Benz	Horan				Bosch	Rayfield		Michelin	Monogram	Bosch
43	Stutz**	Anderson	4¾	5½	389.0	Splitdorf	Schebler	Hartford	Goodyear	Monogram	Bosch
44	Fiat	Oldfield	5⅞	7⅞	850.0	Bosch	Rayfield	Mondex	Firestone	Oilzum	Bosch
					WISCONSIN MOTOR CHALLENGE TROPHY						
2	Mason Special	Snyder	3⅞	5	235.8	Splitdorf	Schebler	Hartford	Michelin	Oilzum	
3	Mason Special	Mason	3⅞	5	235.8	Splitdorf	Schebler	Hartford	Goodyear	Mobiloil	
5	Mason Special	Endicott	3⅞	5	235.8	Splitdorf	Schebler	Mondex	Michelin	Texaco	
					PABST BLUE RIBBON TROPHY						
11	Case	Nikrent	4 23-64	5	447.8	Splitdorf	Rayfield	Mondex	Michelin	Texaco	
12	Bergdoll	Rooney	4	5 1-16	406.5	Bosch	Rayfield	Hartford	Firestone	Texaco	Bosch
14	Mercer	Wishart	4.39	5	309.0	Bosch	Rayfield	Hartford	Firestone	Monogram	Bosch
15	[illegible]	Hastings	4⅛	5¼	280.6	Splitdorf	Schebler	Hartford	Michelin	Polarine	
16	Mason Special	Roberts	3⅞	5	235.8	Splitdorf	Schebler	Hartford	Michelin	Oilzum	Bosch
17	[illegible]	Pullen	4⅜	5	300.7	Bosch	Rayfield	Hartford	Firestone	Monogram	
[illegible]	[illegible]	Chandler	4⅛	5¼	280.6	Splitdorf	Rayfield	Hartford	Michelin	Polarine	
[illegible]	[illegible]	Hughes	4.39	5	309.0	Bosch	Rayfield	Hartford	Firestone	Monogram	Bosch

[illegible]orth wire wheels.
[illegible] wheels.

The Automobile

Vol. XXVII Thursday, October 10, 1912 No. 15

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Contests Have Their Lessons

ROAD racing in America for 1912, which ended last week with the exception of the Desert race, has not done so much good to the American maker as in former years. Not because the lessons to be learned have not been in evidence but chiefly because the manufacturers have been conspicuous by their absence. 1912 has not been a manufacturers' year in road racing; rather it has been a year characterized by sporting car owners, who have entered their machines in different events for the sport of the affair and not because of any holdings they may have had in any company building machines. As is always the case there have been the exceptions, examples where manufacturers have thrown their entire energy into the contest and have come out with flying colors, carrying away laurels that have aided the engineering department and the selling organization.

That many American automobile makers have withdrawn from road racing and speedway racing for the present is and has been apparent but it is very problematic if next year does not see several of them equipping racing teams to campaign the entire country. This is assured in that every company that has gone into legitimate racing this season has reaped a good harvest. The expense of competition has been less than in any previous year: With educated drivers, the amount of practice work before any meet has been cut to the minimum.

There are hundreds of things that the American maker can learn from road racing. A few examples will suffice: There are several high-class, high-priced American machines in which it is necessary to have a service station man set the brakes in order to do the job properly; in fact, their salesmen recommend it. On the best foreign machines the brakes can be adjusted with the car travelling at its highest speed on the road. Here in itself is a lesson in accessibility that the American maker can carry to his own engineering department and work into his new models.

The foreigner is learning new lessons every year in racing. With him the days of bulk and power as the only means of victory are over. The race is not now to the biggest motor or the heaviest machine. Reduction in weight and efficiency in motor are now major factors. These have been made factors because the foreign makers have gotten together and revamped racing conditions according to the needs of the hour and the progress of the times.

When the long-stroke motor was in the spotlight he framed his regulations to test it. The looked-for lessons were learned and the industry profited. Now that smaller motors are desired by the entire country, now that lighter weight is being asked for, he has framed his regulations along these lines and will solve these problems.

In the meantime America is going on as she has been going on for three or four years, spending each successive season as "a tale that is told." There has not been any effort to frame regulations for contest that will measurably advance the industry. The manufacturer who wants to bring out his new machine with smaller motor, lighter weight and combining various other details has to do so at the anticipated expense of being a second-rater, knowing that the unlimited cylinder sizes of other makers will surely go against him. In spite of this handicap a few of our makers have shown progress, they are compelling attention and they are getting good results.

It is time that our manufacturers were awake to the situation. It is high time that they grasped the potentialities of well-conducted, well-regulated racing. Hundreds of lessons are still to be learned from it but if our manufacturers still claim not to have any time in which to sanely discuss engineering tendencies and formulate racing regulations which are not only in conformity with the trends of the years but which will also act as pioneering factors, then they should not aim so strenuously in avoiding the spirit of the rules and try to win at any cost.

It is absurd to spend thousands and tens of thousands in racing if the governing regulations are not in step with the development of the industry. If the public want racing, and their attendance at this year's races has shown that they do, then make this racing a value to the maker, a value to the dealer and a value to the spectator. This can be done.

Everybody is asking for a solution of long-stroke, weight as a factor, wire wheels *vs.* wood wheels, and many other questions. There is an opportunity for racing to solve practically all of these, but in order to do this, the racing rules must be revised each year in respect to those fundamentals that determine such points.

Waldon Defends The Annual Model

Packard Representative Declares It Evidences Progress Made in Industry and Meets Wishes of Public

Season Plan Is Also Treated—Greatest Problem, Says Speaker, Is Even Production Throughout the Year

S. D. WALDON, of the Packard Motor Car Company treated the subject of annual models before the recent convention of sales managers of the Automobile Board of Trade. Mr. Waldon presented the subject from the favorable point of view, showing the reasons that have actuated manufacturers in retaining the idea of annual models. Mr. Waldon's address was as follows:

The original "automobile season" opened with good driving weather in the spring and continued through summer and fall. Every maker produced his output so as to make deliveries during this period. The mechanical developments of the season were incorporated during the winter in the model to come out with the opening the next spring. This plan produced a tremendous demand at the opening of the season because it combined the natural demand of spring with the stimulated demand on account of the new vehicle with its improvements.

In those days we had the automobile show in the fall in an endeavor to prolong the season and to get business to tide the factories through the winter, but it did not work out that way. The only way to shorten the winter seemed to be to advance the opening of the season into it. This was done at about the rate of a month a year but with each advance toward midwinter the close of the preceding season seemed to keep its same distance ahead. There were always two influences combined to retard sales, in winter, the unfavorable weather and road conditions for the use of a new car on the one hand, and the fact that the new car of the fall would be made obsolete by the new one in the spring, on the other hand.

Moving the opening ahead to close up the dry spell might be likened to the cat that gets started chasing its tail, unconscious of the fact that its own approach withdraws the tail.

It was not until we had passed mid-winter and were opening the season in the fall months that the interval between seasons was materially reduced. The public purchased in the months from October to March because the vehicles were the newest models and with every latest improvement, and continued to buy through spring and summer because of good driving conditions. The year in this part of the country may for purposes of this discussion be divided into two equal sections. Six months, April to September, when conditions are favorable for the use of a new car, and October to March, 6 months in which the average purchaser is loath to break in the varnish of a new car in the mud and slush, and in a great many cases cannot be persuaded to take a demonstration. The 6 months from April to September are good driving months, and able to take care of themselves. The 6 months from October to March are unfavorable to automobiling, and need a stimulus if one is to be had.

The greatest gap between seasons occurred when the 6 months of winter weather preceded the offering of the new models in the spring, and the minimum gap when the 6 months of good driving weather is preceded by a new season, which opened in October.

When the new model appeared in the spring all the advantage of good driving weather was added to the stimulant of the new models and the demand was greater than could be cared for, then, but with a tapering off as winter approached, and with every argument against purchasing during the cold weather.

When the new model appeared in the fall it furnished its own incentive to purchase during the first 6 months of bad weather, and, of course, the good weather and roads of spring and summer carried the volume along almost to the opening of the new season. Opening the season at the commencement of winter gave the factory and dealers courage and enthusiasm to drive ahead with manufacturing and selling campaigns during the bad winter months.

How to run our factories on an even keel all the year round is the vital question before all of us and it seems to be best answered under the plan we have used in the past by not combining in the spring the two influences of new models and good weather and road conditions, thereby for a few months producing a pressure upon the factory that it is incapable of handling at that time, and with a subsequent reaction, but by keeping these influences separate and using the stimulant of the new goods at the beginning of winter to produce sales for dealer and factory alike through the 6 months of bad weather and with the natural driving season following to maintain a fairly uniform demand throughout the year.

The plan of selling by seasons grew out of necessity. Manufacturing economy demanded the largest possible factory orders that could be run through without change or interruption. Sales department efficiency demanded an up-to-date car, and mechanical developments were being made by all companies at such a rate that no one could afford to run longer than a year without calling a halt and introducing the improvements. A year was the smallest unit of time to satisfy the manufacturing department, and the longest unit the sales department dare give.

So long as radical and real improvements are made in motor cars so long will some such plan as we have all been working under be necessary to meet the requirements of both the manufacturing and selling end of the business.

There is no denying the fact that it is a big undertaking to change over a large factory from building one car or line of cars to another, and no company would go to the expense and trouble if it were not justified by the returns on the additional business obtained as the result.

When finality of design is reached and there is no opportunity left for genuine and marked improvement then we may all abandon the idea of yearly models and build the same article continuously. I say we may do it, because even after we reach a point where we build the same thing year after year it may be desirable to manufacture in blocks of one year's output.

The chief objections to those who oppose the season plan are wrapped up in the difficulty of accurately estimating the public's requirements as well as the developments of competition. The temptation to make the manufacturing run a little larger so as to secure greater production economy is always great, while sometimes the best laid plans are spoiled through competition educating the public to some other type of construction than you have to offer. The hardships of the season plan fall upon the company who for any reason has cars to sell that have been made obsolete by the new models of competition.

It would practically make no difference whether the industry were operating on the season plan by series, which amounts to about the same thing, or the continuous model plan.

A genuine improvement is a valuable selling asset and if made the most of through advertising by some prominent company immediately sets a new standard by which all cars are measured. It is not selling cars by seasons that should be criticised. The root of the objection is in the improvements that are made in the new models, that add to their value, and detract from all others.

Suppose that during the past 10 years we had been operating under the series plan. The result would probably have been just the same. Every manufacturer would try to make as many of one kind of vehicles as possible, probably a year's run. The same selling reasons would necessitate the introduction of improvements at not greater than yearly intervals. All would have been introducing their series at about the same time or trying to get out first with the general result of gradually advancing the opening date, and a convention at this time would probably be looking to obtain some change in the general scheme.

Suppose on the other hand the industry had had no set time for announcement but was split up into twelve divisions, each bringing out its new series in a different month of the year. All but one twelfth of the companies would have had obsolete models and there would always be the incentive for the purchaser to wait another month and see the next crop of new things.

In the last analysis any complaint against the season plan should be directed against the quantity of improvements, the rapidity with which they have been developed and the speed with which manufacturers have been obliged to work to keep abreast of the times.

If it were not for the changes what good or harm could the season plan do? Without improvements it is not a new model, and there is no stimulant for the prospect to buy.

The last 7 or 8 years we have been regularly confiding to ourselves that we could see the final car. We have always had this or that thing to add, and then the final car would be finished and might be manufactured without change for 5 years or more. But the new requirements that have been developed by the user have prevented us from ever catching up, and it is probable that the next 5 years will hold just as many improvements and the necessity for breaks in our manufacturing and selling for their introduction as we have had in the past.

A motor car is the most self-advertising article there is. It is as much a part of the owner as his clothes. It lends itself perfectly as a medium for the expression of his sense of beauty in color and form. More different trades contribute to its making than to any other popular article in the world, and every trade is an opportunity for improvement. With the automobile industry now standing fifth in size in the United States, with the great incentive to individual initiative on the part of every member of it, and what is even more important with the keen personal interest in the cars of some one of us, of every successful business man in the country, it will be surprising, to say the least, if the next 5 years fail to produce some startling improvements over our present vehicles.

We are all here to build up a good name and to make money, and both can be best done by giving the public what it wants.

Above all things the public wants evidence of progress, whether it be the same thing for less money or a better thing for the same price. The average buyer retains his car 3 to 5 years and then will buy again more or less readily, depending upon the advantages offered by so doing. The public has been educated too well by the last 10 years of the season plan and the addition of improvements by years to take kindly or quickly to any other basis. It is more of a task to go against the brute strength of such a combination demanding improvements by years than any individual maker cares to undertake, and it seems inevitable that the situation must be allowed to eventually solve itself through reaching an approximate finality of design.

It is perfectly certain that no matter what we may do on this subject in the way of resolutions and recommendations, each one of us will go home and do what he thinks is the best for his business.

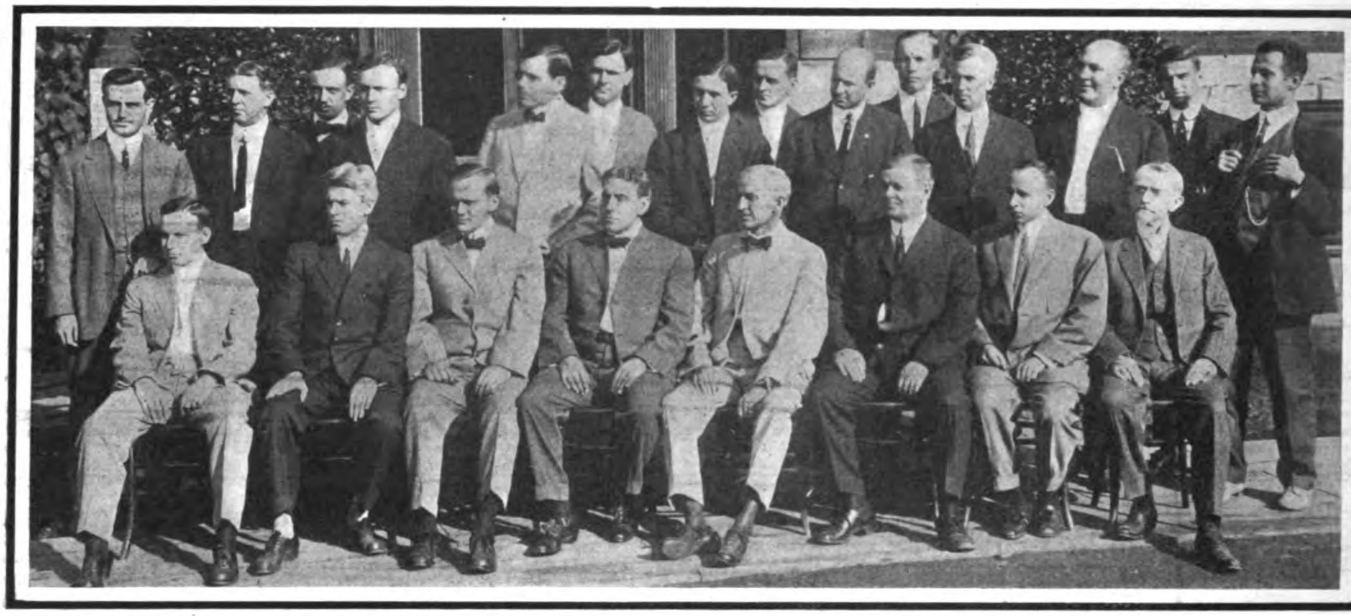
A well-known automobile company has run the same model for four years, practically without change. They have no patent on the plan and everyone else has a perfect right to do likewise, but if all the rest of the industry did the same, except one man who produced something new every year, that one man would have a tremendous advantage, which would not disappear until he had exhausted all opportunity for genuine improvement.

The season plan will have good cause for being so long as we continue to make marked improvements in our vehicles necessitating intervals of time for changing over our shops and permitting our dealers to clean up one output before beginning on the next. The season plan will cease to be just as soon as there are no marked improvements to make the new vehicles more desirable at the expense of the old and of others.

Arizona's New Law in Effect

PHOENIX, ARIZ.—The new state registration law is now in effect. Under its provisions every owner of a motor vehicle must register each machine in the office of the secretary of state. A complete description of each car, including the name of the maker, factory number, style and motor power, must be given. The registration fee is $5 for a machine of 40 horsepower or less, A. L. A. M. rating. The motorcycle tax is placed at $2. This law does away with city numbers, which have heretofore been the source of much confusion.

MONTREAL, QUE., Oct. 7—That Montreal's motor trade is in a flourishing condition, is evidenced by the automobile show which will take place in Montreal during the week of January 4-11. There will be two shows run concurrently, one at the Drill Hall and the other in the Armory.



Gathering of the executive, sales and advertising staff of the Waverley Company at Indianapolis, Ind., to discuss the company's product

WAVERLEY Men in Conference—The executive, sales and advertising forces of the Waverley Company, Indianapolis, Ind., recently met in conference in that city to discuss the Waverley product and to devise means of accumulating data and opinions regarding special features and possible refinements from the entire sales organization.

Wilson Resigns—E. B. Wilson has resigned as general sales manager of the Poss Motor Company, Detroit, Mich.

Bus Line Opened—A motorbus line has been opened from Albany, N. Y., to New Salem, East Berne, Berne and Gallupville, N. Y.

Durval Branch Manager—W. D. Durval has been appointed branch manager of the Diamond Tire Company of Canada, in Toronto, Ont.

Ford Opens Branch—The Ford Motor Company has opened its Minneapolis branch and its St. Paul sub-branch. W. C. Anderson is manager.

Essenkay Invades Omaha Territory—The Essenkay Tire Filler Company has opened a salesroom at Nineteenth and Farnam streets, Omaha, Neb.

Sells 15,120 R-C-H Cars—Contracts for 15,120 R-C-H cars for delivery during the selling season of 1913 have been closed by the R-C-H Corporation since July 1.

Road Progresses Rapidly—Rapid progress is being made on the Hamburg-Buffalo, N. Y., brick road and it is expected the entire work will be completed in a month.

Cortland Club Erects Signs—The Cortland (N. Y.) Automobile Club has just completed erection on roadways of 325 signs in addition to 500 that were already up.

Ride for Incurables—The Ontario Motor League of Canada recently took the inmates of the Hospital for the Incurables around Toronto for their annual outing in automobiles.

Albany Officials Want Car—City engineer Lanagan of the Albany, N. Y., board of public works has made application to the city government for the installation in his department of an automobile for service of his employees who are summoned frequently to various parts of the city to make surveys and measurements.

Preparing Map of Ontario—The Ontario Motor League of Canada is preparing a new and accurate map of the Province of Ontario, showing new roads, old roads that have been improved, condition of the various highways, the material of which they are constructed—all these points being clearly indicated on the new map.

Opposition to the Automobile—With the extension of good roads into rural districts near Shreveport, La., where automobiles never have been seen before, there is some opposition to them being manifested by the ignorant classes. Obstructions have been placed on the roads and glass scattered.

Second Trip Around World—Joseph R. Drake, treasurer of the Hupp Motor Car Company, Detroit, Mich., who last year completed a trip around the world in the little Hupp car, started Wednesday noon from the Hotel Pontchartrain for a second and more comprehensive journey around the globe.

Arizona to See New Records—The Arizona Fair Commission has offered $600 to the driver who will lower the world's mile circular track record on the local track during the week of the state fair, beginning October 28, at Phœnix, Ariz. Barney Oldfield, Teddy Tetzlaff, Hughie Hughes and several others will start to beat the record on October 31.

Demonstration Tours to Officials Proposed—Demonstration tours are being recommended by the Ontario Motor League of Canada to its affiliated clubs, the plan being to take municipal officers, aldermen, reeves, and police officials for a complimentary ride to show them samples of bad roads and instances where traffic regulations could be immensely improved.

Automobile Factor in Strike—The strike on the Georgia Railroad, a small but important line connecting Atlanta with Augusta, has called the automobile into action again as a mail wagon. The Postmaster of Washington, Ga., has been making daily trips to Athens, Ga., by automobile for the mail and has been carrying with him each time cashiers of Washington banks, who were in dire need of ready money as a result of the beginning of the cotton movement.

South Bend Wants Fire Engine—Specifications for the $6,500 hook and ladder truck for the South Bend, Ind., fire department, which was provided for in the city's appropriations for next year have been approved by the board of public safety. Bids will be received up until the morning of Oct. 24; it is probable the contract for the improvement will be let at that time. The truck is to be equipped with a 70 horsepower engine and it must be able to develop a speed of 35 to 40 miles per hour.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Armington, Ill.	Franklin	H. L. Kampf
Aurora, Ill.	Franklin	C. C. Hinckley
Bath, Me.	R-C-H	H. Washburn
Birmingham, Mich.	R-C-H	G. C. Hupp
Bloomington, Ill.	Franklin	O. W. Walters
Boston, Mass.	Krit	F. E. Proctor
Champaign, Ill.	Franklin	J. L. Wiese & Son
Chicago, Ill.	Franklin	J. Hamwall Auto Co.
Columbus, O.	Abbott-Detroit	Snyder Auto. Co.
Columbus, O.	Maxwell	Shaw & Westwater
Columbus, O.	Metz	D. W. Short
Columbus, O.	Michigan	High-Seventh Garage
Columbus, O.	Packard	F. E. Avery
Columbus, O.	Premier	E. Miller
Columbus, O.	Reo	Columbus Auto Inn
Columbus, O.	Studebaker	C. E. Thomas Co.
Columbus, O.	White	C. E. Williams
Corsicana, Tex.	Cole	David Burke
Corsicana, Tex.	Krit	David Burke
Corsicana, Tex.	Paige-Detroit	Corsicana Motor Co.
Danville, Ill.	Franklin	J. B. Chambers & Son
Decatur, Ill.	Franklin	F. L. Winters
De Kalb, Ill.	Franklin	G. H. Dean & Co.
Fall River, Mass.	Franklin	F. W. Davis & Sons
Frankfort, Ind.	Franklin	Model Machine Works
Ft. Wayne, Ia.	Franklin	Ft. Wayne Iron Store Co.
Gadsden, Ala.	Oakland	K-E Auto & Electric Co.
Holyoke, Colo.	R-C-H	G. W. Garland
Iowa City, Ia.	Franklin	H. A. Knease & Sons
Indianapolis, Ind.	Lambert	Firestone Columbus Motor Car Co.
Jennings, La.	Buick	J. E. Parsons
Kankakee, Ill.	Franklin	Kewanee Garage
La Crosse, Wis.	Franklin	Elsen & Phillips
Manitoba, Can.	Marmon	Lion Auto Garage
Marion, Iowa	Franklin	J. L. Ingram
Middletown, N. Y.	Franklin	Hotel Brown Garage Co
Mt. Bullion, Cal.	R-C-H	J. J. Youd
New Haven, Conn.	Marion	Ray Bishop Motors Co.
New Orleans, La.	Franklin	Myatt-Dicks Motor Car Co.
Niagara Falls, N. Y.	Ford	A. L. Noag
Norwich, Conn.	Maxwell	N. V. Porter
Peshtigo, Wis.	Buick	E. St. Peter
Phoenix, Ariz.	Krit	J. A. McCoodra
Phoenix, Ariz.	Reo	J. A. McCoodra
Reedsburg, Wis.	Overland	Sorge & Foss
Reedsburg, Wis.	Rambler	Sorge & Foss
Santa Rosa, Cal.	R-C-H	E. M. Dates
San Antonio, Tex.	R-C-H	C. H. Dean
Sausalito, Cal.	R-C-H	E. M. Dates
St. Louis, Mo.	Fiat	Lindsay Motor Car Co.
St. Louis, Mo.	Speedwell	Meyer-Busch
St. Paul, Minn.	Little	Smith & Heberle
Syracuse, N. Y.	Little	James Auto Co.
Syracuse, N. Y.	Hudson	James Auto Co.
Toronto, Can.	Abbott-Detroit	Central Garage Co.
Toronto, Can.	Rambler	C. A. Finzel
Vancouver, B. C.	Cole	B. C. Auto Co.
Washington, D. C.	Hudson	R. A. Klock
Washington, D. C.	Oakland	J. H. Earle
Washington, D. C.	Premier	Matheson Motor Co.
Washington, D. C.	Pullman	Henderson-Rowe Co.

COMMERCIAL CARS

Place	Car	Agent
Baltimore, Md.	Detroiter	Detroiter-Baltimore Co.
Baltimore, Md.	Universal	Colonial Motor Co.
New Orleans, La.	Garford	Garford Motor Car Co.
New Orleans, La.	Adams	Joseph Schwartz Co., Ltd.
St. Louis, Mo.	Commerce	Standard Auto. Co.
Toronto, Can.	Knox	Canadian Gen. Elec. Co.
Worcester, Mass.	Adams	Power Truck Sales Co.

Vaughan with Olds Company—Guy Vaughan, former engineer for Wyckoff, Church & Partridge, of New York, has joined the engineering staff of the Olds Motor Works, of Lansing, Mich.

Windsor Representing Chicago Firm—Mr. Harry A. Windsor has been appointed Detroit representative for the Fulton-McCutchan Company, of Chicago, Ill., with offices in the Majestic Building.

Dayton Undertaker Uses Automobiles—R. R. Whitmer, of Dayton, O., is the first undertaker in that city to adopt the automobile for funeral purposes and has conducted automobile funerals in many surrounding cities.

Oakland Factory Branch Opened—A factory branch of the Oakland Motor Company has been opened at New Orleans, La. W. C. Gray is in charge of the new agency, which has secured quarters at 745 Baronne street.

Warren's New St. Louis Building—The Warren Automobile Company, local agent for the Warren line in St. Louis, Md., is erecting a new building on Locust street in the center of automobile row. It will be used as a show and salesroom.

Milwaukee Awards Truck Contracts—The board of public works of Milwaukee, Wis., has awarded the contract for furnishing complete two new motor police patrol cars to the Charles Abresch Company, of Milwaukee, at approximately $7,500.

Giving Instructions on Russell Knight—The accompanying illustration shows the branch managers, salesmen and officials of the Russell Motor Car Company, Toronto, Ont., being instructed by Engineer Evans in regard to the new 6-cylinder Knight motor.

Boston Buys Another Truck—On the recommendation of Sealer of Weights and Measures Wooley, of Boston, Mayor John F. Fitzgerald signed an order granting the department permission to purchase a Kelley truck for city use in transporting the scales and sealing apparatus around Boston.

Colorado Springs Receives Park—The Garden of the Gods today has been formally presented to the city of Colorado Springs and dedicated to the use of the entire world. Honor was paid to the memory of the late Chas. E. Perkins, whose children and heirs carried out his wishes that the great natural park be preserved to the people.

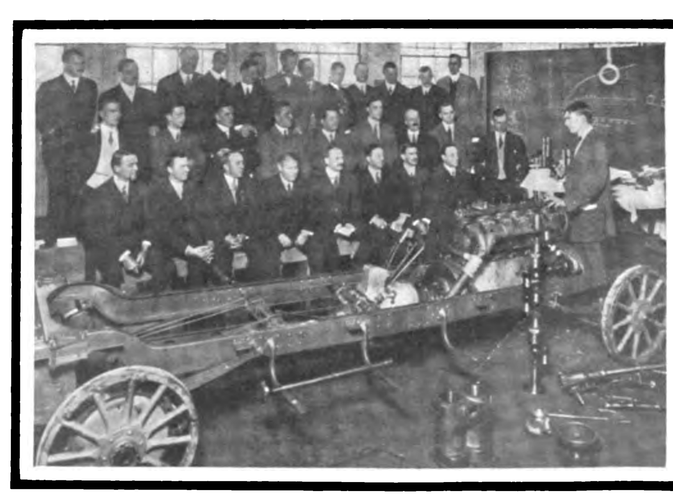
Baker Electric's Convention—A convention of the Baker electric dealers and salesmen will be held in Cleveland, O., where the Baker Motor Vehicle Company is located, October 16, 17 and 18. About one hundred and fifty Baker dealers and salesmen will convene. There will be shown for the first time the new coupé model, which has just been announced.

Pierrepont with Wisconsin Company—Robert Pierrepont has accepted the position of factory manager of the Wisconsin Motor Manufacturing Company, of Milwaukee, Wis., which builds a line of motors for pleasure cars and trucks and has a large plant occupying nearly 10 acres at Forty-fourth and Burnham streets, just west of the Milwaukee city limits.

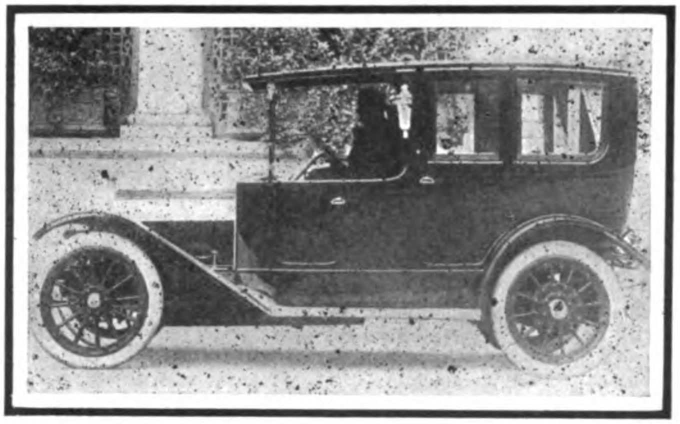
University Teaches Automobile Engineering—The University of Missouri at Columbia, Mo., is to teach students how to assemble, construct, operate, care for and repair automobiles. H. B. Shaw, Dean of the School of Engineering, has announced this new course as elementary automobile engineering. Lectures and laboratory work will combine this course.

Nashville to Mammoth Cave Tour—Twenty-five cars made the tour from Mammoth Cave, in Kentucky, to Nashville, Tenn., in connection with the Tri-State good roads convention, which was held at Mammoth Cave recently. The party inspected several classes of roadway and had an opportunity to examine the work after having been in use several years. The visitors were entertained at The Hermitage, the old homestead of Andrew Jackson.

Marmon's Hundred Century Run—Ten thousand miles in 100 running days is the feat to be attempted by the Marmon's Hundred Century car which left Indianapolis, Ind., Wednesday, October 2, on a remarkable touring test. The Hundred Century car is a new Marmon 32 touring car and is the property of Mr. M. L. Templeton, of Indianapolis, who will pilot the car on its hundred century jaunt. Mr. Templeton is accompanied by his wife and by Mr. and Mrs. J. G. Boston.



Sales organization of the Russell Motor Car Company, Toronto, Ont., receiving instruction on the six-cylinder Knight motor



New limousine of the Mercer Automobile Company, Trenton, N. J.

New Branch Manager—M. E. Gamble has been appointed manager of the Boston branch of the Universal Motor Truck Company.

Vail Makes a Change—Edward L. Vail, Boston, Mass., has accepted a position as sales manager and traveling representative for the Hoffecker Speedometer.

Leominster Club Posts Signs—The Leominster, Mass., Automobile Club has been busy recently posting signs under the direction of Dr. H. Porter Hall.

Establish Branch at Lexington—The Kentucky Automobile Company will establish a branch at Lexington, Ky. Work on the new structure in that city has already been started.

Havers Moves in Boston—The Boston agency of the Havers Six has moved into new quarters at 121 Massachusetts avenue, recently vacated by the Roberts & Sherburne Company.

Maine Number Plates—Cyrus W. Davis, Secretary of State, is preparing bids for the 1913 number plates to be used by Maine automobilists next year. The number ordered for this year was 10,000.

More White Trucks for Canada—Seven more White Motor Trucks have been delivered to the Hudson Bay Company for service in their departmental stores at Winnipeg, Calgary, and Vancouver, Ont.

Correction on Santa Monica—In THE AUTOMOBILE for September 26 it was stated that a National car won the Santa Monica race of 1909. This was a typographical error as the National won this race in 1911.

Top Company's Detroit Store—The National Top & Curtain Company, Detroit, Mich., organized to handle Jiffy curtains, has just announced the opening of a store on upper Woodward avenue, near Willis.

Beloit Boosters Go to Milwaukee—Two hundred Beloit boosters drove to Milwaukee, Wis., on October 2 in 40 cars to spread the gospel of Beloit products and good roads along a 70-mile trail to the Wisconsin metropolis.

Goes into Garage Business—J. Mavor, lately distributing agent in Western Canada for the Halladay automobiles, has given up this agency and opened a garage and repair shop in the Western portion of Winnipeg, Ont.

Detroit Show Space in Demand—Space for the Detroit, Mich., automobile show next winter is already in demand, judging by the applications received by Manager Walter Wilmot. More space will be required this year than last.

Lowell to Have Fire Trucks—At the last meeting of the Lowell City Council an order was passed appropriating $16,000 for the purchase of three motor chemical engines and hose wagons for the fire department to add to the motor equipment.

Winnipeg's Highway Convention—The interest in the Canadian Highway Convention, which takes place in Winnipeg, Ont., October 9 to 12, is rapidly growing, and it is now probable that over 400 delegates will be in attendance from the Western Provinces.

New Montgomery Traffic Ordinance—To prevent interference with traffic automobile and hack stands have been designated by the Montgomery, Ala., authorities. Automobiles and other vehicles will not be allowed to stand at the curb at places other than those designated.

Stuart Going West—George L. Stuart, one of the first motor dealers in Portland, Me., who handled the Cadillac there until recently when he sold out his interest in the agency, has decided to move to Los Angeles, Cal., with his family where he will go into business shortly.

Automobile Hinders Real Estate Business—Real estate men in Montgomery, Ala., are blaming the automobile for the alarming decrease in the sales of city property. They say that young men who a few years ago invested their surplus money in properties now are buying automobiles.

Louisiana's Road Improvement—One hundred thousand dollars is to be spent at once on rural roads immediately east of New Orleans, La. This provides for a network of improved highways that will add materially to the territory that can be reached by automobile from that city.

Cropler Establishes Tire Branch—F. S. Cropler, for several years connected with the old G & J clincher tire people, has taken over the old Federal Tire agency in St. Louis, Mo., and has established a factory branch there. This factory branch will be the distributing point for the Southwestern States.

Springfield Club Elects Officers—The annual meeting of the Springfield, Mass., Automobile Club was held recently at the Hotel Worthy and the secretary reported that the association was in a flourishing condition. He stated that 87 new members had been added to the club's roll during the year, making the membership now 345.

New Mercer Limousine—The Mercer Automobile Company, Trenton, N. J., has brought out a limousine known as type 35 E. This car is shown in the accompanying illustration. It is built on the regular Mercer 35 AB chassis, and unlike the ordinary limousine, it presents a very low appearance. An idea of its height can be judged from the fact that a man a little taller than the average can stand on the curb and look over the top. It has a wheelbase of 118 inches.

Indianapolis to Have Garage—Indianapolis, Ind., within a short time, excepts to have one of the finest municipal garages in the country. A conference of city officials was held recently, and, as a result, City Controller Harry R. Wallace consented to recommend to the city council a bond issue of $110,000. Of the amount that will be received from the sale of the bonds, $40,000 will be used in erecting a municipal garage. The fire headquarters, which will cost $70,000, will be equipped with motor apparatus.

Automobile Incorporations

AUTOMOBILES AND PARTS

BENTON, ILL.—Benton Motor Car Company; capital, $65,000; to deal in automobiles and accessories. Incorporators: H. Stotlar, W. S. Cantrell, A. H. Fraunfelder.

CHICAGO, ILL.—Metzger-Herrington Argo Company; capital, $50,000; to deal in automobiles, motors and vehicles. Incorporators: C. J. Metzger, B. F. Brady, R. A. Herrington.

CINCINNATI, O.—Federal Motor Supply Company; capital, $250,000; to deal in automobiles and accessories. Incorporators: G. W. Platt, E. C. Schmitt, R. L. Dollings, A. M. Draddy, M. F. Platt.

CLEVELAND, O.—Cadillac Automobile Company; capital, $50,000; to deal in automobiles and accessories. Incorporators: T. B. Bolton, W. H. Marlatt, F. H. Pelton, E. Jenkins, E. D. Hayes.

DETROIT, MICH.—Traveler Motor Car Company; capital, $10,000; to deal in automobiles and accessories. Incorporators: W. J. McIntyre, Joseph P. McIntyre, Joseph Lavigne, William L. Kenfield.

LACROSSE, WIS.—Parket-Hirt Company; capital, $5,000; to deal in motor cars and accessories. Incorporators: E. W. Parker, Joseph F. Hirt, Harriet E. Parker.

MENOMINEE, WIS.—D. F. Peyer Company; capital, $75,000; to manufacture automobile trucks. Incorporators: D. F. Peyer, F. J. Trudell, Harry S. Emerson.

NEWARK, N. J.—Ka Dix Newark Motor Truck Company; capital, $100,000; to manufacture commercial and fire fighting trucks. Incorporator: G. F. Kallberg.

NEW YORK CITY, N. Y.—New York Electrical Vehicle Association, Inc., capital, $50,000; to deal in motor vehicles. Incorporators: George Tierman, Frank H. Parcello, Robert G. Redlefsen.

NEW YORK CITY, N. Y.—Used Car Company of New York; capital, $5,000; to deal in automobiles. Incorporators: Andrew F. McNamara, Gustavo Galiani, Jacob J. Kramer.

NEW YORK CITY, N. Y.—Viking Manufacturing Company; capital, $25,000; to manufacture automobiles. Incorporators: R. Condon, A. O. Briggs.

PATERSON, N. J.—Standard Auto Company; capital, $2,500; to engage in the automobile business. Incorporators: Christian Braun, William F. Drexler, Henry Stoeher.

RACINE, WIS.—Wallis Tractor Company; capital, $300,000; to manufacture farm tractors. Incorporators: W. C. Quarles, Markey Wells.

ROCHESTER, N. Y.—Electric Car Sales & Service Company; capital, $10,000; to deal in electrical motor vehicles and equipment. Incorporators: Max Bernstein, Minnie L. Bohrer, Glenn H. Leaty.

TORONTO, CAN.—Standard Motors Company, Ltd.; capital, $40,000; to manufacture automobiles. Incorporators: George S. Skinner, Harry N. Newman, George P. McHugh.

TORONTO, CAN.—Toronto Electric Motor Car Company; capital, $300,000 to manufacture motor cars. Incorporators: James A. Riordans, Albert E. Adams, Edward C. Coleman.

To Motorize Douglas Fire Department—Fire Chief W. J. Nemock has recommended to the Douglas, Ariz., council that automobile tractors be substituted for the horses now used to draw fire engines.

Has New Quarters—The Day Automobile Company, handling the New Orleans, La., agency for the Paige-Detroit and the Alco companies, has moved into new quarters on Rampart street.

Ford at Rochester Expands—Thomas J. Northway, local Ford distributor, at Rochester, N. Y., has completed plans for the construction of a three-story steam-heated salesroom to cost $12,000.

To Collect Mail—Two automobiles will soon be put in use for the collection of mail, in Omaha, Neb., if the proper machines can be secured at a price satisfactory to the post office department officials.

Coal Men Use Trucks—Retail coal men are figuring on utilizing the motor trucks in Minneapolis, Minn., due in part to the uncertainty regarding teamsters and also because horses are difficult to buy at present.

Cox Heads Fordham Company—G. F. Cox was appointed on Saturday, Rochester, N. Y., manager of the Fordham Company, recently organized with capital of $3,000, for the purpose of manufacturing motor vehicles.

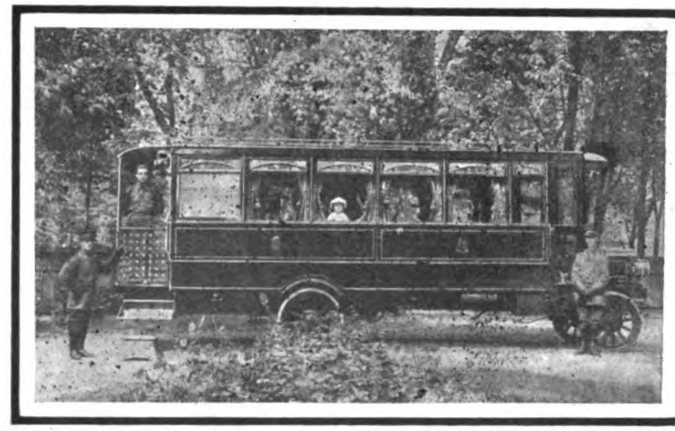
Present for Buffalo Club—The Buffalo Electric Vehicle Company presented recently to the Country Clubhouse of the Automobile Club of Buffalo, N. Y., a charging plant capable of recharging three automobiles at one time.

Washington Dealer Changes Name—The Auto Exchange & Supply Co., 1722 Fourteenth street, Washington, D. C., N. W., has changed its name to the Washington Car Equipment Co., and will shortly remove to larger quarters.

Rochester Builds Police Garage—Work was begun last week on the construction of the Rochester, N. Y., police garage. The building was staked out and Contractors Crossett & Lloyd planned to start immediate construction.

To Sell Rotary Valve Motor—The Parker Motor Company of this city has been formed to promote the sale of a rotary valve motor which is the invention of Victor C. Parker, formerly with *Modern Power*, of Winnipeg, Canada.

Camillus-Elbridge Road Open—The Automobile Club of Syracuse, N. Y., announces that the Camillus-Elbridge state road is open, which means that a continuous stretch of state highway now extends from the West Camillus hill to Auburn.



Pullman Packard owned by U. H. Dandurand, of Montreal, Que.

Duluth Club Active—The Duluth Automobile Club, Duluth, Minn., has started a roads campaign. It is laying out a new Twin City-Duluth road, which is to reach from Sandstone, the half-way point, through Superior, instead of direct to Duluth.

Lockport After Speeders—Lockport, N. Y., fell in line last week with the ordinance limiting the speed of motor vehicles in the city limit to 15 miles an hour. Signs have been posted in conspicuous roads and arrests under the law can now be prosecuted.

Studebaker Men Meet—About thirty branch managers and officers of the Studebaker Corporation met at a dinner recently at the Pontchartrain Hotel, in Detroit, Mich., the occasion being the annual meeting for the discussion of the coming season's campaign.

Hudson Agency Moves—Increased business has made it necessary for the Hudson agency in New Orleans, La., to occupy more spacious quarters. A completely equipped repair shop has been installed in connection with the new sales rooms at Baronne and Perdido streets.

Clubs in Canadian League—The Ontario Motor League has to date affiliated in its organization eleven automobile clubs in the province which are as follows: Aylmer, Brantford, Chatham, Hamilton, Kingston, Niagara Falls, Ottawa, Peterboro, Stratford, St. Catharine's and Woodstock.

Ohio Road Report—The Ohio State Highway Commission has made a report showing the progress made in the improvement of the highways of the state up to date. During the year road construction has been accomplished to the extent of $1,122,060.97. The total length is 658,046.4 lineal feet.

Omaha Show Draws Visitors—Ak-Sar-Ben week and the fall garage show of the Omaha automobile show brought hundreds of visitors to Omaha, Neb. All of the garages were prettily decorated in Ak-Sar-Ben colors and in the colors of the show association, green and white. Most of the dealers had a complete line of their 1913 models on display.

Good Roads Convention at Birmingham—Delegates from all parts of the state are assembling at Birmingham, Ala., for the annual convention of the Alabama Good Roads Association. The Birmingham Motor Club is cooperating with the local Good Roads Association in directing the affairs of the convention. Three hundred delegates are expected.

Express Company's Packard Order—A significant step in the conquest of local transportation by the power vehicle is the order recently placed by Wells, Fargo & Company with the Packard Motor Car Company for 100 motor trucks of 2-ton and 3-ton capacity. These trucks, costing $286,750, will be used to supplant the express company's horse-drawn wagons in the larger cities of the United States.

Luxury in Automobile Travel—U. H. Dandurand, of Montreal, Can., has succeeded in getting luxury in motor travel, together with independence from hotels, by using a Pullman Packard. On a 3-ton Packard truck chassis has been mounted a body whose interior arrangement is similar to that of a private railroad car. Twenty-five persons are easily carried on short trips and for long journeys there are accommodations for the comfort of eleven, including chauffeur and cook. The accompanying photograph shows the truck.

Automobile Incorporations

GARAGES AND ACCESSORIES

CLEVELAND, O.—Service Garage Company; capital, $10,000, to deal in automobiles and accessories and to operate a general garage. Incorporators: Roy J. Ramson, Karl W. Volk, Fred Desberg, Walter McMahon, John W. Willdis.

COLUMBUS, O.—J. C. Sherwood Rubber Company; capital, $20,000; to deal in all kinds of rubber tires. Incorporators: John C. Sherwood, William S. Sherwood, Robert C. Creppen, Parnell J. Cull, Charles L. Creppen.

DALLAS, TEX.—Hazoline Auto Supply Company; capital, $10,000; to sell automobile accessories. Incorporators: Edwin Hobby, Forrest E. White, J. W. Crotty.

DAYTONA, FLA.—Daytona Auto Supply Company; capital, $1,000,000; to sell automobile accessories. Incorporators: A. G. Hunt, H. C. Thompson.

LOUISVILLE, KY.—McPherson Automobile Company; capital, $10,000; to engage in the automobile repair business. Incorporators: Franklin McPherson, Catherine McPherson, Olive McPherson.

NYACK, N. Y.—Nyack Garage, Incorporated; capital, $15,000; to engage in the garage business. Incorporators: Alan Leggett, John J. Laine, Paul J. Douboise.

SHEBOYGAN, WIS.—Wald Manufacturing Company; capital, $30,000; to deal in automobile accessories. Incorporators: Ewald F. Pawsat, Herman Pawsat, Felix Benfy.

ST. LOUIS, MO.—Lewis Automobile Company; capital, $26,000; to conduct a garage and general repair shop. Incorporator: H. D. P. Lewis.

TORONTO, CAN.—Bulldog Tire Company; capital, $300,000; to manufacture tires.

WHITE PLAINS, N. Y.—General Rim Company; capital, $150,000; to supply motor vehicles and accessories. Incorporators: William Kuhl. Robert W. Ashley, Frank Oberkirsch.

CHANGES OF NAME AND CAPITAL

AKRON, O.—Buckeye Motor & Cycle Company; increase of capital from $5,000 to $15,000.

BALTIMORE, MD.—Hupp Motor Car Company; increase of capital from $500,000 to $750,000.

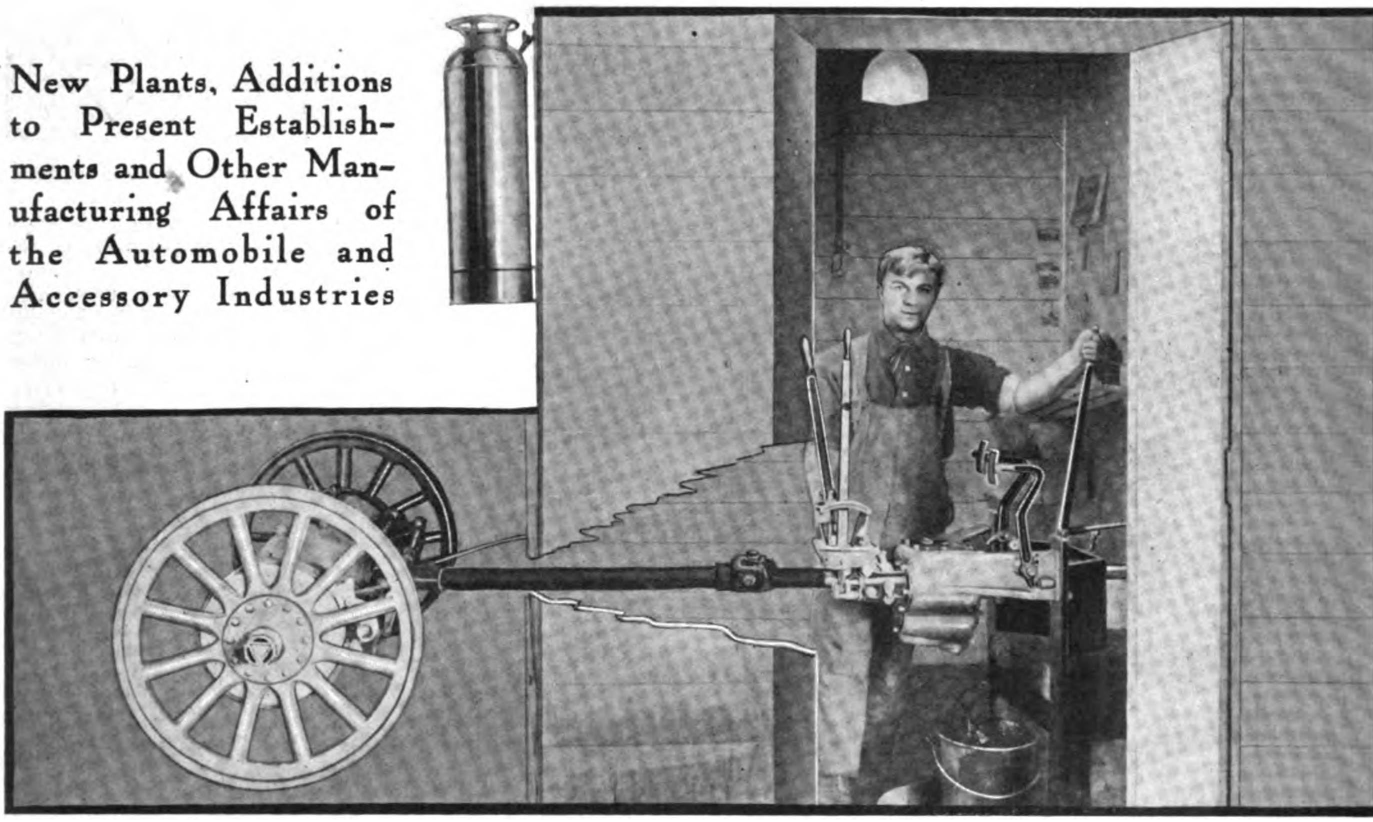
DETROIT, MICH.—Haves Manufacturing Company; increase of capital from $500,000 to $750,000.

DETROIT, MICH.—Kelsey Wheel Company; increase of capital from $500,000 to $1,000,000.

LOUISVILLE, KY.—Kentucky Automobile Company; increase of capital from $24,000 to $65,000.

WAUKESHA, WIS.—H. L. Kenyon Company; increase of capital from $100,000 to $200,000.

New Plants, Additions to Present Establishments and Other Manufacturing Affairs of the Automobile and Accessory Industries



Showing soundproof vault employed for testing differential and transmission gears by the Hudson Motor Car Company, Detroit, Mich.

It is impossible for a tester to do good work with the din of a machine shop surrounding him. To successfully cope with this situation and allow the tester to train his ears to detect the slightest sound which would indicate that the gears in the differential and gearset were not working as they should, the Hudson Motor Car Company, Detroit, Mich., has erected a sound-proof vault in which this part of the work is carried on. The drive mechanism is mounted on the special frame shown in the illustration and the clutch arranged so that the power can be applied when desired. The shaft which drives the mechanism enters from the exterior of the vault, passing through the wall resting in a bearing at that point. One man can operate the mechanism and is sufficient for the testing work. The length of time in the testing work will vary but twenty sets of differentials and gearsets can be tested in a working day. The gears can be shifted in the usual manner and the silent running of all gears is assured by the fact that the noisy ones are not permitted to pass through the test in the silence chamber.

GOODRICH Company's Recent Addition—Although the present floor space of the Goodrich Tire Company, Akron, O., is between 60 and 70 acres, this is at present being augmented by the new building which is shown in the above illustration. This structure of six stories and basement is 270 feet long and 157 feet wide.

Lewis Company in Detroit—The Lewis Spring & Axle Company, Jackson, Mich., has moved its control department to Detroit, Mich., with headquarters in the Boydell Building. Fifty men will be employed.

Supplies DeTamble Windshields—The Columbus Automobile Parts Company, Columbus, O., has closed a contract to supply the DeTamble Motor Car Company, Anderson, Ind., with windshields for the 1913 cars.

Century Electric's New Quarters—The Century Electric Motor Car Company, Detroit, Mich., has removed its factory to the new building erected by the company at Woodward and Lathrop avenues and has started work with two shifts, night and day.

Wagon Company to Make Trucks—The Tiffin Wagon Works of Tiffin, O., is preparing to enter the field of motor truck manufacturing and expects to place a line of trucks on the market in the spring. Agents have already been signed up to market the trucks.

Tudhope Company Moves to Windsor—The Tudhope Motor Company, Orillia, Ont., Canadian manufacturers of the Flanders Six, which was formerly known as the Everitt, will move to Windsor, Ont., shortly. Recently a site for a new factory was bought. The change will bring the concern much nearer to the Flanders Manufacturing Company of Detroit, Mich.

Hudson Factories Double—The Hudson Motor Car Company, Detroit, Mich., has factory floor space of 172,811 square feet. Last winter a new factory was added, bringing the total to 236,411 square feet. There will now be added two more plants, bringing the total floor space up to 363,611 square feet.

Lowell to Have Tire Plant—The Patterson Rubber Company, a Massachusetts corporation with a capitalization of $500,000, has decided to locate at Lowell, Mass., where five buildings will be erected and the company will soon begin the manufacture of automobile tires. About 1,000 employes will be put to work. John S. Patterson, of Providence, R. I., is president of the new concern.

Eight New Overland Buildings—The Willys-Overland Company, Toledo, O., has eight new buildings in process of construction at the Toledo plant. The largest of the group is a five-story concrete building, 102 feet by 127 feet in size. The others range from 34 feet up to 60 feet by 48 feet up to 216 feet in dimension. These buildings represent an outlay of several hundred thousand dollars and when finished will house 2,000 extra workmen.

Toledo Truck Company Building—The Toledo Motor Truck Company, Toledo, O., is building a one-story brick and structural steel building, which will be 54 feet by 236 feet in size.

Goodyear Works Night and Day—Due to increased business of the Goodyear Tire & Rubber Company, Akron, O., it will be necessary to keep the factory going night and day for some time.

New White Plant—The new factory of the White Motor Car Company, Cleveland, O., will be ready for occupancy about December 1. This new structure will be 240 feet by 160 feet in size.

Krebs Purchases Elmore Plant—The Krebs Motor Company, Clyde, O., has purchased the old plant of the Elmore Automobile Company. B. A. Becker is president of the Krebs Company.

Ford's New Assembling Plant—The contract for the new assembling plant of the Ford Motor Company, Detroit, Mich., in Memphis, Tenn., has been awarded and the estimated price is $176,000.

New York's Fifty-six Automobile Factories—According to the last United States census New York City has fifty-six automobile factories. In 1899 there were only three, with a combined output of $6,194,000.

Manhattan Rubber's Addition—The Manhattan Rubber Manufacturing Company, Passaic, N. J., has awarded contracts for an addition to factory building "F", which is to be 70 feet by 90 feet in size.

Tires to Be Made Soon—Tyer Rubber Company, Andover, Mass., has its new addition nearly completed and in a couple of weeks the company will be manufacturing tires of all kinds for motor vehicles.

Apperson in New Deal—Elmer Apperson is head of a new concern that has been organized to make the Wilson Never-Miss self-starter of the compressed air type. A new plant will be erected at Kokomo, Ind.

Ford's Proposed Denver Plant—The Ford Automobile Company, Detroit, Mich., is reported to have secured a site on Broadway and Exposition avenue on which to erect an assembly plant four stories high.

Factory Manager Quits—The resignation of Benjamin A. Rhodes, as general superintendent of the Stoddard-Dayton Automobile Company plant, was recently announced. The resignation takes place at once.

Equipment Company Erecting Factory—The American Auto Equipment Company, Toledo, O., maker of automobile trimmings, will erect a large new factory and will be in the market for new tools, etc.

Hudson's Fireproof Building—The Hudson Motor Car Co., Detroit, Mich., has let the mason and concrete contract for the erection of a new fireproof factory building on Jefferson avenue. It will cost $50,000.

Morton at Chalmers Factory—Robert L. Morton, manager of the Keystone Motor Car Company, Harrisburg, Pa., left for Detroit, Mich., recently to arrange for shipments of Chalmers cars to meet the present demand.

Niagara Company's Dunkirk Plant—The Niagara Gasoline Motor Company of Buffalo, N. Y., has acquired a site and will immediately erect a new large plant for the manufacture of gasoline engines at Dunkirk, N. Y.

Northway Company's Plant—The Northway Motor Company, Detroit, Mich., has let contracts for an addition to the plant, to be three stories high and to be 50 feet by 104 feet in size. The building will cost $32,500.

Pump Company Moving to Buffalo—The Automobile Pump Company, Springville, N. Y., is moving its plant from that place to Buffalo, N. Y. Most of the employes will move to Buffalo and continue in the Pump company's employ.

Edwards Adds Longest Plant—The Edwards Motor Car, Louisville, Ky., has taken over the motor truck plant of the Longest Brothers Company, of that city, and will enlarge it. C. G. Stoddard and H. J. Edwards, New York City, are interested.

Miller Rubber Company Active—Increasing demand for tires, rubbers and reliners for automobiles at the O. K. Vulcanizing Works, Binghamton, N. Y., has necessitated the doubling of stock of rubber goods made by the Miller Rubber Company, Akron, O.

Eclipse Machine Company's Addition—Plans have been completed for the construction of an addition, 125 feet by 60 feet, to the plant of the Eclipse Machine Company, Elmira, N. Y. The addition will be of brick and steel construction and will provide additional room for more machines and also a factory store-room. The Eclipse Company makes automobile screw machinery for automobiles.

Continental Equips New Factory—The Continental Motor Company, Ellicott Square Bldg., Buffalo, N. Y., has leased a plant and will equip it with machinery for the manufacture of automobiles and motor trucks. Frank V. Whyland is general manager.

Lamp Company Builds Addition—The Guide Motor Lamp Manufacturing Company, Cleveland, O., is laying plans for a new factory addition. The building will be 50 feet by 120 feet in size, two stories high, and will be built of brick and reinforced concrete.

Ex-Cel Truck Company's Factories—The Ex-Cel Motor Truck Company, Jamesburgh, N. J., has awarded contracts for the construction of its new plant. It will consist of five factories, each one story high, and 50 feet by 100 feet in size. The estimated cost is $35,000.

Buick Insure Its Employes—The Buick Motor Company, Flint, Mich., has taken out a policy under the new compensation law, which will cover all expenses incurred in every accident. This includes physician's and hospital services for three weeks in case of every accident.

Goodyear Planning New Plant—The Goodyear Tire & Rubber Company, Akron, O., is planning to erect an addition to its plant. The new building will be 250 feet by 60 feet in size, and five stories high. The cost will be $150,000. This will be the third large structure erected by the company during the present year.

Guests of Packard Company—Representing the commercial organizations of forty-five nations, the members of the International Congress of Chambers of Commerce were guests of the Packard Motor Car Company at luncheon in the plant in Detroit, Mich., Thursday, October 3, and made a complete inspection of the big motor car factory.

Chicago Manufacturer Moves to Marinette—The Chamber of Commerce of Marinette, Wis., has practically closed negotiations with a large manufacturer of motors for pleasure and commercial cars, now located at Chicago, for removal to Marinette. The Chicago concern is given a bonus in the form of a site for a factory and a suitable structure in which manufacturing operations may be carried on for the present, and during the construction of a new plant. It is stated that the Chicago concern awaits formal organization and incorporation upon the successful completion of negotiations with Marinette commercial club.

New Starter Factory—The Merralls Starter Company has been organized in Detroit, Mich., with a capital stock of $150,000 to manufacture a compressed air type of starting apparatus, which is the patented invention of W. A. Merralls. It has not been definitely decided as yet whether the concern will locate here or in the East, but in all probability Detroit will be chosen. It is proposed by the new concern to erect a two-story factory to take care of an output of about ten starters a day. Plans for such a structure have been made and they call for a building measuring 60 by 160 feet.

Latest addition to the plant of the B. F. Goodrich Company, Akron, O.

J-M Two-Ring Demountable Rim; Star Headlight; Rebound Check and Shock-Absorber for Ford Cars; Brackets for Carrying Plates on Fords; Handy Fire Extinguisher; Clockless Time-Recording Stamp

LaMay Chemical Extinguisher

DEMOUNTABLE rim consisting of two rings and fastened to the wheel at five points in the latest addition to the manifold line of the H. W. Johns-Manville Company, New York City, which is now being offered to the automobile public after extensive tests carried on with this device have been completed.

The illustrations here given show the rim in place on the wheel and off the same, ready for changing a tire. The rim each ring of which is formed with a flange forming a base for the tire bead to be pressed against, is secured to the wheel in the manner seen in Fig. 1, by the use of clamps C. These clamps grip the recess R formed between the innermost portion of the rim and the bead flange formed on the outer side of the wheel, so that when the nut N is turned tight on its bolt piercing the wooden felloe, the portion P of the rim is pressed toward the inner side of the wheel. The felloe band being tapered does not permit the rim to come off toward the center of the car. The rim itself, as stated before, consists of a continuous ring R1, Fig. 2, and a split ring R2, fitting inside the ring R1 and being secured near its ends by holes engaging studs which project from the inner surface of R1. The openings O in both rims are provided for the tire valve.

The *modus operandi* in mounting and demounting rim, as well as the tire on the same, is very simple, and this work may be done with a good deal of speed, due to that factor as well as to the light weight of the rim, which is made of cold-rolled steel. When the rim is in place on the wheel the clamps press upon the recess R of the rim, as shown by the examples of C and C1 in Fig. 1. To release the rim from the wheel the special J-M combination tool is applied to the nut N holding the clamp C in place and, operating always on the clamp occupying the highest position on the wheel, N is given one turn, which relieves the pressure on the clamp and permits it to drop by gravity, guided by the slot S. After the clamp has dropped the nut is turned back far enough to hold C taut against the wheel felloe and after this has been done in the case of all the clamps, a slight outward pressure on the rim brings it off the wheel.

Fig. 1—J-M demountable rim in place on an automobile wheel

An illustration of the engagement of the ends of the split ring R2 fitting inside the ring R1 is seen in Fig. 2. When both studs V engage the holes in R2, the two rings form one unit with two flanges accommodating the tire and holding its beads in secure relation. To take the tire off the rim the split ring is removed by prying the end E of R2 off its seating in R1. This is done by inserting the tapered end of the J-M tool between the two rings, on the side of the rim next to the chassis when in place on the car. R2 is made with a depression between which and a flange is formed the recess R referred to above. The depression, which extends all around the ring, fits into an annular groove which is formed on the ring R1. In combination with the two studs and the five clamps, it makes the locking positive. The split ring is replaced on the continuous ring by engaging the stud of the end punched for the tire valve and pushing it into the ring with a foot, the second stud being put in place by a slightly accentuated pressure of the foot. After this the rim is replaced on the wheel, securing all clamps when they are in their lowest position by first loosening the nut which results in the clamp dropping over the recess R, and then tightening it, whereby it is fastened in place.

Mitchell Shock-Absorber

The Mitchell rebound check and shock-absorber, specially constructed for Ford Model T cars by the Mitchell Shock-Absorber Company, Lawrence, Conn. The design resembles that of some other accessories constructed for the same purpose, but the novel idea utilized in the Mitchell device consists in the combination of the coiled spring and strap, as illustrated in Figs. 4 and 5. The former figure shows how the accessory is made for and attached to the front axle of the car. It is composed of two units held together by a horizontal plate, the ends of which are shaped with clamps gripping the lower flange of the I-beam axle. Each unit consists of a base-plate B carrying the coiled spring S1 seated around a projection of the baseplate and bearing against the top plate P mentioned above. Two straps are fastened to the plate B, the shorter one carrying a buckle, while the longer one is laid over the front end of the frame F and is secured to the buckle end of the other strap.

Due to the difference in construction of the two axles, the outfitting for the rear portion of the machine differs from the front axle equipment in several particulars. Reference to Fig. 5 shows the most prominent one, which consists in using a flanged two-piece collar C, the halves of which are held together by bolts, which, when drawn tight in the holes of the collar flanges, hold C positively in place on the rear axle housing. Plate P used in the front axle is eliminated in the rear equipment, while base-plate and straps are also used.

Ford Car License Tag Holder

H. B. Klingensmith, 296 Willow street, Meadville, Pa., has designed a license bracket by means of which the number plate of a Ford car may be attached to the support of one headlight, resulting in a solid engagement of the plate and putting the same in a protected position. The license plate, as secured to lamp support, is seen in Fig. 6, and the detailed construction of the bracket in Fig. 7, consisting of a casting M, the front portion of which is screw-threaded for two bolts B, while an extension has three holes for bolts C, permitting of fastening a plate P to it. In installing the bracket on the car, the headlight is taken off its support and the bracket is so placed against it that the forks of the support bear in the grooves C. The bracket is held in place by the plate P, the three bolts C being drawn just tight enough to prevent rattling of the bracket on the support. The number plate is then put in place, the bolts B being drawn through the slots in the plate and drawn, by means of their nuts, to the same degree of tightness as the bolts C. After this the headlights are replaced on the supports.

Magnetograph Electric Recorder

As time clocks used for recording the working time in shops are ordinarily subject to a great deal of strain, the Magnetograph, operating by electricity and without a clockwork, is made by the Magneta Company, 1955 Park avenue, New York City. It has absolutely the appearance of an ordinary small time clock of the tabletype, but it is operated by a small electrical odometer mechanism inside, which draws electric current fed to it from a city conduit through a plug. This time-stamp mechanism is regulated through contacts closed every minute by a master clock which comes with the Magnetograph.

Electric Star Headlight

An electric headlight which is vibration proof and very simple in its construction is the Electric Star Headlight, manufactured for the coming season by the Milwaukee Bronze Casting Company, Milwaukee, Wis. The line of this company's products is distinguished by the so-called quick-change feature consisting in the use of a removable reflector hub which represents the base for the electric bulb. The hub carries all the wiring and being practically independent of the reflector body may be used as a trouble-hunting light. It slips into the central opening of the reflector body and is locked there by a slight turn. A turn in the opposite direction unlocks the hub again; the bulb itself is carried in an Edi-Swan socket immune against vibration.

LaMay Chemical Extinguisher

Garage owners should be interested in the new fire extinguisher made and sold by the LaMay Machine Works, Rochester, N. Y., shown in the initial illustration. This device, which is 3 by 14 inches and weighs 5 pounds, is of the conventional cylindrical shape and contains a specially prepared chemical solution under pressure which forces it out of the cylinder through a nozzle, when a red button on the top of the extinguisher is pressed. It is claimed that a stream from 30 to 40 feet in length may be produced by this apparatus, whose capacity for chemical is one quart. The liquid immediately puts out gasoline, kerosene or acetylene fires, according to the maker, and as it is a non-conductor of electricity, it may also be applied where a short-circuit is the cause of an incipient conflagration. Furthermore, the liquid does not injure any fabric. The extinguisher is refilled by unscrewing the head, filling in a quart of Auto-Chemical solution made by the LaMay company and pumping air into the cylinder by a pump attached to it.

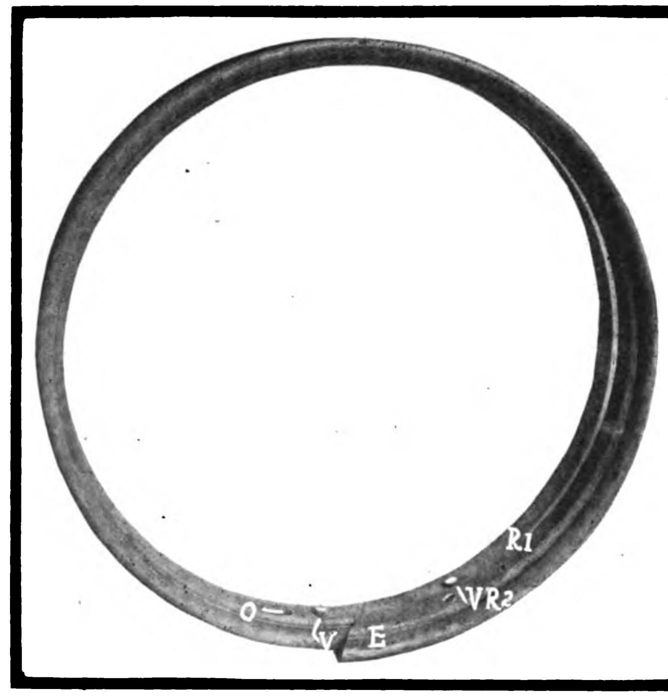


Fig. 3—J-M demountable rim, shown off the wheel, illustrating the use of two rings and two-stud scheme

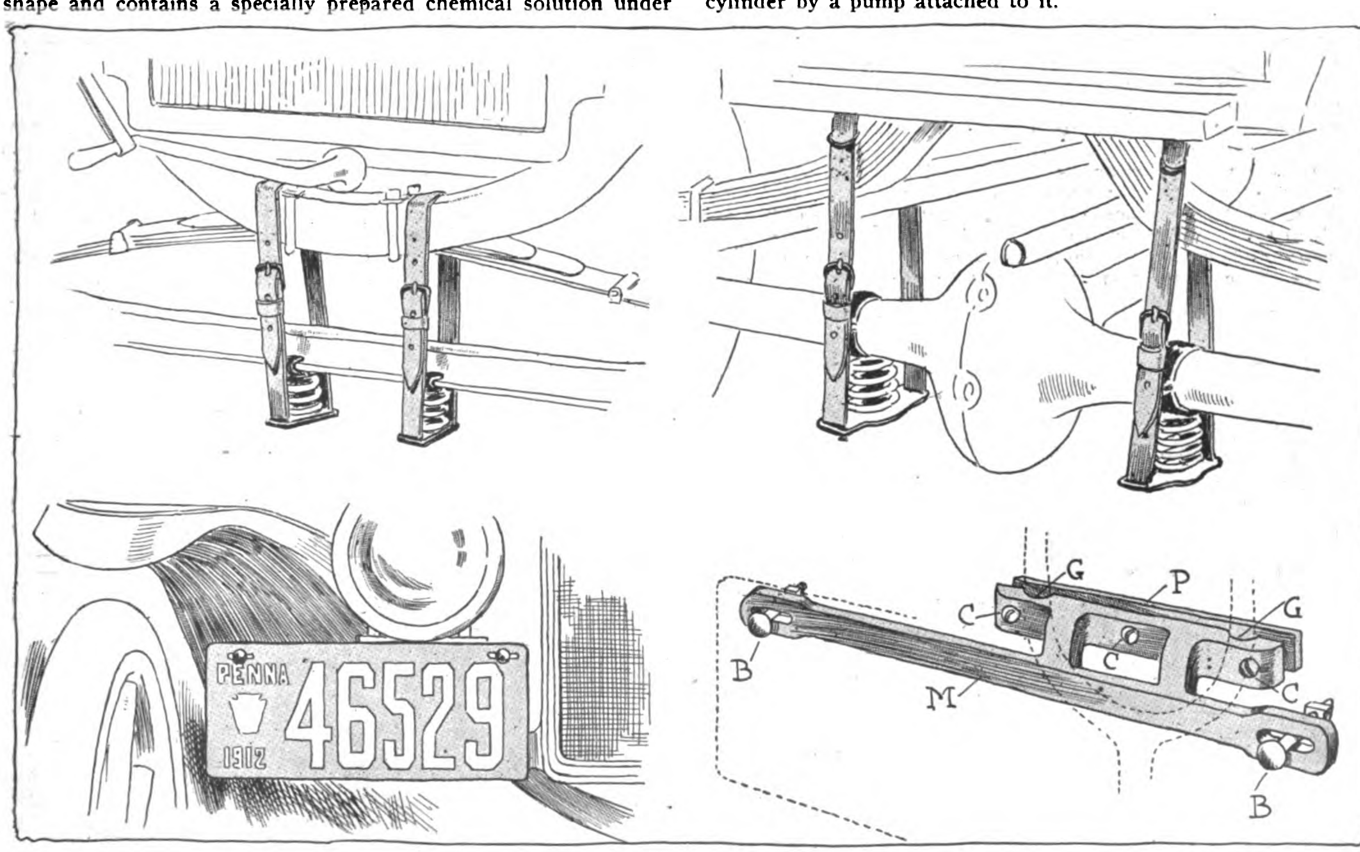


Fig. 4—Mitchell rebound check and shock-absorber applied to Ford model T front axle. Fig. 5—Mitchell shock-absorber design for rear axle unit. Fig. 6—Klingensmith front license-tag holder for Ford model T cars. Fig. 7—Constructional view of Klingensmith license-tag holder

HIGH-Tension Magneto—In which the pole-pieces are formed with an extremity to increase the efficiency of the apparatus.

The subject-matter of this patent, consisting in the peculiar shaping of magneto pole-pieces, is illustrated in Fig. 1. The magneto comprises a magnet M to which pole-pieces P are attached, each of which has one end extended in a direction around the armature A and toward the other pole-piece, so that these extensions E are located diametrically opposite. The inner face of each pole-piece adjacent the extension is formed with a recess R, this design making it possible for the armature to cut the greatest possible number of lines of force twice during every revolution.

No. 1,039,543—to William O. Kinnington, Bloomfield, N. J., assignor to the Simms Magneto Company, Inc., New York City. Granted September 24, 1912; filed October 10, 1911.

Double-Cone Clutch Mechanism—Two male clutch members are mounted on hubs which are pried apart by a wedge.

This patent relates to the clutch construction, Fig. 2, in which the frictional engagement of two cone surfaces C C1 with surfaces F on a driven shaft is kept up by the tension of a spring S connecting their inner centers. Both these surfaces are mounted on the same driving shaft, being slidable thereon by means of hubs H and H1. Each hub is formed with an abutment and between the abutments enters a wedge W carried by a pivoted arm which is connected to a disengaging lever L fitted with a declutching pedal. When the pedal is pressed and the wedge driven in, the latter separates both abutments and the clutch sections to which they are engaged, against the tension of the spring S, effecting disengagement of the clutch sections.

No. 1,039,495—to Paul Daimler, Stuttgart, Germany, assignor to Daimler Motoren-Gesellschaft, Untertuerkheim, Germany. Granted September 24, 1912; filed September 16, 1911.

Internal-Combustion Motor—A two-cylinder design in which two reciprocating and one rotating crankpin is used.

The engine referred to in this patent comprises cylinders cast in pairs, the pistons of which have connecting-rods being on a driving connection D having two bearings R for the ends of the connecting-rods and one C serving as a crankpin, being set eccentrically with reference to the crankshaft S. The piece D is fulcrumed at F to a connection C1 which has one end fixed at the side of the crankcase. In the operation of the motor the crankpin C revolves around the crankshaft S, while the point F reciprocates vertically, remaining always higher than C. The ends of the connecting-rods alternately ascend and descend.

No. 1,039,493—to Elmer L. Courtwright, Tacoma, Wash. Granted September 24, 1912; filed December 20, 1911.

Shock-Absorber for Automobiles—Comprising resilient friction surfaces pressed against the periphery of a container.

This patent refers to a shock-absorber consisting of a casing lined on its inside periphery with a friction surface against which bear friction members or shoes F which normally do not

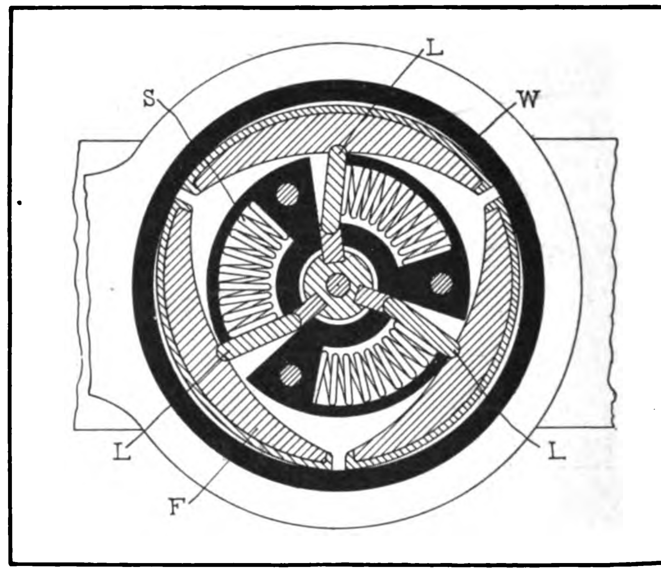
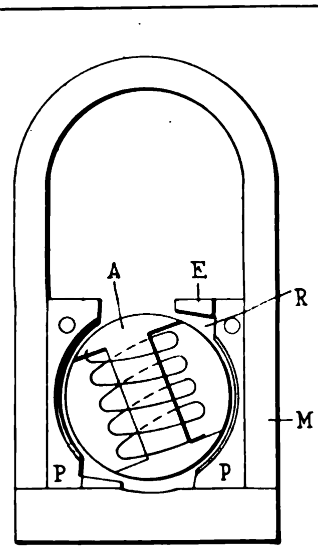
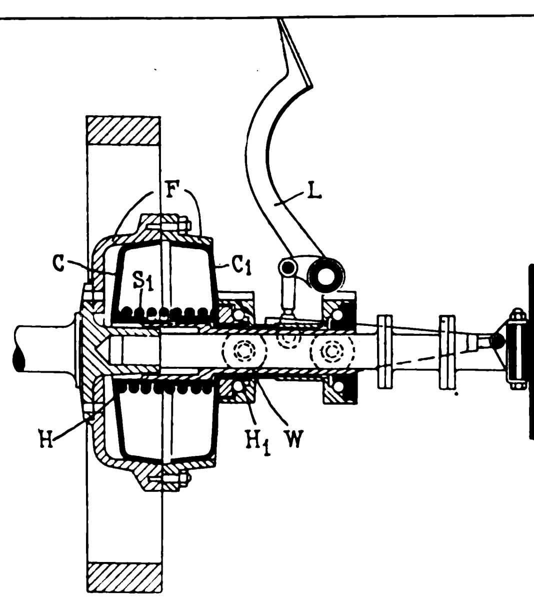


Fig. 4—Martin friction shock-absorber

conform in shape to the wall of the casing. Links L are so connected to the friction members that if they are turned around their central fulcrum, they press the shoes against the wall of the casing, if turned in one direction, or are resisted by the compression of springs S interposed between them (the links) if turned in the other direction.

No. 1,039,305—to George Cushing Martin, Los Angeles, Cal. Granted September 24, 1912; filed September 11, 1911.





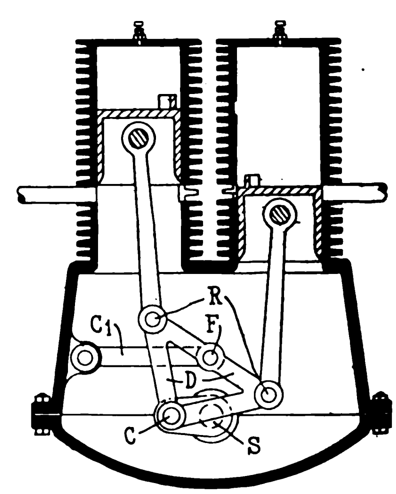


Fig. 1—Kinnington-Simms high-tension magneto. Fig. 2—Daimler double-cone clutch. Fig. 3—Courtwright twin-cylinder motor

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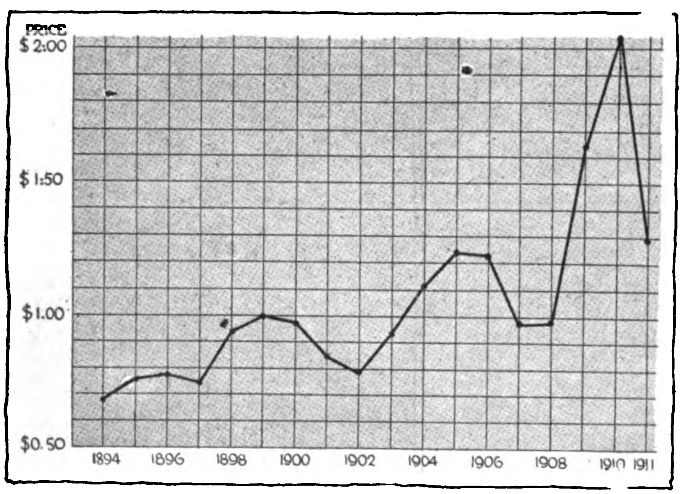
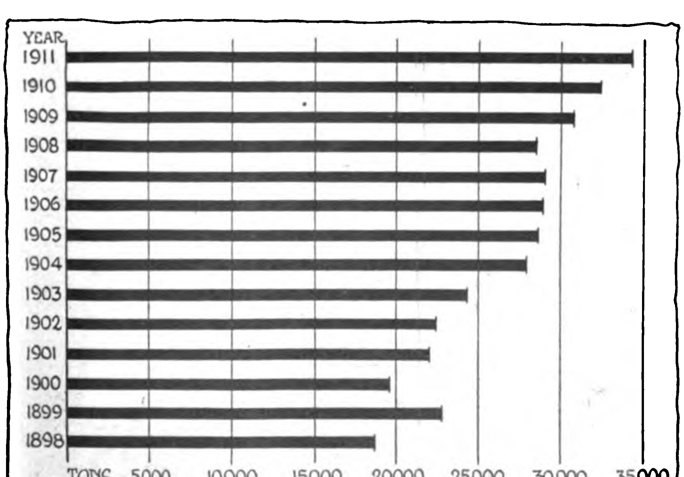
The Automobile

World's Rubber Production On Verge of Vast Increase

With Extension of Plantations to Prospective Limit of 2,000,000 Acres and the Activity to Exploit the Virgin Fields of Wild Rubber, Prospects Favor Larger Yields



Curve shows how the average price of up-river fine has varied since 1894. The apex shown in 1910 resulted from the extra demand exerted by the automobile industry



Consumption of rubber in the United States between 1898 and 1911 in long tons, indicating the influence of the automobile industry on the amount required

Synthetic Rubber a Chemical Success, But a Remote Possibility as an Element in Commerce

RUBBER is grown in every tropical country in the world. In some of the states that lie within the tropics the topography is mountainous as a general thing; in others there are deserts, but from a broad viewpoint, there is some land fit for rubber raising in every land that lies within the torrid zone and some rubber grows in each.

On the borders of the tropics there is also considerable rubber produced, but as a factor in the industry it is of small importance. This year the total crop will approximate 90,000 long tons of 2,240 pounds; some excellent authorities state that it will be nearer 100,000 tons. The former figure is the one most generally adopted by the statisticians.

Of the world's production in 1912, the Amazon Valley will be represented by 40,000 tons, or about 45 per cent. of the total. All of this is denominated wild rubber, despite the fact that in Brazil there are a few small plantations, the oldest of which is 14 years old. These plantations are virtually botanical gardens and experimental stations.

The productive rubber territory in the Amazon Valley has been scratched so far, but that is about all. Back of the navigable rivers, which furnish waterways 32,000 miles long, or more than the distance around the earth, the main artery of which, the Amazon proper, and its direct western branch reach from Para to the foothills of the Andes, over 2,000 miles, there is a wilderness that rarely has been penetrated by explorers and never has felt the influence of exploitation.

As it has been proven on the rare occasions when the explorers have traversed some of these jungles, the rubber forests now being drawn upon represent a small part of the total existing supply. In the wide territory opened up by the new Marmore-Madeira Railway in the remote southwestern part of Brazil and across the border of Bolivia, the potentialities of the Amazon supply will be much increased. No man can estimate with anything like exactness the extent of the rubber fields in Brazil and its surrounding states, but the proof of the fields and forests is represented by 40,000 long tons of the product.

It is said that the collection of rubber means the cost of a human life for each 2 tons marketed. At that rate the mortality in the Amazon collections would amount to 20,000 human lives a year. The simple fact that rubber collection is so deadly explains the reason for the lack of definite statistics covering the extent of the field. Unhealthful conditions, lack of sanitation and the ignorance of the labor employed are the chief reasons for this appalling mortality.

The Marmore-Madeira Railway project is by no means the only great transportation measure under way in Brazil. There are numerous shorter and less important lines under some stage of construction and an immense activity has been noted this year in highway improvement and the betterment of the waterways.

Brazil is alive to the fact that her industry in rubber now has competition in the markets of the world and realizes that a commercial basis must be reached in order to hold the lead she has always enjoyed in the rubber industry.

The law of January 5, 1912, which provides for remission of import duties, relaxation of export duties, bonuses for production of rubber and its manufactured products as well as supplies for the great army of labor, experiment stations and numerous other factors to develop the industry and bring about a greater production, which may cost in cash outlay as much as $15,000,000 a year, is already at work. With the new territory opened, new land planted and old forests conserved, the production of the Amazon Valley will probably increase immediately and it is predicted that it will easily reach 60,000 long tons a year within 5 years.

The chief rival of Brazil is the British colonial plantation rubber, located in Malaya and Ceylon, the production of which will be in the neighborhood of 20,000 long tons this year, some say 22,000 tons.

Both Ceylon and Malaya have been covered in some detail in previous issues of THE AUTOMOBILE, but it may be said that the yield of Malaya will be about 15,000 tons and that of Ceylon 5,000 tons this year.

The wild African rubber is not a factor in the automobile industry, but in the colonial possessions of various European nations on both coasts the plantation idea is being developed with much success. The German, Dutch, French and British colonies and the protectorate of Belgium are trying it. The yield to date has not been considered an important factor, but there is a total acreage of about 10,000 that is being extended with rapidity. The trees are mostly immature, but appear favorably in comparison with other plantation trees. The seeds from which these trees are grown comes from Ceylon and Malaya.

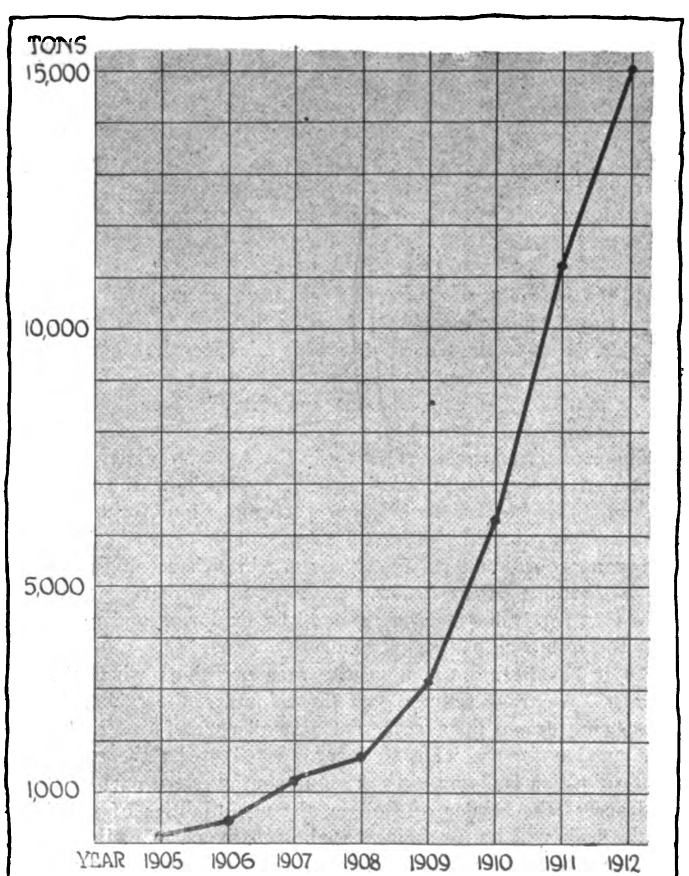
The native African rubber is derived from vines very largely.

Mexico and Central America are not important factors in the production of rubber for automobile use, but the fields of Mexico are of large extent, the acreage being estimated at 100,000, the eventual yield of which will be enormous. The Central American rubber is largely from the castilloa. Guayule is derived from a weed related to rubber, but bearing only a remote resemblance to it. Guayule production in 1911 was about 9,000 tons.

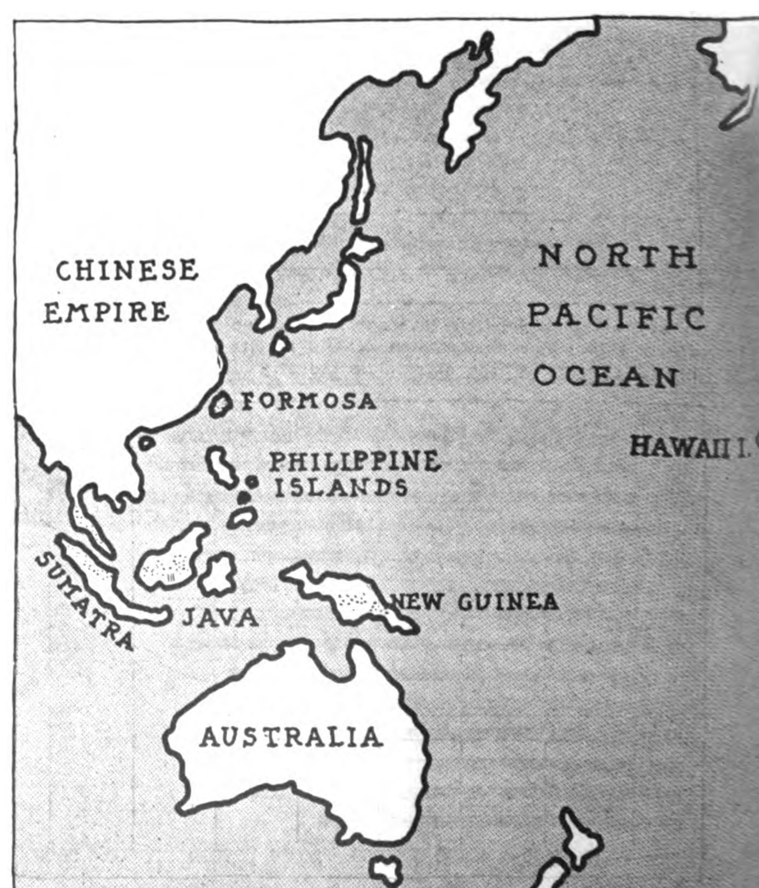
Burma, India, Borneo, New Guinea and the great islands of Sumatra and Java and some of the lesser islands of Oceania produce some rubber now and when their plantations are in full development the amount will be vastly larger. The native rubber is of no account for automobile purposes, but in each section the hevea is being introduced and in a few the castilloa, ceara and other rubber trees are being planted.

As Henry C. Pearson, editor of the *India Rubber World,* said recently in an editorial in that journal, any attempt to estimate the future rubber production of the world in definite terms is sheer vanity. Nevertheless, it may be said with conviction that unless a general blight falls upon the plantations, or somebody invents a process of producing synthetic rubber as good or better than present varieties of crude rubber at less cost, not only will the world's yield be vastly greater next year than in 1912, but the increase will continue indefinitely.

It is said that the plantations of the world embraced about 1,000,000 acres in 1912. It is planned to increase the plantations



How production of plantation rubber has increased in Malaya



Distribution of the world's rubber fields extends throughout of Malaya and Ceylon to 1,350,000. If the other sections expand to their reasonable limit, the total acreage of the world's plantations will reach 2,000,000 within a few years, taking no account of the vast projects to cultivate rubber in Brazil.

The plantation industry is too young to tell where the age limit will prove effective in checking the supply. The oldest trees under cultivation are the largest producers, the record being about 80 pounds of dry rubber a year from a 36-year old tree in Ceylon 16 miles from Colombo. So far the rule has been that the older they are the better they yield.

It is likely that a yield of 10 pounds a year from each tree in the plantation areas will be reached in time and if the proportionate yield increases at anything like the rate shown by some of the older trees in Ceylon and Malaya, it is not unlikely that a general average of 25 pounds or even considerably more may be reached at no very distant date. If the trees prove to be as productive as the one in Ceylon that yields 80 pounds a year for 3 successive years, the average yield of plantations where the trees are of similar age to the record holder might reach 50 pounds.

If all that is true and there is an average of even 100 yielding trees to the acre, the total production of the world may reach the incomprehensible total of 15,000,000,000 pounds, or about 7,000,000 long tons.

Among the newer plantation undertakings the cultivation of rubber in the Philippines, particularly in the Island of Moro, by Dr. Walter Strong and others, and on the Hawaiian Island of Maui and the Japanese protectorate of Formosa have proven successful. So far the yield has been small in the aggregate, but the promise in each field is large.

In Moro Dr. Strong has brought the hevea to a highly productive stage in a small way and has produced some rubber that is pronounced excellent by those in position to judge. The land available for rubber culture in the Philippines is very large in acreage and in the southern part of the archipelago, south of the typhoon belt, the climatic conditions are ideal. In the Philippine islands the labor problem is much nearer a solution on reasonable lines than it is among the various British colonies.

In Hawaii, while the topography of the country is rough, especially on Oahu and the main island of Hawaii, there are many stretches of country 5 miles long that may prove ideal rubber plantations. The rubber that has proved most successful so far in the experimentation is the ceara type. The commercial shipments this year will not be over 6 tons, but in due course the yield will be vastly increased. About 3,000 acres have been planted in rubber.

The Formosan experiments are rather new and so far are inconclusive.

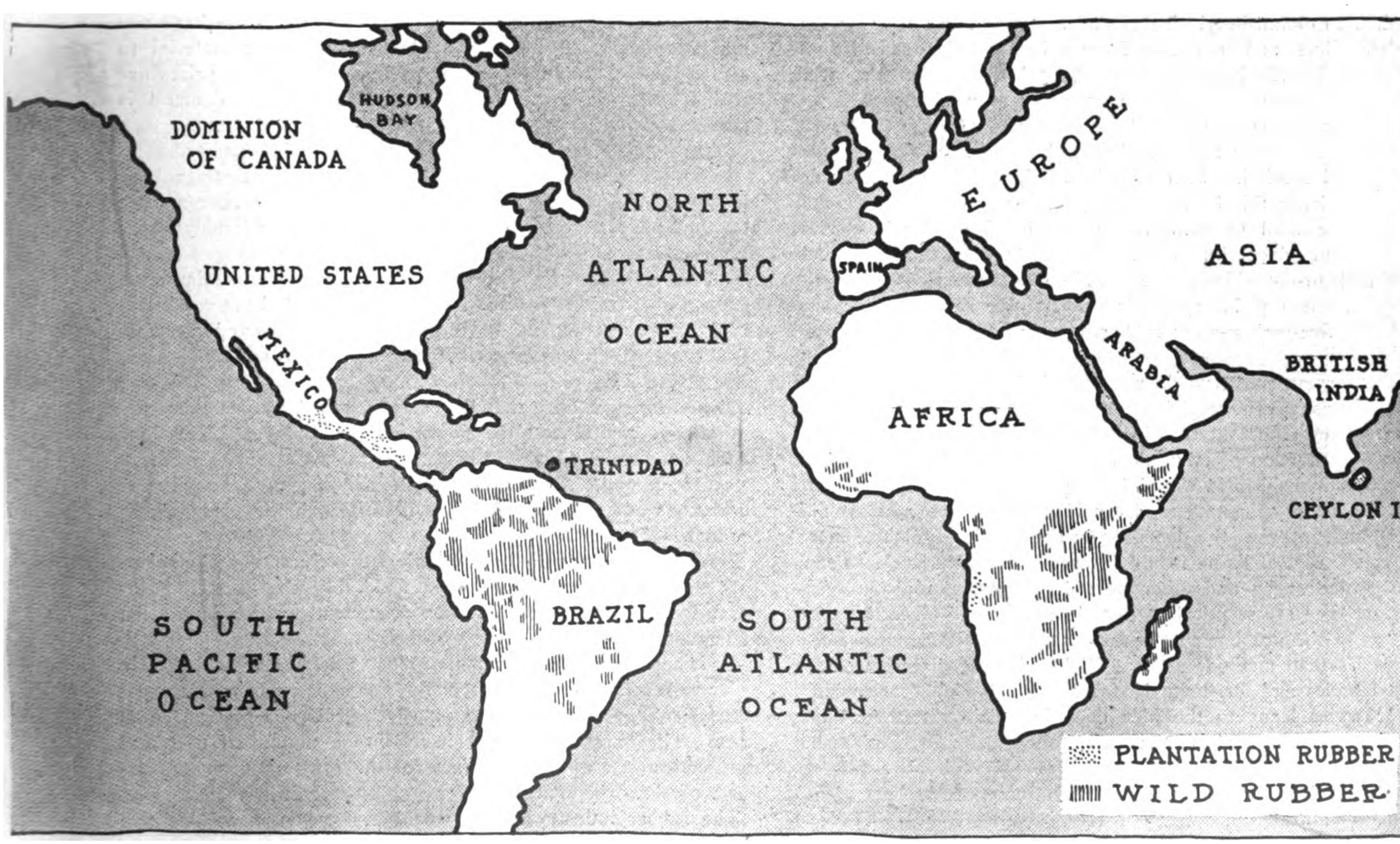
In the West Indies, Trinidad already has taken up the industry with vigor, and it is said that the valleys of Cuba afford the ground work for plantations growing some varieties of commercial rubber. The extent of the present acreage under plantation rubber may be estimated about as follows:

Malaya	600,000
Ceylon	150,000
Mexico	100,000
Africa	10,000
Elsewhere	100,000
Total	960,000

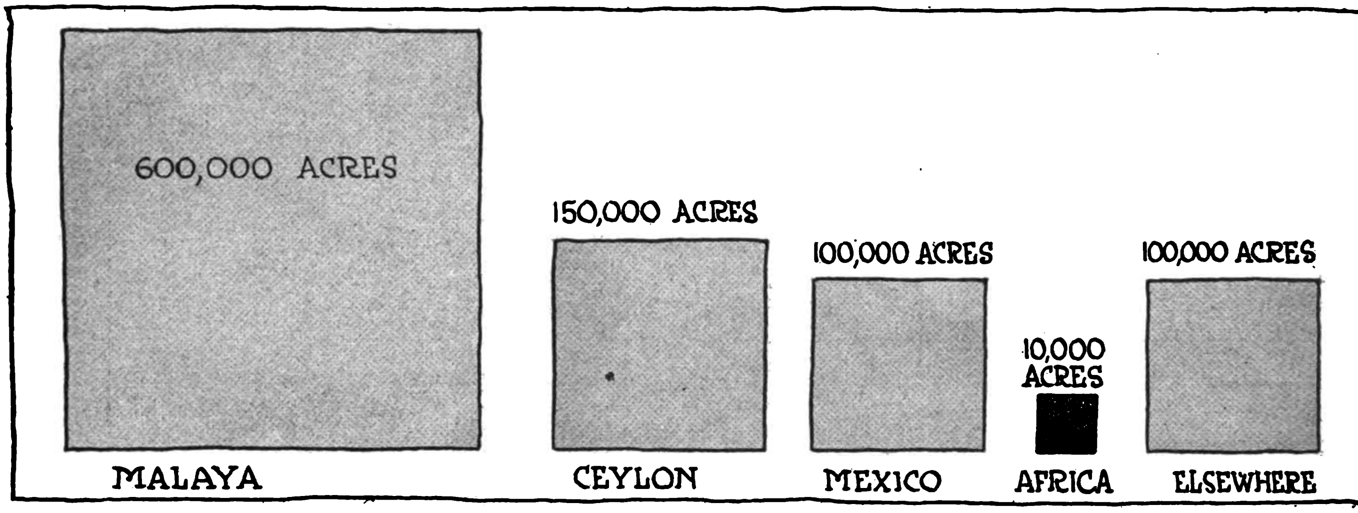
There is not a remote chance for exactness in estimating the extent of the wild rubber fields. The Amazon Valley is over half as large as the territory of continental United States and the rubber country of Africa compares with it in size. The islands of the East Indies increase the total of wild rubber lands enormously.

Aside from wild and plantation rubber another possible factor of future supply is synthetic rubber. There has been much said on the subject, but so far the actual, tangible results as affecting the industry have been negligible.

Synthetic rubber was discovered in 1892 by Professor William Tilden, of Mason College, Birmingham, England, by the sheerest chance. He had prepared a number of experimental combinations of isoprene, a derivative of turpentine, and hydrochloric acid. He found a substance resembling rubber in one of the tubes, but had failed to enumerate the exact constituents of the



the Torrid Zone wherever climatic conditions are favorable to the growth of the latex-producing plants, trees and vines



Acreage of the world's plantations, showing a total of about 1,000,000 acres under cultivation, one-third of which is now producing

experiment and despite years of labor failed to produce any more rubber.

With that much as a basis, the chemical science of the world has been busy at times ever since and periodically announcements have been made that synthetic rubber was an accomplished fact and that the wild and plantation industries better prepare to go out of business.

Some real progress, however, has been made within the past 3 years. Two chief groups of scientists are busy at present to commercialize their discoveries. The British group, headed by Dr. William H. Perkin, professor of chemistry at Victoria University, Manchester, believes he has the real solution. It was acknowledged that the use of isoprene, derived from turpentine, as a basis, while chemically proven, was too expensive ever to hold the promise of competing with Malayan rubber at a cost of 25 cents a pound. Professor Fernbach, of the Pasteur Institute, observed that it was possible to ferment starch or even sawdust to obtain butyl alcohol and acetone at less than present market prices, and to derive from such alcohol so-called fusel oil, which Dr. Perkin insists may be substituted for turpentine or other isoprene in the commercial production of rubber.

The chemical steps required, according to Dr. Perkin, as set forth in a statement to the *India Rubber World* are as follows: Take ethyl alcohol, which may be easily oxidized to acetaldehyde; condense this by means of potassium carbonate to aldol; convert the aldol (quantitatively) into butylene glycol; convert the butylene glycol into dichloride. Then pass this over soda lime and produce butadiene. This substance treated by the sodium method yields synthetic rubber. He says that the product is a five-carbon-atom rubber, closely approximating natural rubber.

The German scientists do not regard the British method very seriously as a commercial, or even as a chemical accomplishment. They point out that in order to produce sufficient starch for the production of ethyl alcohol needed in making 10,000 tons of synthetic rubber it would be necessary to use the yield of 1,000,000 acres of potatoes. Even if potatoes were not prohibitively high in price, the demands on the land due to the general rise in the cost of living would forever bar such use. As to sawdust, grape sugar and other possible elements in alcohol production, they are sceptical as to the sawdust and place the other factors in the problem in the same category with potatoes.

The German methods used at Kiel under the direction of Dr. Carl Harries and Dr. Fritz Hofmann, at Elberfeld, vary widely. Dr. Harries leans to the idea of polymerizing isoprene along somewhat different lines than those followed by Dr. Perkin, but says that the so-called sodium rubbers, although physically resembling rubber and susceptible to vulcanization, are not identical with natural rubber.

Dr. Hofmann takes coal as a basis for the production of the isoprene used in his process. He uses heat in reaching the final result.

That synthetic rubber is a scientific fact of importance to the automobile industry is proven by the recent delivery by Dr. Carl Duisberg in New York of a statement showing that a set of automobile tires had been made from the product of the Elberfeld factory which were used for 4,000 miles without puncture or serious signs of wear.

The most advanced scientists and those most closely identified with the production of synthetic rubber do not believe that it will appear on the market in the immediate future.

Two sets of tires have been made, one of which was presented to His Imperial Majesty of Germany. These eight tires represent the actual commercial accomplishments of the scientists during 5 years' labor.

At present rates of cost, the raw material needed to produce a pound of synthetic rubber has been estimated all the way from 5 cents to 50 cents. The labor, factory expense and overhead are uncertain items. If the product demands sufficient material to shorten the world's supply in any particular, bounding prices are inevitable for the particular element on which the demand is exerted.

Thus, even the cost of material is an intangible quantity.

Based upon present prices of material, the synthetic rubber makers claim that they will be able to supply the rubber market at a level under 60 cents. Some estimates are considerably lower than that figure.

But the activity of the inventors was spurred and stimulated by the high prices of 1910, and while their efforts have continued toward a solution, there have been only half-hearted attempts at production on anything that resembles a commercial scale since prices fell.

The scientists realize that they have arrayed against them the millions of capital and the power of the Malayan plantations which can produce high-grade natural rubber at a big profit at 25 cents a pound. They admit that their big fight will be with the plantations and that the victory will rest with the party whose product is cheapest.

Figuring the birth of the synthetic industry at 1909, the scientists state that when it is 36 years old, like the plantation industry at present, it will occupy a prominent position in the list of commercial factors of the world.

As it applies to the automobile industry, it may be said that in order to become an important factor, synthetic rubber must equal natural rubber at less price or excel natural rubber at an equal price. The question resolves itself into a matter of cost and that subject is a question of fact for the future and not an element of debatable nature under present conditions.

The rubber industry of the world has grown marvelously in the past half century. While rubber has been known for 400 years and has been used more or less for nearly a century, it really had its birth in 1839 when Charles Goodyear, a poverty-stricken scientist, happened to drop a handful of crude rubber mixed with sulphur on a hot stove and the process of vulcanization began.

Brazil in 1840 had a few rude manufactures and even prior to that date exported small lots of rubber. In 1827 the exports amounted to 31 tons.

To give some idea of the present extent of the industry, the following table of estimates covering the 1913 demand for rubber has been prepared by the Rubber Plantation Investment Trust:

Country	Estimated needs in tons
America	47,500
Great Britain	15,000
Germany	15,000
France	10,000
Russia	7,000
Belgium	1,500
Other countries	7,000
Total	103,000

Against this demand and compared with the product of 1912, which has been estimated roundly at 90,000 tons, the increase of 13,000 tons will have to be accounted for largely by the natural increase of the plantations.

The estimates made by experts are all more or less uncertain and vary widely. For instance, despite the fact that the plantation rubber auctions in London will dispose of over 20,000 tons of rubber in 1912, the more conservative experts only place the 1913 estimate on plantation production at 28,500 tons. Leonard Wray, Edward G. Salmon and others connected with the British plantation industry state without reservation that the rate of increase noted is much below the probable results.

Mr. Wray submits the following figures on Malaya's production that seem to indicate a vastly larger yield than the figures of the experts would appear to show. Mr. Wray's figures are as follows:

EXPORTS

Year	Tons
1905	130
1906	420
1907	1,020
1908	1,580
1909	3,010
1910	6,420
1911	11,120
1912	15,000

The acreage in Malaya in 1911 was 542,000, but the yield of 11,120 tons was from plantations comprising only 99,230 acres which had been planted by 1906, as it requires over 4 years to develop the trees to the point of yielding. An acreage of 179,227 is bearing in 1912, and it is estimated that the exports will reach the high total of 17,800 tons. The 1913 product of Malaya will be based upon an acreage of 241,138, and it is easily probable that it will run above 25,000 tons. With Ceylon, which has about one-third of the size of the Malayan fields under cultivation and which is increasing in about the same general proportion, the total yield of these two countries should be about 34,000 tons and other plantation projects will certainly increase the total quite materially.

Despite the calculations of experts it is not unlikely that the plantation yield of 1913 will be close to 37,000 tons.

According to the figures submitted, the whole product of South America will be only 39,000 tons in 1913. Just how that figure is reached is mysterious as no man can say what will come out of the Brazilian jungle. In 1911 the shipments from the Amazon Valley equaled 38,000 tons. In 1912 the Amazon shipments are estimated at 39,000 tons, or more. Neither figure covers shipments of manicoba rubber or any product outside the Amazon Valley. These elements are estimated at about 2,000 tons for 1912. Thus the estimate of 39,000 tons as the production figure for South America in 1913 seems too low. The working of the new law in Brazil will undoubtedly lead to some increase from the Amazon country and many experienced rubber men believe that 40,000 tons is none too much to expect from that section. With that as a basis, the figures of the Brazilian industry indicating at least 42,000 tons for 1913 do not seem to be too large.

The tabulation referred to is as follows:

ESTIMATED PRODUCTION OF 1913

Country	Tons
South America	39,000
Plantations	28,500
Africa	15,000
Central America	5,000
Other sources	3,500
Total	91,000

The table above does not specifically classify several of the newer fields, making no particular mention of Mexico, lumping that country with Central America. The apparent difference of 8,500 tons of plantations and 3,000 tons from South America may be augmented by an item of at least 2,000 tons not mentioned at all in the table. With these additions the total as above would be increased to 104,500 tons as the probable yield of 1913.

The consumption of rubber in the United States by years since 1898 is as follows:

Year	Consumption in Tons
1898	18,623
1899	22,674
1900	19,532
1901	22,327
1902	22,480
1903	24,345
1904	27,300
1905	28,046
1906	28,483
1907	28,634
1908	28,050
1909	30,669
1910	32,385
1911	34,152

In addition to the total of 1911 there was an item of 8,091 tons of guayule imported from Mexico.

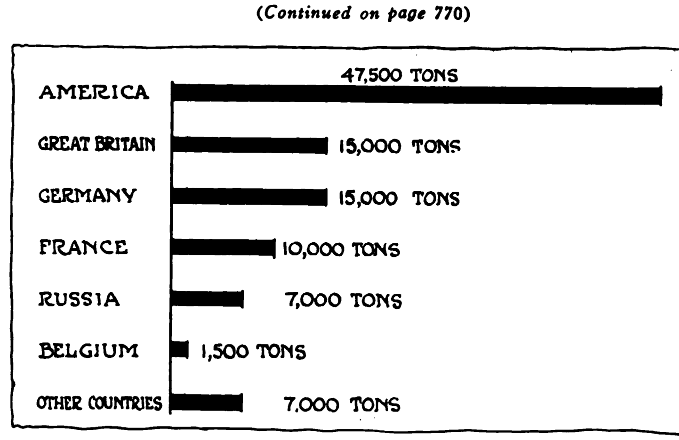
The influence of the automobile industry may be read between the lines of the table above. In 1900 the domestic consumption of rubber was only 19,532 tons and there was no material demand from the automobile industry. In 1911 the consumption was 34,152 tons and the difference between those quantities represents approximately the use of rubber in the United States for automobile purposes, or 14,618 tons in 1911. Of course, other industries have increased in volume during the period covered by the figures, but reclaimed rubber and guayule probably cover most of the additional demand made by them upon the regular supply.

Certain it is that with the bulge of prices noted in 1910 and before and after the market reached its crest at $3.10 a pound, the consumption in other lines than tires was checked at the exorbitant levels.

The tire requirements for 1912 will probably reach 15,500 tons and in 1913 17,000 tons.

The inadequacy of supply at the time of sharpest demand from the automobile industry, together with coincident elements of manipulation by speculators may be seen in the accompanying table showing price fluctuations. Of course, it should be remembered that the grade quoted is up-river fine, and that while

(Continued on page 770)



Needs of rubber-consuming countries shown for 1913 in long tons

Trade News of the Week

Federal Rubber Doubles Capitalization—Gramm Dispute Settled—U. S. Motor Reorganization Details

Crude Rubber Higher in Inactive Market—Ohio Creditors Differ as to Plans of Procedure

MILWAUKEE, WIS., Oct. 14—The Federal Rubber Manufacturing Company, Milwaukee, Wis., and Cudahy, Milwaukee county, has increased its capital stock from $1,000,000 to $2,000,000. Since January 1 the factory has been working night and day and the actual sales have exceeded the pre-season estimates by more than $400,000. During the past season the company has done extensive construction and improvement work, valued at nearly $500,000. A principal improvement was the construction of a new central power, lighting and heating plant aggregating 3,500 boiler horsepower. There are employed at this time 1,750 men in the manufacture of pneumatic tires, solid tires and rubber goods of all kinds. B. C. Dowse is president; H. A. Githens is vice-president and Richard Ward occupies the position of secretary and treasurer.

Gramm Dispute Settled Out of Court

TOLEDO, O., Oct. 14—The difficulties between President John N. Willys, of the Willys-Overland Company, and A. L. White and W. T. Agerter, over the transfer of controlling stock of the Gramm Motor Truck Company, at Lima, have been amicably settled. Mr. Willys had brought suit, charging misrepresentation of the value of stock. The payment of all bonded indebtedness of the Lima plant has been announced and also the intention to double the capacity of the plant.

Findlay Company Again Defendant

TOLEDO, O., Oct. 14—The Findlay Motor Car Company, and its receiver John M. Barr, John Von Stein and the Farmers Bank Company, of Jenera, in Hancock County, have been made defendants in a suit brought by William C. P. Rhoades. Mr. Rhoades seeks to recover judgment on a promissory note of $5,000 asking for the foreclosure of a mortgage on land in Monclova township.

Crude Rubber Works Higher

Crude rubber has worked back to a basis of $1.10 a pound for up-river fine with little or no apparent reason for the upward trend. Consumers have not been aggressive in bidding for the firmly held but liberal supply and the trading on the advance has been somewhat smaller than was noted last week. On the other hand the sellers have not been liberal in conceding anything in order to make trades. Imports in New York are well up to the average. While pale crêpe from the plantations remains steady at the former figures, approximating $1.16 1-2 a pound, bales and sheets have yielded about 1 cent a pound.

Reorganizing United States Motors

Announcement of the reorganization plan to be used in rehabilitating the United States Motor Company along the lines of the article published in these columns last week has been made and progress toward completing the organization will come next. Under the plan adopted by the creditors the matter will be taken out of the hands of the United States District Court as soon as the details have been worked out on a satisfactory basis.

The first step to be accomplished will be to formulate and send out to those interested as creditors and stockholders a legal notice of the agreed plan. Then will follow the call for deposits of the stock certificates and the issuance of new certificates under the schedule as announced.

The financial part of the plan will be carried out under a system of underwriting, the details of which have been completed but not announced.

There has been much talk about the personnel of the new company but no decision has been reached as to who will lead. W. E. Strong, who has acted as chairman of the board since the extension of credit last June has been asked to remain with the new organization, but in exactly what capacity has not been outlined.

Ohio Creditors Differ as to Plans

CINCINNATI, O., Oct. 14—There is apparently a sharp division among the creditors of the Ohio Motor Car Company which is now in the Court of Common Pleas under insolvency proceedings. One committee of the creditors has issued a statement recommending that the plant be sold on the block as quickly as possible and urging the creditors to bring pressure to bear to

Automobile Securities Quotations

General Motors preferred sold ex-dividend Tuesday, the books being closed for payment of the regular dividend of 3 1-2 per cent. This stock has paid $8 a share during the past year, but the extra 1 per cent. was not in the nature of an extra dividend, being merely in the nature of a readjustment of the dividend period so that the bond coupons and the preferred dividend should not fall together. Goodyear common skyrocketed fifty points on bidding by insiders, but little stock came out as a result. The annual meeting of the company does not take place until December, but it has been pretty well understood that it will reveal astonishing conditions. The remainder of the list was irregular, with Goodrich, International and White lower and the rest of the list, where any change was noted, fractionally higher. Trade as whole was small in volume and without particular trend. Whatever movement appeared in the securities of United States Motor was downward, the Street apparently awaiting for a hint as to the intentions of the financial powers with regard to the reorganization. The table follows:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	150	175
Ajax-Grieb Rubber Co., pfd	..	..	95	100
Aluminum Castings, preferred	..	..	100	102
American Locomotive, common	34½	35	42	43
American Locomotive, preferred	105	105½	107	108
Chalmers Motor Company	..	..	145	155
Consolidated R. T. Co., com	6	10	13	15
Consolidated R. T. Co., pfd	10	20	50	60
Diamond Rubber Company	..	..	..	..
Firestone Tire & Rubber, com	178	185	270	275
Firestone Tire & Rubber, pfd	108	110	106	107½
Garford Company, pfd	..	..	99	100
General Motors Co., common	37	38	34	36
General Motors Co., preferred	74¼	77½	74½	77½
B. F. Goodrich Co., common	*238	*242	†72	†73
B. F. Goodrich Co., preferred	*118	*119	†106	†106½
Goodyear Tire & Rubber, com	225	235	375	380
Goodyear Tire & Rubber, pfd	104	106½	104½	105½
Hayes Manufacturing Company	..	..	..	92
International Motor Co., com	..	..	18	21
International Motor Co., pfd	..	..	78	81
Lozier Motor Company	..	..	43	45
Miller Rubber Company	..	..	130	140
Packard Motor Company, pfd	104	106	105½	107
Peerless Motor Company	..	..	116	120
Pope Manufacturing Co., com	40	50	35	37
Pope Manufacturing Co., pfd	73	75	73	75
Reo Motor Truck Company	8	10	..	23
Reo Motor Car Company	23	25	..	10½
Studebaker Company, common	..	..	40	42
Studebaker Company, preferred	..	..	94	95½
Swinehart Tire Company	..	..	99	100
Rubber Goods Company, com	85	95	100	..
Rubber Goods Company, pfd	100	105	105	110
U. S. Motor Company, common	28	30	1	1½
U. S. Motor Company, preferred	69	70	3¼	4
White Company, preferred	..	..	105	108

*Old. †New.

have the whole manufacturing force discharged instantly. This report is signed by J. S. Monroe, E. J. Hess and C. M. Stadelman.

The other report takes a rosier view of the matter. It denies the accuracy and good intent of the other committee and states that a careful appraisement having been made, it was found that the plant is worth about $200,000, not including bills and accounts receivable, good will and stock holdings in other corporations. That figure is over $20,000 greater than the total liabilities, according to the committee.

The committee urges the creditors not to take any action until thoroughly informed of the facts. This report is signed by C. F. Pratt and A. E. Schafer.

In the meantime the receiver, E. G. Schultz, has completed and sold one car and several Breeze buggies.

Crawford Takes Dyer License

The Crawford Automobile Company, of Hagerstown, Md., has been granted a manufacturing license under the Dyer transmission patents. The company is one of the veterans of the industry, but has never approached major size in comparative production.

Market Changes for the Week

A number of important changes took place in the market the past week, the most important being the drop in lead and tin and the gain in Bessemer steel. Tin fluctuated throughout the week, closing at $4.90 per 100 pounds, a loss of $.10. Lead dropped $.02 1-2 on Saturday and remained at that figure to the end of the week, closing at $5.07 1-2 per hundred pounds. Bessemer steel experienced a gain of $.50, rising to $27.00 a ton on Friday and remaining at that price the rest of the week. Antimony remained at $.09 per pound throughout the week, and beams and channels were constant, closing at $1.61. Rubber rose to $1.09, experiencing a gain of $.02, due to the inactivity of the sellers. Copper electrolytic rose $.00 1-10, closing Tuesday at $.17 1-2. Copper lake remained constant throughout the week, selling at $.17 5-8. Open-hearth steel remained constant, closing at $27.50. The cottonseed oil market was decidedly weaker Tuesday, closing at a loss of $.15. The weakness in lard and the decline in cotton were both responsible for considerable selling pressure, causing the drop. The prices of petroleum and gasoline remained unchanged.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.	.09	.09	.09	.09	.09	.09	....
Beams and Channels, 100 lbs..	1.61	1.61	1.61	1.61	1.61	1.61	....
Bessemer Steel, Pittsburgh, ton	26.50	26.50	27.00	27.00	27.00	27.00	+.50
Copper Elec., lb.	.17⅜	.17½	.17½	.17½	.17½	.17½	+.00 1/10
Copper Lake, lb.	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	....
Cottonseed Oil, Oct., bbl......	6.44	6.45	6.45	6.45	6.30	6.29	—.15
Cyanide Potash, lb........	.19	.19	.19	.19	.19	.19	....
Fish Oil (Menhaden) ..	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @...	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime..	.85	.85	.85	.85	.85	.85	....
Lead, 100 lbs....	5.10	5.10	5.10	5.07½	5.07½	5.07½	—.02½
Linseed Oil.....	.64	.64	.68	.64	.64	.64	....
Open-Hearth Steel, ton.....	27.50	27.50	27.50	27.50	27.50	27.50	....
Petroleum, bbl., Kansas crude..	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa., crude....	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine, Up-river Para.	1.07	1.07	1.08	1.08	1.09	1.09	+.02
Silk, raw Ital....	....	4.15	....	....	4.15	....	....
Silk, raw Japan..	....	4.10	....	....	4.10	....	....
Sulphuric Acid, 60 Beaumé....	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs	5.00	5.00	....	4.93	4.90	4.90	—.10
Tire scrap.....	.09⅛	.09⅛	....	.09⅛	.09⅛	.09⅛	....

Lyons Buys Atlas Plant

New Concern Incorporated as Lyons-Atlas Company Will Continue to Make Knight Engines for Trade

Wells Fargo Places Order for Thirty-Five Trucks—Kelly Expands—Shanks Sales Manager

INDIANAPOLIS, IND., Oct. 15—With the approval of Judge Weir, of the Superior Court, Fred. C. Gardner, receiver for the Atlas Engine Works, this afternoon sold the property of the company to the Lyons-Atlas Company, organized and incorporated here today, with authorized capitalization of $500,000. The new company will continue the manufacture of Silent-Knight motors for the trade and also of the Diesel oil engines.

The property was bought subject to a mortgage deed of trust given by the Atlas company to the Indiana Trust Company as trustees. The new owner is to pay $46,100 interest on $1,050,000 in bonds secured by the mortgage deed of trust and also $105,000 incurred by the $1,500,000 bond issue as well as $48,187.04 secured by $63,000 worth of accounts and bills receivable. Also $80,000 cash to pay receivership expenses and debts incurred during receivership, together with $6,700 in judgments against Atlas personal property, merchandise, materials, patent rights, trademarks, account bills receivable, conveyed outright free of liens. The holders of common stock will receive nothing.

The stockholders in the new company have been in the manufacturing business in Chicago. The officers are as follows: James W. Lyons, president; William P. Lyons, vice-president; George W. Lyons, secretary-treasurer. The company will employ more than 2,000 men.

INDIANAPOLIS, IND., Oct. 16—*Special Telegram*—The company has parts on hand for the two models which the old Atlas company brought out, the four and the six-cylinder motors, each 4 1-2 by 5 1-2-inch, bore and stroke, but in the immediate future it is planned to turn out other models, plans for which are now going through.

J. W. Lyon, the president of the new concern, will be the active head of the company and will move to Indianapolis. As to the other officials nothing has been definitely settled outside of the decision to retain F. H. Baker as general superintendent. Mr. Lyon is a gas engineer expert and at one time was connected with Allis-Chalmers.

Wells Fargo Buys Thirty-Five Trucks

About one-third of the reported order for 100 automobile trucks for the Wells Fargo Express Company has been placed according to statements current in the industry. The present order numbers thirty-five and is divided among seven companies as follows: General Vehicle, nine electrics; American Locomotive Company, six gasoline trucks; Packard, six; Peerless, six; Mack, four; General Motors, four, and Lansing, one.

The cars will be distributed among the New York, Chicago, St. Louis and San Francisco establishments of the company. The trucks ordered are mostly of the 2-ton and 3-ton sizes.

Kelly Expands; Shanks Manager

SAN FRANCISCO, Oct. 10—Charles B. Shanks, who has been appointed general sales manager of the reorganized and enlarged Kelly Motor Truck Company, of Springfield, O., will assume active charge of that department within a short time. The company had just increased its capitalization from $500,000 to $4,000,000 and contemplates a big increase in manufacturing.

Appeal Patent Tread Suit

Validity of the Adams Midgely Tread Claims Depends upon Interpretation of the Term Interwoven

APPEALING from the decision of United States Circuit Judge Platt, against the patent of Calvin T. Adams covering a certain kind of automobile tire tread in which wire was interwoven to give greater life and non-skidding properties, the Metallic Rubber Tire Company and the Hartford Rubber Works Company appeared before the United States Circuit Court of Appeals last week.

The appellant is the assignee of Adams as to the patent in suit, which is numbered 609.320 and granted August 16, 1898.

The only claim contained in the application is as follows: "The combination with a cushioned vehicle tire, of a tread applied to the entire periphery of a tire, and having metallic wire interwoven with itself, parts of said interwoven wire lying substantially flush with the outer surface of the tread and forming cushioned anti-slip bearings covering the sides and bottom of the tread."

The defendant company manufactures a tire known to the trade as the Midgely tread which consists of embedding a series of wire coils in the rubber before vulcanization.

It was claimed that the Midgely tread infringed the Adams patent.

Judge Platt in the lower court decided that the defendant did not infringe and the case went up in due order.

In the present hearing the complainant's attorneys, Alfred Wilkinson and J. H. Roney, contend that the opinion of the court below was based only upon an erroneous view of the prior art, particularly outlining the alleged worthlessness of several old British patents and holding that the terms of the patent were sufficiently broad to cover the Midgely construction.

The defendant's attorneys, E. W. Vaill and Livingston Gifford, argue for an affirmation of Judge Platt on the grounds that there has been no infringement because the wire is embedded in the Midgely tire and the Adams patent applies only to interwoven wire.

As additional defenses it is alleged that the Adams patent is completely anticipated by the Phillips British patent of 1893; that in view of the prior art there is no invention; that the Adams patent has been abandoned within the purview of the statute and that the claim is inequitable.

The case apparently turns on the interpretation of the term interwoven, as contained in the claim in suit.

Offers Made for Newark Factory

NEWARK, N. J., Oct. 14—The trustee acting in the matter of the bankruptcy of the Newark Automobile Manufacturing Company has reported to the United States District Court that he has received an offer to purchase the factory building and real estate of the embarrassed company and also an offer to rent the same until December 1, 1913. A meeting of the creditors will be held October 21 to consider the offers.

Forestalling Another Car Famine

INDIANAPOLIS, IND., Oct. 14—The car shortage situation has become somewhat acute and there is the greatest difficulty in getting sufficient freight cars to move motor car shipments promptly. It is thought by some that the present situation is only a forerunnner of what is to come and that before many weeks there will be an alarming car famine.

Desiring to avoid a genuine car famine, local motor car manufacturers have already taken up with the railroad companies the matter of getting the greatest possible efficiency out of freight cars and moving all freight traffic promptly.

One day last week a conference between motor car traffic managers of the city and traffic officers of the New York Central Lines was held in the Board of Trade Building in this city. A rather thorough understanding was reached with the railroad men and it is believed beneficial results will obtain.

Motor car concerns represented at the conference were the Nordyke & Marmon Company, Cole Motor Car Company, National Motor Vehicle Company, Marion Motor Car Company, Ideal Motor Car Company, American Motors Company and the Mais Motor Truck Company.

Marks Patent in Court Test

BUFFALO, N. Y., Oct. 14—The Philadelphia Rubber Works Company, of Philadelphia, brought action last week in Federal Court to restrain the United States Rubber Reclaiming Works from infringing on a patent held by the former concern. J. Kearsley Mitchell, president of the Philadelphia Rubber Works Company, asserted that letters of patent on October 17, 1899, were granted to Arthur M. Marks for certain new improvements in the process of reclaiming rubber from vulcanized rubber waste.

These letters of patent, according to the complaint, were assigned to the Diamond Rubber Company, the Alkali Rubber Company, and to the Philadelphia Rubber Works Company, which is bringing the suit. The complainant requests that the Buffalo concern pay the rubber firm in Philadelphia the profits and income alleged to have been unlawfully derived in violation of the complainants' rights. The complainant asks also that its company be paid damages to the extent of three times the loss suffered by the Philadelphia concern. Decision was reserved.

Hartford-Connecticut Case Argued

Motion for a preliminary injunction against Walter H. Ellis, doing business as the Ellis Motor Car Company, of Newark, N. J., was argued on behalf of the Hartford Suspension Company before the United States District Court, of New Jersey, at Trenton on Monday. Decision was reserved.

The suit is one of several now pending, that have been started by the Hartford Suspension Company to protect its rights under the Truffault patents covering the principles embodied in the Truffault Hartford shock-absorber. The alleged infringement, as outlined in the complaint, consisted in the selling by the Ellis company of shock-absorbers made by the Connecticut Shock Absorber Company, which are alleged to contravene the rights of the complainant.

The case will probably be brought to issue before the end of the year and may be heard before spring.

In the argument Monday the complainant suggested that a bond of $20,000 would be acceptable as a release from the operation of a preliminary injunction pending the hearing of the case.

Clifford E. Dunn represents the Hartford company and Bartlett, Brownell & Mitchell act for the defense.

Court to Test De Tamble Bonds

ANDERSON, IND., Oct. 14.—A meeting of the creditors of the De Tamble Motor Company was held October 9. John C. Teegarden, temporary receiver of the concern, was appointed trustee for the $75,000 of unsecured claims. There is in addition to the unsecured claims a mortgage bond indebtedness amounting to $133,000. It was reported at the creditors' meeting that some of the bonds have been purchased at 10 cents on the dollar and an effort will be made to have the court consider the bonds at the price at which they were sold, instead of at par value.

Big Bay State Registration

In Past 9 Months 47,431 Cars Took Out Licenses, as Compared with 36,796 for 1911

BOSTON, MASS., Oct. 12—Massachusetts, which has had more cars registered each year than the other New England states combined, bids fair to continue its record when 1912 ends, for already there is every indication that the figures will show close to 50,000 cars on the list this year. With 9 months passed and 3 more to go there have been registered by the Highway Commission 47,431 cars while the full year of 1911 had 36,796 cars registered so that the increase to date over last year is about 33 per cent.

In the amount of revenue from the motor industry the Bay State is reaping a harvest again this year. The state has received $583,359 so far this year while the total for 1911 was $466,199, or $177,160 more than all of last year. That the figures will go above $600,000 seems certain. This is a remarkable growth in a decade, for 10 years ago the state received from motorists but $17,684. Here are the figures showing the amount of money received annually during these years:

1903	$17,684.00
1904	19,162.00
1905	24,490.50
1906	33,085.50
1907	92,096.50
1908	121,488.50
1909	169,973.54
1910	374,038.25
1911	466,199.75
*1912	583,359.00

*To Oct. 1.

The figures for registrations, operators, dealers, etc., show an increase all along the line, and this is particularly true of the motorists who register in the state for a couple of months, there being more than 100 of them this year. The following figures give the entire year of 1911 and up to October 1, of 1912.

	1911, entire year.	1912 to Oct. 1
Automobiles	36,796	47,431
Motor cycles	3,712	4,720
Manufacturers or dealers	829	1,064
Manufacturers or dealers (motor cycles)	13	22
Operators	10,232	12,988
Operator renewals	24,842	30,495
Chauffeurs	3,695	5,348
Chauffeur renewals	9,449	11,625
Examinations	5,386	5,512
Total fees	$466,199	$583,359

COLUMBUS, O.—At the close of business September 30, 1912, the Ohio State Automobile Department had issued 61,500 license tags since January 1 of this year. On September 30, 1911, the number issued was 44,800 and the total for the year 1911 was 45,788.

INDIANAPOLIS, IND.—During the three months ending September 30 the number of motor registrations in Indiana was 5,222, according to a report made by Lew W. Ellingham, secretary of state. During the same period of 1911 the number of registrations was 3,467, showing a gain of 1,755.

MADISON, WIS.—For the fiscal year ending July 31 the secretary of state of Minnesota reports receipts of $60,168 from license fees for automobiles and from chauffeurs. The previous year the total was $30,385.

Milwaukee Motor's Working Plans

MILWAUKEE, WIS., Oct. 14—The Milwaukee Motor Company, of Milwaukee, Wis., has been reorganized following the sale of the controlling interest by E. E. Warner and C. F. Kaiser, founders of the big works, to other interests. The new official personnel consists of the following: President, J. C. Coerper; vice-president, August John; secretary and treasurer, Henry John. August John will be general manager. J. D. Bowes, former vice-president, remains as a director of the corporation and will act in a managerial capacity. James Church, formerly of the Davis Gas Engine Company, has become associated with the reorganized motor company in a prominent mechanical capacity.

The Milwaukee Motor Company was organized in 1903 with a capital of $10,000 and today owns and operates a large factory, producing several thousand motors for pleasure cars and trucks annually. Additions to the works and improvements, including equipment, now being completed, aggregate in value $80,000 and will require a working force of more than 600 skilled laborers. The contracts now on the books amount to $1,000,000. The retiring president, E. E. Warner, will continue in an advisory capacity for a short time. He will then take a vacation, his first in 9 years, and re-enter business, the nature of which he is not willing to announce at this time.

Marmon Nominated as S. A. E. President

The following nominations have been made for the various offices in the Society of Automobile Engineers:

For president, Howard Marmon.

Vice-presidents, Russell Huff and John G. Perrin.

Treasurer, Herman F. Cuntz.

Members of Council, Joseph A. Anglada, Eugene F. Russell and Harold L. Pope.

The nominations were made by the regularly appointed committee on nominations and the election will be by mail vote in which all persons of either of the member grades may participate. The vote will not be announced until just prior to the annual meeting of the society during the second week of the New York automobile show about the middle of January.

Grabowsky May Continue Work

DETROIT, MICH., Oct. 16—An order modifying the injunction filed by John C. Kimble September 17 against the Grabowsky Power Wagon Company, of this city, was signed and filed in the Wayne County Chancery Court, October 14. The original injunction as filed by Kimble restrained the Grabowsky concern from carrying on business as well as preventing its sale. The intention of Kimble was merely to restrain the sale and the original order has been modified to this effect.

Canada's Industry Increases

MONTREAL, Oct. 11—The census reports of manufactures taken in 1911 for the calendar year 1910 are now compiled. Compared with the census of 1901 for the year 1900, they show an increase in the 10 years of 4,559 in the number of working establishments; of $798,829,009 in the value of capital; of 175,108 in the number of persons employed; of $127,274,301 in the earnings of salaries and wages and of $683,722,157 in the value of products.

The statistics of establishments for 1910 are given in the following table. The number of industries is 300 as compared with 274 in 1905 and 264 in 1900.

Establishments	Capital Employed	Employees	Salaries	Value of Products
19,209	$1,245,745,496	514,281	$240,523,651	$1,164,775,532
AUTOMOBILES.				
8	4,699,256	2,438	903,394	6,251,885
AUTOMOBILE ACCESSORIES.				
11	361,272	132	76,060	170,930

McGraw Company Cuts a Melon

EAST PALESTINE, O., Oct. 14—At the regular monthly meeting of the McGraw Tire & Rubber Company October 9 it was unanimously voted to increase the capital stock from $100,000 to $250,000. Acting upon the favorable report of the year's business made by President E. C. McGraw, the directors voted a stock dividend of 50 per cent. plus a cash dividend of 10 per cent.

The McGraw Tire & Rubber Company has made several important additions to the plant this year, including a laboratory.

Evolution of Fire-Engine

Progress Made in Past 76 Years Shown by Photographs Depicting Ancient and Modern Types

From Old Hand Pump to Advanced Model of Steam-Electric Automobile Apparatus Is Far Cry

JUST how much progress has been made in the past 60 years in building fire-fighting apparatus is vividly pictured in the accompanying photographs showing the fire-engine of 60 years ago and the highest type of automobile fire-engine of the present day.

The first photograph shows one of the first fire-engines ever built. It was used in Cincinnati in 1836 to 1853. Eight volunteer firemen pulled it to the scene of action. These same firemen operated the big hand pump, which threw a stream from a 2-inch nozzle a distance of 50 feet. The apparatus was considered a wonder in those early days of fire fighting.

After this early type of fire-engine, came the one drawn by horses, one which is still used but rapidly being replaced in this age of automobiles by the motor-driven fire-engine of the present day with a speed of 50 miles per hour and as far superior to the horse-drawn apparatus as that one is over the old hand pump engine.

The ultra-modern automobile fire-engine of the near future is shown in the last photograph. This is a steam-electric automobile apparatus that travels with the speed of the wind. A rate of 75 miles per hour can easily be attained by this automobile machine. It has lost all resemblance to its former brothers and sisters and is built on an entirely new principle with electrically-operated pumps. A single stream from a 3-inch nozzle can be thrown a distance of a city block or 200 feet up the side of a skyscraper. Two streams go just half as far but the volume of water is so great that it resembles a good size rainstorm that can flood any building in five minutes. The pumps operate silently. There is no smoke, no cinders or ashes to litter up the street where it operates. It is considered the last word in automobile fire-engine construction and is said to be the coming universally used automobile fire-engine.

Small Crowd at Springfield, Mass., Races

SPRINGFIELD, MASS., Oct. 12—Before a crowd numbering 3,600. a program of automobile races was given at the Imperial Park half-mile track this afternoon. The track was slow and the fields small. T. B. Shoemaker, of New York, acted as referee and representative of the American Automobile Association. There were no accidents and no protests were filed by the contestants.

The events comprised a 3 and a 5-mile free-for-all, won by Mercedes (Hickman) and Mercer (Grennon), respectively; 3 and 5-mile races for cars having less than 601 inches piston displacement, taken by Pope-Hartford (Kyle) and Mercer (Grennon); a 10-mile match race between Pope-Hartford, Mercedes and Zust, won by the first, driven by Kyle, in 15:06, and a 5-mile handicap taken by Grennon's Mercer.

Hoosiers Plan Run to the Pacific

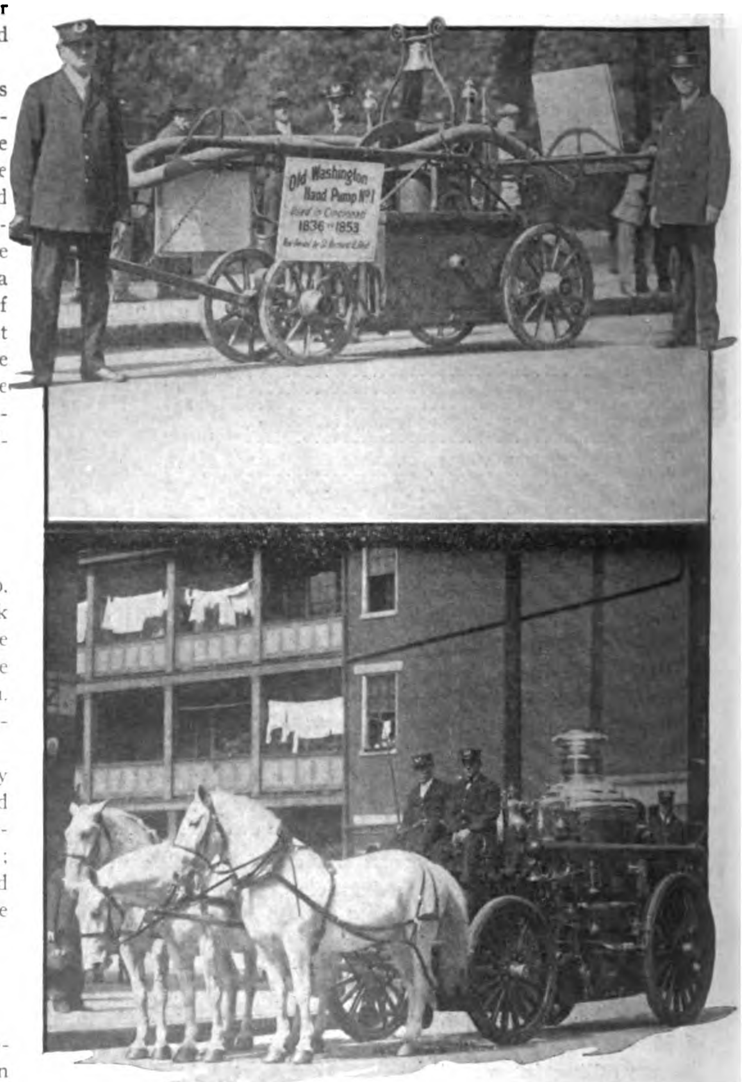
INDIANAPOLIS, IND., Oct. 14—At a meeting of the Indiana Automobile Manufacturers' Association here recently, a proposition to conduct the 1913 run to San Francisco was taken under advisement. It was proposed to follow one of the routes proposed for the rock highway projected by Messrs. Fisher and Allison, this taking the place of the Four-State Tour. The route proposed is through St. Louis, Kansas City, Omaha, Denver, Salt Lake City, Ogden, Sacramento and San Francisco, taking about 40 days for the round trip.

A plan also was proposed to run a special train for Indiana exhibits to the New York show in January, making stops en route at Philadelphia and Pittsburgh. The by-laws were amended to provide for the annual meeting in September and nine directors were elected.

May Open Yosemite to Automobiles

SAN FRANCISCO, CAL., October 12—Secretary of the Interior, Fisher will hold a conference in the Yosemite Valley, on October 14 for the purpose of deciding whether or not motor cars shall be admitted within the valley, which for several years past has been under Federal control and in charge of United States troops. A concerted effort is being made by the automobile men of California to secure the opening of the valley to the automobile, and it is confidently expected that Secretary Fisher will accede to the request.

It is recognized that the steep roads and narrow grades of the valley make precautions necessary, and it is probable, therefore, that the motor cars will be restricted to the use of one of the three roads entering the valley. Otherwise they will be permitted to use any of the three roads, but only during certain hours of the day assigned to them. The latter plan is the most generally favored by dealers and owners.



Upper picture shows most efficient fire-fighter in use back in 1836—it was a man-drawn, hand-pumping device—The lower cut shows the efficient type of horse-drawn engine, the best 20 years ago

Oil Man Talks Gasoline

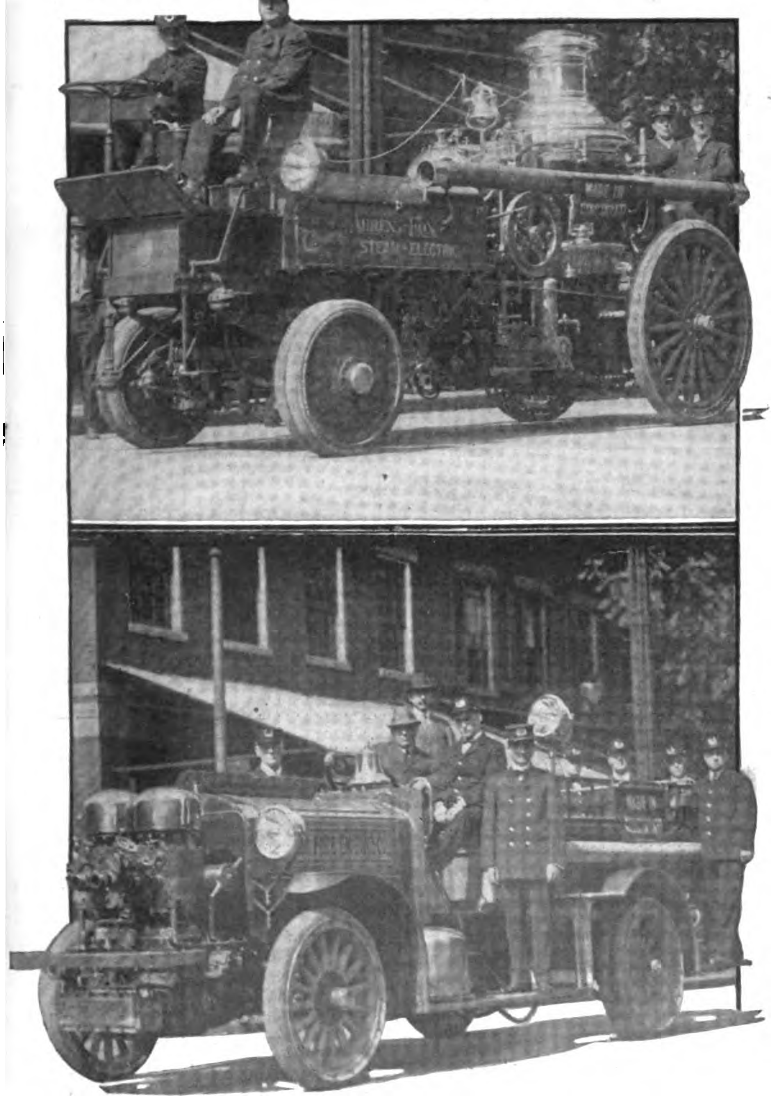
Sees Only Working of Supply and Demand Law in the Recent Series of Price Bulges and Jumps

Shows That Recently Discovered Oil Wells Produce Small Proportion of Potential Gasoline

FROM the viewpoint of the oil man, the extraordinary bulges that have marked the course of the gasoline market during the past year are simply evidences of the working of the law of supply and demand. The following article prepared by a prominent oil man outlines the situation as he sees it:

"In order to understand fully the situation in regard to supply of gasoline it should be understood that a considerable proportion of the oil produced is not suitable for the manufacture of gasoline.

"The state which produces the largest number of barrels (California) with a total of 81,134,391 barrels, produces only a comparatively small amount of oil suitable for gasoline manufacture, the bulk of this oil being only for fuel, road oil and asphalt production.



Two types of ultra-modern fire apparatus. The upper photograph shows a motor-driven fire engine which has a speed of 75 miles an hour and which uses electrically-operated pumps

"Dr. David T. Day, of the U. S. Geological Survey, in his report on the production of petroleum for 1911, states that while fuel oils increased, refinery oils declined. It is from the refinery oils that the gasoline production is secured.

"It should also be noted that gasoline can only be secured to the extent of the small percentage which is found in the oils, and where gasoline is not found in such percentage to pay for refining, the oil cannot be used for this purpose.

"The figures given below show that while the general production of oil for 1911 increased over 1910, there is no increase perceptible in 1912 over 1911, and in all cases where increase has occurred, the oil has been of such a character as to yield practically no gasoline.

"In the meantime the consumption of gasoline has increased yearly between 65 to 100 per cent. In other words, the oils from which gasoline can be drawn have not increased in quantity and it has been necessary to draw largely upon the accumulated stocks for the supply of gasoline.

"On account of the increased requirements for refinery oil, the price of crude oil suitable for refining purposes has risen approximately 33 1-3 per cent. during the last year.

"Not more than 6 months' supply of oil is in stock even in California where much of the oil is not suitable for gasoline manufacture, and in many cases, the supply on hand is much less.

"The total production of oil for 1911 (from the report of Dr. Day) 220,449,391 barrels.

"Delivered for all purposes during 1911, 229,567,581 barrels.

"While the reports for 1912 are not yet available, the records so far given show practically no increase over 1911.

"Stocks of refining oils:

December, 1910	93,038,828 bbls.
December, 1911	81,791,433 "
June 30, 1911	76,421,058 "

"The production from the fields which supply most of the refining oil stands as follows:

1910	126,255,667 bbls.
1911	127,215,812 "
(6 mo.) 1912	62,900,069 "

"In the meantime, some figures on the automobile business give the following number of cars in service:

	Pleasure Cars	Commercial Vehicles
December, 1910	350,000	No Record
December, 1911	550,000	No Record
June, 1912	859,000	32,000

"With an estimated production of the automobile factories for 1912 of 300,000 cars.

"To this must be added the number of stationary engines, gasoline traction engines, motor boats and yachts, the production of which has increased several hundred per cent. in the last 3 or 4 years.

"In other words, while the supply of oil has increased slightly, the supply of gasoline is not increased, but demand is going up by leaps and bounds, and as a consequence, the material is increasing in value."

Glidden at Hoosier Capital

INDIANAPOLIS, IND., Oct. 15—Charles J. Glidden, who is touring over the route selected for the A. A. A. national reliability tour from Detroit to New Orleans, reached this city today. He was escorted from Detroit by a number of cars and was received by the Hoosier Motor Club. Tomorrow's run is to Louisville. Mr. Glidden is using a Maxwell car.

Iowa Tour Finally Starts

DES MOINES, IA., Oct. 16—After three postponements the third annual Little Glidden tour of the Iowa Automobile Association left Des Moines early Tuesday morning for an 830-mile trip over Iowa. Five days will be consumed on the run and a complete circuit of the state will be made.

Harvest Proves a Bumper

Final Report of Government Shows 20 Per Cent. Increase Over Average of Last Year Throughout Land

Industrial Council Formed to Work for Safety of Employees—Automobile Trade Interested

WASHINGTON, D. C., Oct. 14—Crop reports as of October 1, just issued by the Department of Agriculture, are unusually favorable. This date is recognized by the Department as harvest time, and computations are made with reference to it. The composite condition of all crops on October 1 was about 20 per cent. better than last year, and 10 per cent. better than in an average season. The composite condition of all crops in each state on October 1, or at time of harvest compared with the same time last year and the averages of recent years is given in the table at the bottom of the page.

Industrial Safety Council Organized

MILWAUKEE, WIS.—The safety congress held at Milwaukee from September 30 to October 4 under the auspices of the Association of Iron and Steel Electrical Engineers has resulted in the organization of the National Council for Industrial Safety. which will conduct an American Safety Congress in 1913 at New York, and an international congress at San Francisco in 1915, in conjuction with the Panama-Pacific exposition. All of the big automobile manufacturers of America will be invited to join the National Council, the importance and magnitude of this and allied industries having received instant recognition.

Court Decides Against Insurance Company

The literature of automobile insurance litigation was enriched this week by the trial of the suit of William P. Hardenburgh, former vice-president of the New Jersey Zinc Works against the Employers' Liability Assurance Company, of London. Mr. Hardenburgh owned a car and, like a prudent man, insured it against road accidents. The policy of insurance was written by the defendant company. If there never had been any accident or claim made under the policy, Mr. Hardenburgh never would have known whether he was protected or not. As it turned out. he found that he was protected, but he had to take the matter to court to develop that fact.

The circumstances of the case, as they were brought out at the hearing on Monday before Justice Green in the City Court showed that while Mr. Hardenburgh was driving near Far Hills one evening about a year ago, he ran off the road and wrecked his car in the ditch.

To the average person the mishap was a road accident, but the Employers' Liability Assurance Company, of London, did not so construe it and through its representatives informed Mr. Hardenburgh that the accident occurred in the ditch and not on the road. But in addition the defense was put in that the road in question was not a real road, improved and protected by the authorities. In fact, it was only such a road as was under the jurisdiction of the Highway Commission. For that reason the company asked the court to dismiss the case.

The reasoning of the defendant did not appeal to Mr. Justice Green who instructed the jury to find a verdict of $635 in favor of Mr. Hardenburgh.

How to Avoid Freight Car Famine

Anticipating prospective shortage of automobile freight cars, when the shipping season opens in full blast, the National Association of Automobile Manufacturers, through James S. Marvin, assistant general manager, has issued a circular to the members of the organization warning them to be prompt in loading and unloading freight cars and cautions to members to load the cars to their full capacity if possible.

The circular recommends that shipments of supplies should be ordered in units of as much size as possible and to specify automobile cars so that the factories can reload such cars with their finished product.

Last winter and spring there was some complaint on the part of the railroads that automobile cars were tied up at various points of consignment because dealers failed to take prompt delivery.

TABLE OF CROP REPORTS TO OCTOBER 1

State	1912 Compared With		State	1912 Compared With	
	1911 Per Cent.	Average P. C.		1911 Per Cent.	Average P. C.
Maine	103	104	Missouri	124	103
New Hampshire	122	114	North Dakota	148	124
Vermont	115	113	South Dakota	213	108
Massachusetts	119	103	Nebraska	140	98
Rhode Island	111	100	Kansas	160	114
Connecticut	110	99	Kentucky	112	104
New York	117	101	Tennessee	99	98
New Jersey	115	103	Alabama	94	100
Pennsylvania	120	105	Mississippi	100	96
Delaware	113	106	Louisiana	101	100
Maryland	118	105	Texas	128	115
Virginia	110	93	Oklahoma	165	102
West Virginia	158	115	Arkansas	100	98
North Carolina	97	95	Montana	101	106
South Carolina	96	94	Wyoming	104	96
Georgia	87	92	Colorado	129	101
Florida	99	98	New Mexico	96	100
Ohio	105	99	Arizona	91	108
Indiana	107	96	Utah	112	100
Illinois	113	99	Nevada	100	128
Michigan	99	97	Idaho	97	105
Wisconsin	114	104	Washington	100	105
Minnesota	138	110	Oregon	113	113
Iowa	140	112	California	95	97

In the statement above the September 1 condition figures are used for oats, spring wheat and barley; the yields per acre, as reported on October 1 have overrun somewhat the yields indicated by the condition figures, which would tend to increase the above figures for some of the important oats, barley and spring wheat states, as Illinois, Minnesota, Iowa, North and South Dakota and Nebraska.

(Continued from page 763)

the market always responds with more or less accuracy to fluctuations in that grade, the curves are not concentric:

Year	Price
1894	\$0.64½ to \$0.73
1895	.70 to .81½
1896	.71 to .85
1897	.79½ to .89
1898	.82 to 1.06
1899	.91 to 1.10
1900	.83 to 1.11½
1901	.76 to .95
1902	.66 to .92
1903	.78 to 1.13
1904	.89 to 1.32
1905	1.13 to 1.35
1906	1.16 to 1.28
1907	.69 to 1.24
1908	.65 to 1.30
1909	1.13 to 2.15
1910	1.16 to 2.90
1911	.90 to 1.67

It will be noted from the foregoing that between 1894 and 1904 the average price ran around 90 cents and that from 1904, when the automobile began to exert some influence, the price rose to an average of $1.05 a pound during the next 5 years. In 1909 it bulged up to $1.64 on an average, and in the following year reached a general average of $2.02. The maximum price quoted is set at $2.90 because the real top of the market, 20 cents higher, was for only a certain grade of up-river and only held for a short time. The sharp decline since 1910 is the result of response to economic influences embodied in the universal law of supply and demand.

Improving Body Finish

Mechanical Improvements on the Modern Car Demand a Correspondingly Artistic Appearance—Use of the Dark Room

French Attain Best Results by Getting Preliminary Coats Worked Down Close and Hard

EARLIER issues of THE AUTOMOBILE have told the conspicuous part which good painting and finishing has played and is playing in making the automobile a beautiful example of craftsmanship.

The motto of the painter spells Improvement, which means that there is no going backward nor no standing still. The car is being improved mechanically and it must continue to be improved artistically.

One improvement connected with the varnishing of the modern motor car is the dark room. This department, adjoining the varnish room, is equipped with shutters and dark curtains. With the vacuum cleaner it can in a short time be made clean. The heating capacity is equal to anywhere from 70 to 100 degrees. It is provided with a system of ventilation through the ceiling which furnishes pure fresh air in a quantity sufficient to assist the drying of the varnish.

It is a room in which the freshly varnished surface set for anywhere from 24 to 48 hours at a temperature of not less than 70 degrees takes on a high, sharp brilliancy quite unattainable in a room flooded with light.

After this deep, high lustre is assured the work is removed to the light room, i. e., a room in which plenty of bright light prevails. Here, too, the varnish, cured and set to a degree of striking lustre, is further dried and its brilliancy given an increased permanence by the light shed upon it.

The basis for the installation of the dark room is founded upon the fact that in the light room there is always a movement of dust atoms. This movement can best be ascertained by looking into a shaft of sunlight penetrating the room. Through this shaft the particles of matter will be found floating in myriads. In the absolutely dark room this dust movement is eliminated, or at any rate more completely eliminated than in the room containing some measure of light. **So far as possible this room during construction should be made dustproof.** Through the use of it clean surfaces and brilliant finish are produced.

Many years ago French chemists established the fact that after a varnish sets up free from dust during the process of which the dark room is the preferred storage quarters, plenty of light, barring direct sunlight, not only increases the brilliancy of the high lustre established in the dark room, but serves to give the varnish a firmness of film and a capacity to respond to all the varied exactions of service which could be obtained under no other circumstances.

This consignment of work to the dark room immediately following the application of the varnish is called in New York, Chicago and other large cities the beauty treatment. It is not precisely a new method of developing varnish lustre, but rather the resurrection of an old-time carriage finishing room practice.

Another practice which the car owner in making a demand for an improved quality of painting and finishing is forcing upon the painter is this, namely, more thorough rough coat surfacing. By this we mean that the priming or first coat and the coats closely following this and including the foundation of roughstuff are to be worked up with greater care and accuracy than has heretofore been the case. This applies to both old and new work. An American paintshop expert lately returned from abroad declares that the painting and finishing of French cars excels not so much by reason of superior color treatment or varnishing, but rather through the painstaking attention given the foundation or surfacing coats of material —the finesse, in fact, lavished upon the many little and at first glance insignificant details of surface building.

Even the first coats are given the greatest possible attention. So carefully is the paint prepared and seasoned and made fine and smooth of consistency that where it is applied and brushed out it has a smoothness and an appearance of good workmanship that it is a pleasure to see. Over this coat a like excellent second coat is put on, brushed out clean and velvety, and when dry the surface is gone over with great care and all defects, etc., puttied.

Above this coat anywhere from five to six coats of roughstuff are put on in as many days. This body of coarse pigment is allowed from 3 to 6 days to cure out and harden, whereupon it is rubbed down to a smooth and level surface with artificial pumicestone, using with the stone a generous supply of water to keep the stone working free and prevent gumming up. This is the practice in vogue in this country, **except that no great attention is paid to getting these coats under the last coat of the roughstuff worked down as close and hard as the French method calls for.**

A vacuum cleaner working by suction forms an ideal cleaner for use in removing dust and dirt from surfaces that have been sandpapered. Practically every atom of dust is licked up with the cleaner. In this way the rubbing of the roughstuff is made much easier and the surface is kept free from things which serve only to give the painter trouble.

Two and three coats of color are now being used in order to establish a density of color over which, in due season, are applied three coats of varnish color, each containing a gradually diminishing quantity of color.

Above these pure and simple varnish color coats two and three coats of so-called clear rubbing varnish is used. **Into this varnish is put a few drops of the body color in order to preserve the integrity of the field color.** These coats are further rubbed with pumicestone flour and water to give the foundation body and stability.

Then, last of all, the surface is carefully washed, cleaned up, touched up if necessary, and flowed with a coat of some elastic finishing varnish.

The drying room or baking oven is another device which promises to materially assist in getting cars through the paintshop quickly and with plenty to admire. In many parts of the country these drying rooms are used in connection with the application of all the varnish coats. **By a little forcing of these plants two and even three coats of varnish may be applied per day. For first class work, however, this practice is not to be commended.**

In subjecting a finishing varnish for several hours to a temperature of say 140 degrees you of course get a very fine and well dried finish, but it is an open question if such a finish will stand up and hold its elegant looks to the same extent that a varnish seasoned under the natural conditions of ordinary varnish room practice will. Nevertheless it is more than likely—indeed it is certain—that **within the next few years the drying room or baking oven will find widespread use.**

In making plans to maintain the car in first class condition it is well at all times to bear in mind the hard service to which the chassis or running parts are exposed. Mud, dust, oil and grease saturate these parts. **To remove these substances requires a cleaning practice which in the very nature of the case must be more or less destructive.** For such parts, then, a varnish is needed and should be used which dries quickly and hard, after the manner of a baked finish, at the same time retaining elasticity sufficient to insure its durable wearing properties. Hoods and fenders should invariably be varnished with an elastic finishing varnish capable of withstanding the constant vibration and the expansion and contraction.

Argument for Correct Mounting of Shackle Springs Suggests a Convenient Graphic Method for Laying Out Spring Suspensions in General—New Planetary Gear from Germany—Safe Children's Cars—Seeing Sparks by X-Rays

FUNCTION of **Auxiliary Springs**—A study of spring and shock absorber action is presented by N. Duaner in *Le Génie Civil* having for its object to show how shackle springs should be used. The properties of an ordinary spring suspension are formulated mathematically and it is shown that the formulas confirm the established theories to the effect that (1) with a given flexibility of the leaf spring or helical spring the oscillations are more rapid the lighter the load and therefore more disagreeable and injurious, (2) that the load and the flexibility should vary inversely, and (3) that an increase in the frictions of a spring suspension always has the effect of reducing the amplitude and duration of oscillation. It is further shown that the dangers of unrestricted oscillation—in the way of breaking springs and catapulting passengers—should be counteracted and that the problem involved in doing so is intricate; so much so that in the artillery, for example, all spring suspension is dispensed with although a mitigation of shocks would be desirable. Shock absorbers under various names are with these facts in view devised for the especial purpose of reducing the amplitude of oscillations while avoiding the effect of increasing their velocity or, in other words, to effect a suspension whose movements are timed as those of a flexible spring and spaced as those of a stiff spring insofar as this may be done. In practice the requirements of these devices are (1) that they shall have no effect on small oscillations, (2) that their action shall be progressive, restraining a large deflection more energetically than a smaller one and (3) that their action shall be of short duration, so as to place the vehicle spring in its position of equilibrium with the static load as quickly as possible, ready to receive a new shock if one should arise.

[Compare herewith the theory that it is the function of auxiliary devices to leave every departure of the vehicle spring from its normal position perfectly free and unrestricted while braking the return of the spring to this normal position so effectually that if possible no oscillation to the other side of the position of equilibrium takes place. The Derihon device, designed on this principle, was described in THE AUTOMOBILE of June 13; another hydraulic device in the issue of June 20.—ED.]

If it is now assumed to be the main function of auxiliary devices to establish a decreasing flexibility in the spring suspension of a vehicle according to the severity of the shock received it becomes interesting to examine the conditions under which they correspond to this requirement. With ordinary springs, whether leaf or coil springs, it cannot be met, since their flexibility is approximately constant, but arrangements may be made for having several sets of ordinary springs enter successively into action as is done in practice by means of overload springs or buffers. Many of the shock absorbers, while unsuitable for sustaining a static load, are perfectly well adapted for establishing a decreasing flexibility and at the same time reducing the duration of oscillations, but in practice they are adjusted to only one load. Neither with a minimum load or with an overload do they leave the small oscillations free. The most interesting devices, because the simplest and most generally used, are the auxiliary springs which are applied as elastic shackles and which may be used with or without shock absorbers and with or without supplementary overload springs. By means of shackle springs it is possible to realize to a certain degree a suspension with variable flexibility, but as they are usually applied this advantage is not obtained. If they may be used to give additional flexibility in all cases when the maximum load is not carried to a suspension which has been designed for the maximum load their utility may be conceded.

[The author here shows by means of two separate diagrams that spring shackles mounted without initial tension are faulty and that those with unlimited action (being a range of flexion equal to that of the leaf spring) cannot serve any other purpose than at best that of correcting the action of a spring which is too stiff for its maximum load, but it would seem to be evident without special argument that an auxiliary spring should fill its framing when supporting its minimum working-load or, in other words, should be under the tension of that load, and also that, if its range is unlimited it must not only be long and cumbersome, but will continue to add its flexibility to that of the leaf spring throughout the range of action of the latter and thus fail to bring about the desired decrease of flexibility for the more severe shocks. However, in the remodeling of a vehicle or in transforming a heavy limousine or a vehicle of other heavy type into an open and lighter car it may be convenient, as noted by the author, to remodel the spring suspension by means of auxiliary springs with a long range of action and with an initial tension corresponding to the reduced weight of the new vehicle body. The smooth, restful spring action which is obtained from a leaf spring of suitable flexibility, because the friction between its leaves tends to moderate its oscillations, can scarcely be obtained by this means, however.—ED.]

A diagram of the spring action is useful to show how the auxiliary springs should be applied. In Fig. 1 the axis Ox represents the varying loads in kilograms, while the deflections of

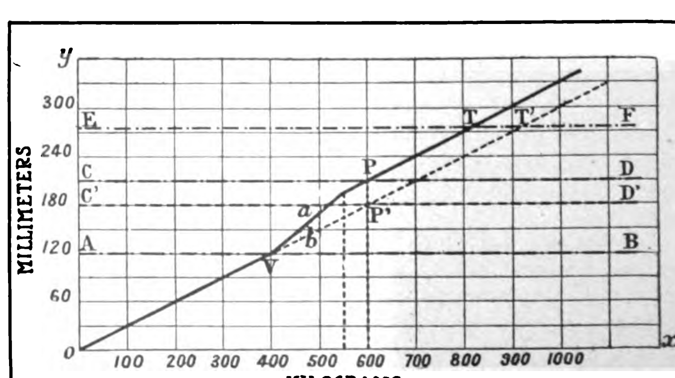


Fig. 1—Diagram of combined leaf-spring and shackle-spring action for minimum load of 400 kg. and maximum static load of 600 kg.

the spring equipment are counted in millimeters on the axis Oy. Assuming a flexibility for the leaf spring of 30 per cent. [which by the convenient French method of notation means that the spring gives a lineal deflection of 30 millimeters for each 100 kilograms of load—Ed.], the line OV is the flexibility curve for the leaf spring since it realizes this proportion of deflections to loads. Assuming further, that the load on the spring is 400 kilograms when the vehicle is empty and that 600 kilograms is intended as the maximum load, the line AB denotes the position of the axle when the vehicle is empty, while C'D' similarly denotes the position of the axle at full load. Usually some form of guard is employed to prevent the chassis from striking the axle, and by this means the range of the spring action under full load may be established at about 100 millimeters, in which case the line EF indicates the position of the chassis 100 millimeters above that of the loaded axle C'D'.

To simplify the consideration of the improved spring action, which may be effected by means of spring shackles of the general type shown in Fig. 2, it may now be supposed that one of these auxiliary springs is attached at each end of the leaf spring, instead of at one end only, as usual in practice, and that in combination they have a flexibility of 20 per cent., each of them 40 per cent. They are supposed to be placed in position under a tension of 400 kilograms, or 200 kilograms for each, and consequently begin to act when this load, which is the minimum load on the whole spring combination, is exceeded either by increased load or by shock.

The diagram now shows the modification of the flexibility curve which is effected if the range of each of the auxiliary springs is limited to 30 millimeters; that is, if an additional load of 150 kilograms, bringing the total load to 550 kilograms, compresses the auxiliary coil spring completely, taking it out of action as a spring. By measuring off 20 millimeters on the vertical corresponding to a load of 500 kilograms from its point of intersection with the flexibility curve of the leaf spring, as from *b* to *a* in the diagram, the direction of the modified curve is obtained and this curve (in this case a straight line) continues to represent the flexibility of the whole spring combination until a load or shock of 550 kilograms is reached, as shown in the diagram by the dotted vertical erected to represent this load. Thereafter, the leaf spring going into unaided action, the flexibility curve returns to what it was—one of 30 per cent.—but the position of the rear axle in relation to the chassis has been changed by the compression of the coiled spring so as to reduce the distance from the axle to the chassis by 30 millimeters, PP' in the diagram, which is equal to the range of the coil spring. The line CD therefore represents the position of the axle at maximum load with auxiliary spring equipment and the point T, corresponding to a shock of 825 kilograms, shows that the range of the spring, or the deflection possible before the chassis strikes the buffer, has been reduced as compared with the maximum shock of 925 kilograms indicated by T' for the leaf spring alone. This drawback to the attachment of auxiliaries may be obviated by means of a shock absorber or an overload spring for the most severe shocks. The advantage of the equipment, on the other hand, is plainly this, that with a leaf spring properly designed for the maximum static load and too stiff for the empty or lightly loaded vehicle a flexibility curve of 50 instead of one of 30 per cent. (French notation) is obtained for just those frequently occurring instances when a full load cannot be taken on board.

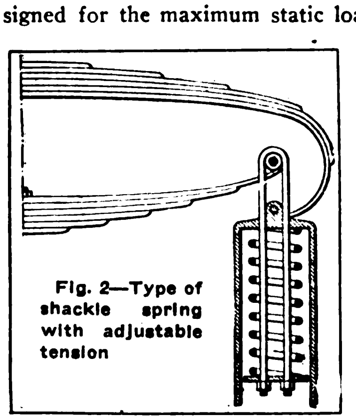


Fig. 2—Type of shackle spring with adjustable tension

If a single auxiliary spring for each leaf spring is used instead of two an examination of the conditions will readily show that, other things equal, a range twice as great and a quadrupled flexibility must of necessity be provided.

By operating at random in the attachment of shackle springs disagreeable surprises are, on the other hand, frequently encountered. The suspension is often unduly weakened; teetering of the vehicle body is produced by road shocks and at stops and starts and the vehicle holds the road badly at turns.—From *Le Génie Civil*, August 31.

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VISUALIZING the Sparks—As a high tension current is used for producing the light phenomena observed with a Crookes tube, a Parisian inventor reasoned that a Crookes tube or bulb could be made to tell from the outside whether the sparks wanted on the inside of a motor cylinder are properly and regularly produced. He devised an instrument for this purpose which has the appearance of a very thick sharpened lead pencil. The pencil point is an electrode set in hard rubber and leads to a small Crookes bulb inside of the pencil, whose surface is a thin copper jacket serving as the other terminal. At the butt end a non-conductive plug with a hole through the center is inserted in the copper tube. The observer puts his eye to this hole to see what he shall see. The pencil point is to this end placed against any exposed portion of the ignition circuit of the motor, for example the top of the spark-plug, while the observer's hand clasps the copper tube firmly to ground whatever amount of current may be able to pass the Crookes bulb. Now, when the ignition circuit is closed, to produce a spark in the motor, a light becomes visible in the pencil. If the sparks are strong and regular, so are the fluorescences of the bulb. On the other hand, if no light appears the plug is short-circuited, and if the light is irregular and weak the spark is fouled or the porcelain broken.—From *Omnia*, September 21.

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AUTOMOBILES for Children—At the exposition for "little inventors," which for some years has been held annually in Paris with a view to helping out inventors who are either too impecunious to help themselves or whose productions are so far out of the beaten industrial track that those who would be interested in them might be hard to find, there are this year shown automobiles for children. They have a 3-4 horsepower motor and their speed cannot exceed 4 kilometers per hour, not even on the downgrade. This result is accomplished by having the driving shaft actuate a low-pitch irreversible worm on the rear axle, so that the vehicle cannot push the motor. The clutch and the brakes work on the opposite plan of that followed in ordinary cars; that is, the driver must push a pedal to throw the clutch in and the brakes off. If he does nothing the car stops. This radical precaution against accidents to the children has at times been proposed for cars in general but has met with no favor among adults. It is now relied upon for making cars for young children popular.—From *Omnia*, September 21.

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PLANETARY Gear of New Type—With a view to the problem, which eventually must be solved, of driving motor vehicles—for example, municipal garbage collection vehicles—very slowly and with many stops and yet economically, it is necessary that the power used should be very small and adapted for working at high speed, so that the vehicle may not be exposed to great stresses and may be built cheaply, and it is at the same time necessary that the power taken from the high-speed shaft of the little motor shall be geared down to a very slow motion of the driving wheels without encumbering the vehicle with a large and power-consuming gear box and without a multiplicity of gear reductions at various points, all of which would mean increased first cost, waste of power, wear of a number of parts and difficulties in keeping the vehicle in good repair.

A similar problem exists with regard to motor boats and turbine boats, where there is need of a simple reducing gear because

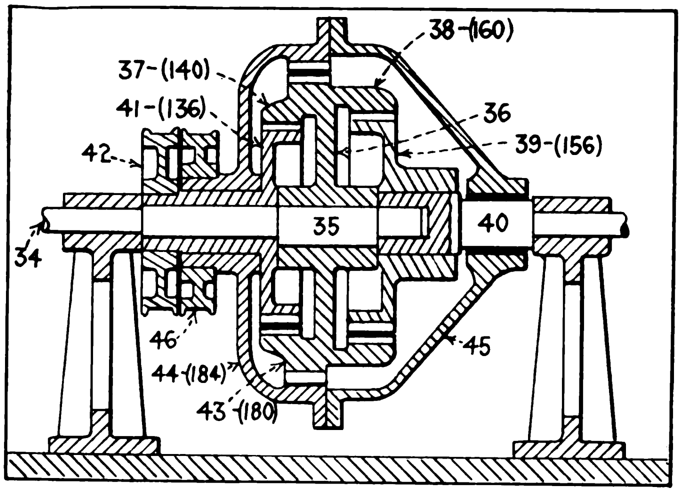

Fig. 3—Section of the Peters planetary gear for large reductions (with the number of teeth on each gear-wheel in parenthesis)

the engine operates to best advantage at high speed and the propeller at a relatively low speed. And in electric transmission the same problem appears again, in some cases reversed, the requirement being then to transform a slow movement into one of very high speed. Compactness in conjunction with great strength and facile operation for starts, stops, reversing and gear changes are in most of these cases of the greatest importance.

Consideration of this long-felt want has led in Germany to the development of a new type of planetary gear of remarkable design and mechanical properties. Fig. 3 shows a section through the driving shaft 34 of this mechanism in the form in which it has been placed in the market for use in automobiles, motor boats and turbines. The driven shaft 40 lies in prolongation of the driving shaft, being bored concentrically to receive it. Direct drive may apparently be obtained by locking together the two brake disks 42 and 46, while leaving them free to turn on the driving shaft, but the German description is silent on this point, and no locking device is shown. The construction, as illustrated, has only one reduction gear and a reverse. For each additional gear desired an additional brake disk and an additional pair of spurwheels would be required, but this complication may not be excessive as it is one of the characteristics of the mechanism that it may be made in very small dimensions and with very small gear teeth, even for the transmission of great power, as at any time at least one-third of all gear teeth are in engagement. [The engagement is not quite complete, however, but depends upon the small difference in the diameters of external spur wheels and the internal gears with which they engage, this difference barely exceeding the height of a gear tooth if great gear reductions are involved. Probably the engagement of a large number of teeth is realized closely enough for purposes of strength, considering that each tooth possesses a certain elasticity whereby great stresses will be distributed, perhaps well within the elastic limit of all the teeth involved. In this respect the use of small, thin teeth may even be of particular merit for the very special construction under consideration.—Ed.]

The middle portion 35 of the driving shaft 34 is formed eccentrically to the rest of the shaft, and on this eccentric portion is mounted the wheel 36, without being keyed, and to it there are secured the internal gear rings 37 and 38 as well as the external gear crown 43. These gears may, of course, be machined directly out of the material of wheel 36, if preferred. The spurwheel 41 is journaled upon shaft 34 and has an extended hub upon the end of which is secured the brake disk 42, by means of which this spurwheel may be held motionless. It is constantly in mesh with internal gear 37. Internal gear 38 is similarly in mesh with the spurwheel 39, and the latter is secured upon the end portion of the driven shaft 40. All driving is thus done through internal gear 38 and spurwheel 39, the forward as well as the reverse. On direct driving they are locked together. The casing within which the whole mechanism runs in oil is composed of two parts, 44 and 45, which are bolted together. During forward driving this casing revolves idly; held motionless it effects the reverse. Part 44 is formed with an internal gear constantly in mesh with spur gear 43 on wheel 36 and has an extended hub which is journaled upon the hub of spurwheel 41 and carries a brake disk 46, by means of which it may be held motionless. Part 45 is formed with a packed bearing in which the driven shaft 40 turns.

To operate the reduction gear, the brake 42 and thereby the spurwheel 41 are prevented from turning. The driving shaft, when revolving, rocks the wheel 36 around by means of the eccentric portion 35, and by each revolution of the shaft all the teeth of the stationary spurwheel 41 are thereby successively engaged by the teeth of the internal gear 37. But if the number of teeth in the internal gear is 140 while the spurwheel 41 has only 136 (as exemplified in Fig. 3, where the supposed number of gear teeth is indicated in parenthesis together with the reference numeral of each gear wheel), the internal gear 37 is compelled to turn backward an angle corresponding to four teeth for each revolution of the driving shaft, since it is only 136 teeth which corresponds to a full circle of engagement with the stationary spurwheel. The internal gear 38, being in one piece with 37, consequently also turns back the same angle and thereby drives spurwheel 39 forward, turning the shaft 40 in the same direction of rotation as that of the driving shaft. The speed reduction produced with the here supposed dimensions is now 140 to 4 in the first pair of gears and, as the internal gear 38 has 160 teeth while spurwheel 39 has 156, the total reduction is obtained by multiplying 140/4 by 156/160, giving 34 1-8 to 1. [In the German report it is figured as 312 to 1 on the supposition that the action between the last pair of gears is of the same nature as the action of the first pair, but this supposition seems to be at fault, since the four-teeth movement of gear 37, and consequently an equal angle of movement for gear 38, is an actual rotation which takes effect upon the gear 39 in the manner of ordinary gears; that is, in the proportion of the two gear diameters or that of their numbers of gear teeth, which is the same thing.—Ed.]

The reverse is effected by immobilizing the casing by means of brake 46. This forces spurwheel 43, with its 180 teeth, four teeth ahead for each revolution of the driving shaft, as for each revolution it must be engaged successively with all of the 184 teeth of internal gear 44 in the casing, on exactly the same principle which applied to forward driving excepting that wheel 36 is now turned in the opposite direction, which is the same direction as that of the driving shaft. And consequently internal gear 38 now turns the driven shaft in the reverse direction, as desired.

If more than one reduction gear are wanted, the wheel 36 is extended on the motor side to make room for more internal gears of smaller diameters and with corresponding spurwheels and brake disks, and the hubs of the latter must be journaled upon the driving shaft inside of the hub sleeves for the large spurwheel 37 and for the casing. It is stated that reductions of as low as 2 to 1 may be obtained, but it seems that in that case the gear teeth must be made relatively large or the eccentricity of portion 35 of the driving shaft more pronounced. With a rapid rotary motion of the wheel 36, as would occur with small speed reductions, the one-sided weight distribution, which would lead to vibrations, may, of course, be obviated by counterweighting this member.—From *Der Motorwagen*, September 20.

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IMPROVED Goggles—In the German market goggles in which the glasses are made of quartz are now offered as a great improvement over the ordinary kind. The optics are more perfectly colorless and transparent and so much harder that their polished surfaces never get dulled or scratched by the action of dust and grit.—From *Allgemeine Automobil-Zeitung*, No. 38. [Quartz also sheds water better than glass and clouds up less readily.—Ed.]

Patrol Bodies Specified

New York Police Department Issues Requirements as to Design and Dimensions—Also States Purchase Conditions—Cars to Seat Fourteen

THE Police Department of the City of New York has taken sufficient interest in the motor police patrol to issue special specification for bodies for them so that all orders for future motor patrols will have to meet the specifications decided upon and reproduced herewith.

According to the commissioner of the Police Department, "the department is not essentially interested in the design of the chassis or engine, but the body design as specified meets all of the needs of the department and the dimensions are satisfactory in every respect."

When purchasing these chassis the department does so under competitive contract and the manufacturer is bonded to maintain the apparatus in first-class working condition to the satisfaction of the department for a period of 2 years under penalty of revocation of the contract for failure to do so. In the contract an equitable provision is made for accident or other damage due to neglect or carelessness on the part of the department; and the chassis manufacturer has not any recourse if his chassis is out of service for 50 or more days in each year of the two protected by the bond.

In size the new vehicle shows an increase over its horse-drawn predecessor, having a total seating capacity of fourteen, the inside accommodating twelve persons, while the driver's seat provides room for two.

In the particular wagon in question the body is mounted on the Garford service chassis with a wheelbase of 145 inches. The rear wheels are of dual type. The tires on all of the wheels are 36 by 4 1-2 inches.

With regard to the body construction this is entirely in wood, ash slats forming the two interior seats arranged lengthwise, with frame and panelling of the same wood at the side, front and back to a height of 34 inches from the floor. The entire space between the upper edge of the seat back and the roof is fitted with heavy wire mesh, as are also the front and back. Provision is made to cover the whole of this mesh area with a series of roll-up blinds of black waterproof material, having transparent celluloid insertions to admit light. These blinds are arranged outside the screens.

The two seats are hinged at the rear edge to permit of their being swung up out of the way as indicated in the drawing so that in case of emergency the floor space can be utilized to accommodate an ambulance bed. A stretcher, forming part of the regular equipment is carried under one of the seats.

When used for ambulance purposes the attendants stand on the rear step, a vertical handrail being provided at each side of the door.

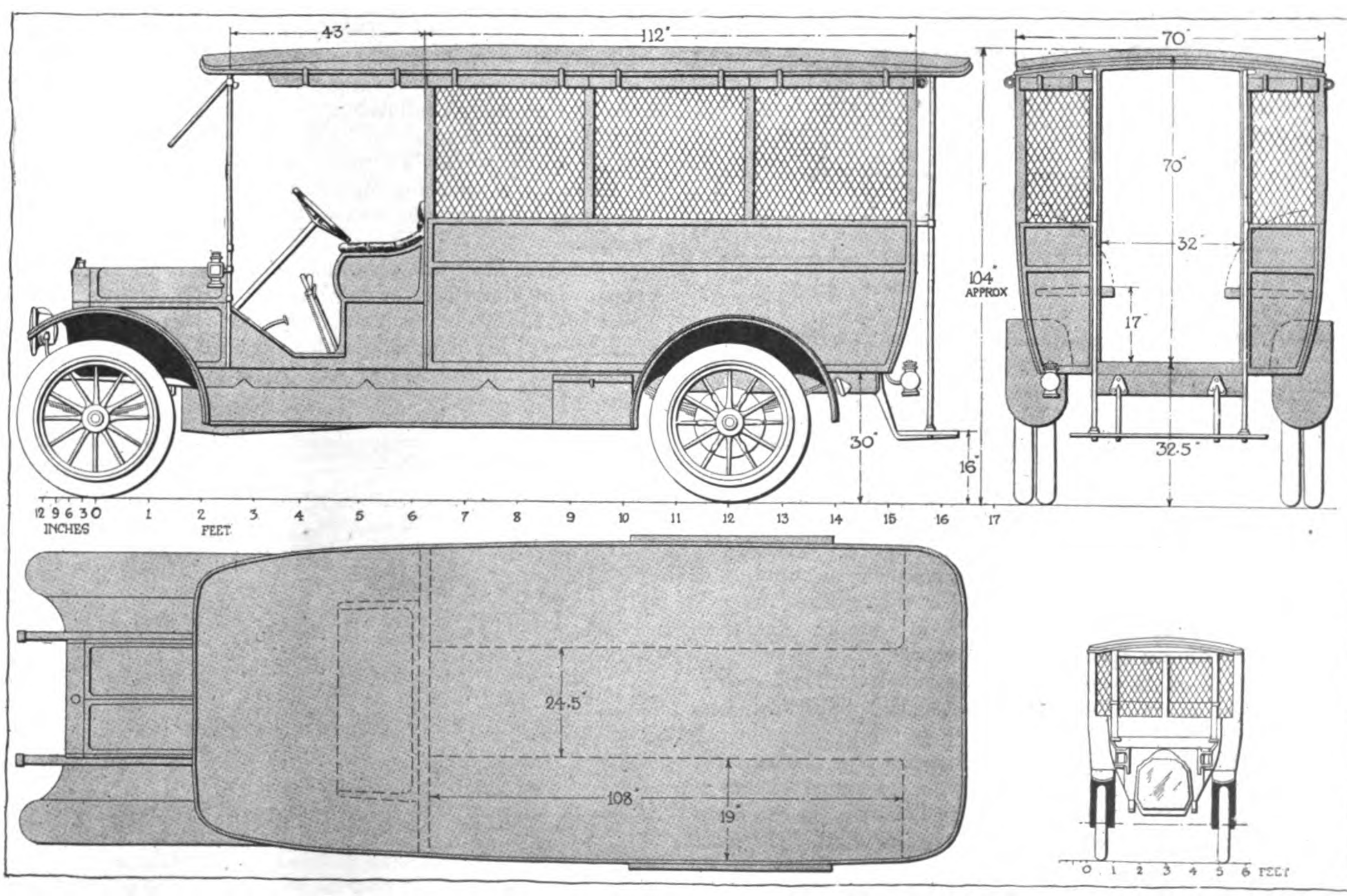
Heavy linoleum laid with brass strip binding covers the floor space, a wide tread plate being placed at the door. Emphasis may be placed here on the necessity of a clean sanitary result throughout all the interior finish, the flooring in particular.

Illumination of the interior is effected by means of a large center dome light covered with a wire mesh guard.

The only upholstery on the vehicle is on the front seat and this is of black leather tufted on both cushion and seat back. The gasoline tank is beneath this seat.

All the leading dimensions appear on the drawing, but the following particulars may be added: The weight of the complete motor-vehicle is approximately 4,200 pounds, the body itself weighing 1,000 pounds.

The speed capability of the machine is in the neighborhood of 50 miles per hour.



Style and dimensions of body specified by the Police Department of the City of New York for automobile patrols

Foreign Constructions Designs and Practices

Silent Couplings for Magneto Drive Now Insisted on by European Makers—Wood Pin Used by Many

General Observations on Shop Methods in Many of the Foreign Factories

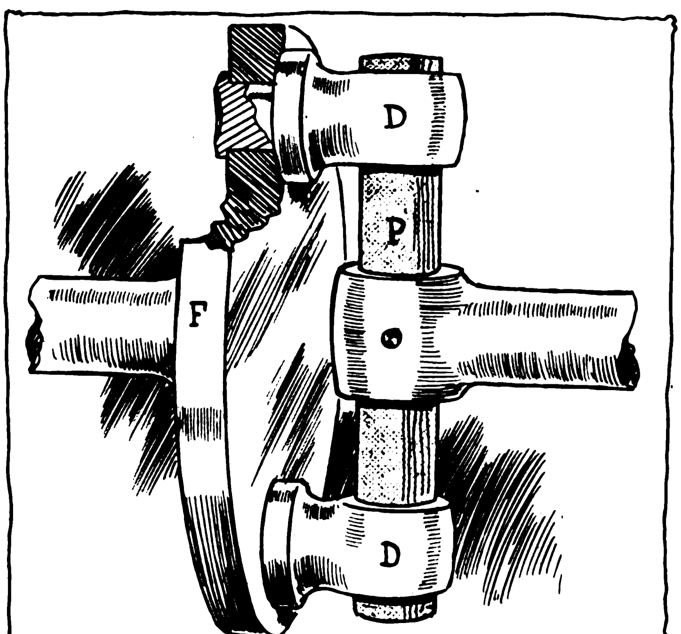


Fig. 1—Wood-pin coupling in magneto drive

EVERY effort for flexibility is recognized as a step in the direction of thwarting depreciation, but every joint has the voice of thirty little noise-devils at concert pitch. Designers in Europe think so and they govern themselves accordingly. It is no easy matter to master noise. It is equally difficult to fix the pitch and timbre of sounds that the combined murmur will not arouse the ire of the automobilist. Some makers of automobiles have the faculty of silencing noises temporarily! They put paint in the joints at every point in the chassis! Other makers destroy interchangeability by hand-fitting parts. No two automobiles are alike in this process and it is the owner who pays the bill by difficulty in replacing worn parts, and cost consequent upon such replacements.

The makers of the best types of automobiles are still looking for ways and means of eliminating noises without abating flexibility of mechanism. Fig. 1 shows a principle which is now regarded favorably. A wooden pin P is placed in the universal joint to transmit the torque. It may be of round section or rectangular and is carried in two dogs D carried in the flange F, which in turn is electrically welded to its shaft. The wood affords ample strength and gives the desired silence to the coupling.

Sprags for Truck Use Prove Necessary When Brakes Fail To Have Adequate Holding Power

Sidelights on Steel Tires, Spring Supports in France and Germany

On a street in Vienna recently a heavily loaded truck had its motion arrested by a guardian of the law in a garb that looked over-military. The street happened to be tilted in the direction of the slowly receding sun at 3 p. m. The driver of the truck accepted orders without so much as a murmur, but the truck, apparently not appreciating the interruption, began to back down the steep incline. The driver applied the brakes; they failed to hold. The situation looked serious for a moment due to the presence of a funeral procession with the head of the line perhaps a dozen yards behind the truck, but the driver instead of struggling with the brakes, tripped the sprag. The pavement was of granite block. How the sprag ever got a grip is a wonder, but it did take a hold and after stuttering a little it brought the big bulk to a standstill.

The sprag looked a little different and just a little better than the average of its kind. The illustration here offered of the sprag is clear enough to establish the fact that the angle of the sprag is favorable to good results. The hinged end is 18 inches from the ground. The bracket, in addition to being substantially made, is so placed under the side frame of the truck that the struggle of the sprag is to lift the load on the truck during the operation of snubbing the motion when the truck backs up. The sprag is short and stocky. The end is fashioned like a pinch-bar.

In America the truck sprag has not been used to any great extent. There are three or four American cities where hills are sufficiently large to warrant the use of the sprag. The sprag, in addition to being a good guardian against accident, is useful to the new driver to hold the truck on a hill while getting started again.

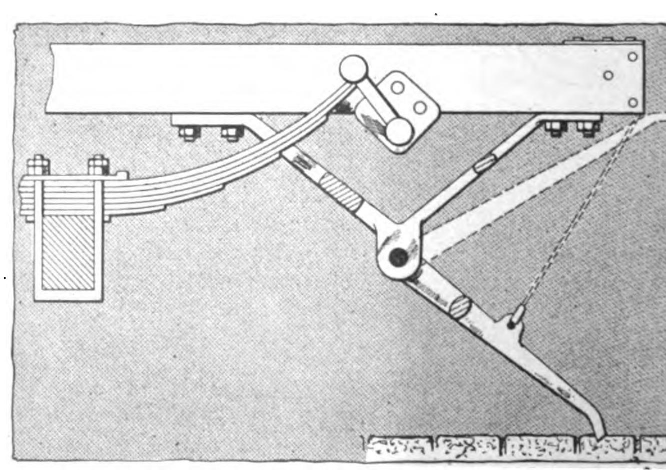


Fig. 2—Sprag design used on truck in Vienna

French Use Steel Tires on Heavy Trucks

Over 90 per cent. of all the trucks seen in actual service in Paris are fitted with steel bands instead of rubber tires. Some of the tires of steel are made narrow enough to give a high pressure of contact with the pavement to aid traction. In a few makes the steel bands are serrated. In one make observed the steel tires were wide, about 11 inches, but, instead of being plain, were drilled full of holes, each hole being about 3-4 inch in diameter. The holes soon filled almost flush with street dirt, but enough of a depression remained at the orifice of each hole to bite the pavement. Fig. 3 illustrates this tire with its steel band B and its series of three rows of circumferential holes extending three-quarters through the band.

The grade of steel used, by the way, in truck tires in France is far better than the ordinary steel obtainable on the open market. The metalloids in the steel are about one-quarter of the value as given in American specifications.

German System To Insure Good Springs

The remarkable easy-riding qualities of German railway cars make it desirable to look for the reason. The springs are responsible. They are flat springs, relatively wide, and sufficient plates are used, considering width, to make the section rectangular. In a word, a spring with a 5-inch width of plates has sufficient plates to bring the other dimensions up to 5 inches also. The same rule holds for other sizes of plates. The springs are made of long span with very little bow or camber.

The novel point is in the detail of suspension, Fig. 4, is that the mechanism used for linking the spring to its hanger H at each end is composed of a pair of links of a chain. They are sprung into grooves in the pins. One pin P1 passes through the eye of the spring, and the other pin P2 passes through the bore of the suspender. The links L1 and L2 are held in place by the pressure of the spring. This plan might be refined for use in automobile trucks.

Boards for French Truck Wheels

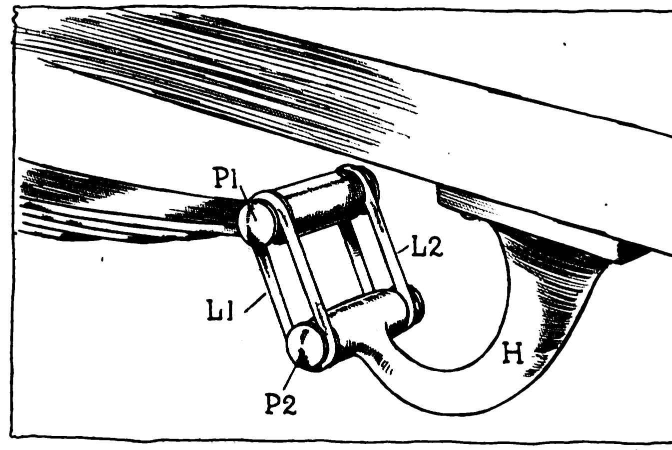


Fig. 4—German method of spring mounting to insure tight clips

It is extremely difficult to get hickory wood large enough to do for spokes of truck wheels of the larger sizes in Europe. Even southern white oak is scarce enough to influence the price and deliveries are uncertain. Steel wheels are being used, but they do not afford the peculiar elastic qualities of wood and the life of solid rubber tires suffers accordingly. Fig. 5 of a wood wheel seems to answer several questions. The wheel is built up—laminate of thin oak boards are glued together. The grain is alternated at right angles. After the wood is built up, it is turned round and the bore is made for the hub H. The metal work, consisting of hub and brake drum, is so made as to clamp the wood. The steel band B, 36 by 8 by 1 1-2 inches in diameter, face and thickness, respectively, is shrunk on. The wood in thin boards is easy to get. The wheel is strong and with careful workmanship there is not any danger of water getting between the boards and destroying the material. Two series of cross bolts hold the boards together, one series at the hub, the other at the periphery.

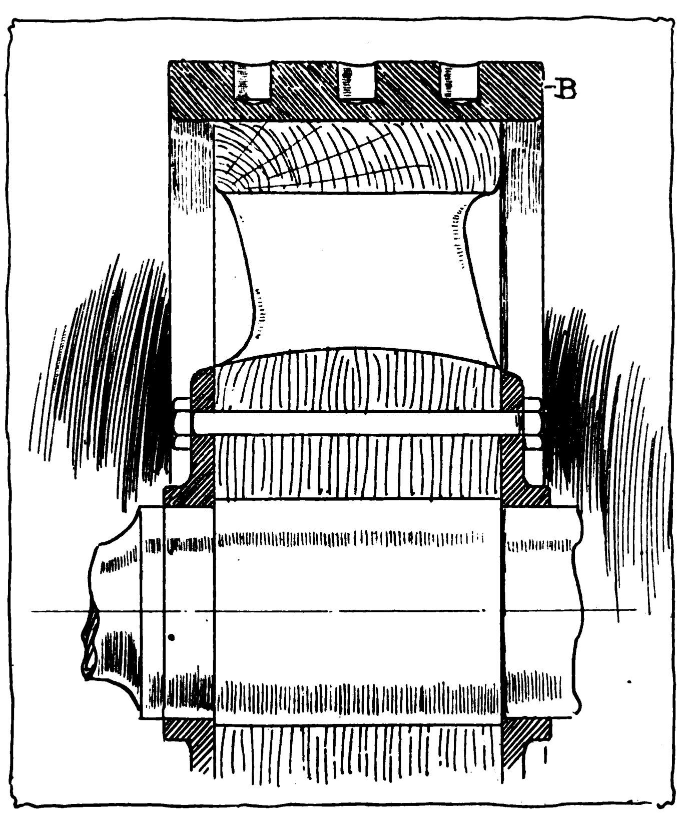


Fig. 3—One of the many French steel truck tires with anti-skid holes in band B

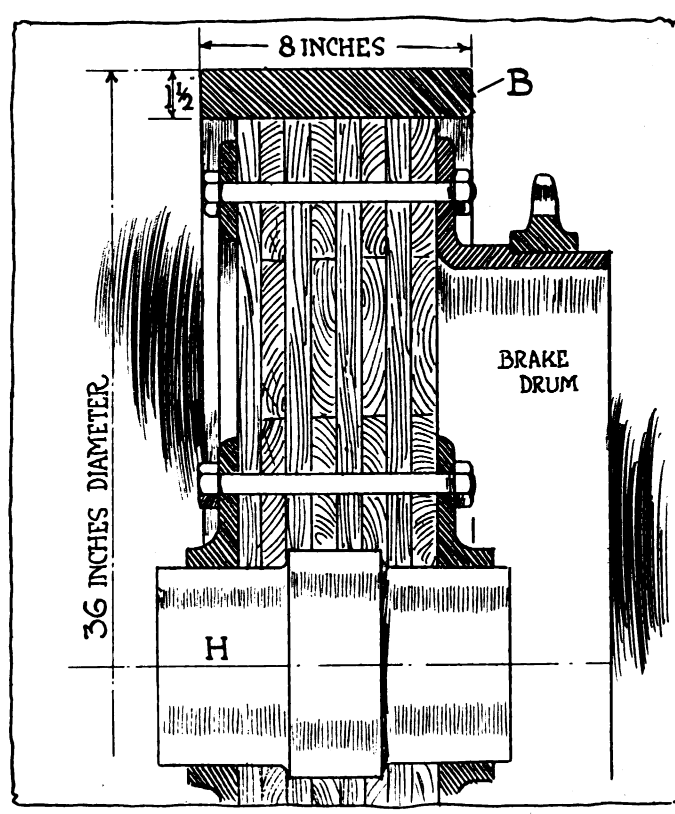


Fig. 5—European truck wheel design of lamination due to scarcity of hickory

Welding—European Methods and Uses

English Engineer Describes Various Welding Methods—Tinman's Solder, Brazing Solder, Liquid Brazing, Autogenous Welding, Electric Welding and Slow-Heat Processes

Paper read by Alexander E. Tucker, F. E. C., before the Institute of Metals, London, Eng., September 26, 1912.

THE methods in practical use for joining metals may be divided in the order of their importance as follows:

1. *By metallic cements,* such as tinman's or brazing solder, which have to be brought to the plastic or liquid state, and whose constituents should be capable of alloying perfectly with the metals to be joined.

2. *By autogenous fusing,* in which the two parts are heated and liquid metal of the same character run round the mass, or the parts are heated to fusing point, and the surfaces worked together by pressure or hammering.

3. *By the use of a cementing metal under pressure,* generally that of a rolling-mill, and at ordinary or only slightly raised temperatures.

In respect to the first method, it is obvious that the fusion point of the solder must be lower than that of the articles to be joined, and the higher the melting point the stronger the solder; it follows that it is desirable that such solder or brazing spelter should be used whenever possible, the melting point of which is only a few degrees less than that of the metals to be joined. The solder should also have, if possible, the same characteristics, such as malleability, color and hardness.

Tinman's Solder—In the use of this care should be especially taken to avoid the presence of zinc, and in certain cases even a trace of zinc is especially prejudicial; it thickens the solder, and probably on account of its liability to oxidation forms a superficial scum which the ordinary spirits of salt is incapable of dissolving. If the presence of zinc be suspected, the addition of a few drops of acid will help greatly. Antimony is frequently present in tinman's solder—this, by forming a cement of higher tensile strength, may, under special conditions, make a joint of greater strength. In the use of solder, either soft solder or brazing solder, it is clearly the correct method to raise the work to the highest temperature that the solder and the work will stand, because under such conditions the penetration of the solder into the surfaces to be joined will be better, and further, the soldering medium may then be squeezed out to the maximum from between the surfaces by suitable means, and hence the requirement can be met, that the thinner the layer of cementing material and the closer the surfaces are together, the stronger the join. Additional strength, because of the additional intimacy effected, may be given to the work by rubbing the surfaces carrying the liquid solder together; in the same way it is always well to rub the soldering iron, when possible, over the work when it is used, the wetting of the surfaces is then more perfect, and no stripping of the solder is possible when this rubbing is done. In order to obtain a lower melting point in tin solder bismuth, and sometimes cadmium, is added.

The conditions here are very different from those in the case of the brazing of brass and copper, because it happens that all the metals employed in brazing and tinman's solders destroy the character of the steel they are intended to join if they are heated sufficiently with the steel, while they have no corresponding injurious effect when used for brass or copper work.

Soft Solder Advantages

When soft solder is used the thin gauge tubing is not so likely to be spoiled by deteriorating action on the steel, or by being oxidized at the heat necessary for brazing; and, further, on account of the greater liquidity of the soft solder, it will, when properly applied, sink into the small annular space between the lugs, etc., and the tubes more completely than can be expected with the more viscous flux and brazing solder. The reasons that soft solder is not used for such work are, firstly, because the heat of the enameling stoves makes its use risky; and secondly, popular prejudice—a soft soldered frame sounding badly to the untechnical layman.

It is a common habit of workmen and amateurs who have soft soldering to do, to depend on the ordinary bit, when they might use a bunsen or blowpipe. These, in many cases, would heat the work more generally than is possible with the bit, and would allow of the penetration of the solder into the surfaces, and the subsequent squeezing out of the excess of solder.

On the other hand, many forms of soldering bits are now in use, in which a bunsen burner connected with a light flexible tube is employed to heat the bit, and the flame can be conveniently made to heat the work as well. This form of soldering iron has many advantages. One of the best fluxes I have found for ordinary soldering can be easily made by macerating flux skimmings from galvanizing pots with weak hydrochloric acid. On filtering, the solution is ready for use and is an ideal flux, because of the chloride of ammonia present with the chloride of zinc. No iron or lead is dissolved if the acid added is not in excess. Solder is often used in the form of granules or strips of various sizes, and in this form is very convenient for routine work. In the case of spectacle frames or other light articles a large amount of work can be prepared, on each of which a small piece of solder, either in the form of a granule or a strip, is placed with flux on the part to be joined. The articles are then put in a tray, which is afterwards taken to a muffle working at a convenient heat, or in same cases it is sufficient to put the work on a metal plate, heated by a gas flame or even a spirit-lamp. Brass tubes are often made by bending the strip through dies and fixing a wire of suitable composition in the overlap with borax, or the borax may be mixed with finely granulated spelter. On passing the work through a furnace to raise it to a red heat, the spelter runs perfectly and a good join is made. The flux is then dissolved off the work, and the tubes are finished by drawing through dies with or without a mandrel.

Silver Solder Is Best

The best brazing, if it may be properly so termed, is done with silver solder; thus the blading used in turbines is all fixed with silver solder. It is, of course, of the utmost importance that the small pieces used in the construction of turbine motors shall be immovably fixed and cemented in position, on account of the heat and centrifugal strain to which they are subjected. Various silver alloys are used, but they are generally about 60 of silver, 23 of copper and 17 of zinc, the flux used being borax, or borax and carbonate of soda. Such a mixture is remarkably liquid when in the molten state, and on this account penetrates interstices which ordinary brazing spelter would fail to fill.

Brazing Solder—The composition of ordinary brazing solder ranges within wide limits; the analyses of samples I have examined show a variation from 61 to 33 of copper, and 39 to 67 of zinc. The tin may vary from nil to 14 per cent., and the lead from nil to as much as 3 per cent. Any of such metals may be and are used for brazing, in accordance with the character and requirements of the work to be done. The higher the percentage of copper the higher the melting point, and the higher the percentage of tin the lighter the color. We thus have a very large series of alloys available for very varied requirements. The presence of other metals when in small amounts is often of no consequence in the brazing of brass or copper, though obviously in all cases it is very desirable in important work, such as the brazing of high-pressure steam pipes or where great strength is required, that the composition of the brazing metal shall approach as closely as possible to that of the metal to be joined, as only under such conditions can the maximum strength of the joint be obtained, and it is the non-observance of these conditions which has led to disaster. The skill of the workman is often limited to the fluxing of the solder, and seldom extends to an appreciation of its composition.

When, however, we come to brazing iron and steel the importance of purity is very much greater, and I have found the presence of tin in brazing solder intended for bicycle frames to be very injurious. The explanation is probably to be found in the extraordinary deleterious effect of tin on iron and steel. It is well known that **a very small amount of tin scrap, if allowed to get into a bath of molten steel, will make it very red short, and when brazing solder containing as little as 0.5 per cent. of tin is used for brazing bicycle frames I have found that the joints are very unsatisfactory and unsafe.**

An ingenious method of making a brazed joint is by connecting the two parts to be joined with the terminals of a suitable dynamo. On account of the local resistance the two parts become heated, and if suitable brass wire is wrapped round the tube, in the case of a cycle frame, and the whole surrounded with a reducing gas, such as hydrogen or coal gas, a very perfect joint is obtained without any borax or other fluxing medium.

The reducing gas under such conditions will insure the absence of any oxide of iron or other metal used, and no previous cleaning is required. Such a method of joining has the great advantage that there is no borax to remove from the joint. On account of its great hardness this removal of borax is a serious matter, and much money has been spent on experiments to remove it by pickling and other methods. It is best removed by sand-blasting, the whole frame being so treated, leaving an excellent surface, on account of its roughness, for enameling.

Advantages of Liquid Brazing

Liquid Brazing—Several patents have been taken out for details of apparatus in which a bath of brazing spelter has been kept liquid. The parts to be joined are dipped in the molten metal, the metal being prevented from adhering to the parts that have not to be brazed by applying a coating of blacking to them. **The advantage of this method consists in the fact that less metal is used in making the joint, as so little is lost in applying it, and also the heat is general on the joint instead of being local,** and I have no doubt that on routine work the consumption of gas for heating is less than when blowpipes are use, and of course blast is not required.

A modification of brazing is the use of copper in the form of sheet or wire. Under the Simpson patents tools are thus made in which the cutting part is a small piece of high-speed or other steel, while the shank is mild steel or iron. In making, say, a lathe tool by this process, a bar of square mild steel is taken and a channel planed or milled out on it in which a suitable square piece of high-speed steel fits. The two or three sides being clean, strips of copper are fitted in with a special flux, and the whole highly heated to the fusing point of the copper. After welding, the compound tool is cleaned up and treated for hardening and tempering in the ordinary way. There are some features about this process of building up tools which seem to have considerable merit. First, if ordinary brazing were used, the hardening of many tools implies such a temperature as would often destroy an ordinary brazed point. The zinc would possibly be volatilized, which is not the case when copper alone is used, the temperature of fusion of the copper being so much higher. Secondly, it is conceivable that the weld would be considerably stronger than with an alloy of zinc, because while copper alloys to a considerable extent with iron, the same cannot be said of zinc, which therefore, under the circumstances, would become a deteriorating element. Thirdly, the saving of expensive material, such as alloy steel, must be considerable in the case of heavy machine tools, as only a small portion of metal is ever in actual use. In a sense, therefore, the shank becomes a tool-holder without the disadvantages of the latter in respect to unsteadiness, difficulty of setting, etc. The process lends itself to many interesting applications; thus milling cutters may be made having a core of mild steel instead of tool steel. Hardening and tempering such cutters is a source of much difficulty and loss through distortion and cracking, and if the compound cutters can be so produced the possible economy should be considerable. There is no doubt as to the perfection of the joint, as I have seen pieces of steel joined by the process, which, on splitting, did not part at the weld.

A process has been invented by F. Pich, Berlin, for the hard brazing of cast iron in a smith's hearth. **The patent consists in the decarburization during brazing of the cast iron surfaces to be united, and in bringing at the same time the molten brass solder into close contact with the cast iron surfaces which are decarburized, but without exposure to the air.** For the decarburization of the surfaces copper oxide is used, which is mixed with borax, as a flux, until it has the consistency of a paste. This is applied to the surfaces to be joined, which must first be carefully cleaned. The cast iron pieces are then firmly tied together with wire and heated. The borax first melts, protecting the surfaces from oxidation, and taking up any oxide that may be still clinging to them. It also precludes the attacking of the copper oxide by the oxygen of the air. As the heating proceeds the copper oxide fuses and gives up to the now red-hot surfaces its oxygen, which combines with the graphite of the cast iron forming carbon monoxide and dioxide, while the metallic copper is set free in a very finely divided state. This alloys with the brass solder as it melts when strewn on, and the new alloy combines with the decarburized iron of the surfaces which it is desired to join.

Specimens of cast iron united by this method were prepared and subjected to tensile and breaking tests, and the summary of all the results shows that when the brazing of cast iron pieces is carefully performed according to the details given by Pich, the strength of the pieces so joined is virtually equal to that of the solid material.

Aluminum Soldering Difficulties

As is well known, numerous patents have been taken out, and numerous mysterious mixtures have been advertised for the so-called soldering of aluminum. In nearly every case the result is that, while fairly satisfactory for a short time, the join failed after a time, varying from a few days to some months. One of the most severe tests to which such joins in aluminum can be subjected is that of warm steam. Joins which look well and are apparently mechanically strong, fail rapidly when submitted to this test. In all soldering, it is obvious that the flux used must efficiently clean the surfaces of the metals to be joined, otherwise no alloying of the solder used with the surfaces is possible. In the case of aluminum very few materials adapted for such fluxes are available, the requirement being that they shall absorb oxide of aluminum. Another detail of importance is the great heat conducting of the metal. **A consideration of the results obtained with all the so-called solders of aluminum shows that the metal is so susceptible to electrical action and oxidation that the use of any metal in which aluminum itself does not preponderate is hopeless. The best results have invariably been obtained when the solder was of the same composition as the material to be joined.** This condition involves the principle of autogenous soldering, which will be subsequently dealt with.

The best flux used is a mixture of alkaline aluminum chloride, with the addition of fluorides, such as potassium fluoride or calcium fluoride. When these are mixed in suitable proportions and damped with alcohol, and heated on a strip of aluminum, the surface of the metal is cleaned perfectly. It therefore follows that if two surfaces of aluminum are so cleaned, and an alloy containing a high percentage of aluminum, with such addition of other melted metal as will reduce its melting point slightly below that of pure aluminum, applied with the flux named, that a very satisfactory join will be obtained. The heat such as from a spirit-lamp or bunsen burner must, however, be applied from below the work. I have seen such joins made over a spirit-lamp which stood every test, including that of the steam test.

Difficulties arise from the presence of high percentages of aluminum in alloys in connection with soft soldering. These may be largely overcome by coating them electrically with copper. The following directions for soft soldering their alloys, containing from 5 to 10 per cent. of aluminum, have been issued by an electric smelting company:

"Cleanse well from dirt and grease. Then place the part to be soldered in a strong solution of sulphate of copper, and place in the bath a rod of soft iron, touching the parts to be joined. After a while a copper-like surface will be seen on the metal; remove from the bath, rinse quite clean and brighten the surfaces. The surfaces can then be tinned in the ordinary way."

Autogenous Welding System

The second method of joining metals referred to is that of autogenous fusion or running liquid metal of similar character on to the surfaces to be joined, and in its simplest form is very old. It is illustrated in the case of repairing broken rolls and in lead-burning. It has been a practice for the broken surfaces of rolls to be cut away to give room for the new metal. The whole roll is then heated and hottest possible metal run into the intervening space, with suitable headers to allow of escaping gases.

The application of autogenous welding by acetylene, hydrogen, benzol, petrol or other hydrocarbon vapor to commercial purposes has extended enormously during the past few years, and constructions and work are now possible by the use of such methods, which could not be carried out by any other means; thus repair work of ferrous and non-ferrous metals is now done in every town of importance, and tubes of all sizes are made on a very large scale. For branch pipe construction the process is quite unrivaled. For high-pressure steam pipes the joints after screwing are often welded up, and metal vessels, instead of being made with folded joints, are now made with the blowpipe more cheaply and far more efficiently. Lead burning forms an excellent practice for acetylene welding, as it is fusion welding in the simplest form. It is usually carried out with hydrogen and air, and if the workman can make a good joint with and without a stick of lead, it is a very easy step for him to advance to making one of aluminum or steel, or any metal.

In practice a proportion of four volumes of acetylene to five of oxygen gives much better results than the theoretical two volumes of acetylene to five of oxygen. So important is this detail that blowpipes are now generally constructed to consistently maintain a reducing flame. Such a blowpipe is that of the Drager-Greishiem. In this blowpipe the automatic reducing valves on the cylinders are fitted with gauges, which, instead of being graduated to pressure, are marked with the thickness of the material to be welded. All, therefore, that is necessary is for the workman to adjust the springs on both regulators, so that both gases indicate the same thickness. A simple mechanical mixture is arranged on the blowpipe, making the whole apparatus very practical and convenient.

Characteristic Oxy-Acetylene Flame

A characteristic of the oxy-acetylene flame is that it indicates the correct mixture, for when the acetylene is in excess a small green cap appears over the inner cone of the flame. On reducing the oxygen there is a point at which the cap disappears. The right mixture is just at this point, and the effect is so distinct that when working with acetylene the workman has no excuse for not getting the right proportion.

If temperature were the only consideration, the oxy-acetylene process would be used in all cases in the working of thin metal, but its use requires much greater skill than the lower heat of the oxy-hydrogen flame. Then again, when a fixed acetylene generator is not available, the risk and danger of a portable generator is considerable, and in such cases for oxy-acetylene welding dissolved acetylene only should be used. On the other hand, this is very expensive and the apparatus is heavy, and it therefore follows that the oxy-hydrogen method with its complete portability is very often to be preferred, because hydrogen can be obtained in the usual bottles, and thus forms very convenient plant.

In welding metals other than iron, not only the melting point but the heat conductivity of the metal must be considered. Thus copper, with its high conductivity and its low melting point, can hardly be worked with the oxy-hydrogen flame. Indeed, for the same section as iron it requires a much more powerful oxy-acetylene flame. Brass, bronze, and indeed any metal, may be autogenously welded, and many require much less care than that for aluminium.

The conditions of success which apply to all welding with acetylene or other hydrocarbons are: 1, the use of pure gases; 2, the use of a metal rod of approximately the same composition as that of the work to be joined; 3, the thorough fusion of the inside surfaces before the additional metal is applied; 4, cleanliness of the parts, and when desirable the use of suitable dioxidizing and fluxing powders, such as charcoal and borax, and lastly, the use of a blowpipe capable of complete control in respect to size of flame and proportion of mixture. With extended experience in the autogenous joining of non-ferrous metals, it is to be expected that this method will replace ordinary brazing where quality of work is of the first importance.

It should be noticed that in consequence of the highly local heating action of acetylene, contraction strains are likely to be set up, which may be more serious than those occasioned when the whole work is heated and welded up in the smith's fire in the ordinary way. In the case of cast iron it is very desirable that such strains should be avoided by making the weld first and then reheating the mass as much as possible, and cooling slowly. With respect to steel, it has been repeatedly shown that an acetylene or electric weld should not be hammered while the weld is being made. It is well known that cracks are likely to be made by hammering the metal at a black heat, a temperature occurring quite close to the point of fusion. The work, therefore, should be allowed to cool slowly and then raised to a high temperature in the ordinary way and not by the blowpipe; the weld can in this way be much improved both in shape and strength. A good fusion weld very seldom breaks at the point of welding—indicating, therefore, that this point is stronger than the neighboring metal. I believe this is the explanation of the paradoxical effect noticed with fusion welding, that thick sections never give as high a tensile strength as thin.

Thus 1-6-inch 3 per cent. nicked steel strips gave 97 per cent. strength, 1-4-inch gave 90 per cent., while 1-inch bars broke at 60 per cent. to 70 per cent., with the fracture clear of the weld every time. Again, welded 1-2-inch copper rods drawn down to 3-8 inch in the ordinary way gave regularly 95 to 97 per cent. as compared with the original drawn rod.

Reducing Power of Aluminum

There is an interesting series of processes for the autogenous joining of metals, most of which are patented, which depend on the reducing power of aluminium. Anyone who has seen the application of the Goldschmidt or Thermit process to the joining of the ends of street car rails can hardly fail to be struck by its extreme beauty and simplicity. We have here a small steel foundry not much larger than a silk hat, from which the metal pours in a perfectly liquid state.

As showing the great heat obtainable when aluminium powder is used for welding, it may be mentioned that if a wrought-iron plate 1 inch thick is placed under the crucible, the liquid metal when tapped will burn a hole straight through it, leaving a fairly smooth edge. Experiments show that the heat of the molten metal approaches 3,000 degrees C., the temperature of the Siemens furnace being about 1600 degrees C.

This Thermit process has been applied for the repair of ship's sternposts and other large fractures, and means have been adopted for heating up the fracture surfaces to the proper temperature before pouring in the cementing iron without damaging the clean metallic surfaces. This is done by building up the moulding-box around the fracture in such a way that it may act as a flue or chimney to an outside fire worked with a compressed air-blast, which dries the sand mould and heats up the metal very rapidly. The presence of even a small trace of moisture in the mould gives rise to blowholes in the thermite iron, hence great care must be taken that the mould is as dry as possible. The repair of the sternpost of the German Lloyd steamer *Friedrich der Grosse* was effected in this way.

The only doubtful point in the process is the possible formation of internal fractures or cracks, but it is stated that in all the tests of the results fracture has invariably taken place outside the welding region.

It is very probable that in point of strength most thermite welds are superior to those electrically made, because the volume of heat is greater if not more intense, and, again, there is less risk of the original surfaces being burnt or oxidized. The thermite metal can also be adjusted to carry reducing media, which would quite eliminate any oxidizing influences.

Some Methods of Electric Welding

A third system of autogenous welding is the electric, of which two methods are in use, namely, arc welding and resistance welding.

Arc welding is applied for repairing breakages and filling up flaws in castings, while resistance welding is rapidly being adopted for the working up of metal articles, and it is common to find electric plant in operation for sheet-iron working. Two forms of machines are on the market for this purpose, one known as the spot-welding machine and another for butt-welding. In the spot-welding machine the sheets are joined at spots instead of rivets, hence the name. The electrodes are shaped in accordance with the work to be done, and are put on to the work by pressure effected by a foot-lever, and the current, which is automatically switched on at low potential, welds the parts together at that point. After removing the foot-lever the work can be moved along for welding at a new point.

The entire process is so rapid that an unskilled workman is able to make 1,000 welds per hour on plain sheets, while in the same time an experienced hand could hardly put together a quarter as many rivets. The up-and-down movement of the upper electrode may be performed automatically by means of a motor electrically worked. The electrode then falls and rises at regular adjustable intervals, and the workman only has to move the pieces of work.

This machine may also be applied on water-tight welding. In this case the travel of the work takes place slowly, so that the points of welding lie close together, forming an unbroken seam. The edges of the sheets are completely softened and are pressed together seamlessly. Similarly, when the sheets are not too thick, and irregular shaped sections do not have to be dealt with, the spot-welding machine makes a very satisfactory weld. Thus wheel rims for cycles and motor cars can be joined perfectly by its means, while the advantage of this system for welding handles on covers, or for welding rings on cooking utensils, etc., are conspicuous. In the same way half-stampings, such as kettle spouts, make up to a very satisfactory job with seamless welding.

The last system of joining metals to which I desire to direct attention is the one in which the surfaces are not melted, but only slightly heated.

During recent years the manufacture of compound metals, such as nickel and steel, copper and steel, aluminum and copper, has become of great practical importance, and many beautiful articles are now sold for domestic purposes. The nickel steel, copper steel or nickeled zinc sheets may be obviously produced electrolytically and afterwards rolled down to gauge, allowance being of course made for the ductility of the softer metal. But another method has lately been introduced in which sheets of different metals may be joined perfectly.

The manufacture of aluminium copper sheets illustrates the process, and further is interesting from a metallurgical standpoint. One method with which I am familiar is as follows: **The copper sheet is pickled and cleaned. Aluminium powder is then brushed on by machinery, or by rubbing the surfaces with brushes or rollers of aluminum wire. A sheet of cleaned aluminium is then placed on such a surface, the two are heated and passed through rolls. The union is perfect, and hence the compound sheet may be subjected to stamping, spinning, etc., without any trace of lamination.**

In the same way copper and steel, or almost any two or any number of sheets of different metals, may be compounded. The aluminium acts as a metallic adhesive. While rolling such sheets the top surfaces are often kept oiled to retard oxidation and to obtain better finish.

A second method of making a compound sheet of different metals is that in which an oxide or sulphide of a metal which will alloy with both of the two sheets is taken and mixed with aluminium powder, and the mixture laid evenly between them. The whole is then heated to the fluxing point of the mixture and then rolled, and as the two sheets to be joined receive the full heat of the furnace in which the work is placed, it will be understood that the alloying of the metal from the mixture with the two surfaces of the sheets is very complete.

In another method, where still more heat is used, for the production of compound plate, say, of aluminium and copper, copper or other wire gauze is placed between the sheets and the interstices filled as before with aluminium powder and flux, consisting of alkaline, chloride and fluoride.

On heating the whole and rolling, the surfaces unite as before described, and probably more perfectly, because the gauze retains the flux better during the heating, and so does its work better, and is afterwards squeezed out by the rolls, while in addition there would also be the knitting or dowelling action of the gauze during rolling, which would further tend to hold the sheets together.

The use of such wire gauze would seem to be applicable to certain conditions of brazing, especially when the greatest care is necessary to produce the highest quality of work, such, for instance, as the brazing of steam pipes, to which allusion has already been made.

Factors in Carburetion of Various Automobile Fuels

From a paper by E. J. Stoddard in the September Bulletin of the Society of Automobile Engineers.

I WILL try to digest the important facts relating to carburetion as follows:

By way of laying a foundation for and illustrating what I wish to present for your consideration let us look at our materials in the first place. For our purpose we may say that air is a mixture of

	Oxygen.	Nitrogen.
By volume........	20.81 per cent.	79.19 per cent.
By weight........	23.10 per cent.	76.90 per cent.

We may neglect the other gases as inconsiderable.

But we think the amount of water vapor in the air does make a difference. It has been said that the engine acts quite differently on a rainy day. If the temperature is 62 degrees a cubic foot of air should weigh .0761 and a cubic foot of saturated air .075581. That is, the air is a little over .7 of a per cent. heavier than the mixture. I have figured that only .0119, or a little over 1 per cent. of the air would be displaced. Even with the air at 82 degrees it would be only $\frac{.0733}{.072267} = 1.014 +$, a little over one and four-tenths per cent. heavier than the saturated mixture, and only about .0236 + or a little over 2 per cent. of the air would be displaced.

Gasoline is said to be a mixture of the lighter distillates of petroleum, mainly of the methane or paraffine series, having the general chemical formula C_nH_{2n+c}. The following table contains data relative to some of the liquid distillates from Pennsylvania petroleum, compiled from the books of Redwood and Crew on petroleum.

Name	Chemical Formula	Per Cent. of Carbon	Per Cent. Hydrogen	Boiling Point, F.	Specific Gravity	Vapor Density	
		12064	10365	87			
Pentane ..	C_5H_{12}	83.20	16.71	100	.64	2.538	22430
		9984	60156	143			
Hexane ...	C_6H_{14}	83.68	16.32	158	.676	3.053	159996 air
				165			
Heptane ..	C_7H_{16}	83.90	16.04	210	.718	3.547	
		12204	9820	247			
Octane ...	C_8H_{18}	84.17	15.83	255	.737	3.992	22025
Nonane ...	C_9H_{20}			303	.756	4.8	14792 air

If we assume that the liquid is a mixture of the above-named substances, there is still a good deal of room for variation in the proportions. If we take the heat value of its constituent parts, and my figures are correct, pentane would have a value of 22,430 B.T.U. per pound and octane 22,025, not a very great difference. When we come to figure the quantity of air required, there is apparently a greater difference, 16 pounds of air being required for pentane and 14.79 for octane.

It is desirable in testing carbureters to draw a charge of the mixture from the intake pipe and find out of what it is composed. I have tried taking a given volume of mixture and dissolving out the hydrocarbon with olive oil, noting the diminution of volume. I have not had satisfactory results so far, perhaps because of imperfect apparatus. I believe the chemists use alcohol to dissolve out the heavy hydrocarbons, afterward removing the alcohol vapor with water (Hempel's Gas Analysis). If gasoline vapor is three times as heavy as air, we may estimate roughly the relative volumes of gasoline vapor and air in a 16 to 1 mixture as $\frac{13 \times 1/3}{46 \times 13} = \frac{1}{16 \times 3} = \frac{1}{48}$, or about 2 per cent. Now I think we would want to distinguish a one-tenth variation anyway, and therefore with this method, if it worked perfectly, we would want to distinguish clearly a variation of one-fifth per cent., a fineness of measurement that makes me distrust it. I have thought we might measure the degree of saturation thus: Suppose we put some pure air into a receptacle, introduce sufficient gasoline to saturate it with vapor, and note that the water column rises and stops at 60 inches of water. We know that this is the saturation pressure. Now if we put into a similar vessel the mixture to be estimated and then introduce gasoline as before and note that the water column now rises to 44 degrees instead of 60 we would think that the mixture was $\frac{60 - 44}{60} = \frac{4}{15}$ saturated. It would seem that this was somewhat more hopeful. Now suppose we take a cubic foot of gas from the intake pipe during the operation of the engine. This might weigh .0777 pound and one-sixteenth of it would be about .00486 of a pound. If we take 22,000 B.T.U. as the heat value of gasoline, $22{,}000 \times .00486 = 106.92$ B.T.U., a value that could be easily read to a small fraction of a per cent. Even a much smaller quantity of mixture might be taken. For instance, a gallon, 231 cubic inches, which would contain about 14 B.T.U., is sufficiently large to measure. It seems to me that by this latter method the quantity of gasoline in any mixture may be measured with sufficient accuracy.

Multiple Series Connection Makes Batteries Last; What Is the Cause of Tire Wear? Best Flux for Cast Iron; How to Put on Hub Caps; Curing Squeaky Springs; What to Do When Entering Canada

Shape of Typical Curve

EDITOR THE AUTOMOBILE:—What should be the shape of a horsepower curve? Recently in some brake tests that I made upon a motor upon which I have been experimenting I got a series of results which gave me almost a straight line. Is this correct? Will THE AUTOMOBILE publish a curve which has been reached through actual brake tests on a well-known motor. Such a curve should show at what speed the power falls off when the revolutions per minute get too high.

New York City. INVESTIGATOR.

—This curve for the Packard 48 motor is reproduced at Fig. 1. It shows how the power increases on a straight line practically from 300 to 1,200 revolutions per minute. That means that the power is increasing directly at the motor speed. Above this point the power does not increase as rapidly as does the motor speed and the curve begins to flatten until at 1,700 revolutions per minute it starts to fall off.

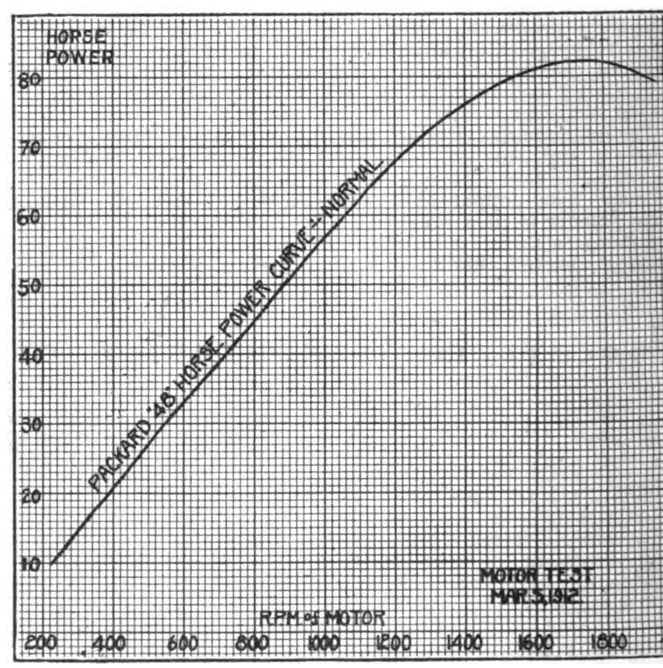


Fig. 1—Characteristic horsepower curve as result of tests on Packard 48 motor

Recommends Multiple-Series

Editor THE AUTOMOBILE:—On page 587 of your September 19 issue you answered a question of C. W. Cauthorn's relative to the number of dry cells to use with a Splitdorf coil. As you have stated, this coil is designed to operate on about 6 volts and therefore not more than five new cells connected in series should be used on it.

I would like to call Mr. Cauthorn's attention to a characteristic of dry cells, which, if taken advantage of, will save him a good deal of money in renewals. It is generally known that if a dry battery is allowed to stand idle for a few hours after hard usage it will "pick up" or "recuperate" to nearly the same current value that it had before. The reason for this is purely chemical—certain reactions within the cell requiring some time to take place. If this time is not allowed, much of the possible service from the battery will be lost. Upon this depends the fact that two sets of cells connected in multiple, as shown in Fig. 5, will give considerably more than twice the service of one set, and three sets so connected, as shown in Fig. 5, will last nearly five times as long as one set.

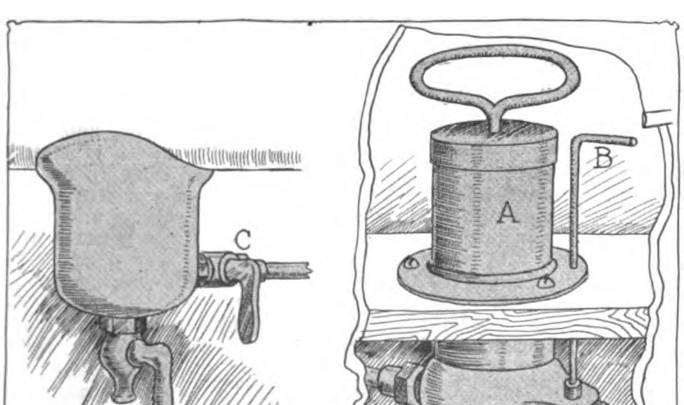


Fig. 2—Oil shut off cocks and auxiliary hand oil pump on the Hudson car

Actual service tests have shown that if one set of five cells in series will run a car approximately 500 miles, two such sets connected in multiple will operate it 1,400 miles and three sets 2,400 miles.

It is obvious then that besides being more reliable, considerable money can be saved by using three sets of cells connected in series-multiple at a time. The gain with four sets is not so marked, and the additional space they take up argues against the use of more than three sets. These can be bought packed in a case with the connections made and spaces filled with waterproofing compound, if desired, at a slightly advanced price.

Cleveland, O. V. A. CLARKE.

What Causes Tires to Wear

Editor THE AUTOMOBILE:—Has any one ever compiled data on the causes of tire casing wear? I think it would be interesting to know why the average tire wears out. Is it due to the negligence of the owner or is it due to the normal wear and tear encountered on an ordinary tour? Can THE AUTOMOBILE tell us anything regarding this important and interesting matter?

New York City. OSCAR TROUTE.

—There have been several independent investigations regarding this matter made by different authorities, but the results have varied considerably owing to the difficulties in obtaining detailed information from a large number of individual casings and tubes. Taking an average of some compilations which have been recently made, it is shown that the percentage of tires that had passed their period of usefulness through normal wear was not in excess of forty for the casings or tubes. This means that 60 per cent. of all the tires have been consigned to the scrap heap because they have suffered neglect or damages which need not have been encountered in ordinary work. It is a fact that many casings have deteriorated to a marked extent before they are ever placed upon the rim. This may be either due to the carelessness of the dealer who handled the tire or the owner who did not take the pains to keep the rubber away from the destructive effects of heat, light, oil and all other agencies to which the tire is susceptible. Taking casing trouble as being the greatest bother to automobilists that now exists, the following percentage table was given some time ago by an authority:

Normal wear	36.0 per cent.
Perforation by nails, etc.	26.5 " "
Under inflation	16.5 " "
Small cuts	5.8 " "
Layers destroyed	5.6 " "
Damaged by oil	3.8 " "
Rusty and dented rims	3.8 " "
Sudden breaking	1.5 " "
Shifting on rim	1.5 " "

This does not take into consideration the factor of overload which the experts of the tire factories state is responsible for the early demise of so many of the tires. That this factor of overloading is important is evidenced by the fact that many of the tire companies have brought out oversize models which fit the regular rims, thus giving a tire that will wear for a considerably longer period. In buying the oversize tires the consumer should use judgment as they are higher in first cost and should the tires he is using on his car regularly be of sufficient size to give satisfaction it is to be doubted if the oversize will make up in additional mileage for the added cost. Many cars of late have been overtired by their makers for the purpose of cutting down on tire trouble for the consumer. On these cars there is no necessity of buying larger tires.

The way for the owner to get the best service from his tires is to weigh the car and then get tires which are recommended by the tire makers for a car of that weight. The practice of weighing the front and rear axle loads is a good one for then the

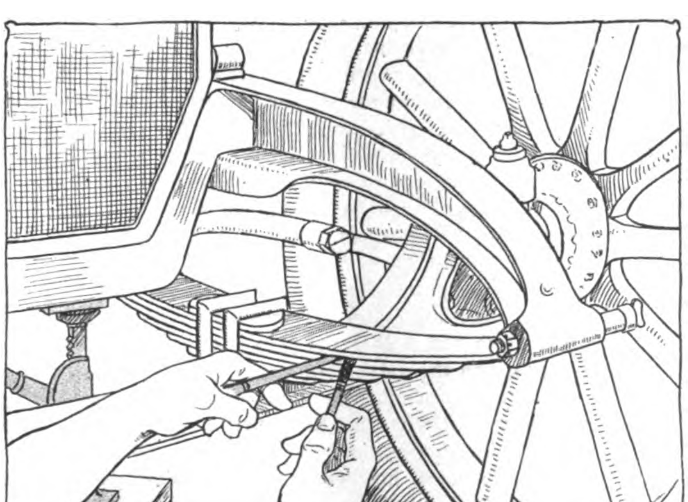


Fig. 4—Showing how to get at the springs of a car to insert graphite

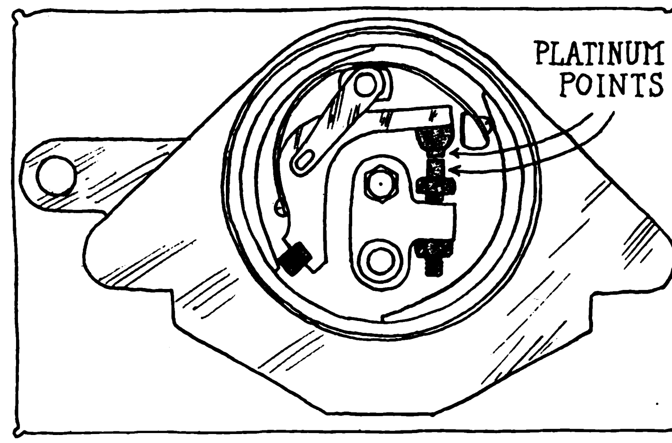


Fig. 3—Breaker box mechanism of the Bosch, showing adjustment points

tire could be designed for the axle carrying the greater load. The practice of taking tires of different sizes for the front and rear axles is not a good one because it is then necessary to carry two complete sets of extra casings when on a tour. Besides the trouble with the carrying of the extra shoes there would be the necessity of having spare tubes for each tire.

Easy Way to Break Hub Caps

Editor THE AUTOMOBILE:—The hub caps on my Hupmobile runabout cost 80 cents apiece. They are light stampings and are very easily breakable by any method whatsoever, but I believe I have discovered the quickest way to run up a fairly good-sized bill for these caps alone. Twice I have attempted to tighten a cap which had a habit of dropping off, so that it would not do so again. I found that owing to the peculiar shape of the cap I could get a good grip on it with my wrench by slipping the latter over the outside flange Fig. 7. A very small amount of pressure exerted this way was sufficient to break the cap. In putting on these caps one should be particular to put the wrench on the nut part of the cap and tighten at this point. Too great a pressure applied at the nut will shear this off also, it must be remembered, and when a hub cap exhibits a tendency to drop off frequently, it should be examined to see if there is not some end thrust upon it which develops this tendency.

New York City. HUPOWNER.

Requirements for Entering Canada

Editor THE AUTOMOBILE:—I am going to take a short trip into Canada. Is it necessary to pay duty when going through the lines or can I make some agreement as to the fact that I am to return within a period of a month bringing the car with me, of course. I know that some such arrangement can be made while taking a car abroad and I would like to know if I am compelled to spend a large sum of money for customs duty in going into Canada.

Malone, N. Y. CHESTER WILKE.

—Automobiles not manufactured in Canada may be admitted under bond or cash deposit for a period of 90 days. This is provided that the owner accompanies the machine and that the owner is not engaged in any automobile business or that the car is not to be used in any business undertaking of any nature during the time that it is within the country. The requirements are as follows:

(a) The automobile shall be reported on form approved in duplicate at the Customs House at the port of importation where a careful examination and appraisal will be made.

(b) An invoice showing the selling price of the automobile will be produced (when practicable) as an aid to the customs collector in determining the value of the machine.

(c) Upon receiving a cash deposit of $25 and a bond executed in Canada in approved form for double the estimated duties,

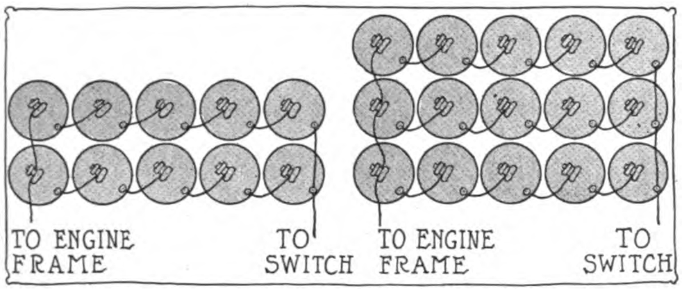


Fig. 5—Battery sets recommended for long endurance by Cleveland man

conditional for the due exportation of the automobile covered thereby within three months of the date of the bond, the collector may grant a permit accordingly (to be indorsed on the duplicate report) for the use of the automobile in Canada for touring purposes.

(d) The bond shall be signed by the importer and by two residents of Canada; or by the importer and by a resident of Canada who has deposited with the collector of the port of entry the general guarantee of an incorporated guarantee company authorized to do business in Canada, and which guarantee is then available as a security in the case; provided:

That the special bond of an incorporated guarantee company authorized to do business in Canada may also be accepted, in a proved form, instead of the bond first herein mentioned, and that the cash deposit of $25 may be dispensed with in any case covered by a special or general guarantee bond.

(e) The bond shall be filed by the collector with the tourist report attached, and the duplicate report shall be handed to the tourist with permit and receipt for deposit indorsed thereon.

(f) The deposit shall be subject to refund by the collector upon return of the permit with proof of the exportation of the automobile within three months of the date of bond. In default of the exportation of the automobile with proof of such exportation to the satisfaction of the collector within three months of the date of importation, the deposit is to be entered as customs duty and the provisions of the bond enforced.

Registration, license tags, temporary importation papers, bonds, etc., can be secured in advance through the Secretary's office so that the tourist will have everything necessary to pass into and tour Canada before he leaves his home city.

Tourists who wish to enter Canada for a period of not more than 7 days can obtain a Customs card at the Customs House at the port of entry and thus avoid the usual Customs formalities. They are not permitted to go beyond the limits of the port of entry and must return to the United States through the same port and must be known to the Customs Collector.

Some Points on Hudson Car

Editor THE AUTOMOBILE:—I am driving a Hudson 33 roadster, 1912, which I have recently purchased second-hand. There are several points about the car which are not clear to me and as I am not a mechanic I do not wish to take anything apart that I am apt to have trouble in putting together again. Among the details with which I am not familiar are the adjustments which are necessary from time to time in the valve and ignition systems and also the lubricating system which includes the use of an auxiliary hand pump which I believe is for the purpose of helping out the regular supply of oil should the car be subjected to hard work as in climbing steep, long hills, etc. Would you please touch a few of the salient features which it is necessary that I understand and tell me how the systems I have mentioned above operate?

New York City. NEW OWNER.

—The adjustments which have to be made on a motor car, even from time to time, are very few. Many cars are run throughout a season without a single change of adjustment in any parts. Regarding your specific inquiries regarding the changes of adjustment necessary in the valve and ignition system, however, a few remarks may be made which will tend to show when these changes are necessary and how to make them.

Taking the valves first, there are two points of wear on a valve. One is where the valve stem strikes the tappet, or, in other words, the bottom of the valve stem and the other is at the point where the valve seats. The wear at these two points is due to different causes, one being the wear of service, while the other is what may be called a deliberate wear. The bottom of the valve stem wears slowly because it continually strikes the tappet in performing the functions for which it is designed. When traveling at high speed, especially if the cam is somewhat square in shape, the movement of the stem takes the form of a sharp blow. In spite of the hard and excellent metal of which the stem is made it will wear away under these repeated blows in the same way that granite will wear away beneath

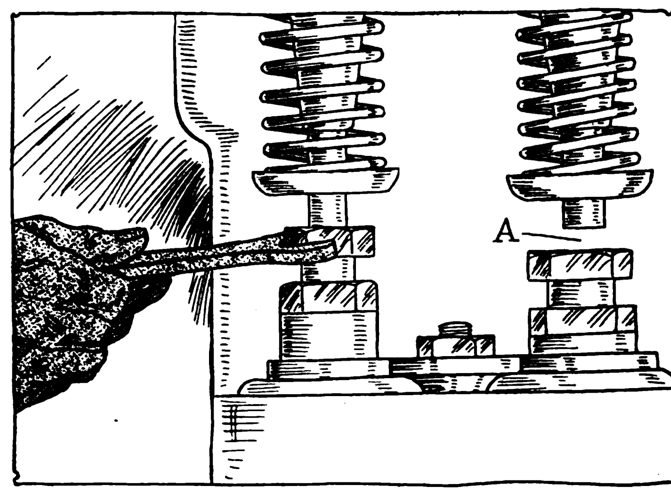


Fig. 6—Method of adjusting tappets on the Hudson 33 roadster model

the repeated drops of water. The wear on the valve at the seat is caused by an entirely different matter. After being subjected to the heat of combustion for a long time the metal around the flame-swept seat will become pitted. It is necessary to grind away the metal of the valve in doing this. Both these sources of wear will tend to equalize each other. As the valves and seat are ground away it will allow the stem to drop lower, while the wear on the stem itself will shorten this part of the valve and equalize the drop due to grinding. Should grinding be necessary very freqnently, or should the stem not wear away rapidly on account of the exceptionally hard metal of which it is composed, the valve stems will need adjustment. On nearly every car made this adjustment is regulated by a nut on the tappet or valve stem. As shown in Fig. 6, a turn of the wrench will make the required adjustment. The motor should be turned over until the valve is entirely down. This can be determined by watching the bottom of the valve stem while the crank is slowly turned until the space at A, Fig. 6, on the valve to be adjusted, is a maximum. The nut should then be turned until the space at A is about .002 inch, or the thickness of a sheet of paper. This adjustment must be made when the motor is cold as the space is only left for the purpose of allowing the valve stem to have room to expand when the motor becomes warm. A good way to test the space is to slip a sheet of thin paper in the space between the tappet and the valve stem and then tighten up on the nut until the paper is just pinched. Then back off the nut a little so it is possible to just withdraw the paper.

Regarding the ignition system, the less you touch it the better. There is one point, however, in the breaker box mechanism that will perhaps require adjustment occasionally. This is shown in Fig. 3, which is a sketch of the breaker box. You will notice on the flywheel of your car a line drawn on the rim with the letters MAG. marked upon it. When this point on the flywheel registers with the pointer on the rear of the motor, the two platinum points should be separating. If the points break too late or too soon, loosen the setscrew on the magneto coupling and turn the magneto shaft by hand until the points are just breaking when the flywheel is in the proper position. Be sure that the order of the spark-plugs is not disarranged. The Hudson car fires in the order 1, 3, 4, 2 counting from the front end of the motor. Batteries are used for starting and these should be tested with a voltmeter occasionally. Six volts is required to adequately meet the needs of the ignition system, while below 4 volts the latter will become inoperative. Another point in regard to the platinum points in the breaker box which should receive attention every few months is that the magneto key furnished with the car should be used to gauge the distance between the points. These should separate the distance indicated by this gauge. As will be noted in the illustration the contact points are fitted with means of adjustment.

The oiling system of the car is not hard to understand. The chain oil supply is carried in the crankcase, while the auxiliary supply is in the tank mounted on the rear of the roadster. The oil is pumped from the crankcase reservoir to a trough-like formation in the crankcase casting. One of these troughs is located beneath each cylinder and as the connecting-rod reaches the bottom of the stroke it plunges into the trough and throws the oil up into the cylinder lubricating them thoroughly besides also sending a spray of oil to the camshaft and other bearings. The pump of which you speak sends an extra supply of oil to the crankcase reservoir to take care of a shortage in supply here or to replenish the supply in case more oil is necessary for heavy work, such as hill-climbing. A is the body of the pump in Fig.

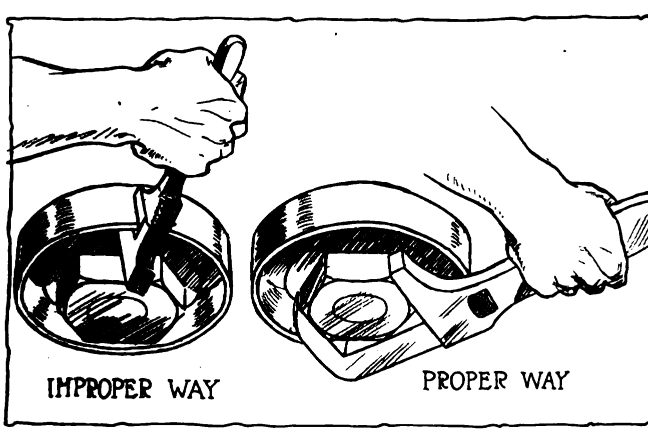


Fig. 7—Two ways of tightening a hub cap with a wrench—bad and good

2 and it is actuated by the handle above it. B is the handle for shutting off the supply from the oil tank. On the bottom of the tank at D is the oil drain, while C is the shut-off from the oil tank to the hand pump.

New Gear Causes Bad Knock

Editor THE AUTOMOBILE:—After having an exhaust cam gear put in my machine, a very bad knock has developed which cannot be stopped by advancing or retarding the spark. While the engine is running idle there is a slight knock which stops instantly if pressure is applied to the shaft which runs magneto and water pump. This seems to indicate that there is play somewhere in timing gears. The exhaust cam gear meshes with magneto gear. When pulling the slightest load there is a very bad knocking and also loss of power. Do you think by putting a new magneto gear in, that it will stop knocking? Or, if not, can you help me in any way to remedy my difficulties?

Garthersburg, Mo. D. B. DIAMOND.

—The trouble is that the two gears do not mesh correctly. The teeth of the two gears should come together as in Fig. 8 while they are probably in bad mesh as shown in Fig. 8. Every time the motor speed changes the two gears which do not properly mesh together come against each other with a sharp impact that is sufficient to produce a heavy rapping sound. This is also the cause of the loss of power. The valve timing will change at every change in relationship between the gear on the end of the crankshaft and the new camshaft gear. At times the valves will not close soon enough and a loss of compression will ensue. A new timing gear that fits will cure the trouble by taking up the lost motion.

Eliminating Bad Spring Squeak

Editor THE AUTOMOBILE:—For some time the left front spring on my car has troubled me by keeping up a continued squeak when traveling over any road that is not as smooth as new asphalt. I have kept the shackles well greased and yet that does not seem to do any good as the noise still continues. I have come to the conclusion that the noise comes from between the leaves of the spring and would like to know if this could possibly be so and how to cure it if it is.

New Haven, Conn. WALTER AMES.

—The answer to the question is simply lubrication. Good graphite, which can be secured from any of the supply houses, is the best lubricant for springs because it will stay in place and will not require renewal for a long time. The method of inserting the graphite between the leaves will be seen in Fig. 4. The car is jacked up under the front member of the frame so that all the weight is taken from the springs. The leaves will then have a tendency to separate. A chisel or any solid piece of metal may be used to still further pry the leaves apart while they are painted with the graphite. If the spring seems to be in rather bad condition it would be well to take it off the clips and remove all but the top leaf, which is held in place by the shackles. These can be left undisturbed as it will be simple to clean this leaf while it is still on the car. Clean the leaves thoroughly with kerosene and then wipe them dry. After this coat them quickly with graphite and reassemble them. This will take the squeak out of the spring and leave it in perfect condition. The springs require this treatment once a season and if it is done in the fall, before the car is put up for the winter, the squeaks which often issue from the springs when the car is taken out for the next summer's season will not be present.

Soldering Cast Iron

Editor THE AUTOMOBILE:—Would you please tell me if there is a flux that is suitable for use with cast iron, such as the waterjacket of a cylinder?

Masontown, Pa. CLARENCE KOEPFE.

—If you have a cracked waterjacket it would be much more satisfactory to take this to a welding company and have a good, careful job done upon it than to trust to simple soldering work. A flux which can be used to solder the waterjacket of a cast-iron cylinder is cut muriatic acid, that is, hydrochloric acid in which zinc has been dissolved. For tinning, use four parts of sal ammoniac solution in water and one part of hot hydrochloric acid. The action can be improved somewhat by sprinkling a little powdered sal ammoniac on the surface. When the welding is done by the oxy-acetylene process a good clean job that you rely upon will result. With the soldering job the chances are that it will start to leak again in a short time.

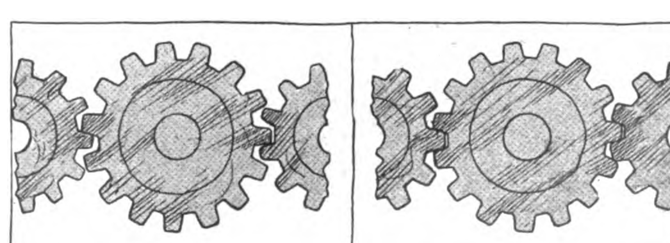


Fig. 8—Showing the cause of a knock in the timing gears, also proper mesh

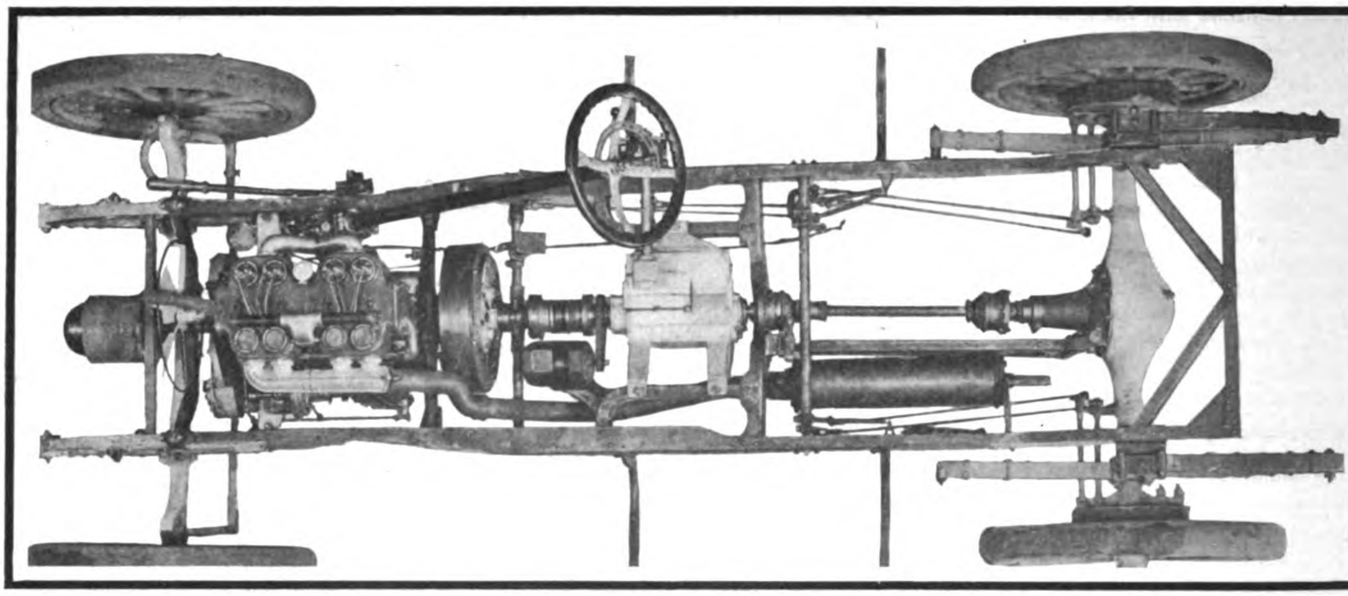


Fig. 1—Plan view of four-cylinder, 40-horsepower Klinekar, showing mounting of Rushmore lighting dynamo and Ever-Ready self-starter

Kline Adds Coupé Model

Special Body Construction Permits of Change from Coupé to Torpedo Roadster in 10 Minutes

Adoption of Ever-Ready Starter and Rushmore Lighting Dynamo Mark 1913 Line

FOR 1913 the Kline Motor Car Corporation, York, Pa., manufactures the same four chassis models as in 1912, a few minor changes having been made in the way of refinements in promoting silence and ease of mechanical operation and comfort in riding. The company has also brought out a special body type which is practically new to the trade. This is a combination coupé and roadster, the coupé top being removable in 10 minutes, leaving a fully finished torpedo runabout of distinctive appearance. This body is furnished on the 4-40, 6-50 or 6-60 chassis as specified, the only model of the line for which it is not adaptable being the 4-30. These four chassis models constitute Series A, the Kline company having adopted the series system of manufacture for the coming season.

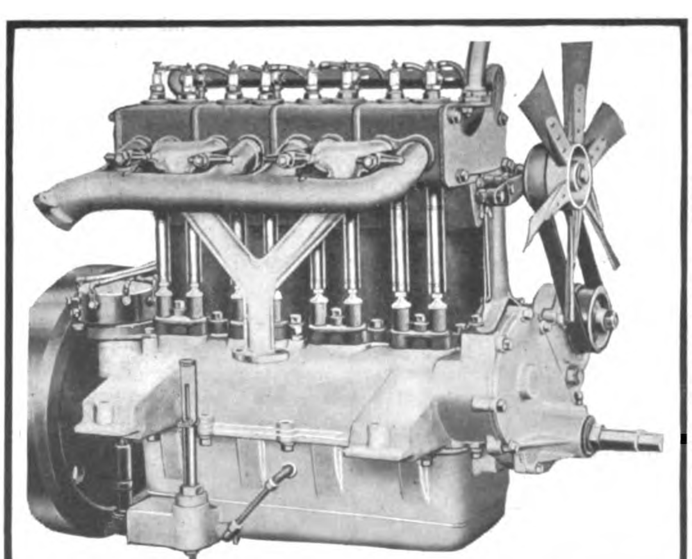


Fig. 2—Right side of Kline 4-30 motor, showing inclosed valves

Mechanical changes in the Klinekars for the coming season are all of a minor nature, the new features being: The inclosing of both intake and exhaust valves on all motors; the addition of a Rushmore dynamo for the electric lighting system; the adoption of the Ever-Ready automatic mechanical self-starter; some slight modifications in the sizes of springs and tires; use of cork inserts in the clutch instead of the spring inserts used in the 1912 cars; an auxiliary spring construction has also been adopted in the rear. A three-way valve connecting the gasoline tank with the motor is regulated from the side of the car, rendering it unnecessary to crawl under the car to change the fuel connections. All bodies for the 1913 cars are made in the Kline shops and are of combination steel and wood instead of semi-aluminum as in 1912.

There is no change in any of the motors outside of inclosing the valves. The horsepower of all motors is calculated at 1,200 revolutions per minute, except the 4-30, which is taken at 1,100 revolutions per minute. Motor dimensions are as follows:

Model	Cylinders	Bore	Stroke	Horsepower
6-60	6	4¼	5½	60
6-50	6	4 3/32	5	50
4-40	4	4¼	5½	40
4-30	4	4	4½	30

All motors are of the long-stroke, water-cooled type and are constructed on the separable enbloc system, the cylinders being cast single or double according to the model. Thus any cylinder may be removed and placed without disturbing the others, it being possible to take out the cylinders separately without removing the motor from the car, or the cylinders can be removed as a unit. Should a new cylinder be needed, it can be substituted for the old one without disturbing the rest of the motor. As each cylinder is opened at either end it is possible to obtain a large and well-gauged water space between the cylinder and the waterjacket. After the cylinders have been machined, they are bolted together with six bolts made of special stock designed to resist rust. These run through the waterjackets, the joints being made tight by paper gaskets, while the opening between the cylinders does away with water pipe connections between them, as shown in the accompanying illustrations of the various motors. As the water enters at the forward end of the motor and is forced out of the waterjacket of the rear cylinder up to the radiator, moreover, this has the advantage of insuring free circulation. Contrary to the general application of the enbloc system, there is a bearing between each cylinder, designed to render the motor much more rigid while at the same time making the construction lighter. Thus, in the case of the six-cylinder motors, the crankshaft has seven bearings, and in the four-cylinder motors five crankshaft bearings are used.

Close-grained gray iron of specially selected stock is used for the cylinders of all motors. Before the cylinders are assembled in the motors, each one is subjected to a severe hydraulic test under high pressure. If any defects or flaws exist this will bring them out and the cylinder is rejected.

In grinding the cylinders, every precaution possible is observed to insure accuracy in every case. Specially selected gray iron is also used for pistons and piston rings. These are ground on both diameters and sides and are made interchangeable. Piston pins are of large diameter and are hardened and ground. Positive lubrication of the pins is secured by making them hollow.

A feature of the 1913 cars is the fact that all valves are inclosed, as shown in the accompanying illustrations of the various motors. The valve casings are of aluminum, entirely dustproof and easily removable. All valves are interchangeable. The heads of the valves are of nickel steel and are of large diameter. Integral stems, of carbon steel accurately ground, are used. The valves are operated by a drop-forged camshaft with cams keyed and pinned. They are case-hardened and ground accurately to size. The camshafts are housed in the crankcase. The push rods used are of the sliding type with large bearing surfaces, the adjusting nuts being drilled and fiber inserted. This, of course, renders the rods silent in operation and provides a sliding contact on the cam practically without friction. The whole construction tends to insure positiveness and silence in the valve action.

All motors are mounted on a three-point suspension, except the 4-30, which is mounted on a subframe.

The crankshaft used in all motors is of special carbon steel, drop-forged and double heat-treated, all beaing surfaces being ground to exact size. All crankshaft bearings are of Parson's white brass and all are adjustable.

Connecting-rods are of drop-forged nickel steel. Crank pin bearings are bushed with Parson's white brass, while the piston pin bearings are bushed with Cramp's special bronze.

A special aluminum casting is used for the crankcase, the forward supporting arms being cast integral on all models, with the exception of the 4-30, which, being mounted on a subframe, requires different construction. The half-time gearcase forms an integral casting with the engine base and entirely incloses the gears, insuring protection from grime and dust. The bottom section of the crankcase contains an oil reservoir and is easily removed for the purpose of making adjustments or inspecting the crankshaft, connecting-rods, or main bearings.

Two separate systems of ignition are used, the first consisting of dry batteries and a single-unit coil on the dash with a switch on the steering column (except on the 4-30), with high-tension distributor and separate spark-plugs, while the second comprises a Bosch high-tension magneto with a separate set of spark-plugs.

The method of supporting and driving the magneto is shown in the illustration of the 4-40 motor, Fig. 4, the base plate of the instrument being attached to the left side of the crankcase, the same shaft driving the water pump and fan. A positive universal coupling forms a direct connection between the gear-driven pump shaft and the magneto. The distributer is located between the cylinders, as can be seen in the same illustration of the 4-40 motor, where it is shown between the magneto and the water pump. It is driven by spiral gears from the time shaft with a vertical shaft running in bronze bearings. The distributer is inclosed in a dustproof hard-rubber cover. It has but one adjustment and but one point of contact for either the four or six-cylinder motors.

In advancing or retarding the spark the central post is the only movement, thus doing away with the primary or secondary wire breaking at the terminals. The contact points are of aluminum and require very little attention.

The splash system is used for the lubrication of all motors, the oil being carried in the lower part of the crankcase, which has

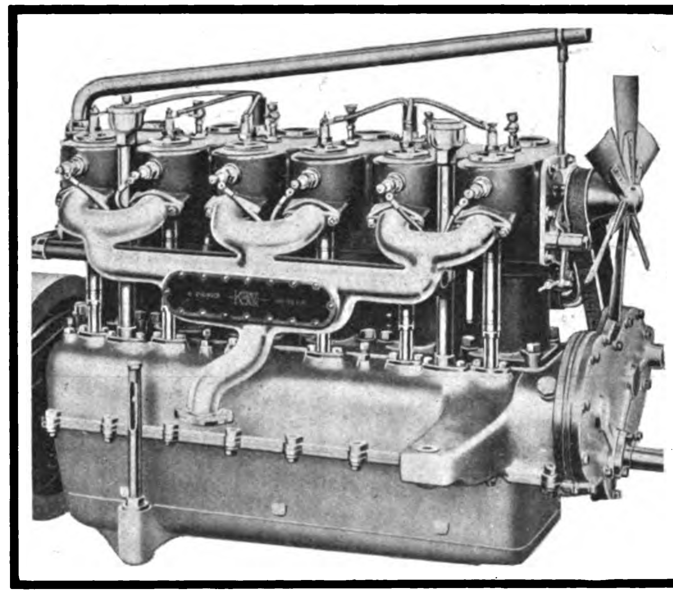


Fig. 3—Motor of 6-50 model with intake manifold and oil level

a capacity of about 2 gallons, and which is divided into four or six troughs, depending upon the number of cylinders of the motor. These divisions consist of the horizontal partition which forms the bottom in the lower half of the crankcase, together with the vertical partitions designed to keep the oil from running to one end of the crankcase when the car is on a grade. The partitions insure ample lubrication under all conditions, provided, of course, that the proper oil level is maintained in the crankcase. The splash system is of the constant level type and is readily adjustable by levels inserted in the side of the crankcase. These levels are shown in the illustrations of the 4-30 and 6-50 motors, Figs. 2 and 3, respectively. They have a micrometer adjustment and the level can be raised or lowered, according to the lubrication requirements of the motor. The oil is supplied to the crankcase reservoir through a filler tube mounted on the side of the crankcase, that on the 6-60 being shown in Fig. 5. This tube is equipped with a cap and filtering screen to prevent foreign matter from getting into the crankcase.

A gear-driven oil pump delivers the oil from the base reservoir

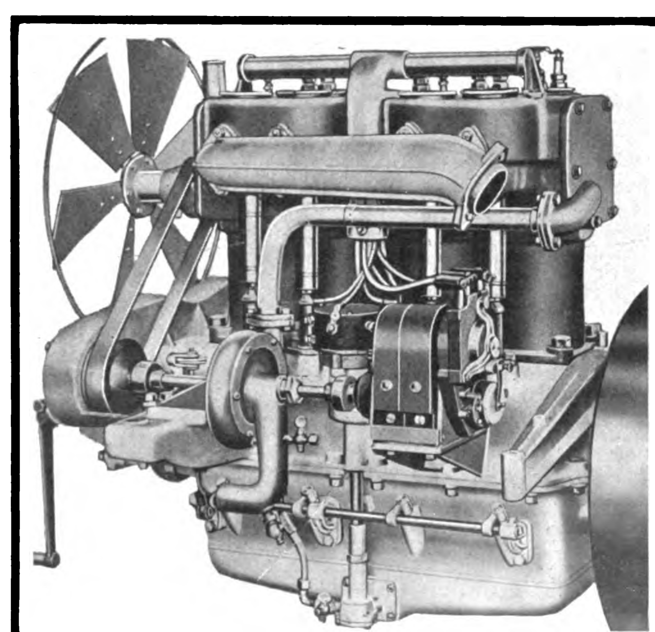


Fig. 4—Exhaust side of 4-40, showing fan, pump and magneto mounting

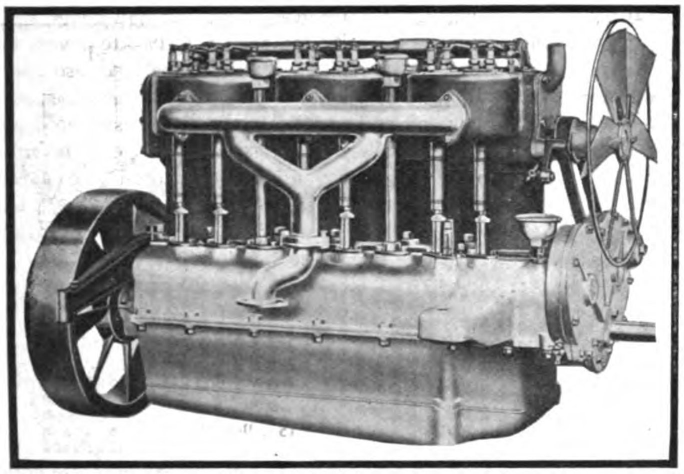


Fig. 5—Bringing out clean design of intake side of the Kline 6-60 motor

to a sight-feed on the dashboard. All the oil passing through the lubrication system of the motor must go through this sight-feed in full view of the driver, who is thus enabled to tell exactly the condition of the oiling system. From the sight-feed the oil is led to the crankcase where it enters the distributing pipe leading to the splash troughs in the upper part of the crankcase.

The steering gear, cardan joint and differential are packed in grease. The transmission gears run in heavy oil.

The carbureter used is of the automatic float-feed type and of special design to secure the greatest efficiency with the Kline type of motor.

Cooling of the motor is effected by means of a positive, gear-driven centrifugal pump forcing the water from the radiator up through the waterjackets and back to the radiator. The radiator is of foreign design, being of the flat tube, cellular type, of large capacity and substantial construction. The pump case is bolted to the crankcase, insuring permanent alignment. The auxiliary cooling system consists of a ball-bearing fan bolted to the forward end of the motor and driven from the pump shaft by means of a belt which may be readily adjusted to the proper tension.

The clutch is of the leather-faced inverted cone type with cork inserts, the leather used for the facing being of the non-burning variety. The clutch is provided with a ball thrust contained in the dustproof housing. A heavy spring released through the action of a yoke acting on a ball thrust ring holds the clutch in engagement. As soon as the clutch is disengaged, its rotation is stopped by a clutch brake. This tends to render gear-changing noiseless. The clutch pedal is compounded so that a slight pressure of the foot is sufficient to throw out.

A special feature of the Klinekar is the design of the double universal joint between the clutch and transmission, which instead of sliding to release the clutch, as in common practice, has an arm or spider mounted on the main shaft and connected in the clutch with blocks and pins. This promotes easy engagement. The joint is fitted with a metal greaseproof covering and is so constructed that it may be lifted out after removing the bolts which hold it in place, thereby giving free access to both clutch and transmission without further complication.

The Rushmore dynamo, driven by a silent chain from a gear on the main drive shaft just in front of the gearbox, as shown in Fig. 1, is mounted on an extension of the subframe supporting the gearbox.

The transmission is of the sliding gear selective type. It has four speeds forward and one reverse, with direct drive on third, being geared up on fourth speed. All speeds are obtained by single lever from the right side through an H-quadrant. The gears and shaft used are of heat-treated alloy steel. The bearings are imported and are of the annular ball variety. When changing gears, a sliding movement to either right or left engages one of the gear-shifting levers which operates the gear selected and automatically locks the rest. Gears are 6-pitch with .875-inch to 1.125-inch face, turned from solid bars of alloy steel and machined on the pitch line to within .003 inch, producing silence and ease of operation.

The driveshaft connecting the transmission with the rear axle is fitted with two universal joints, as shown in Fig. 1. These are automatically lubricated, the front one from the transmission and the rear one from the differential, and are protected from water, dust and dirt by steel covers. A slip joint is provided at the end of the shaft, being arranged so that it lies practically horizontal, thus preventing end thrust and wear on the joints.

The rear axle on all models is of the floating type, the bevel gears, differential and live axle being contained in a one-piece pressed steel housing except on the model 4-30, on which it is divided in the center. All moving parts of the differential and rear axle run on non-adjustable ball and roller bearings. The large differential and small bevel gears and bearings may be lifted directly out of the axle housing without disturbing any adjustments, except on the model 4-30, which requires only the separation of the two parts of the housing.

Two sets of brakes, both of the expanding type, are operated on drums on the rear axle by means of cams. Each set works through an equalizer and both are inclosed so as to be dustproof, except the 4-30 model, on which the service brakes are of the internal-expanding type, while the emergency brakes are external-contracting. This model has the expanding brake entirely inclosed in the drum and the contracting brake inclosed on the inner side.

The adjustments for taking up wear in the brakes are on the outside of the brake drums. To tighten the brakes, the locking nut is released and the adjustment bolt is turned to the right. This bolt is integral with the cam operating the brake and by throwing the cam on an angle increases the opening between the brake bands and consequently increases the outer diameter of the band. On the 4-30 the adjustment is made by means of turnbuckles on the brake rods.

The front axle is an I-beam drop-forging, the spring seats being forged integral with the axle.

Control is by means of spark and throttle levers located on a sector on top of the steering wheel and an accelerator pedal on the front floorboard. The spark and throttle sector does not move with the steering wheel. The gas and spark are regulated through gears located at the bottom of the steering gear housing and connected to levers for operating the carbureter, dis-

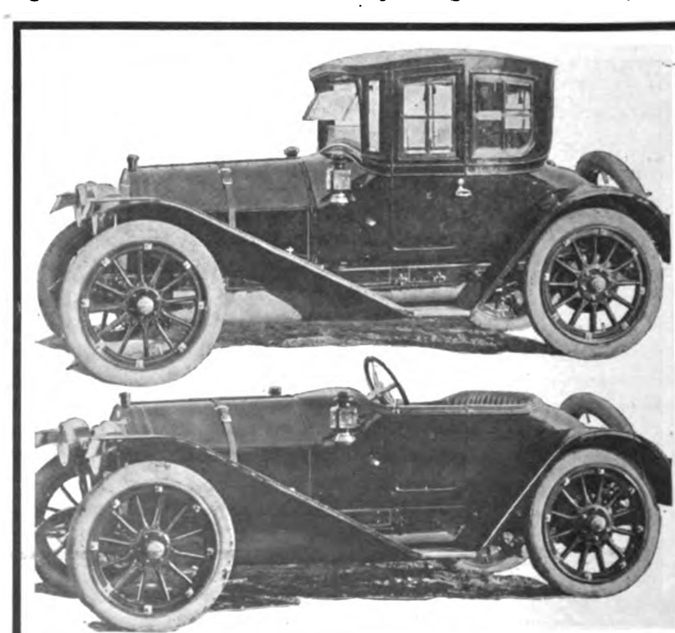
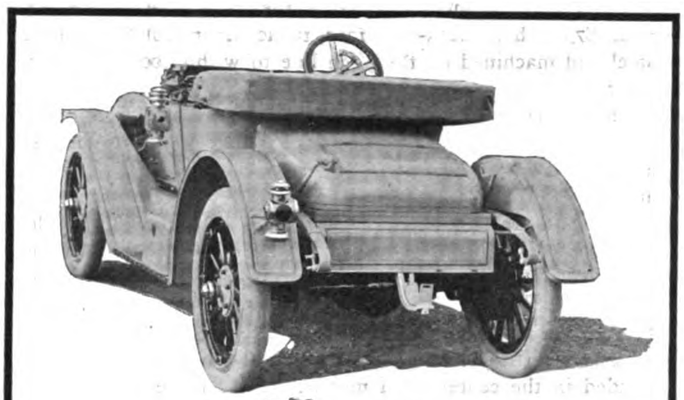


Fig. 6—Upper—Kline 6-60 coupé roadster with top
Fig. 7—Lower—Coupé torpedo roadster without top



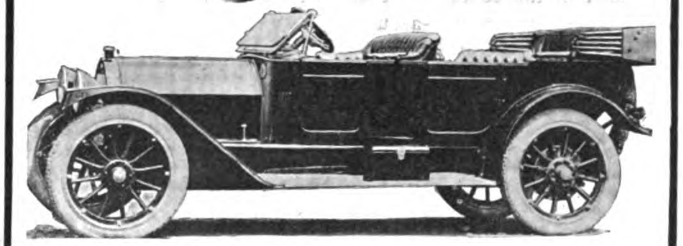


Fig. 8—Kline 6-60 runabout with baggage compartment
Fig. 9—Kline 6-60 model with foredoor touring body

tributer and magneto. The steering column is mounted on the right frame member and is supported by bearings in the dashboard. The walnut steering wheel is 18 inches in diameter. Steering is effected by a semi-irreversible worm and gear fitted with ball bearings to take up lost motion.

The frame is of heat-treated pressed steel, channel section with a subframe to carry the transmission, and, on the 4-30, another subframe to carry the motor. The main frame is narrowed in front to provide for turning the car in a small radius and has a kick-up over the rear axle to allow for spring clearance and to keep the center of gravity as low as possible, thus increasing the safety factor. Clearance on all models is 11 inches, except on the 6-50 and 4-30, on which it is 10 inches.

The spring suspension of the 1913 Kline has a novel feature in the shape of an auxiliary rear spring, which is shown in Fig. 10. This consists of a short, heavy spring which does not come into service except under an extra-heavy load or extremely severe road shock. Then it tends to resist the flexure of the main spring and thus reduces the jar on entire car.

Front springs on all models are semi-elliptic in form, the three-quarters scroll elliptic type being used on the rear, the only exception to this being the 6-60 and 6-50 Meteor special speed car, on which semi-elliptic springs are used all around. The front springs on all models are 36.5 inches, while the rear springs are 47 inches, except in the case of the Meteor, which has 50-inch rear springs.

The wheelbase of the 6-60 has been increased 2 inches over 1912. Wheelbases of the various models are as follows:

6-60	132
6-50	126
Meteor	110
4-40	118
4-30	115

Wheels on all models are of the wood artillery type, selected second grove hickory being used.

The tire dimensions on the various models for 1913 are as follows:

Model	Front	Rear
6-60	37 x 5	37 x 5
6-50	36 x 4.5	36 x 4.5
4-40	36 x 4	36 x 4
4-30	34 x 4	34 x 4

The Meteor is equipped with 36 by 4.5 tires all around for the 6-60 chassis and with 36 by 4 for the 6-50. Tread is the standard 56 inches with an option of 60 inches for Southern trade.

Combination steel and wood bodies of flush-side design are used in the 1913 cars instead of semi-aluminum. The 6-60 is furnished in touring car, toy tonneau, runabout and coupé roadster style, the passenger capacity ranging from two to seven, and the road speed from 55 to 65 miles an hour. The 6-50 also comes in these styles, as does the 4-40. The 4-30 is furnished as a touring car, toy tonneau and roadster only, the passenger capacity ranging from two to five and the speed from 50 to 60 miles per hour. Limousines, berlines and other closed and special body constructions are built to order. The Meteor is a special two-passenger creation mounted on the 6-60, 6-50 or 4-40 chassis, capable of 65 to 70 miles per hour.

Gravity fuel feed is used on all models, the capacity being as follows:

Model	Touring	Toy Tonneau	Roadster
6-60	19 gallons	17 gallons	26 gallons
6-50	19 gallons	17 gallons	26 gallons
Meteor			26 gallons
4-40	18 gallons	17 gallons	26 gallons
4-30	16 gallons	15 gallons	26 gallons
Coupé			32 gallons

An addition to the 1913 line of the Kline company is the coupé roadster illustrated in Figs. 6 and 7. Fig. 6 shows the canopy top in position, making the car a coupé, while Fig. 7 shows the top removed, leaving a comfortable, commodious roadster of the torpedo type. The mechanical specifications of this car are the same as the other 4-40, 6-50 or 6-60 models, as this is simply a special body mounted on the regular chassis. The detachable coupé top is mounted on the parapet of the roadster so cleverly that the joint is invisible, giving it the appearance of a one-piece body. The top has two large doors, one on each side, and the windows are made in either plain or Colonial style, the latter being shown in Fig. 6. The front glass is adjustable and the windows may be lowered to any height desired. With the top mounted, two large doors are used, for which smaller doors are substituted when the car is used as a roadster. The operation of detaching the top requires only 10 minutes, it being held by seven bolts. The interior of the coupé affords the same degree of luxury in appointment as a limousine and is fully equipped. When the top is detached and the small doors are bolted in place, the car presents an entirely different appearance, as shown in Fig. 7.

The equipment on all cars except the 4-30 includes: Semi-duquesne silk mohair top, side curtains and dusthood; adjustable clear vision shield; improved tire irons; Firestone universal detachable demountable rims; Rushmore dynamo, silent chain drive, with two electric headlights, 25 candlepower each, also sidelights, tail light and gauge lamp on the dash; automatic mechanical Ever-Ready self-starter; speedometer, horn, foot rail, coat rail, tire repair kit, pump, jack and complete set of tools. Black and nickel finish is employed throughout.

The equipment of the 4-30 is the same except that the self-starter is optional, the Ever-Ready mechanical type or the Prest-o-Lite acetylene starter being furnished as desired, there being a difference in price depending on the starter selected.

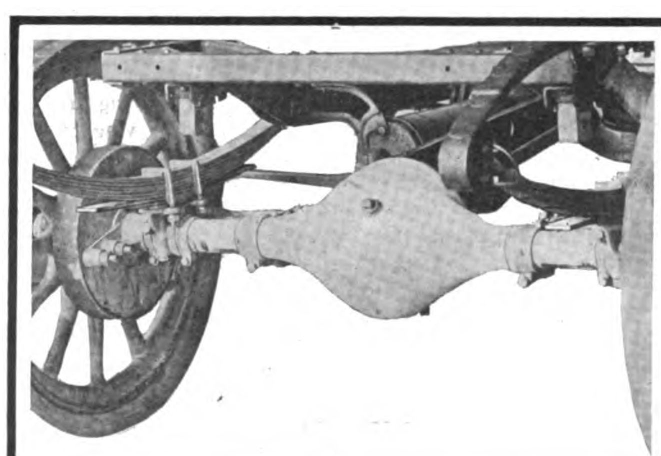


Fig. 10—Rear construction of the 1913 Klinekar, showing spring suspension and the auxiliary spring underneath the main spring

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A $1,000 British Car

"THE motor trade in this country has taken many years to come to the front, although today the best British cars are the best cars in the market. To turn to the manufacture of rubbish, from which no lasting reputation can be built up, is to cast away the fruits of long endeavor. We hope and believe that British manufacturers will have the good sense to stick to a class of work in which they, at the present time, excel."

This sums up the opinion of engineering England on the present agitation of bringing out a $1,000 British car to compete in the British Empire with the low-priced American machines. This extract from an editorial in the current issue of **Internal Combustion Engineering** is emphatic, it is certain, there is not any ambiguity in it, and it is straight from the shoulder. While coming from the highest motor car engineering authority in Great Britain it expresses a sane survey of the situation from the engineer's viewpoint, penned as it was by one who has traveled through America, knows the enormous buying possibilities of this country and is also entirely familiar with the manufacturing methods necessary for the production of such a car.

Speaking further on the subject editorially:

"Any creator of cheap-car schemes must steadfastly keep before him the immensely important fact that the American maker has 100,000,000 of people at home and many more millions just over his frontiers. Here in the British Isles not only is there a much smaller population, but a smaller percentage of the population are possible, or probable, buyers of cars, because greater distances, lesser value of space and a higher average earning ability prevail in the United States. And above all the American car in America only costs half or less than half its European price, if price be reckoned as a percentage of earnings. One thousand dollars is approximately equal to £200 on rates of exchange, but $1,000 is as easy to earn in America as £100 in England, and it is earned. This means that the American market is not only twice the size of ours—in proportion with the population—but four times as great. We lay special emphasis on this aspect of the matter as it is seldom realized. **What it means, is that to have as good a business proposition in proportion to the population here as the $1,000 car in America, the identical vehicle would have to be sold at from $400 to $500, obviously utterly impossible."**

This is sound reasoning, which could be carried further, namely that a British factory would have to entirely re-vamp its method of manufacture before production of a cheap car would be possible in the face of the prices of American cars in Europe. The British factory is not equipped with the intricate jig systems of America; a year ago in plants turning out over 2,000 cars a year it was difficult to find half a dozen jigs in the entire factory. Hand labor was relied upon everywhere. Parts were removed to be fitted and refitted again and again before they were finally assembled. Such practices could not exist with the $1,000 car. To bring out a cheap car would alone be a big problem, but this task would assume enormous proportions when it coupled with it an entire revision of manufacturing methods.

In commenting on the possibilities of a cheap British car outselling a cheap American car in the British colonial possessions, such as Canada, Australia, South Africa and parts of South America, the editorial goes on to say: "It is easy, too, to talk glibly of the colonial markets, but there it is not so easy to sell British cars, except those of the highest reputation. Our citizens overseas know the cheap American car, and the good British, but the cheap British machine is unknown and would therefore be regarded with suspicion. It must also not be forgotten that an American maker has always this free-trade island—the British Isles—as a dumping ground, so that a slight overestimation of output can be corrected easily. We here have no similar land to take our own surplus with open arms."

This aspect of the colonial trade is a true one, but goes further in that the British subject in Canada realizes the value of close proximity to the American factory for spare parts, so that in case of breakage there is not an expensive cable toll and a 6-day boat trip, meaning a delay of perhaps 10 days, but the possibility of having the spare part reach him within 1 or 2 days at the utmost. This is strong argument for the United States car in America and chiefly for the Canadian market.

Gathering of the first General Automobile Sales Association in the auditorium of the Claypool Hotel, Indianapolis, Ind.

General Automobile Sales Association Is Formed as Result of Indianapolis Convention

New Organization Aims to Bring Together the Automobile Manufacturer, Dealer and Advertising Man—Keynote in Resolution Perpetuating the Association Which States That Helping the Dealer Benefits the Whole Industry

INDIANAPOLIS, IND., Oct. 9—The General Automobile Sales Association, which claims Indianapolis as its birthplace, brought its first convention to a close this afternoon after having staged a remarkably successful 2-day meeting of dealers, manufacturers and advertising representatives. In the automobile industry, the newly-born association is unique in its scope and purposes, for it brings together the dealer who sells the cars, the manufacturer who makes them and the advertising agent who creates the demand for them. All must work in perfect harmony for best results, and it is for a better understanding of one another that such a gathering was proposed.

Homer McKee, of the Cole company, is the originator of the idea, although J. J. Cole made the first meeting possible by lending what financial assistance was necessary. And to Francis L. Wurzburg, general manager of the Class Journal Company, belongs the credit for its perpetuation. His resolution, proposed and adopted along towards the end of today's session, strikes the keynote when it states that "in helping the dealer, the whole industry is benefited." Incorporated in the resolution is a list of fourteen representative figures in the industry who have been selected to put the organization on a firm and lasting foundation, and whose very participation in its future affairs assure it of a healthy and rapid growth. The resolution follows:

"Whereas, we, the charter members of this, the first automobile retail convention, are of the opinion that an organized national movement in behalf of the retail dealers will be of great benefit to the industry, be it

"Resolved, that we hereby constitute ourselves the nucleus of such an organization and pledge ourselves to its perpetuation.

"And be it resolved that the next meeting be held in Detroit in 1913 at a date to be later determined.

"And be it resolved that the following men be appointed as a committee in charge to serve for one year:

"J. J. Cole, Indianapolis; Homer McKee, Indianapolis; H. M. Swetland, New York; E. LeRoy Pelletier, Detroit; John C. Wetmore, New York; Hugh Chalmers, Detroit; Roy D. Chapin, Detroit; William Boyd, Chicago; Carl Page, New York; C. B. Mears, Cleveland; J. L. Mahin, Chicago; H. L. Stratton, New York; J. G. Monahan, Indianapolis; F. B. Stearns, Cleveland."

Unlike many a great undertaking which has had humble beginnings, the General Automobile Sales Association, which was so named on the suggestion of J. J. Cole, received anything but a small start. Long ago manufacturers in other branches of industry realized the advantages to be gained from helping the dealer in just this

Heard at the First General Automobile Sales Association Convention at Indianapolis

"The idea of helping the dealer in all his problems is worthy of all the effort we can muster."—J. J. Cole, president Cole Motor Car Company.

"A good dealer can hold up a poor car a good while, but a poor dealer cannot uphold a good car very long." —H. O. Smith, president Premier Motor Manufactuirng Company.

"If we can ever get a co-ordination between advertising and sales, there is nothing we cannot do."—E. LeRoy Pelletier, Flanders Interests.

"The automobile industry is one of the great, strong, red-blooded businesses of to-day."—C. A. Bookwalter, president Cheltenham-Ætna Press.

"Individuality means everything in business."—W. D. Nesbit, Mahin Advertising Company.

"When you sell a man an automobile, you do him a great benefit."—Elbert Hubbard.

"By service is meant the education as to the proper use of an article, its speedy adjustment and quick parts replacement."—H. G. DuPree, Remy Electric Company.

"Advertising, instead of detracting from a salesman, multiplies his services many times."—W. H. Boyd, Curtis Publishing Company.

"There will be no more automobile departments in the daily newspapers when races, reliability runs, endurance contests and other motor car competitions cease to be carried on. Manufacturers should support them." —J. C. Wetmore, New York Evening Mail.

way, and it marks the beginning of additional prosperity for the great automobile industry of this country and Canada when such a method of promoting the sale of motor cars is adopted. Not only has the industry welcomed the idea openly and eagerly, but without exception every figure of note in this great business who attended the 2-day meeting was enthusiastically in favor of it and congratulated the Indianapolis men for conceiving it.

Some of the more striking high-lights that developed during the sessions in the delivery of the addresses were the following:

J. G. Jones, of the Alexander Hamilton Institute, New York City, in speaking on Headwork in Salesmanship gave some sound advice to dealers and salesmen: "Since automobile manufacturers are building cars along scientific lines," he said, "the salesmen should sell them along the same lines. There are fourteen qualifications for a good salesman. They are: Natural qualifications, prime condition, personality, ambition, honesty, courage, acquired qualifications, confidence, enthusiasm, earnestness, application, preparedness, observation, self-analysis."

"How to Use Advertising in the Retail Game," by J. L. Mahin, of the Mahin Advertising Company, Chicago, was one of the best addresses of the convention. Mr. Mahin pointed out the many phases and kinks for the edification of the dealer and laid special emphasis on the fact that service for the customer is the major point for the salesman to keep in mind. Mr. Mahin's address is on pages 794 and 795.

S. A. Seiberling, president of the Goodyear Tire & Rubber Company, Akron, O., delivered a masterly talk on the future of the industry. "The automobile industry has written one of the most spectacular pages in the history of the world," he said. For the coming year he predicted the following:

"At this rate 10 years from now the automobile business and its allied interests will have a value more than four times greater than that of the great Pennsylvania Railroad system. And when we shall have developed and taken advantage of our roads and highways by using automobiles on them, the automobile industry will be worth more than the entire railroad interests of the country. The dealer is the medium for this great growth.

"But," continued Mr. Seiberling, "the dealer of the past had an entirely different problem from that with which the dealer of the future will have to cope. Cars must henceforth be *sold*, whereas in the past they have been *bought*. Service in the future must begin when the car is sold. The dealers in each community have problems which are local to that territory, and these must be evolved by co-operation."

H. L. Liebricht, of the Export Advertising Company, said of the possibilities of extending foreign motor car trade. "In foreign countries all realize that the medium-priced American car has no equal. But the greatest drawback to the sale of American cars abroad is this question of service. The European manufacturer sells more cars in South America than does the maker from this country simply because the buyers can get their cars repaired reasonably and quickly. There are many openings for American garages where American cars are understood. Ninety-five per cent. of the chauffeurs abroad are Italian, Swiss or German, and these men do not understand the American car. They cannot repair it. Consequently, there is much demand for the American chauffeur. There is an opportunity for many a young American in this business, therefore, in foreign lands. In all foreign countries new roads are being built, which broadens the field for cars. Last year Venezuela appropriated $285,000 for good roads, and she will set aside $400,000 for the same purpose for the coming year. The foreign field is unlimited."

"Advertising instead of detracting in any way from the salesman aims at multiplying his services many times over," was the keynote of W. H. Boyd's message to the convention. Mr. Boyd, continuing, said: "The whole type and standard of salesmanship is improving. Today a man can be a good man and still sell goods. The forces and influences which are put into the salesman's hands are a far greater asset today than any personal qualifications which he may possess. Here is where the sound manufacturing organization and advertising come in."

Mr. Boyd also touched upon the actual and potential demand for advertising. "Your advertising must not only convince the man who buys a car, but it must make converts to your line of all those with whom he comes in contact before the sale is made. Many of these may never buy a car, but they have an influence upon the man who does. If public sentiment is in favor of a particular car, it will sell, for one is proud to own something which others admire."

The inadequate advertising fund was decried by Mr. Boyd, who added "that to make a car known it must be hammered into the people incessantly. One big advertisement in a national publication followed by none at all is of little value. The article must be kept constantly before the public. Before signing up

Co-ordination of Sales and Advertising

Extracts from an address by E. Le Roy Pelletier before the First General Automobile Sales Association in Convention at Indianapolis, Ind., October 8 and 9

TO knock your competitor will never get you anywhere. Personally. I most admire the man who gives me the strongest competition. We are all in business for the same purpose, and every man is entitled to a share of it in proportion to his ability. If we were asked to pick out the best car made today, we could not do it, for they are all good, and to run down the products of other makers to a prospect is to jar his confidence in the product as a whole.

When the time comes when we get a perfect co-ordination between the advertising and sales ends of the industry, there is nothing which the industry cannot do. Just because a man was not in the market for a car 2 months ago is no reason why it is useless for the agent to call upon him today. Prospects are born in a night. When the automobile dealer is enjoying himself in the evening, his advertising is still working for him, hammering home the need of every man for a car. And seated at the library table, the man who is thinking of a car reads the advertisement and becomes convinced and enthused.

There is not a very large percentage of good salesmanship in the automobile business. Motor car salesmen would do well to emulate the cash register and adding machine salesmen, for these men can bring back only one of two things—the order or the burial certificate of the prospective purchaser.

This convention is an excellent idea, and being such it cannot fail. I predict a much greater attendance of dealers and manufacturers another year. But the main lesson for every dealer to gain from the present session is to go back home and organize another little convention of the dealers in his community, and to talk over with them the subjects which have been discussed here.

Price cutting should cease. The whole world is a disorganized organization working against the little community of automobile dealers, and the latter are very foolish to cut one another's throats, making their ranks just that much smaller to cope with the greater outside army.

How to Secure the Newspapers' Aid

Excerpts from an address by John C. Wetmore before the First General Automobile Sales Association

THE dealer is the man behind the gun. The whole success of the industry depends upon the gunner. He sells 80 per cent of the cars made—the small dealer, not the branch manager.

I am proud of what the newspapers of this country have done for the automobile. The automobile was bound to arrive at its present state of perfection sooner or later, but through the aid of the press it has arrived 5 years ahead of time. The dealer should follow several tips as to how to get the best results from his newspapers in his home city.

In putting publicity in the newspapers, the dealers should use the right kind of stuff—that which has a news value. Boost the man who boosts you; put your advertising in the paper which supports automobiles for this is the paper which is read by the class of people whom you wish to reach. Create a field of optimism and don't knock. Create a desire in the minds of the buying public to own motor cars—don't point out all the faults of the machine.

The automobile departments of the newspapers must have something to talk about—they must have real news—else they cannot survive. When there are no more races, motor car contests and hill-climbs, then there will be no more newspaper support. It is up to the makers to enter these things to furnish news for the press and to keep automobile news alive.

with any car maker the dealer should assure himself of the maker's consistent and national advertising campaign. For this reason every dealer should become a student of advertising."

"There are two distinct types of salesmen whom we come in contact with every day," continued Mr. Boyd. "One is the personal salesman, the man who has brilliant qualities as a salesman, who has his own methods and has perfect confidence in himself; and that is a good type. But there is another type that I would call the scientific salesman, were it not for the fact that that word scientific has been used so much that it is becoming stale and has lost to a large extent its original force. But I would call the salesman I have in mind the 'social'—not the 'sociable.' That is the salesman who represents the organization with the buyer; the man who does not depend upon his own brilliant qualities of personal salesmanship, but the man who depends upon the force and influences which have been created for him to use, who knows how to shape this force and influence for his own individual purposes.

"The forces and influences that are put in our hands as salesmen are far greater and far more effective than any personal qualities which we will be able to exercise, no matter how brilliant we may be.

"That naturally brings me to the subject of advertising and what it represents, and especially what it represents to you salesmen who have back of you a manufacturer who appreciates to the full extent the value of advertising and knows how to use it in such a way as to put the greatest possible dynamic influence and power in your hands to use.

"I want to emphasize the essential difference between what is the natural and potential demand of advertising. When an advertisement or a series of advertisements appears in a magazine, immediately it arouses curiosity and interest on the part of people who are interested in the product, and it develops immediately a certain amount of tangible evidence of its presence. A few people, perhaps several thousand people, will send in a direct answer to that advertisement and ask for a catalog or information of some kind about the product. Many other people will go into the dealer's store in their respective communities and ask for the article advertised. I am speaking now, of course, of publicity advertising which is intended to stimulate the sale of merchandise through local dealers all over the country. But whatever may be the tangible evidence of that advertisement, or that advertising, it is only a very small fractional part of the real value of the advertisement and the potential value of the advertisement, which has been sown broadcast among the multitude of people who read the advertisement. Without any attempt at accuracy, if the tangible direct value of an advertisement is measured, we will say, by 10 per cent, the potential value of the advertisement must be equal to at least 90 per cent.

"What is this potential power of advertising with which we are concerned, and which is the most vital thing that will come before this convention?

"That advertising in order to realize its greatest value must touch and influence directly not only the people who are interested in the purchase of an article, but all the people who may influence those who actually do purchase the article.

"So it is up to you dealers to study the advertising just as carefully as you study the mechanism of a car, and be sure that you have got the kind of advertising that is going to educate every man, woman and child in your community as to the value of the car."

H. G. DuPree, of the Remy Electric Company, Anderson, Ind., spoke on the topic of service, asserting that the accessory maker must have service for his customers as well as the car maker. The automobile today is sold in competition with almost everything else, for people must give up other luxuries in order to afford the machine. Service for the customer is essential. It might be argued that service implies that something is going to happen to the product, but people who become so delighted with the results of quick repair and so on that they loose sight entirely of this thought. Courtesy, dispatch, kindly interest and diplomatic conversation are the chief essentials to successful service.

In introducing Elbert Hubbard to the convention Mr. Nesbit stated that individuality means everything in business. Hubbard is individual—he is eccentric and unique. Mr. Hubbard interspersed his humorous talk with words of motor car wisdom. When you sell a man an automobile you do him a favor, he said, for you give him a chance to get out into the great out-of-doors. He made a plea for good roads, and for Fisher's project of a transcontinental stone road, saying that every manufacturer should set aside 1 per cent. of his gross income each year for the proposed highway. Mr. Hubbard's address will appear in next week's issue of THE AUTOMOBILE.

The Scientific Selling of Motor Cars

Extracts from an address by C. F. Kettering before the First General Automobile Sales Association in Convention at Indianapolis, Ind., October 8 and 9

EVERY business is confronted with the selling problem and the automobile industry is not any exception. There is no other means of transportation today which can rival the motor car as a solver of the problem of the carrying of persons and things from one point to another. For this reason, the automobile has passed the experimental and the merely pleasure stage and is a permanent fixture. A good dealer can hold up a poor car a good while, but a poor dealer cannot uphold even a good car very long. To increase sales, educate the salesmen. There is no influence for their betterment which surpasses such a gathering as this. There are few things in the automobile business today which are worse than the practice of taking used cars in trade for new ones for more than such cars are worth. The used car should be taken in at a figure which will allow for its quick re-sale.

Does the dealer broaden the industry by trading in cars at such prohibitive figures that it is impossible for him to get rid of them again? The interests of the manufacturer and dealer are identical. The manufacturer is closely interested in the dealer, for the latter is a part of the selling organization. If the dealer is devoid of prosperity it reflects upon the car maker.

Starting as a luxury, the motor car today is a practical proposition. It is one of the keys to the high cost of living, for it makes it possible for the farmer to get to town with his wares oftener, for the city business man to live in the suburbs, and in the commercial field it is conducive to lower transportation cost. It is most important for the dealer to select the best selling line of commercial cars for his territory. That line which sells best in one community is not necessarily most popular in another. The dealer should have explicit confidence in the line which he sells, for he cannot enthuse his prospects unless he himself is enthusiastic. The first question which some realers ask is, "What is the discount?" A low cash selling basis and a long discount do not go together.

Development of the Automobile Industry

Excerpts from an address by H. O. Smith before the First General Automobile Sales Association

IN this day and time, automobiles have become so common that we of the superior knowledge of their workings have slipped somewhat away from the calling to the attention of those who do not know them so well what really wonderful pieces of mechanism they are. There are many thousands of people who still look upon them as experiments, and it is these whom we must interest.

The salesman who is alert will relate to the passive prospect the story of the development of a gear, a rubber tire, a carbureter or any other parts of the car in a way to incite his admiration for the supreme efforts which have been necessary to bring about such perfect-runnning machines. If he complains of the troubles which are experienced with tires, point out to him how bad it would be if there were no such things as pneumatics. We marvel at the great and powerful mechanism of the locomotive, yet we pass with a glance the automobile, which is a far greater thing. Do not say to the buyer of a car that he *must* oil this or that, but point out to him the disastrous results of not doing so. Such concrete examples as this will teach the man how to take care of his car, where mere directions as to what to do and what not to do would not be heeded. By getting him to appreciate the mechanical reasons for doing *this* and not doing *that* you stimulate his interest and make him a satisfied purchaser.

How To Use Advertising in the Retail Field

Substance of the Address Delivered by J. L. Mahin Before the First Annual Convention of the General Automobile Sales Association at Indianapolis —Service for the Customer a Big Advertising Factor

SERVICE—Sometimes we salesmen get a little bit confused in our viewpoint as to whom we are actually serving. **Do we actually serve the man who pays us the money, or the man who takes the product of our sales and consumes it?** The keynote of the talks yesterday all seemed to be along the line that the consumer, the man who took the automobile off the market, was really the man who was to be served.

There is no question that the manufacturer up to date has done his duty in that direction. Nobody could listen to what Mr. Kettering said yesterday about the wonderful scientific and mechanical problems that had been overcome in the production of a motor car, placed in the hands of people who do not have to spend a lifetime of study and experiment in getting satisfactory service, but appreciates that fact. **The successful manufacturer to-day is the man that is looking out to give service to the man who pays the money.**

I believe in salesmanship. To me salesmanship gives a man positively the best opportunity for expressing the force which God Almighty has put into him. Salesmanship is the ability to get other people to accept your viewpoint as to the value of the thing that you have to present to him. That is really all that salesmanship is. **It is the power and ability to get others to accept your estimate of the value of the thing that you are connected with or that you have anything to do with.**

On this question of salesmanship does the dealer render service? And if he renders service, to whom does the best part of his work go in the form of service? Up to date in many quarters there has been an impression that the dealer was working for the manufacturer; but the question, it seems to me, for you gentlemen to seriously consider is: **Can the dealer render 100 per cent. of efficiency in service to the automobile user? Can he? If he can, it does seem to me that the solution of the thirteen problems that were on the list that was sent to me, which will be brought out in this convention, will be comparatively easy.**

The manufacturer recognizes that the dealer who best serves the consumer is the best dealer for him. **The dealer who can serve the buyer, give the buyer the most intelligent and efficient use out of the car that he buys, is the best dealer for the manufacturer.** That being true, why is not that dealer the best dealer for the dealer himself? And is it possible for the dealer to earn every cent of the money that he gets on a car in actual service to the buyer? I believe that it is; and I believe it so strongly that I have an order in on a car absolutely on that basis to-day. I believe that the dealer who makes his legitimate commission off from the sale of my car is going to earn his money. I propose as a committee of one to see that he does anyhow, and I believe that he is going to do it. I believe that that car is going to be worth more to me than it possibly could have been if I had gotten the agent's discount and not have the service that I intend to have and have already received through that dealer.

Now what can the dealer do for the consumer? Certainly in as complicated a piece of mechanism as a motor car, notwithstanding the wonderful foolproof qualities that brains and skill and experimentation on the part of the manufacturer have put into it, certainly in a motor car as complicated as it is the buyer cannot learn too much about it; he cannot know too much about it to get full efficiency out of it.

The manufacturer cannot meet the buyer face to face. He cannot size the buyer up as a man and see what he reveals in his countenance or in his manner, as to his special fitness to handle a motor car, or his viewpoint toward things in general. **The manufacturer cannot get that delicate point of contact. The dealer is the only one who can get that contact, and when a car is properly and intelligently used it saves trouble with the car.** Who is to put the owner of the car in the mental attitude by which he can save that trouble except the dealer? And how can the dealer do that unless he not only knows the car, its powers and its limitations, but also he knows human nature, and knows what the man who buys that car is likely to do to it or not do to it, and keeps him in the proper mental frame of mind toward the car, its functions, its care and attention? Isn't it reasonable to assume that if the dealer takes the attitude with a man, after he has sold him a car, as was stated here yesterday,—that you are going to have tire trouble, but you would have nothing but trouble if you did not have tires; tires overcome trouble; without them there would be no motor car—and if you educate the buyer to the old fundamental principle of life that prevails everywhere, namely, that anything which is worth having is worth working for; that you cannot get full, efficient, satisfactory service out of the car unless you properly use it, unless you give thought and work to the use of it; get the buyer in full appreciation of the responsibility that he possesses as one in possession of the car—I say, isn't it reasonable to assume that if the dealer puts the buyer in possession of these ideas and into this attitude, isn't the life of the car going to be longer? Won't it give greater satisfaction, greater mileage? Isn't it going to be possible to take care of the car so that it will be worth more than it would be if it were indifferently or carelessly handled?

If that is true, there is the dealer's opportunity and the dealer's responsibility.

Now, I have said a good many times before that salesmanship has two primary qualities. No successful salesman that I know but what has the ability to be both plausible and sincere. What is plausibility but the ability to size up the man you want to sell something to, and present what you have to him so that it appeals to his viewpoint, his standpoint? To do this you have to know human nature. You must know the circumstances of the buyer. You have got to look at the thing from his viewpoint before you can be plausible. If you are plausible, if you fit what you have into the scheme of life and the every-day experiences of the buyer you have got him coming your way; he is yours; he belongs to you. You have given him the best demonstration of the power of salesmanship. **Plausibility is adapting what you have to the viewpoint of the other man.**

Service is really all you get out of an automobile. You can have all sorts of equipment on your automobile, but when you want it, and it isn't fit to run, what good does it do you? It is like money in the bank which the banker will loan you **when you don't need it.** The time you want it is when you need it, and really that is all that any buyer gets out of an automobile, service when he needs it. And isn't it possible for the dealer to take the same viewpoint toward his function in the sale, service to automobile buyers so that he can honestly and conscientiously feel that so far as the automobile buyer is concerned the money that he, the dealer, gets is the best invested portion of the whole transaction? If that is true, gentlemen, if that can be made true—and I honestly believe it can be made true because that is a fundamental principle that is borne out by every successful salesman that I ever met—it is worthy of your serious consideration. I never met a successful salesman yet, a really successful salesman, a man who could sell anything and knew he could do it, but who could add the cost of his salesmanship to the cost of the article that he was selling and make that thing that much more valuable by that amount.

If that can be done in the automobile business by the dealer getting that idea in his mind, that the services he renders the buyer, the man who buys the automobile, that is the best portion of the service that these buyers can get and a lot of these other problems will adjust themselves.

The first problem; how to dig up new prospects: **The best way to dig up prospects is to have a satisfied customer boosting for you. There is nothing that beats it. The voluntary service of a satisfied buyer will bring you more of the**

best kind of prospects than anything else that I know. The best manufacturers to-day are using the best advertising mediums, the best advertising ability, the best engineering ability, and all of that service is being given to the dealer. All the dealer has to do is to simply discriminate and use ordinary, every-day common sense and judgment in tying up with the manufacturer that gives him all of the other facilities for service which the dealer himself is not in a position to render. That is only a matter of decision and choice on the part of the dealer.

The manufacturer wants the good dealer a whole lot more than the good dealer wants a good manufacturer, as a rule—in other words, I firmly believe that there are more good manufacturers than dealers available; so it is up to the dealer to simply exercise his choice, you see, as to the concern that he is going to tie up with, and the fellow that has not mastered engineering service and advertising problems needs that service more.

How to deal with women: A woman does not want to ride in a car that does not look like something and that does not give service. She wants a serviceable, presentable car. A car where your customers are your boosters, where your customers are saying good words for you, you get the best class of people as your clientele, it does seem to me that right on that point alone there is a strong force at work.

Now to organize and maintain a money-making sales organization. **The best money-making sales organization is the sales organization where the salesman earns all he gets in service to the buyer. All the rest of it is then just velvet; what he does for you or sells for you is velvet. But he will never get that thought in his mind unless you put it there; talk to him about it.**

How to prevent frittering away profits on free repairs: The better way indeed to prevent frittering away of profits on free repairs after you have sold the car is to have demonstrated to the buyer and have him accept his responsibility in the care of that car. What better way is there? After you have shown him what he has to do to get full service a good start is made. Don't show him in a negative way. Don't say, "Don't do this, that or the other thing," but say to him, "You must put this oil in here, and do this and do the other to get the highest possible service," and you get him to do that, and then if he comes in and wants you to make repairs you ask him, "How did that happen? Didn't you do so and so?" "Yes, I did that." "Well, don't you remember I told you about that very thing?" Now, isn"t that man in a better position and more likely to be fair with you and not to demand unreasonable things than he would be if you had never told him those things? Isn't he in a better position to not demand unreasonable things from you?

How to dispose of second-hand cars: If the dealer believes himself that the price he gets on the sale of a new car he earns in service to the buyer he is not going to give up part of that in taking a loss on a second-hand car. He cannot consistently be honest with himself and take a loss on a second-hand car when he has given full value to the man who bought the car in the first place, can he? I see one of you men shaking your head. That doesn't scare me at all. I have heads shaken at me so many times that I don't mind it. We have got to aim high. We have got to have an ideal to strive for and we have got to have a margin of safety—all of those things. But I will come right back again: If you can get yourself, Mr. Dealer, to believe that you earn in service to the man who buys your car all of the money you make out of the car, if you really believe it, you are not going to be so keen to take his second-hand car at a price that will lose you money, and it will help a long ways to get yourself into the proper mental attitude.

You can never ask anybody or expect anybody to believe what you don't believe and get away with it for any length of time, I don't care how plausible you are. The salesman who lasts is the man who is sincere. The man who is not afraid of the lost sale on the wrong basis will eventually win and you cannot do something in this world and get a reputation for doing something without it costs you something; and one of the things it will cost you will be a lost sale now and then to a man who wants the unreasonable thing and who puts you in the attitude of not being consistent if you do the unreasonable thing that he has wanted you to do. You have got to take the stand, but you will win in the long run.

There isn't any better philosophy than Mr. Hubbard preached last night—that you win in this world by indirection. You don't always win the thing that you set your heart on, but the fundamental principle that you put into your work, that you stick to, attracts to you somebody else to take the place of the lost one.

I could go on with all these thirteen arguments, but I have very much exceeded my time. However, I will just say a word about the sincerity that is back of salesmanship—the ability to take the loss of a sale and to smile and go back again.

I am a believer in the salesmanship that is expressed in the philosophy, **that the man who gets the most turndowns makes the most sales because he makes the greatest number of calls.** That has been my experience in salesmanship. I have not found any easy, royal road to su cess. I don't know any way to catch many fish by sitting down and waiting for the fish to come. The best method of fishing to-day is going along the stream and casting the fly in everywhere and the fellow who does that all day brings home more fish than the one who sits down and waits for the time to be ripe or the sun to be just right and the wind in the right direction and waits for the fish to come to him.

The business of selling automobiles is working upon so many complex things in human nature, the emotions, the sentiments, the sympathies of life—they are all somehow entwined in the automobile. The man who rides in the automobile for purely sentimental reasons, to give himself relaxation, to give his family greater enjoyment, is contributing to a cause in the matter of good roads that will unquestionably be one of the greatest economic developments and forces for good that this country could possibly accomplish. And a business that gives a man an opportunity to do all those things is a mighty good business to be in and it seems to me it is a business that a man ought to be proud to be in. An automobile dealer has the opportunity; he comes in contact with human nature in all of its phases. He is dealing with the manufacturer. He comes in contact with the biggest brains and the most courageous dispositions that it is possible to find in this country. He meets the men who do things in a big way. And in meeting his customers, the car buyers, he meets every kind of human being and the man who can sell motor cars—and the time is coming if it is not here when motor cars **must be sold** rather than simply **supplied**—is the man who certainly is to be envied for his position in the world.

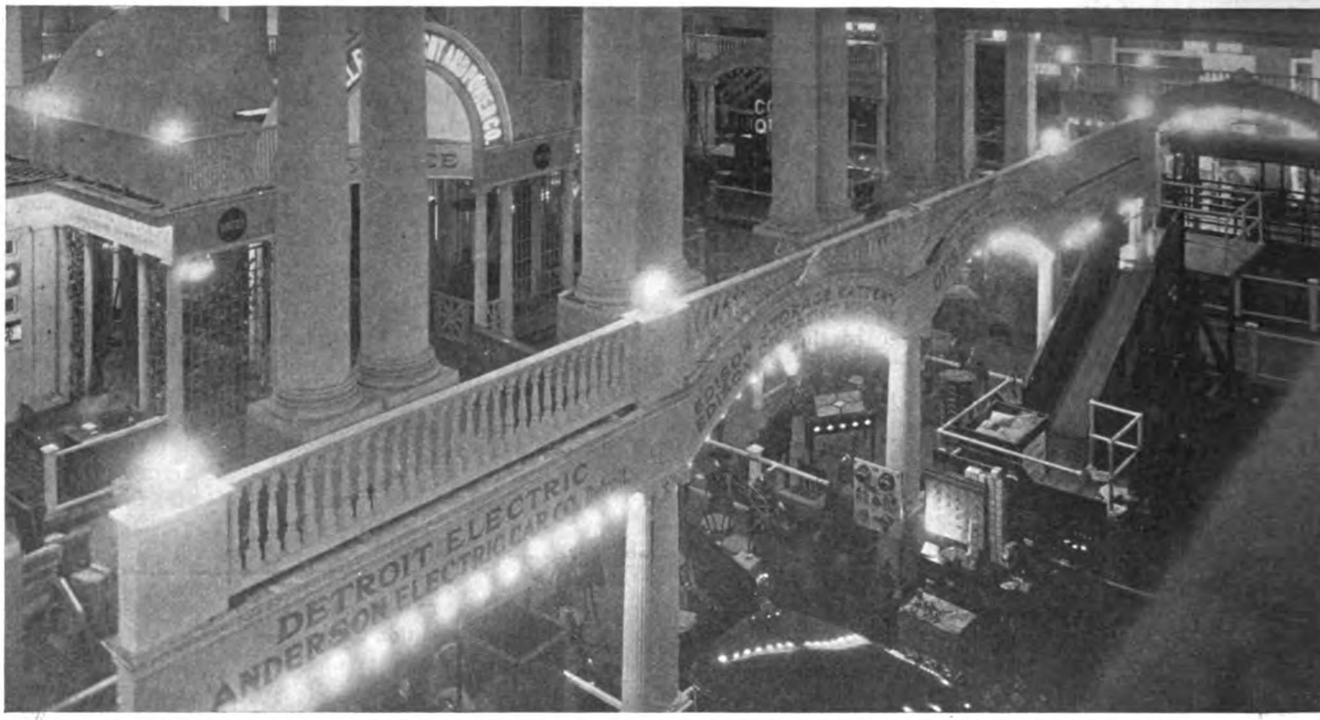
Now, it is possible for every man in every community to have leadership of some kind, and leadership as an automobile dealer, it seems to me, is a very enviable thing from the standpoint of a man's own self-respect. He has got to do more things well to be a successful automobile dealer than almost anything else I know. And in doing more things, and doing them all well, what is he doing to himself? Isn't he being true to the purpose that God Almighty put us into this world for, and that is, finding out all the hidden forces and resources we have within ourselves and using them with a beneficial purpose for those with whom we come in contact?

Automobile Men Enter Insurance Field

In an effort to bring order out of the present chaos pertaining to automobile insurance and to inject an element of competition that will work for more reasonable rates, the National Motor Indemnity Company and the National Motor Insurance Company have been chartered at Albany. The former concern will insure against automobile collisions, property damage and liability and the latter will cover fire, explosion and marine hazards. The managements will be identical and the policies issued will be contained in one document if convenient and losses will be handled through one adjustment department.

A number of prominent men in the automobile industry are named as among the incorporators of the companies, among whom are the following: William E. Metzger, A. G. Batchelder, Hugh Chalmers, Thomas Henderson, Albert C. Pope, Alfred Reeves, S. A. Miles, Winfred J. Foss, Edwin B. Jackson, A. E. Maltbie, George W. Hipple and Chester I. Campbell. William B. Joyce, president of the National Surety Company, will be chairman of the executive committee of the new insurance organization.

The companies will be affiliated with the Motor Union Insurance Company, of Great Britain, which has an intimate connection with the Motor Union, the big organization of automobile owners of Britain that corresponds with the American Automobile Association in the United States.



Interior view of Electrical Exposition, held now at New York Grand Central Palace, where eighteen models of electric automobiles are exhibited

Electric Car Men in Third Convention

More Than 150 Members of Electric Vehicle Association of America Meet in Boston —Capitalization of $500,000,000 in the Automobile World Represented— Standard Charging Plug and Lamp Socket Adopted

BOSTON, Oct. 12—The feature of the week was the big convention of the Electric Vehicle Association of America, which was held here the past few days, the association representing a capitalization of $500,000,000 in the automobile world. It was the third convention of the association and there were present more than 150 members. President William H. Blood, Jr., of Chicago, called the convention to order Tuesday morning, saying among other things:

"A few years ago electric vehicles were not largely used and the public was unaquainted with their true value. The vehicle manufacturers were not making large sales and their factory and selling costs were necessarily high. As few electric vehicles were being marketed the makers of batteries were making correspondingly few batteries. Central stations with comparatively high rates for current were hindering rather than helping the introduction of electric vehicles. All of these interests awoke at about the same time, joined hands and formed this association with the result that the use of the electric vehicle has increased marvelously and its adoption is becoming more general. It is proper, I believe, to call your attention to the comparison between gas and electricity. Only a few years ago gasoline was a by-product. When the automobile industry started, the ruling price was 10 cents a gallon. This price has constantly climbed to 14, 16, 18 and 20 cents, and even to as high as 25 cents in some localities. The garage owners are probably justified in opposing this rise, for the wholesale price is being advanced constantly, and the ultimate consumer, as usual, will pay the bill. On the other hand, the rates charged for electricity are constantly on the decline. The price of electricity used for charging batteries in the first electric vehicles was at the rate of 20 cents per kilowatt hour; a 15-cent rate soon followed, and for a number of years a rate of about 10 cents or thereabouts has been common. Today the user who charges his own single vehicle gets rates varying from 8 or 9 cents down to 4 or 5 cents per kilowatt hour, while the larger user, in certain localities, pays between 2 and 3 cents. The entire tendency is downward."

Reports were presented by committees on operating expenses, rates and charging stations, publicity, insurance, standardizations, etc. C. E. Michel then read a paper "Where We Stand Today" presenting some interesting facts and figures relative to the growth of the electric vehicle business. He said: "In St. Louis our revenue from charging during the first 6 months of 1912 increased at the rate of $1,000 a month or nearly 37 per cent. more than the previous year. It is estimated by Mr. Williams, of the Edison company, of New York, that the number of electrics in use in New York has increased 35 per cent. in the year ending June 1, 1912. Mr. Jones, of the Commonwealth Edison Company, of Chicago, estimates that in June, 1912, there were 200 electric vehicles under order but undelivered to Chicago business houses. One electric truck man sold single-handed $981,000 worth of trucks during the 1911 season and he did not make an apology for a single one of them.

Dr. M. Ekstromer, of Denver, in his paper on the Electric Vehicle in Denver, made the surprising announcement that in his city there is one electric pleasure vehicle to every 217 inhabitants, or more per capita than in any other city in the United States.

Street and Traffic Conditions As Related to the Electric Vehicle, was the topic prepared by R. McAllister Lloyd. In it was suggested the need of dividing streets to provide a surface for motor traffic. It said: "As commercial vehicles drawn by horses have always been greater in number than pleasure vehicles, and as they are all destined to become motorized, accidents are likely to increase unless radical measures are taken to limit the speed of motor traffic. Up to the present time the electric vehicle for both passenger and commercial use has maintained a reputation for sane speed and ease of manipulation, but there seems to be a growing tendency for salesmen to advocate higher speeds, and if no protest is raised we shall find within the next few years the entire traffic of our streets speeded up to the pace set by the taxicabs. From an engineering standpoint it is perfectly practicable to increase the average speed of the electric vehicles, wagons and trucks, about 50 per cent., but I question the advisability of doing so. Is it not wiser to stick to the speeds now prevailing in the operation of electric trucks and advocate them for all methods of propulsion, not because electricity is inherently slower than gasoline, but because the interests of humanity are conserved by so doing?"

The forenoon session ended with the members discussing the papers. After luncheon they were taken for a drive through the historic sections of the Bay State. At the evening session there was an election of officers resulting as follows: Arthur Williams, president; F. W. Smith, vice-president; Harvey Robinson, secretary; Day Baker, treasurer; William H. Blood, Jr., P. D. Wagoner, G. N. Kelley, and E. S. Mansfield, executive officers for 3 years and William G. Bee for 1 year to fill an unexpired term. Papers were then presented as follows: Frank W. Smith on The National Co-operative Advertising Campaign of the Electric Vehicle Association of America; Dr. Harold Pender and H. F. Thompson, on Notes on the Cost of Motor Trucking; and Bruce Ford, on Some Recent Developments in the Lead Battery for Electric Vehicles.

The second day's session was called to order by the new president, Arthur Williams. Ex-President Blood took the floor and declared that the members who were refusing business were making a mistake and he further contended that every manufacturer of electric vehicles should have ample capital to increase his plant to meet orders. Stephen G. Thompson then delivered a talk on The Future of the Electric Vehicle in the East. He said among other things: "The industry is steadily gaining ground in its proportion to the total number of commercial vehicles in use. The reason for this is not far to seek, in that the market for commercial power wagons is found to be in those states that are the most densely populated. In New York, Pennsylvania, Illinois, California, Ohio, Massachusetts, Michigan and New Jersey, with a total population of nearly 40,000,000 people, more than 20,000 commercial vehicles are in daily operation, these states leading all the others in rank of population in cities of 25,000 inhabitants and more. Logically, therefore, the future of the electric vehicle lies in the East, this being the section of the densest population and hence of the most extensive street freight movement."

E. S. Foljambe presented a paper on the progress of the commercial vehicle in America with especial reference to the electric truck. He said: "The production of commercial vehicles has now reached the stage where the number in use will probably be doubled in 1 year. Taking the 30,000 commercial vehicles in use in 1912 as a basis it is safe to estimate that the production of these vehicles will exceed 40,000 during next year, more than doubling in 1 year the total number of trucks in daily use. It is impossible to ascertain the exact number of electric vehicles which have been produced, but estimates place the number of electric trucks between 7,000 and 8,000." He then advocated more advertising by the makers stating that much of the success of the gasoline cars was due to this feature. R. E. Russell then read a paper on Electric Vehicle Battery Charging Apparatus that was illustrated by different forms of appliances for this purpose.

Alexander Churchward opened the afternoon session with a paper on The Standardization of the Electric Vehicle. He stated that the speed of such vehicles had been increased from year to year because of the demand of the owners for faster machines. He said that he believed that a speed of 25 miles an hour was too high for a machine capable of easy control by a woman or child where the brake strain is 56 per cent. greater than at 20 miles an hour. He said that the manufacturers should agree on a standard maximum speed. This should apply, also to the commercial vehicles. Carl H. Clark then read a paper on The Electric Vehicle from an Insurance Standpoint, in which he brought out the fact that much caution and care is being taken now in wiring such vehicles, reducing the possibilities of fire in the trucks now being manufactured to a minor degree. Harold H. Smith then read a paper on The Edison Storage Battery in Service.

The convention then adopted a standard plug for charging, and also a standard bayonet lamp socket to be used in the future on all electric vehicles constructed. The convention also recommended that a flat rate be charged for garaging and a kilowatt hour charge for current be used in the future. The convention ended with a theater party in the evening. Many of the members remained here throughout th week attending the Electric Show now going on in Mechanics' Building.

New York Electrical Exposition Larger Than Ever

THE Electrical Exposition of 1912 opened at the Grand Central Palace on October 9 and will continue until October 19. In its general scope it is larger and more complete than any of its predecessors, but in the way of automobile trucks and pleasure cars the representation is not so large as has graced a number of former shows.

Ten companies are exhibiting. One company failed to receive its show car in time for installation. The exhibitors are as follows:

Anderson Electric Car Company, Detroit: Detroit electric pleasure cars.

Atlantic Vehicle Company, Newark: Two models of trucks.

Baker Vehicle Company, Cleveland: Pleasure cars and 2-ton trucks.

Champion Electric Vehicle Company, New York: 750-pound wagon and 1-ton truck.

Buffalo Electric Vehicle Company: Buffalo electrics.

General Motors Truck Company, Pontiac, Mich.: Model 5-ton truck.

General Vehicle Company, Long Island City: Trucks of assorted sizes.

The Lansden Company, Newark: Municipal and commercial trucks.

The Studebaker Corporation, Detroit: Assorted trucks.

Ward Motor Vehicle Company, New York: 1,000-pound wagon and 1-ton truck.

All told there are ten models of pleasure automobiles representing the Anderson, Baker and Buffalo companies. The line of trucks is more complete, consisting of eighteen models made by eight companies.

An important feature of the exhibition is the testing track that has been established on the third floor. The three companies showing pleasure cars have one or more of their cars assigned to the testing floor and running demonstrations are given at each session. In connection with this feature of the show there has been installed a treadmill arrangement upon which novices can be schooled in the first principles of operation.

The attendance on opening day was excellent, it being estimated at well over 5,000 and all of the automobile exhibitors were kept busy explaining the qualities of their wares.

While storage batteries were in evidence and many designs adapted for automobile uses were exhibited, an inspection of this department of the show brought out the fact that the line of 1913 products is practically identical with what the makers offered for the year of 1912. No improvements to speak of have been made in lead batteries, and the same refers to the non-sulphuric type of accumulators. The exhibitors of batteries were: Edison Storage Battery Company, Orange, N. J.; Gould Storage Battery Company, New York City; Philadelphia Storage Battery Company, Philadelphia, Pa.; Electric Storage Battery Company, Philadelphia, Pa.

Other exhibits of interest to automobile engineers and owners were the lighting equipments of the Wagner Electric Manufacturing Company, St. Louis, Mo., and the Universal Electric Welding Company, Long Island City, N. Y.

Investigation of Relative Costs

What will probably prove a most important factor in the impartial and scientific calculation of delivery costs is the investigation now being carried on by the Massachusetts Institute of Technology of the relative costs of horse, gasoline and electric delivery service. Findings of these researches have been published from time to time within the last 6 months, and while absolutely conclusive and satisfactory for the engineer and technical man, the results have not yet reached the stage where the public at large appreciates their importance.

At the Electrical Exposition and Automobile Show of 1912, as part of an engineering exhibit showing facts of interest in regard to central station service, certain figures given out by the technology researchers are presented in graphic form. An effective color scheme is also employed to carry home to the average spectator the essential facts of delivery service cost, whether by horse, gasoline truck or electric vehicle service.

In comparing the cost of gasoline and electric vehicle delivery, a 10,000-pound truck is used as the standard and the cost is divided under three headings, fixed charges, maintenance and operating, designated by three colors, and reckoned in cents per mile of travel. Thus for the electric vehicle the fixed charge is 10 cents, the maintenance 15, and operating 22, making a sum total of 47. For the 10,000-pound gasoline truck, the sum total is 61, of which 17 is assigned as fixed charge, 18 for maintenance, and 26 comes under the heading of operating.

Horse delivery is calculated on a basis of cost in cents per trip, for a two-horse wagon. This, however, includes the cost of three horses, allowed as necessary to keep a two-horse team in daily working condition. Here the fixed charge becomes a little more than 1 cent a trip, the maintenance drops below that sum, while the operating cost rises to 6 cents per trip. This chart, however, does not attempt to show the comparative amount of territory covered by the horse team in contrast to the trucks.

In another group of charts, the subject of package delivery is taken separately. Here the cost is reckoned in cents per mile with a 1,000-pound gasoline and electric wagon respectively. The same divisions of fixed charges, maintenance and operating costs are continued. In package delivery service, one learns that the fixed charge in cents per mile for a ½-ton gasoline wagon is 6.5, maintenance is 4.5 and operating cost about 20. For the same weight electric truck, the fixed charge is 5 cents, maintenance 4.5 and operating about 14. With a horse-drawn wagon, allowing two horses for daily work, the cost in cents per delivery comes under 8 cents, and is divided into 1 cent for fixed charge, 3 cents for maintenance and 6 cents for operating. Here again no attempt is made to compare the amount of territory which the motor trucks would cover in excess of that traversed by a one-horse team.

70,000 at St. Louis Show

Record Attendance Marks Most Successful Automobile Exhibition Ever Held in the Mound City

Automobiles, Trucks and Accessories Worth $1,000,000 on View—200 Cars Sold Outright

ST. LOUIS, Oct. 14—With a record attendance reaching a grand total of approximately 70,000 the most successful show ever held in this city closed tonight. It was given by the St. Louis Automobile Manufacturers and Dealers' Association. The $1,000,000 display of pleasure cars, trucks and commercial vehicles, accessories and tires attracted visitors from all parts of the Middle West.

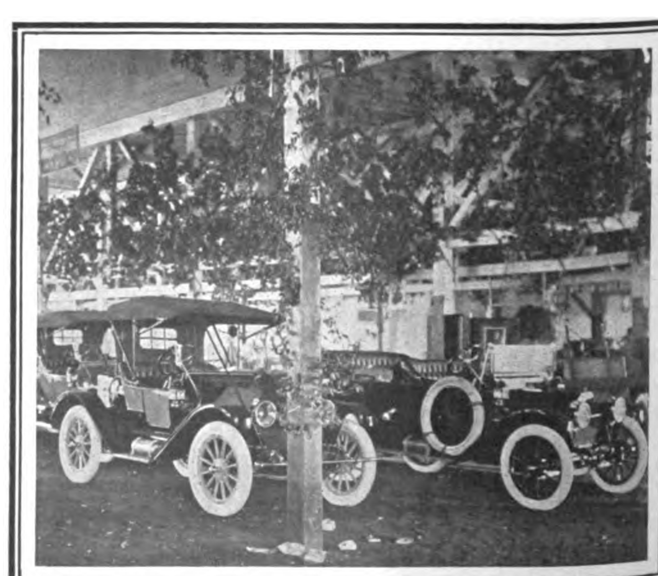
The exhibits included 300 1913 models of seventy makes of pleasure cars and more than sixty models of commercial vehicles were displayed.

As a business getter for the exhibitors the show has been unsurpassed. The public repaid the exhibitors for their expenditure of money, time and effort. It is estimated that 200 machines were sold outright and 3,500 prospects were acquired.

Estimates as to the amount of business that will be done in this city in the next year ranged from $9,000,000 to $15,000,000. Counting the sales which will probably be made in the St. Louis territory by St. Louis agents or sub-agents the amount of business has been estimated as high as $200,000,000. This estimate was made by one of the largest distributors of the St. Louis territory and included the larger part of Missouri, Illinois, Texas and a part of the south and southwestern states.

Negroes Lead as Alabama Chauffeurs

MONTGOMERY, ALA., Oct. 14—Only 36 per cent. of the licensed automobile drivers in this state are white. Negroes seem to have an established place in this field. This is the result of the lower wage for which they will accept the service. The average age of chauffeurs is 22 years, but two men in the state having licenses who are over 30 years of age. The average height among the 3,224 men holding licenses is 5 feet 9 inches. The average weight is 160 pounds. In order to enforce the state automobile tax more thoroughly this year every police officer in the state has been made a deputy collector of automobile licenses.



Partial view of the St. Louis, Mo., automobile show

Contest News of the Week

Twelve Entries in Phoenix and San Diego Road Races—Chicago Athletes Win Team Match Series

Disbrow Lowers Track Record at Springfield, Ill., by 2 Seconds—Also Beats 2-Mile Mark

PHOENIX, ARIZ., Oct. 14—Entries for the Desert road race closed last week with an even dozen contenders named. The list includes the following: Three Cadillacs, Buick, Franklin, two Americans, Schacht, Simplex, Hupmobile, National and Mercedes.

The Automobile Club of Southern California guaranteed only ten entries and the list leaves a margin of two contestants on the right side.

In addition to the Los Angeles cars there will be a division from San Diego, sanction for which has been given by the American Automobile Association. Under its terms the San Diego club agrees to secure at least eight entries.

The start of both divisions will be on Saturday, October 26. The Los Angeles cars will follow a route made up of certain sections used in former races but will not go to San Diego as it did last year. The San Diegans will follow a route through the southern part of San Diego and Imperial counties, skirting the Mexican line in places. The two routes join a few miles west of Yuma, where the night control has been established.

The cars will be ferried across the Colorado at Yuma and the start to Phoenix will take place the following morning. In order to smooth out any possible friction in the arrangements, the A. A. A. has ordered its Arizona representative to take charge of the contest at Yuma. Under his instructions, this official will line up the Los Angeles cars on the eastern side of the river at 5 o'clock in the morning and will start the column ahead of the San Diegans. The latter contenders will start 5 minutes after the last of the Los Angeles cars is sent away.

From Yuma to Phoenix it is likely that a wild race will ensue between the representatives of the two California cities despite the rough roads and shifting sands.

Athletes Beat Motorists in Tour

CHICAGO, Oct. 14—Winding up the 1912 series of team matches, the Chicago Athletic Association's representatives decisively defeated the Chicago Automobile Club in the fall run for the Allen S. Ray and Carleton White trophies, making the sixth victory for the Cherry Circle in the seven times the two clubs have clashed. Nine of the C. A. A.'s ten cars were perfect, while the C. A. C. had four of its ten penalized. A new scheme was tried in the run of Saturday—that of giving 5 points credit to a team for each perfect score it turned in. As the C. A. A. only had 13 points against it and was credited with 45 for nine perfect scores it won the match with a mark of 32 plus. On the other side, the C. A. C. had 263 points against it and only 30 points credit, so its score was 233 minus. Because of having the best total the C. A. A. won the Ray trophy and because of having the greater number of perfect scores it added the White cup to its already large collection.

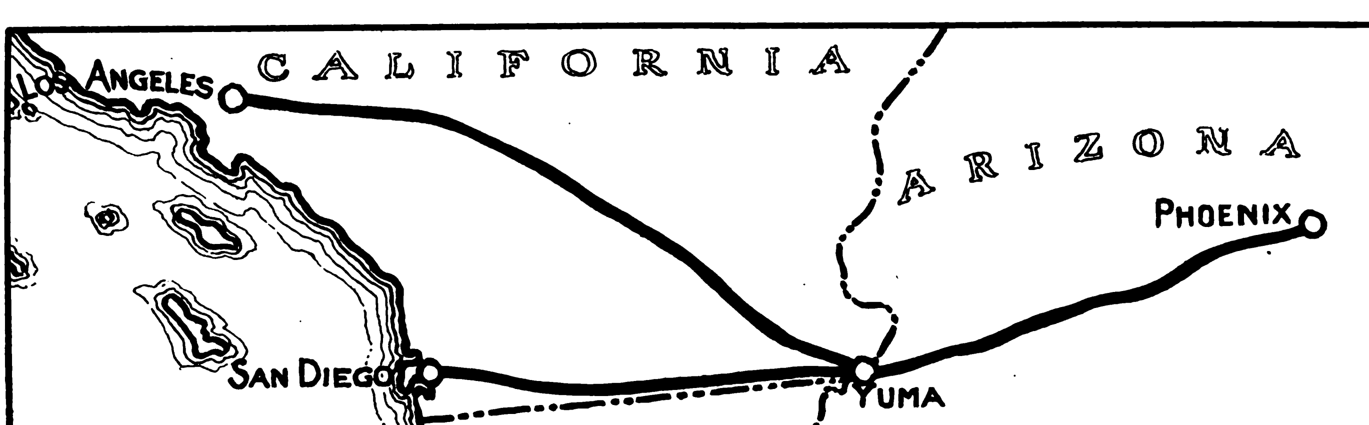
The run was a 1-day affair instead of the usual 2, the noon control being located at the Hazelden farm of George Ade, the playwright, at Brook, Ind., a distance of 90 miles. Threatening weather the night before, when it rained hard, kept down the size of the field and so only twenty cars went to the tape. But those who did drive had a most enjoyable outing, for the sun shone, the roads dried up and it was a joy ride both ways. At Ade's the Daughters of Ruth served the luncheon and at the finish the losing team paid for the dinner at the South Shore Country Club.

Penalties exacted were mostly for stalled motors but in the case of A. M. Robbins, who got the maximum penalty of 250 points, broken shock absorbers brought on penalization that put the C. A. C. out of the running completely. It took Robbins so long to complete the repairs on the accessories that he was just reaching the noon control as the last car pulled out on the return journey.

Local Records Go at Springfield

SPRINGFIELD, ILL., Oct. 12—Two local mile track records were broken here today at the motor races held in connection with the state fair in progress this week. Louis Disbrow, driving the Simplex Zip, lowered by 2 seconds the track record for the mile of 53 1-5 seconds held by Barney Oldfield in the Blitzen Benz. Disbrow also lowered Kirscher's record for the 2 miles on this track. These were two of the nine events of the meet which were witnessed by 25,000 people. Summaries follow:

Car	Driver	Time
5-MILE—CARS 231-300 CU. IN.		
Case	Nikrent	5:34.75
White	Ulbrecht	
5-MILE—CARS 301-450 CU. IN.		
Case	Endicott	5:10
Interstate	Madden	
Stutz	Luttrell	
1 MILE AGAINST TIME		
Simplex	Disbrow	:51.20
5-MILE HANDICAP, 300 CU. IN.		
White	Ulbrecht	5:13.20
Case	Nikrent	
Staver	Monkmeier	
Falcar	Parker	
3-MILE—CARS 300 CU. IN.		
Simplex	Disbrow	2:56.80
Case	Endicott	
Hotchkiss	Kilpatrick	
Stutz	Luttrell	
ILLINOIS CLUB CHAMPIONSHIP—10 MILES		
Case	Nikrent	10:28.50
Stutz	Luttrell	
Falcar	Parker	
2 MILES AGAINST TIME		
Jay-Eye-See	Disbrow	1:47.40
		1:47.80 previous record
5-MILE RACE		
Simplex	Disbrow	4:36.80
White	Ulbrecht	
Case	Endicott	
Hotchkiss	Kilpatrick	
Staver	Monkmeier	
Falcar	Parker	



Map showing race routes for Phoenix and San Diego races

Paraffin Carbureter Tests

Stewart-Morris Instrument Gives Excellent Results with That Fuel on 2,000-Mile R.A.C. Trial

THE following account of the R. A. C. tests made upon the Stewart-Morris paraffin carbureter is based upon an article appearing in *The Motor* (London).

The Stewart-Morris paraffin carbureter is controlled by the Stewart Precision Carbureter Company, Ltd., London, and tests on a 27.3-horsepower Pathfinder car fitted with one of these carbureters, and running on paraffin have been made recently. This is the same car which has been through the 2,000 miles R. A. C. test.

The design of the carbureter is such that while intrinsically only a single instrument, it serves a dual purpose, insomuch as one may start up for simplicity's sake with petrol, and when the engine has warmed, the petrol tap is turned off and paraffin takes the place of the more expensive fluid. There is no need for any adjustment or attention to the carbureter, beyond merely turning off the tap which cuts off the petrol supply when the engine is warm, the said tap being part of a three-way cock, so that either of the liquids may be passed to the carbureter or both cut off, according to the requirements of the case.

A basic differentiation from ordinary practice is that the suction of the engine conveyed through the ordinary induction pipe has no effect whatsoever on the delivery of the fuel from the jet and is not really intended to suck up the fuel from the jet orifice. At the base of the sectional drawing is seen a T union through which the fuel enters the circular chamber R. In the center of this circular chamber is a light rod, connected to the plunger Q, which, working in the cylinder constitutes a dashpot control. Following the small central rod up the center of the cylinder, it will be seen that it passes, at the point O, through a hole in the center of the cap P. This light rod is tapered in construction so as to constitute a tapered needle valve. It will be seen, therefore, that if we assume the presence of paraffin in the chamber R, under a certain pressure, there being no other means of escape for it, it will be sprayed out in an atomized form round the orifice surrounding the needle valve, and it will also be understood that as the needle valve rises or falls so the orifice surrounding it is increased or decreased, the action being entirely automatic. With this paraffin carbureter, the fuel is delivered under a pressure of some 4 pounds to 5 pounds to the square inch, and it is this pressure which causes the spraying of the fuel from the jet, and not the suction of the engine. The description of the operation of atomized paraffin from the pipe D follows. On the left is an opening C, through which the air which mixes with the paraffin to constitute the explosive mixture is drawn. From D the pipe runs to the exhaust manifold, enters into it, passes through a certain length of it, and on making its exit is connected again to the pipe E, situated just above D on the body of the carbureter. In this way the fuel and air are carried in a gasified state to the vaporizer, are carried bodily through the vaporizer, and come back again to the body of the carbureter as a fixed gas. Having, then, a properly mixed gas at the pipe E and entering into the space marked F, the mixing chamber. At the top of the mixing chamber is a plain valve marked J, which is accurately weighted, and in the base of the said valve there are a number of slots, so that when it is raised from its seating B, through the medium of the suction of the engine, the gas in the mixing chamber can pass through to the induction pipe in the ordinary way. The needle valve is also connected to this valve at the top, so that as the valve rises according to the suction of the engine, so the needle valve is moved in synchronized correlation, thus automatically delivering the correct proportion of fuel. To the left of the mixing chamber F is an auxiliary air-inlet valve, the control of which is effected through a link connection with the throttle valve, and this supplies a sufficient quantity of air to insure a correct mixture up to about 70 per cent. of the full power of the engine, after which a still further supply of air is allowed to enter, the control being effected either by hand or by means of the throttle-controlling mechanism.

It is, of course, the question of the extra air which is always the main feature likely to cause trouble in the design and production of a paraffin carbureter, but in the case of the new Stewart-Morris design the arrangement appears to be quite satisfactory. The suggestion has been advanced that the suction of the engine would have an effect upon the flow of the fuel, as the main air supply is drawn past the orifice through which it issues, but the orifice in question is so minute, and the pressure within so great in comparison with the suctional effort, that one may practically neglect its action. The other illustration shows the method of fitting the carbureter, and the comparative simplicity of the vaporizing media adopted, while in general dimensions the size of the carbureter itself is by no means out of the ordinary.

The R. A. C. Certificate

Certificate of Performance, No. 355, in a 2000 Miles Trial of a Stewart-Morris Paraffin Carbureter (Under the Open Competition Rules of the R. A. C.) August 30 to September 11, 1912.

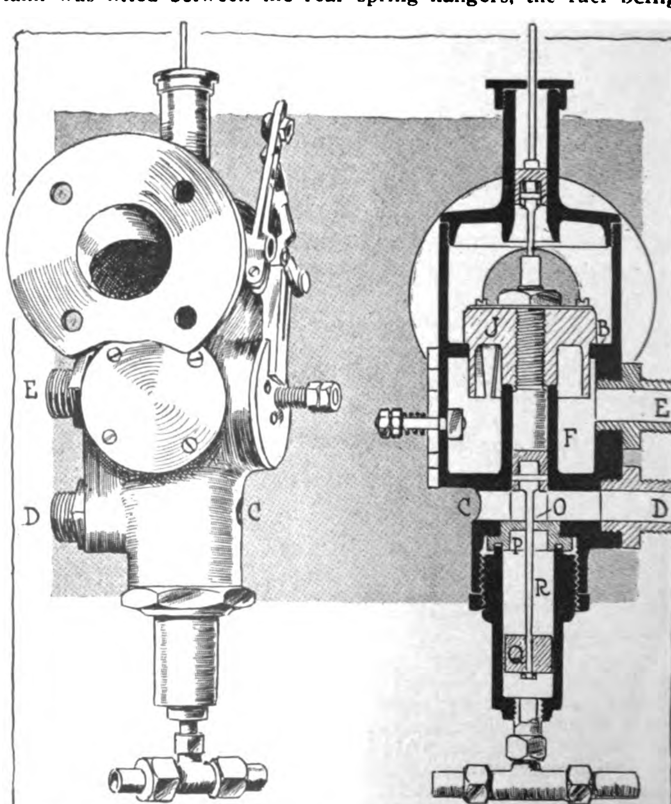
This is to certify that a Stewart-Morris paraffin carbureter was entered for trial by Messrs. The Stewart Precision Carbureter Co., Ltd., of 199, Piccadilly, London, W.

The weight of the carbureter, not including the vaporizer within the exhaust manifolds, but including the pipes leading thereto, was 9 lb.

The carbureter was fitted to a 27.3 h.p. R.A.C. rating "Pathfinder" car. The following are the particulars of the car:

Weight (front axle)	1507 pounds
Weight (back axle)	1963 pounds
Total weight	3470 pounds
Average weight of load during trial	356 pounds
Average total running weight	3826 pounds
Bore and stroke of engine	105 millimeters, 133 millimeters
Number of cylinders	4
Gear ratio on top gear	3.7 to 1
Size of tires	34 inches by 4 inches
Wind area of body	14.8 square feet

The carbureter was fitted in the usual place. The paraffin tank was fitted between the rear spring hangers, the fuel being



Section of Stewart-Morris paraffin carbureter lifted to the carbureter by pressure. The petrol for starting was carried in a small tank in the boot, the same pressure system being used for both fuels. Petrol and paraffin pipes led to a three-way cock on the heel-board, thence to the carbureter. The pressure was not sustained automatically, but by means of a hand pump. The pressure was not kept constant, but was usually between 5 and 6 pounds per square inch. It was increased when approaching any considerable hill, and was put up to 7 pounds per square inch up Sunrising Hill.

The control was by throttle and cold air lever. The latter was not used much, on an average about three times a day.

On some occasions when the engine was started on petrol a device was employed which allowed petrol to be injected into the induction pipe.

The paraffin oil was an oil marketed by Messrs. Carless, Capel and Leonard, as "Phœbus" oil. Its specific gravity was .807 at 13 degrees C.

The following is a synopsis of the ways in which the engine was started during the trial:

The engine was started direct on paraffin twenty-three times, the longest stop after which this was done being 17 minutes. On four occasions unsuccessful attempts were made to start on paraffin direct.

On nine occasions the engine was started on paraffin, petrol having previously been injected into the induction pipe, the longest stop after which this was done being 45 minutes.

The engine was started on petrol twenty-one times, the shortest period after which the fuel was changed to paraffin was 10 seconds, the longest being 4 minutes 20 seconds. The variation in this time appeared to be dependent on the duration of the previous stop. On six occasions the engine stopped when the change of fuel was made, being subsequently restarted on paraffin.

The total distance covered during the trial was 2003.3 miles, 1001.0 miles being run upon the road upon the club's six standard routes, and 1002.3 miles upon Brooklands track.

Road Trial.—The average speed (running time only) was 19.8 miles per hour. The quantity of paraffin used was 47.88 gallons, being a consumption of 20.91 miles per gallon or 35.70 ton miles per gallon. 1.05 gallons of petrol were used during the road portion of the trial.

Brooklands Tests.—The 1002.3 miles upon the track were covered at an approximately constant speed of 35 miles per hour. The paraffin consumed was 46.41 gallons, being a consumption of 21.59 miles per gallon or 36.88 ton miles per gallon. 0.76 gallons of petrol were used during the track portion of the trial.

Slow Engine Speed Test.—The engine was run idle for 10 minutes on paraffin at an average speed of 352 revolutions per minute. The speed during this time was very regular, and no misfiring was apparent. At the end of this period the throttle was opened to its fullest extent as quickly as possible, the ignition at the same time being advanced more slowly. The engine accelerated regularly without hesitation or misfiring.

Slow Car Speed Test.—The car was driven on paraffin, on top gear for 1.5 mile at 6.14 miles per hour, the speed being kept as constant as possible. The car was then accelerated, 39.2 miles per hour being attained in 51 seconds. The engine fired regularly during the slow running except during the last 200 yards, when there was occasional misfiring.

Consumption Tests.—The following tests of the consumption of paraffin were taken:

Speed Miles per hour	Consumption Miles per gallon	Ton-mile per gallon
10.6	23.12	39.43
14.9	23.81	40.66
20.1	26.69	45.58
25.2	27.19	46.44
30.45	23.94	40.89
35.8	17.45	29.81

Hill Test.—The car was timed up the test hill, the speed being 11.16 miles per hour. The weight of the car and load in this test was 3,557 pounds.

Condition After Trial.—At the conclusion of the trial the cylinders of the engine were removed. There was a somewhat considerable amount of deposit upon the piston heads of No. 1 and No. 4 cylinders, while that on the piston heads of No. 2 and No. 3 cylinders was not so great. The cylinder heads and valve ports had slight deposit, but were somewhat sooty. The valves had no deposit, but were somewhat sooty. The sparking plugs were somewhat sooty. The engine showed signs of over-lubrication.

General Remarks.—Throughout the trial there was no misfiring with the exception of that mentioned above in the slow car speed test. During the trial 1 minute and 1 4-5 seconds was taken to check the adjusting nuts of the taper needle. With this exception no work was done upon the carbureter or upon the engine. The fuel pressure was at that time 4.5 pounds.

The temperature of the cooling water was taken at midday each day, and was found to vary between 94°C. and 96°C.

Throughout the trial the engine was stopped by turning off the fuel supply and not by switching off.

Harking Back a Decade

What the Motoring Publications of 10 Years Ago Had To Say on Live Matters of the Day

FROM *The Automobile and Motor Review*, October 11, 1902: The Peerless racing car that appeared recently at Brighton Beach was the first 1903 model to be introduced in New York. The motor has two cylinders, 4 1-2 inches in bore by 5 1-2 inches stroke. It is equipped with sliding gears in the transmission in place of the small individual clutches formerly used.

Word comes from Paris that William K. Vanderbilt, Jr., is now backing the manufacturing operations of Leon Bolee, the French constructor, who is engaged in building a small number of automobiles of the Daimler-Mercedes type intended for the American market and listed at $6,000 each.

In the recent British reliability trials, the honors in the steam division must be accorded White 29, a 6-horsepower car driven by Mr. White himself. The car finished with a clean score, being credited with the maximum number of points, 1,800, for the whole test.

The hilly and roughly paved streets of Baltimore are probably accountable for the lack of progress that has been made in that city by the automobile so far. There are only about seventy automobiles owned in the city.

California and the whole Pacific Coast has shown a wide interest in the automobile. The Golden State Automobile Company is preparing to manufacture an 8-horsepower car at San José. The motor will be of the double-opposed type and the transmission will be by rawhide pinion and iron gears, so that it will be noiseless.

Exports from New York for the week ended October 4 amounted to $4,000. This is a considerable falling off from recent weeks.

At the Republican convention at Saratoga September 24, a plank for the platform of the party in the State of New York was adopted urging the construction and maintenance of good roads.

The annual reliability run of the Automobile Club of America started from New York on Wednesday last and will be completed next week. Additional entries were received, bringing the total number to seventy-nine. Tuesday was spent in weighing the cars. A full report of the run will appear in next week's issue.

Frederick H. Elliott, secretary of the Automobile Club of Syracuse, will soon resume his work of organizing a New York state association of automobile clubs. The object of the state body will be to prevent hostile legislation. In speaking of the persecution to which automobilists are frequently subjected, Mr. Elliott said: "There are very few persons, either peace officers or plain citizens who are capable of telling how fast an automobile is going. Consequently testimony based upon conclusions of witnesses incapable of judging the facts must be unreliable."

Informal applications for space at the Chicago show, which will be held in February, number fourteen. The diagrams will be issued next week and allotments will be made October 15.

The Peerless Motor Company, of Cleveland, has filed incorporation papers in West Virginia. The capitalization is placed at $300,000. I. M. Blanchard, L. H. Kittredge, John McGregor, Jr., F. A. Quail and G. B. Slidell, of Cleveland, are incorporators.

H. Ward Leonard, formerly third vice-president of the National Association of Automobile Manufacturers, has been elected first vice-president to succeed A. L. Riker. Frederic Martin Lande was chosen second vice-president. Charles Clifton was made third vice-president. Harry Unwin was made secretary and Windsor T. White has been elected a director.

Disco Electric Starter

Two-Unit System Including Motor, Generator and Storage Battery Adopted in Addition to Acetylene Type

THE new Disco starter is of the electric type. For some time the Ignition Starter Company, of Detroit, Mich., has been well known for its activities in the acetylene starter field and it is with great interest that the construction of the new device may be noted because it is the first time that a concern which has been devoted to the acetylene starter has included one of he rival type in its line. Both types of starter will be carried in future by this concern which has recently improved its acetylene product and brought it out under the name of the 1913 model Disco.

A two-unit system is used for starting, lighting and ignition. The system is complete in that no other electric apparatus is necessary when the entire Disco system is employed. All the electric functions throughout the car are taken care of and the system is made automatic as near as it is possible for an electric starting, lighting and ignition system to be. The apparatus consists primarily of a dynamo, a motor and a storage battery. Suitable connections and electric devices for automatically regulating these three principal units form the remainder of the system.

The electric motor has no other purpose than to start the motor. It is mounted on the side of the crankcase and connected by gearing to the flywheel. The amount of reduction between the motor and the flywheel depends upon the size of the motor to be started and the compression pressure against which the motor has to pull. In the test motor at the Disco works, which has a bore of 4 7-8 inches and a stroke of 6 inches, with a compression pressure of 75 pounds, the total reduction between the motor and the flywheel is twenty to one. On a motor of lower compression or smaller size, the reduction would not have to be so great. The ratio of reduction is variable as is the method of mounting the starting motor upon the structure of the crankcase of the automobile motor. To take the motor the flywheel will have to be geared in the same manner as is common with the electric systems now found on the market.

The amount of current consumed by the motor when starting the engine will vary with the motor upon which the starting system is applied. On the larger six or four-cylinder motors the amperage which will be drawn when starting the motor will be much higher than in the smaller type. For instance with a motor of 4 1-2 inches bore and 5 1-2 inches stroke having a compression pressure of 60 pounds which is common in ordinary touring practice the motor will draw 65 amperes when spinning the flywheel at the rate of 120 revolutions per minute. On a heavier motor the amperage will rise considerably as may be expected from the added effort necessary in producing the turning moment on the geared periphery of the flywheel. To take an example of a heavier motor the current required with a bore of 4 7-8 inches and a stroke of 6 inches is 90 amperes when turning the flywheel 110 revolutions per minute. In the latter case the gear reduction was twenty to one as mentioned above which gave a speed of 2,200 revolutions per minute to the starting motor.

It must be remembered when estimating the current required with an electric starting motor that everything depends upon how stiff the motor is, whether it is to be started dead cold or whether the motor has just been stopped after a long run. Carburetion difficulties under adverse climatic conditions will necessitate a longer spinning of the motor than when everything is favorable for a quick start. No compression release is required with the Disco electric system which is powerful enough to start the motor against full compression.

The voltage question is another upon which the makers of electric starters do not seem to agree. The Disco system works entirely at 12 volts. This is a very practical voltage in that the lighting system is readily handled with it. The ignition system which generally works at 6 volts through the primary circuit can also be adequately taken care of by a 12-volt system. The starting motor is made only in the 12-volt size. It is series wound and can be connected by any means desired to the flywheel of the large motor. The electric starting motor is illustrated in Figs. 1 and 2. The latter illustration shows the plan view with the only two wires required in its operation while the elevation is given in Fig. 1.

The generator is entirely automatic in its action. It is cut into the storage battery when the motor speed has reached a point that approximates a rate of 7 miles per hour of the vehicle when running on direct, at a reduction of about three to one to the driving wheels. Below this speed there is no connection between the battery and the dynamo so that there is no possibility of the storage battery discharging back through the generator when the car is standing at the curb. The current for the lamps and the ignition, if the motor is running idle, is furnished at this time by the storage battery. The charging curve of the dynamo commences at a 7-mile an hour vehicle speed and continues to rise until it reaches a maximum at about 15 miles per hour. At this point it starts to flatten, the slope of the curve gradually becoming more slight and at 25 miles an hour it drops off. The charging curve can be varied, however, and can be made to suit conditions by the manufacturers who adapt the system to the vehicle upon which it is to be placed.

The switch which automatically cuts the generator into the battery circuit and out again when it does not produce a sufficient current to charge the storage battery, is regulated entirely by armature reaction and not by the actual speed of the motor except that the latter will govern the reaction. By this means, however, the tendency for the switch to be continually cutting in and out when the speed of the vehicle closely approximates 7 miles per hour, is obviated to a large extent.

The batteries are carried in the usual manner beneath the frame of the car. A voltage of 12 is required and this condition can be filled by a battery which will be light and yet have a sufficient current capacity to light the lamps for a long time, when the motor is not running. The ignition feature is optional and may be added to the starting system if desired by the purchaser. When the ignition feature of the Disco electric system is omitted it will not in any way interfere with the other units which are connected up in the same manner as they would have been had the wiring been taken from the storage battery.

The Disco people have not brought out this starting system suddenly. They have been working upon it vigorously during the past year and were among the first to recognize the commercial value of a high grade electric starting and lighting system. The units have been carefully refined and it will no doubt be one of the highest priced outfits upon the American market at the present time.

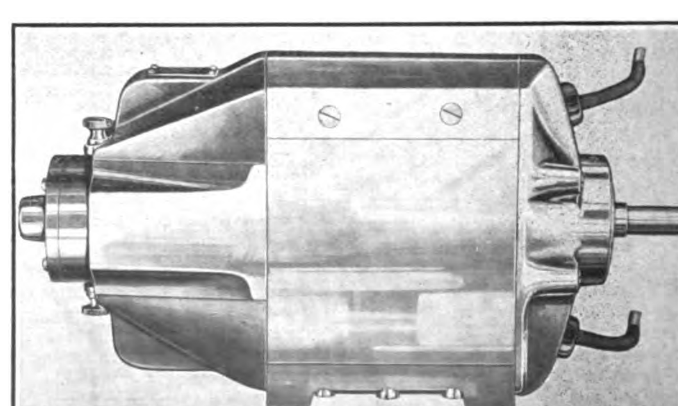


Fig. 1—Side elevation of the Disco electric starter

British Retain Tax Rating

Committee Appointed by the Treasury Finds Present Horsepower Taxing System Satisfactory

LONDON, ENG., Oct. 11—The committee appointed by the treasury in order to investigate the horsepower rating of automobiles has now issued its report. The committee was appointed on December 6, 1911, with the following reference:

To consider the provisional regulations which have been made under section 86 (2) of the finance (1909-10) act for determining the horsepower of motor cars, and to report whether any amendments are desirable, with special reference to the equitable treatment of steam cars and electric cars.

The committee has held a number of meetings, and has had before it seventeen witnesses representing manufacturers, and the various institutions and societies in connection with the motor car industry. The main point to be considered by the committee related to the effect of stroke bore ratio, a topic which has been much discussed in recent years by various societies and institutions concerned in the manufacture of motor cars. For example, according to one formula put forward by the Society of Automobile Engineers based upon a large number of engines, the power of an engine of which the bore and stroke are equal should be 33 per cent. less than an engine of similar bore in which the ratio of stroke to bore is 2 to 1. The recommendation of the committee, after hearing the whole of the evidence, is that the present rating now enforced be retained as regards the taxation of motor vehicles. The committee believes that the majority of those interested in the manufacture of motor cars are in favor of this course, not only because the method of rating is substantially fair as between one car and another, but also because any change of system would lead to a great deal of inconvenience to persons who have made arrangements for manufacturing or dealing in cars in classes suggested by the present system. In view of the fact that an engine with a longer stroke consumes more gasoline by reason of developing more power, therefore this engine pays an additional tax on gasoline.

With regard to old cars, a number of witnesses represented that the horsepower of cars made a number of years ago was considerably less than that of modern cars of the same rating. A grievance is undoubtedly felt by many owners by reason of the high tax on a car of little value. The committee however, has not considered it within its province to make any recommendation as to the taxation of cars which have depreciated in value in the ordinary way.

Steam cars have hitherto been taxed in the same manner as the petrol car, that is the steam engine in a car is taken as equal to that of the petrol engine having equal cylinder area, and where the engine is double acting the rating is correspondingly increased. Since the real horsepower is independent of the engine dimensions, and depends solely on the boiler, the regulations now in force are obviously incorrect. The committee recommends that in regard to steam cars 3 square feet of heating surface should be taken as equivalent to 2 square inches of piston area, which may be regarded as giving 1 horsepower in a gas engine.

The number of electric motor cars is comparatively small, and are all used in this country for one kind of service, namely, town work. Most of these vehicles are fitted with motors rating at 8 horsepower, and as the result of experiments carried out by the committee it is found that at 20 miles per hour about 7 1-2 horsepower has been used. They are of the opinion that these cars can be described with sufficient accuracy as exceeding 6 1-2 but not exceeding 12 horsepower, and recommend that the regulations dealing with them be amended accordingly.

The substance of recommendations of the committee is most conveniently summarized in the form of the following regulations for the determination of horsepower, which might, in the opinion of the committee, take the place of the provisional regulations now in force:

1. For the purpose of these regulations the horsepower of any motor car deriving its motive power wholly from an internal combustion engine worked by a cylinder or cylinders shall be taken to be:

(a) in the case of a single cylinder engine the horsepower attributed to the cylinder of the engine;
(b) in the case of an engine having two or more cylinders the sum of the horsepowers attributable to the separate cylinders.

2. The horsepower attributable to any cylinder of an internal combustion engine shall be deemed to be equal to the square of the internal diameter of such cylinder measured in inches divided by a numeral.

(a) in the case of a single-acting cylinder having a single piston, the numeral used as divisor shall be 2.5;
(b) in the case of a single-acting cylinder having two pistons, the numeral used as divisor shall be 1.6.

3. The horsepower of any motor car deriving its power wholly from a steam engine shall be taken to be proportional to the effective heating surface of the boiler supplying steam to such an engine, at the rate of 1 horsepower for every 3 square feet in such effective heating surface, and the effective heating surface shall be taken to be:

(a) in the case of a boiler having horizontal or approximately horizontal tubes, the whole of the surface of the tubes which is exposed to the flame or hot gases;
(b) in the case of a boiler having vertical or approximately vertical tubes, half of that surface of the tubes which is exposed to the flame or hot gases.

4. Any motor car deriving its motive power from an electric motor or motors shall be deemed to be of a horsepower exceeding 6 1-2 but not exceeding 12.

5. In measuring cylinders and boilers, and in calculating horsepower, fractions of inches and feet and fractions of a unit of horsepower are to be taken into account.

6. Where it appears that in consequence of the exceptional design or construction of the engine of any motor car the horsepower as calculated under the preceding rules is substantially less than the average power which the engine would develop in continuous use on the road if there were no restrictions on speed other than those imposed by the car itself, then such average power shall be taken as the power.

EDMONTON, ALTA., Oct. 14—Statistics compiled from government reports show that in comparison to population Alberta has more automobiles than any other province in the Dominion of Canada, there being 300 cars or one to every 124 persons, estimating the population at 374,663. Manitoba is second, having one car to every 152 persons of its population of 445,614, while British Columbia has third place, reporting one automobile for every 165 persons of a population of 392,480.

Saskatchewan is fourth. It has 2,537 cars, or one for each 194 persons of its population of 492,432. Ontario has the largest number of cars reporting 7,338, or one for each 344 of a population of 2,523,208. Nova Scotia has the smallest number of automobiles, there being one to each 852 of its population, which is placed at 492,338. New Brunswick with a population of 351,889 has 594 automobiles.

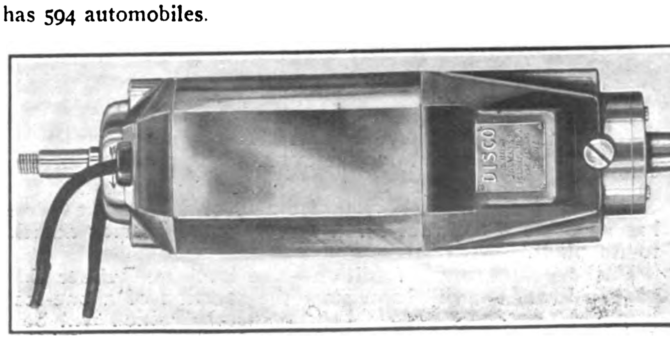
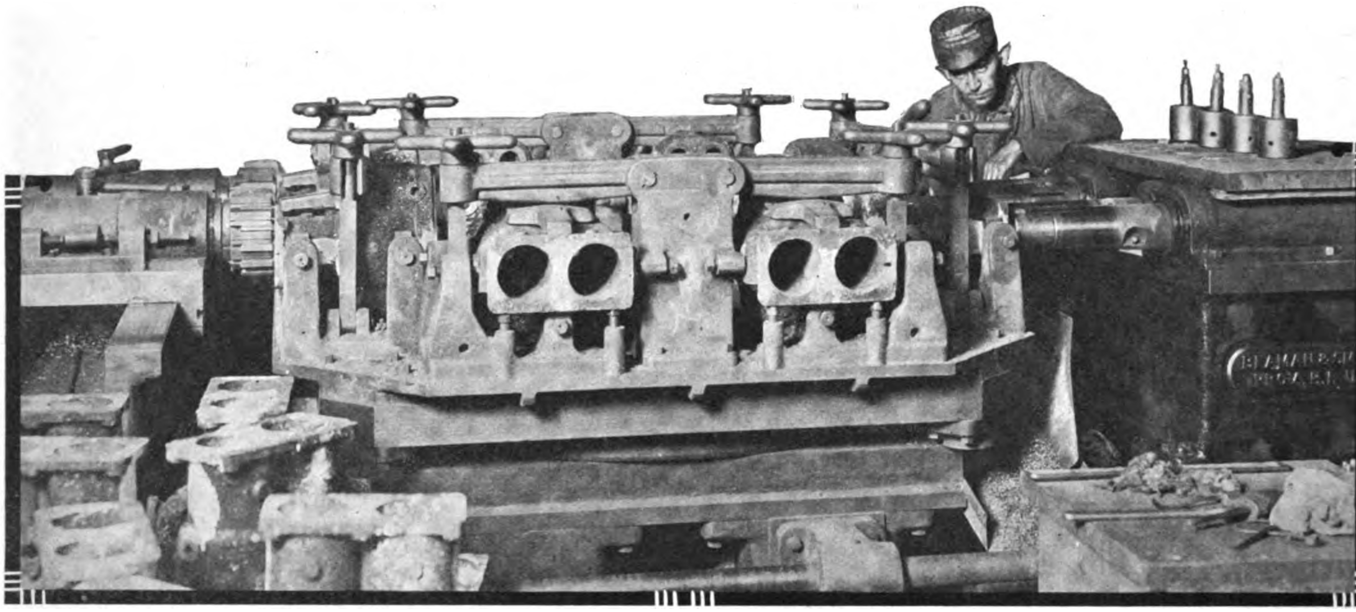


Fig. 2—Plan view of Disco electric starting-motor

Factory Miscellany



Machine built especially for use in the shops of the Packard Motor Car Company, Detroit, Mich., for boring and milling cylinders

Made specially for the Packard shops, the machine shown in the above illustration is more than justifying the expense which must necessarily be connected with the design and manufacture of a special machine. The particular work which this large machine takes care of is the boring and milling of cylinders. The large turntable which holds the work in its proper place takes eight cylinder castings at a time, that is to say, sixteen individual cylinders. This machine completely mills, bores and faces eight complete cylinder castings in 10 minutes. It can be operated steadily throughout a working day and during that time will turn out 60 complete jobs. The machine is operated by two men, one of whom takes care of the setting up of the work, while the other operates the mechanism connected with the machine. The latter operation consists in changing cutters and stopping and starting the mechanism after each new job is ready for the milling and boring operation. The lubrication and general care of the machine can also be taken care of by the second man, while the man who sets up the work can do this so rapidly that it does not interfere in any way with the steady manipulation of the machine. When this machine finishes its work a quick shift is made to a second milling table where ports, intakes and exhaust openings are milled to gauge. Altogether the arrangement is a great time-saving factor.

MERCHANTS Visit Kissel Factory—The Milwaukee Merchants and Manufacturers' Association recently made a pilgrimage to the main plant of the Kissel Motor Car Company, Hartford, Wis. As the company is about to establish a branch factory in Milwaukee, Wis., the visit was of particular interest to the business men who made the trip. Twenty-four cars met the party at the station and took them to the company's plant, where they were able to observe the building of automobiles at the height of the busy season. The accompanying photograph shows the party assembled before the factory.

Jackson's Factory Plans—The Jackson Motor Car Company, Jackson, Mich., contemplates erecting a branch factory, to cost approximately $200,000.

Planning Krit Addition—The Krit Motor Car Company, Detroit, Mich., is having plans prepared for the erection of an addition to the company's plant.

Rauch & Lang's Addition—The Rauch & Lang Carriage Company, Cleveland, O., builder of electric automobiles, will erect a large addition to its plant.

Prest-O-Lite Enlarges—The Prest-O-Lite Company, Minneapolis, Minn., has bought property 80 feet by 336 feet in St. Paul, Minn., for $8,000, and will enlarge.

Julian Company Builds—The Julian Motor Company, Syracuse, N. Y., has commenced construction of its new plant for the manufacture of automobile engines and marine motors.

Detroit Company's Plant—The Parish Manufacturing Company, Detroit, Mich., manufacturer of automobile frames, has awarded a contract for the erection of a brick addition to its plant.

Buckeye Company's Addition—The Buckeye Rubber Company, Akron, O., will soon start the erection of a one-story brick and concrete addition to its factory, which will be 40 feet by 120 feet.

Moon's 1912 Additions—In the past season many additions were made to the factory of the Moon Motor Car Company, St. Louis, Mo., increasing its capacity 65 per cent. Further additions are now being made and a very great amount of new machinery is being installed.

Walloff Establishes Plant—The Walloff Motor Truck Company, Minneapolis, Minn., in consideration of receiving a free site and free gas, has undertaken to establish a plant at Redcliff, Alta., for the manufacture of motor trucks and automobiles. The main building will be 60 feet by 150 feet.

Willard Company Buys—The Willard Storage Battery Company, Cleveland, O., has purchased the real estate and three-story brick and stone building formerly occupied by the Frost Wire Fence Company of that city. The building affords the company 50,000 additional square feet of space.

Vinot's Montreal Plant—A site has been selected in the east end of Montreal, Can., by the Vinot Car Company of Canada, and it is expected that it will be possible to turn out the finished product in the spring. The local company has a working agreement with the Vinot Car Company of France and will be helped materially through this connection.

Ford's Scientific Management—Revolutionary steps along the line of scientific management of its factory are being taken by the Ford Motor Company, Detroit, Mich. It is striving to eliminate every waste motion of its employees and all superfluous space in its buildings. Its latest move toward that end is the abandonment to a large extent of its storerooms.

Ford's Walkerville Progress—The Ford Motor Company, Walkerville, Ont., has more than doubled its production each year since 1909. The plant is being greatly enlarged. A big gas producer engine is being installed, the machine shop is being increased and every other department is being increased in proportion. This is being done to take care of the estimated production of 15,000 cars for the coming year.

Calendar of Coming Automobile Events

Shows, Conventions, Etc.

Jan. 2-10	New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11	Cleveland, O., Annual Automobile Show.
Jan. 4-11	Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-25	New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25	Philadelphia, Pa., Annual Automobile Show.
Jan. 25-Feb. 1	Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1	Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1	Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8	Chicago, Ill., Annual Automobile Show.
Feb. 10-15	Minneapolis, Minn., Annual Automobile Show.
Feb. 11-15	Ottawa, Ont., Annual Automobile Show.
Feb. 17-22	Kansas City, Kan., Annual Automobile Show.
Feb. 24-Mar. 1	Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1	Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1	St. Louis, Mo., Annual Automobile Show.
March 3-8	Pittsburgh, Pa., Annual Automobile Show.
March 8-15	Boston, Mass., Annual Automobile Show.
March 17-22	Buffalo, N. Y., Annual Automobile Show.
March 19-26	Boston, Mass., Annual Truck Show.
March 24-29	Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Oct. 19	Track, Brighton Beach, N. Y., Motor Dealers' Exhibit Company.
Oct. 19	Salem, N. H., Track Races, Rockingham Park.
Oct. 19	Narberth, Pa., Track Races.
Oct. 19	Fort Smith, Ark., Ft. Smith-Van Buren Automobile Club.
Oct. 21-25	Reliability Run, Chicago Motor Club.
Oct. 24-26-27	Track—San Antonio, Tex., San Antonio Auto Club.
Oct. 26	Track—York, Pa., York Motor Club.
Oct. 26-28	Los Angeles to Phoenix Road Race, Maricopa Auto Club.
Oct. 31	Track—Phoenix, Ariz., Maricopa Auto Club.

Proposed Contests

Oct. 19	Hartford, Conn., Races, E. W. Powell.
Oct. 26	Track—White Plains, N. Y., Geo. T. Long.
Nov. 3-5-6	Track—Shreveport, La., Shreveport Auto Club.
Nov. 15-16	Track—Richmond, Va., Richmond Automobile Club.
Nov. 28	Road Race—Visalia, Cal., W. H. Lipton.

Kelly Enlarges Plant—The Kelly Motor Truck Company, New York City, has been refinanced with a capital stock of $4,000,000, which means the enlargement of its plant.

Packard Building Addition—The Packard Motor Car Company, Detroit, Mich., is erecting a new factory building at its plant on Harper street and the Boulevard.

Mathiesen Company's Plant—The Mathiesen Spring Cushion Wheel Company, San Antonio, Tex., will install a plant at that city for the manufacture of spring cushion automobile wheels.

Plans Accessory Factory—The Ernest Lee Machine Company, Cleveland, O., has plans for an automobile accessory factory to cost $15 000. It is to be one story high, of brick and 100 feet by 320 feet.

Cheverlot's Flint Addition—The Cheverlot Motor Company, Detroit, Mich., has secured a site in Flint, Mich., and will erect a factory for the manufacturing of automobile bodies, to cost $50,000.

Hall's $17,000 Addition—The C. M. Hall Lamp Company, Detroit, manufacturer of automobile lamps, has taken out a building permit covering the erection of a two-story addition to its plant to cost $17,000.

Ross & Young's Plant—The Ross & Young Machine Company, Detroit, Mich., has acquired a site 100 feet by 200 feet, and will, it is stated, erect a new factory. The company manufactures automobile engines.

Wheel Company's Factory—The Ideal Steel Wheel Company, Cincinnati, O., makers of a new automobile wheel, will close a deal for a factory within a very short time. The transaction will involve about $30,000.

Oakland Makes 11,500 Cars—The Oakland Motor Car Company, Pontiac, Mich., plans to make 11,500 cars for 1913, necessitating a number of factory additions. A total of 300,000 square feet of space will be added.

Poppenberg's Seven-Story Building—The Poppenberg Motor Car Company, Buffalo, N. Y., has completed plans for the construction of a seven-story building at the corner of Main and Carlton streets, that city.

Building New Car—A. G. Bayerline has secured manufacturing space in the plant of the King Motor Car Company, Detroit, Mich., where he is at work on the car which he will shortly introduce to the automobile world.

Electric Company Starts—The new factory building and sales branch of the Buffalo, N. Y., Electric Vehicle Company were formally opened recently. Electric roadsters and coupés equipped with wire wheels were on exhibition.

U. S. Tire Company Busy—All of the United States Tire Company's plants will be operated during the coming winter on full summer schedule. This means that they will be run night and day, three shifts of workmen being employed.

General Vehicle Builds—The General Vehicle Company, Long Island, N. Y., manufacturers of automobiles, is receiving bids for the construction of a new factory, to be six stories high and 327 feet by 75 feet. The estimated cost is $50,000.

Factory in Hyde Park—The Lenox Motor Car Company, Boston, Mass., has increased its business so that it has outgrown its present quarters in Boston, and so a factory has been secured at Hyde Park, Mass., in which to build the product, the Boston plant being used as a service station for Lenox owners.

Inaugurate 9-Hour Workday—The Aluminum Castings Company has inaugurated a 9-hour workday schedule at its Manitowoc, Wis., plant, which is devoted to the manufacture of castings for the automobile industry. The wage schedule has been changed so that employees receive wages equal to a 10-hour workday rate.

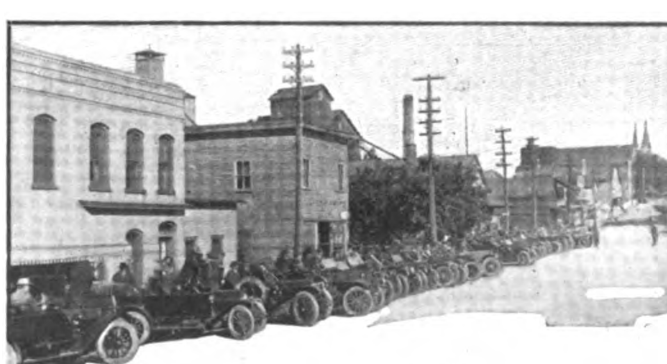
Tire Factory in St. Louis—A rubber tire manufacturing plant, to be a new industry in St. Louis, Mo., soon will be started. The concern, to be known as the St. Louis Tire and Rubber Company, will be organized in the near future. It will be capitalized at $150,000. A site for the plant already has been chosen and work will be begun as soon as possible.

Marathon's New Factory—The Marathon Tire & Rubber Company, Cuyahoga Falls, O., was recently organized for the manufacture of tires, inner tubes and a general line of rubber goods. A building is now under construction which will be 65 feet by 300 feet, and machinery will be installed as soon as possible with the expectation of beginning operations November 1.

Buy Axle Works—Thomas Walker and Superintendent Weiss, of the Weston-Mott Company, Detroit, Mich., and other associates have bought the Flint Axle Works and the firm name will be changed to the Walker-Weiss Axle Works. They will enlarge the facilities of the plant for the manufacture of automobile axles.

Rands Buy Factory—The Rands Manufacturing Company, Detroit, Mich., maker of automobile equipment, has purchased from the Pfauder Realty Company, Rochester, N. Y., the plant located at Fort and St. Antoine streets. The plant is about two-thirds the size of the fa tory now occupied by the company and will be operated as an addition to the present plant. The very latest equipment will be installed in the factory.

KisselKar Adds Plant—The Kissel Motor Car Company, of Hartford, Wis., has acquired the former Romadka trunk works on Center street, between Thirty-first and Thirty-second streets, Milwaukee, Wis., and is now converting the plant into a motor car factory which will serve as a branch of the big KisselKar works in Hartford. The Romadka Bros. Company, up to the time of its failure last spring, owned and operated one of the largest trunk and bag manufa tories in the United States, having more than 200,000 square feet of floor. Frank J. Edwards, manager for the Kissel company, states that it is proposed to use the Milwaukee branch for the production of two complete Kisselkar models.



Visit of the Milwaukee Merchants and Manufacturers Association to the plant of the Kissel Motor Car Company, Hartford, Wis.

The Chinese are beginning to yield to the lure of the American automobile. Two Overland cars arriving at Tientsin

AMERICAN Cars Abroad—Automobiles built in the United States are being shipped into every civilized country of the world. Even inhabitants of the Celestial Kingdom are becoming converts to the American machine and numbers are driving about in them at the present time. The above photograph shows the arrival of two Overland cars at Tientsin, China.

The Rittenhouse-Winterson Company, Baltimore, Md., has moved to new and larger quarters at 602 Water street.

Prest-o-Lite in Toronto—The Prest-o-Lite Company, Indianapolis, Ind., has opened a branch in Toronto, Ont.

Elmer Resigns—H. A. Elmer, president and general manager of the Grant Motor Car Company, Indianapolis, Ind., has resigned. His future plans have not yet been divulged.

Salisbury Pathfinder Manager—H. G. Salisbury, for the past few months sales manager of the Pathfinder Motor Car Company, Los Angeles, Cal., has been appointed general manager of that concern.

Baltimore's City Garage—Mayor Preston of Baltimore, Md., and the other city officials are working on a plan to establish a central city garage for storing all motor vehicles used by the municipality.

Imperial's Frisco Branch—The Imperial Automobile Company is the latest motor car manufacturer to establish a factory branch in San Francisco, Cal. G. A. Troutt will take over the Imperial interests for the entire Pacific Coast.

Purchase Tire Branch—Fred L. Harveycutter and Thornton Chesley have purchased the branch business of the Kelly-Springfield Tire Company, Washington, D. C., and will conduct it under the name of the Kelly-Springfield Tire Company.

Waite Manages Reeve Company—H. C. Waite, formerly factory manager of the G. & J. Tire Company, Indianapolis, Ind., has been appointed general manager of the Reeve Company, Providence, R. I., which concern is another subsidiary of the U. S. Rubber Goods Company.

Ordinance Strictly Enforced—The police department of Columbus, O., has issued notice that the ordinance recently enacted by the City Council providing that all automobiles must come to a full stop while passing street cars discharging passengers will be strictly enforced.

Maxwell in Toronto—The Maxwell-Stoddard Ontario Company is one of the new firms entering the automobile field in Toronto, Ont. This concern, which is the Ontario distributer for the United States Motor Company, handles the Maxwell and Stoddard-Dayton cars in Ontario.

Baltimore's Show Appointments—Messrs. John S. Bridges, Thomas G. Young, Joel G. Nassauer and Secretary H. M. Luzius has been appointed by the Automobile Club of Maryland as committee to make arrangements for the annual automobile show to be held this winter in Baltimore, Md.

Nurse Receives Automobile—The gift of an automobile tc Miss Florence Charters, visiting district nurse for the Hospital for Sick Children, Albany, N. Y., permits her to make from twenty-five to thirty daily trips, whereas by street car and walking she could visit only twelve patients a day.

Hoosier Elect Officers—Officers have been elected for the Hoosier Motor Club, Indianapolis, Ind., for the ensuing year as follows: James L. Gavin, president; Joseph R. Raub, treasurer, and W. S. Gilbreath, secretary. George Ade, the humorist, and Harold Taylor have been elected honorary members of the club.

Tire Regulations Extended—The regulations of the Treasury Department of April 22, 1912, providing for the allowance of drawback on tire treads known as Woodworth's treads, manufactured by the Leather Tire Goods Company, Niagara Falls, N. Y., in various sizes, have been extended to cover tire treads 26 by 2½, manufactured by the same company, with the use of imported hard rivets.

Boston Club Needs New Quarters—The members of the Massachusetts Automobile Club, Boston, Mass., the oldest motor organization in the Bay State, are trying to decide what to do about new quarters. The club has outgrown its present building on Boylston street and because of lack of room there is a long waiting list of prominent motorists who would like to join the club and use the garage, which is regarded as a model of its kind.

Essenkay in Houston—The Essenkay Sales Company has established an office in Houston, Tex., with H. H. Hassel as manager.

Road Bureau Established—A bureau of information has been established in Tacoma, Wash., and it is proving of great value to the touring public.

Establishes Milwaukee Auto Mart—The Auto Mart of Chicago, Ill., has established a branch at Milwaukee, Wis., with headquarters at 301-303 Watkins building.

Establishes Repair Shop—F. O. Morse has established a salesroom, garage and repair shop at 386 Brady street, Milwaukee, Wis., and will be distributor for the Crawford.

Studebaker's Mail Car—The Studebaker Corporation, South Bend, Ind., has put a test car on trial in collecting mail in Minneapolis, Minn. Services are to be given free for 60 days.

Alabama's Road Delegates—With the assembling of over 1000 delegates in Birmingham, Ala., last week at the state good roads convention, this state claims to be first in the South in good roads activity.

Lozier in St. Louis—The St. Louis Lozier Company, St. Louis, Mo., organized to take the agency for the Lozier line in that territory, has opened salesrooms in that city. Nelson S. Gottshall is in charge.

Stearns Shipments Increased—Statistics taken in July, August and September, 1912, show the shipments of the F. B. Stearns Company, Cleveland, O., to have increased 100 per cent. over the preceding year.

Does Wisconsin Business—The Galena-Signal Oil Company, a Pennsylvania corporation, capitalized at $10,000,000, has filed articles and a statement to do business in Wisconsin. The local interest is given at $10,775.

Clemens Enters Retail Business—J. Stanley Clemens, for a long time manager of the Portland, Ore., branch of Chanclor & Lyons, accessory dealers, has resigned and will enter the retail automobile business in Portland.

Ohio Affairs—The Ohio Motor Car Company, Cincinnati, O., for which a receiver was recently appointed, is being operated under the jurisdiction of the court. Every indication points to the fact that the company will be reorganized at an early date.

Changes in U. S. Tire—The following changes will take place in the United States Tire Company, Tacoma, Wash.: H. A. Farr will become manager of the Seattle branch October 1; C. H. Mayer will be promoted to the managership of the Portland, Ore., branch.

Promoting Highway Construction—An association has been formed at Lemmon, S. D., to promote construction of a highway from the twin cities to Yellowstone Park, a continuation of the Parmley road which is being built from Aberdeen to Mobridge.

Form Tire Partnership—A Weisskopf, state agent for the O'Neil Tire Protector Company, Milwaukee, Wis., and Oscar L. Bland, a well-known accessory and car man, have formed a partnership and established a general accessory and supply store in that city.

San Benito's Registration—It is claimed that no community in the United States has a greater number of automobiles for its population than San Benito, Tex. The population of San Benito is little more than 3,000 and the number of automobiles owned by the people there is 127.

Loomis Leaves Truck Business—F. L. Loomis, of Minneapolis, Minn., has left the truck manufacturing business and is looking for a line of trucks and pleasure cars. T. F. Robinson will continue the former business, which was the Robinson-Loomis Motor Truck Company, building the Gopher truck.

Alabama Receives $64,489—With the completion of Alabama's fiscal year, October 1, it is found that $64,489 was paid into the state's treasury for automobile licenses. The expense of operating the department was $9,673.35. About half of the remainder, $24,434.90, was devoted to the improvement of roads.

Fire in Specialty House—The Aluminum Specialty Company, Sixth and York streets, Manitowoc, Wis., sustained a loss by fire last week when a back fire in a gasoline engine which was being primed for starting, ignited a gasoline container, causing an explosion. The resulting fire caused only a slight inconvenience.

Error Corrected—In a recent issue an item appeared stating that the residents of Glens Falls, N. Y., addressed a petition to Governor Dix protesting against the acceptance of the new state road between Lake George and Glens Falls, and that the state executive had given assurance that the road would not be accepted until investigated. This was an error as a resident of Glens Falls states that the road had already been accepted without the Governor's knowledge.

New Automobile Agencies

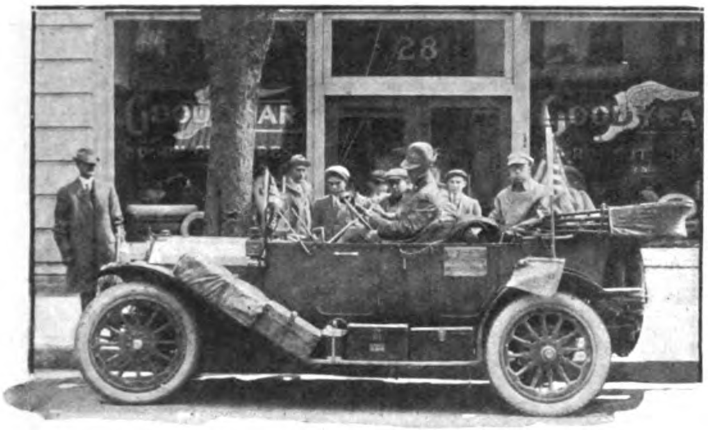
PLEASURE CARS

Place	Car	Agent
Columbus, O.	Chalmers	Broad-Oak Auto Co.
Columbus, O.	Paige-Detroit	Broad-Oak Auto Co.
Columbus, O.	Pierce-Arrow	Broad-Oak Auto Co.
Hamilton, O.	Buick	Hamilton M. C. Co.
Lancaster, O.	Empire	Mattox M. C. Co.
Lancaster, O.	Mitchell	Mattox M. C. Co.
Lima, O.	Henderson	Griffith A. S. Co.
Kokomo, Ind	Franklin	Dr. J. H. Carnelly
New Orleans, La	Franklin	Myatt-Dicks Motor Car Co.
North Platte, Neb	Franklin	J. S. Davis Auto Co.
Ottawa, Ont.	Mitchell	Stanley & Morris
San Francisco, Cal	Perfex	A. D. Perkins
Spokane, Wash	Detroiter	Spokane Taxicab Co.
Spokane, Wash	R-C-H	L. W. Gilmore
Spokane, Wash	Marion	L. E. Crowell & H. Burgess
Syracuse, N. Y	Buick	M. H. Granger
Syracuse, N. Y	Overland	O. T. F. Fitzpatrick
Toronto, Can	Rambler	C. A. Finzel
Vernon, Can	Winton	W. R. McGraw
Victoria, B. C.	Franklin	G. Harold Grant
Washington, D. C.	Columbia-Knight	Dupont Gar. Co.
Washington, D. C.	Hudson	Dupont Gar. Co.
Washington, D. C.	Little	Henderson-Rowe Auto Co.
Washington, D. C.	Stutz	The Miller Co.
Winnipeg, Can	Reo	P. F. Plews

COMMERCIAL CARS

Place	Car	Agent
Boston, Mass	Atlantic	C. D. Daly
Toronto, Can	Lippard-Stewart	W. T. Butler
Vancouver, B. C.	Dayton	O. J. Fox

This car, an Overland, dashed over a 50-foot embankment at Houston, Tex., and sustained only a slight bend in one front fender. The machine was hoisted to the street with a derrick, refilled with gasoline and driven to the salesroom



A. L. Westgard in his official Pathfinder car starting from the New York branch of the Goodyear Tire & Rubber Company on his Midland Trail through Philadelphia, Reading, Harrisburg, Chambersburg, Pittsburgh, Columbus and Dayton to Indianapolis; thence to St. Louis

Forsyth with Thomas—R. L. Forsyth has been appointed sales manager of the Thomas Flyer Company, San Francisco, Cal.

Hyde with Empire—Harlow Hyde, late of the Cole Motor Car Company, Indianapolis, Ind., has been made advertising manager of the Empire Automobile Company, Indianapolis.

Denniston District Manager—E. E. Denniston has been appointed by the Stewart Motor Corporation, Buffalo, N. Y., manager for the district covering the states of Illinois, Iowa and Missouri.

New Atlanta Swinehart Manager—A. L. Talbott has been appointed manager of the Atlanta, Ga., branch of the Swinehart Tire & Rubber Company, Akron, O., succeeding C. E. Homes, who has resigned.

MacNab with Marion—M. D. MacNab has resigned as general manager of the United Motor Chicago Company, Chicago, Ill., to become vice-president of the Marion Motor Car Company, Indianapolis, Ind.

Delegates in Automobiles—No feature of the Tri-State Good Roads meeting at Mammoth Cave, Ky., was more of a success than the idea of inducing the delegates to come in automobiles. The Nashville, Tenn., delegation occupied thirty-two cars.

Carnahan District Manager—A. T. Carnahan, of the Swinehart Tire & Rubber Company, Akron, O., has been appointed district manager in charge of Ohio, West Virginia, Kentucky, western New York, western Pennsylvania and eastern Michigan.

Aid Association Formed—The employees of the Standard Tire & Rubber Company of Boston, Mass., have formed an association called the Standard Tire & Rubber Company Mutual Aid Association for the benefit of its members when they are ill and in need.

Wilby's Canadian Tour—Thomas W. Wilby and F. V. Haney, the two transcontinental motorists, who left Halifax, Nova Scotia, on August 27 for Victoria, B. C., in search of an all-Canadian highway from coast to coast, had covered 4,000 miles of the trip and had reached Nelson, B. C.

Organize Insurance Company—A number of automobile owners of Eugene, Ore., have organized a mutual insurance company known as the Oregon Automobile Mutual Fire Association. The object is for mutual protection and relief of the members against loss by fire.

Sells 2,010 Cars—On October 1 the Ford Motor Company closed its fiscal year. The Northwest branch at Seattle, Wash., under the management of R. P. Rice, handled a total of 2,010 machines during the 12 months beginning October 1, 1911, compared with 875 cars sold in 1911.

Baltimore Motorists Indignant—Baltimore, Md., motorists are indignant at the proposed scheme of Mayor Preston to pass an ordinance imposing a local license on automobiles. They declare it would be triple taxation, as they now pay the highest registration fee of any state in the Union, and in addition they pay personal tax on their cars up to their fullest value.

Bosch Prizes Awarded—The Bosch Magneto Company, New York City, has distributed its prizes to the Vanderbilt Cup and the Grand Prize winners whose cars were Bosch-equipped. De Palmo, winner of the Vanderbilt, received $200, while Bragg, winner of the Grand Prize, received $500. Second and third places were awarded $100 and $50, respectively, in the Vanderbilt Cup, while second place in the Grand Prize received $200.

Sales in Australia—Canadian motor cars are having a large sale in Australia. About a tenth of the cars in use in the commonwealth are of Canadian make. The Canadian trade commissioner in Australia reports that in Victoria there are registered 447 cars of Canadian make. New South Wales has 376, South Australia 203 and 75 in Tasmania. One hundred additional cars have just arrived from Montreal, Que. The competition, he reports, is very keen.

Dallas Has Motordrome—Dallas is to have the largest motordrome in the world. The contract for the same was closed recently and calls for an expenditure of more than $40,000. The track will be a .25-mile saucer around which will be placed thousands of seats for the public. The company backing the enterprise is composed of such men as Louis Nicolaus, Edward Magnus, E. L. Winterman, J. S. Arthur, Louis Nolker and A. E. Koener, of St. Louis, Mo.

Automobile Ordinance Modified—The Chicago, Ill., ordinance which prohibits automobiles passing street cars which have stopped at crossings to take on or let off passengers has been modified by the City Council which recently amended the regulations so as to include all vehicles. A test case had been threatened by motorists who claimed class legislation and the city fathers, rather than risk having the law wiped off the books, made the change, which, it is thought, will make the clause ironclad.

Indianapolis Patrol Mileage—An interesting report of the mileage of motor cars used in the Indianapolis, Ind. police department during 1911 has just been filed with the board of public safety by Martin J. Hyland, chief of police. The two Packard patrol wagons covered 23,868 miles in 7,249 runs, carrying 9,139 prisoners to the police headquarters, 1,804 prisoners to the workhouse and 165 prisoners to the woman's prison. The Premier touring car used for emergency runs made 1,978 runs, carrying 401 prisoners and making a total to 12,542.1 miles. The total cost of gasoline, oil and maintaining the three machines, exclusive of the drivers' salaries, was $3,927.60.

Automobile Incorporations

AUTOMOBILES AND PARTS

Canal Dover, O.—S. Toomey Company; capital, $60,000; to manufacture and sell automobiles. Incorporators: R. I. Toomey, S. J. Brister, Theodore Williams, M. C. Toomey, Oliver Toomey.

Cleburne, Tex.—Cleburne Motor Car Manufacturing Company; capital, $10,000; to manufacture automobiles. Incorporators: H. E. Luck, W. P. Ball, Brown Douglas.

Detroit, Mich.—Detroit Motor Chassis Company; capital, $25,000; to manufacture automobile chassis. Incorporators: J. Kinucan, J. L. Stringer, William P. Culver.

Elyria, O.—Elyria Auto Sales Company; capital, $10,000; to sell automobiles. Incorporators: W. C. Bennett, F. S. Bates, Correl Smith, J. J. Dillon.

Jackson, Tenn.—Jackson Motor Car Company; capital, $5,000; to manufacture automobiles. Incorporators: H. C. Gillespie, H. D. Canfield, E. L. Bowne, W. H. Weakley, W. C. Sandifeur.

Morgantown, W. Va.—City Automobile Company; capital, $4,800; to manufacture automobiles. Incorporators: J. Leonard Yates, B. S. Dearing, N. B. Yost, Margaret Smith, Cora B. Dearing.

New York City.—Auto Bankers, Inc.; capital, $5,000; to sell automobiles on credit. Incorporators: Clyde E. Block, J. Lester Fierman, Samuel W. Schwartz.

New York City.—R. H. Conty & Company; capital, $2,500; to manufacture and sell motors, parts, etc. Incorporators: R. Henry Conty, M. Conty, Emil Frankel.

New York City.—Grant Six Company; capital, $15,000; to engage in the automobile business, etc. Incorporators: Clarence P. Hulst, William G. Miller, James B. Speyer.

New York City.—Kammer Automobile Company; capital, $10,000; to engage in the automobile business. Incorporators: Max A. Kammer, Frances Kammer, William Magsamen.

Rock Hill, S. C.—McFadden Auto Company; capital, $3,500; to manufacture automobiles. Incorporators: V. B. McFadden, D. B. McFadden.

GARAGES AND ACCESSORIES

Detroit, Mich.—Merralls Starter Company; capital, $150,000; to manufacture gasoline engine starters and other automobile accessories. Incorporators: William A. Merralls, Robert S. Neely, Harlow B. Lowland.

Goldsboro, N. C.—Blackburn Garage & Motor Supply Company; capital, $25,000; to conduct a garage and deal in accessories. Incorporators: H. C. Smith, M. M. Allen.

Hopkinsville, Ky.—Hopkinsville Cadillac Company; capital, $10,000; to conduct a general automobile and garage business. Incorporators: R. E. Cooper, T. W. Blakey, Odie Davis, Richard Levell, E. G. Peterson.

Jefferson City, Mo.—Shackelford Garage Company; capital, $2,000; to engage in the garage business. Incorporators: Addison Shackelford, L. E. Shock, Paul Gee.

Shell Road to Be Restored—The shell road around Mobile Bay, Mobile, Ala., the most famous driveway in Alabama, is to be restored.

Forsyth Salesman Thomas—R. L. Forsyth has been appointed sales manager of the Thomas Flyer Company of San Francisco, Cal.

Van Deusen Resigns—Walter H. Van Deusen, assistant general sales manager of the Abbott Motor Company, Detroit, Mich., resigned Oct. 1.

New Service Station—The Pope Hartford Company, Boston, Mass., has leased a large building on Heywood street, Cambridge, for use as a service station.

Stevens Transferred to Denver—Sam A. Stevens, representative of the Rauch & Lang Electric Company, has been transferred to the Denver branch of the company's business.

Construct Municipal Garage—The Rochester, N. Y., common council adopted last week an ordinance authorizing the construction of a municipal garage and stable to cost $30,000.

Shanks Made Sales Manager—The Kelly Motor Truck Company, Springfield, O., announces the appointment of Charles B. Shanks, formerly of the Winton, as sales manager.

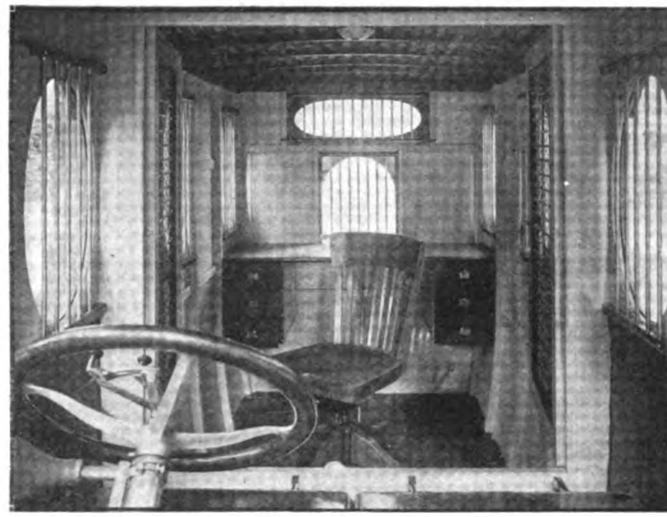
Federal Opens Frisco Branch—The Federal Rubber & Manufacturing Company will shortly open a factory branch in San Francisco, Cal., which will be in charge of L. L. Rettig.

Hickman Representing Stevens-Duryea—S. E. Hickman has been appointed by the Stevens-Duryea Company special representative for the Buffalo, N. Y., territory, with offices in the Hotel Lafayette.

Budd with Sanford—J. G. Budd, manager of the Victor Motor Truck Company, Buffalo, N. Y., has resigned to become general sales manager of the Sanford Motor Truck Company, Syracuse, N. Y.

Hall President Salisbury Company—Frederick P. Hall has been elected president of the Salisbury Wheel & Manufacturing Company, Jamestown, N. Y., succeeding Scott M. Penfield, who becomes sales manager and vice-president.

Martin Manager Buick—Robert H. Martin has been appointed manager of the Buick Motor Company's branch, Washington, D. C., succeeding T. S. Johnston, who has been made Eastern sales manager of the Republic Motor Company.



Interior of the bank on wheels now used by the city paymaster of Detroit, Mich. It is fitted up inside like a regular office which can be locked securely to prevent robbers from reaching the money. It is mounted on a Cartercar chassis

Dallas to Get Big Motordrome—A contract for a $40,000 motordrome to be built in the city of Dallas, Tex., has just been closed. The track will be one-quarter mile long and built as a saucer around whose circumference the grandstand will be arranged.

Northwestern Cole Company Formed—The Northwestern Cole Motor Company, 219 Sixth street, Minneapolis, Minn., has been formed to handle the northwest distributing business of the Cole Motor Car Company of Indianapolis, Ind. H. P. Wood is president and general manager.

Midland Changes—J. D. Beebe has been appointed general manager of the Midland Motor Company, Moline, Ill., succeeding Frank B. Wood. F. A. Padgett has been made sales manager. The company will build a 60-horsepower, six-cylinder car which will be fitted with a Wisconsin motor.

Gamble Company's New Quarters—The Gamble Motor Car Company, Toledo, O., is constructing a new building which together with its old quarters will increase its establishment to the size of one-fourth city block. The new construction will be of brick and steel, the floors being made of concrete.

Ford Joins Goodyear—J. A. Ford, of the Cleveland, O., Mechanical Rubber Company, has resigned his position as superintendent to join the forces of the Goodyear Tire & Rubber Company, Akron, O., where he has accepted a position in the experimental department in connection with mechanical goods.

Buffalo Boulevard Opened—The Buffalo-Niagara Falls boulevard, which the Buffalo, N. Y., Automobile Club was instrumental in constructing, will be officially opened for traffic November 15. Sixteen feet of the road is of brick and 16 of improved earth road, the boulevard being 32 feet wide along the entire course.

Highway Engineer Appointed—Owing to the large amount of good roads construction now in progress in Louisiana, a state highway engineer has been appointed, W. E. Atkinson, who will be at the service of all parishes to indicate proper methods of road construction and to see that roads once built are properly protected.

Federal's San Francisco Branch—The Federal Rubber & Manufacturing Company, Milwaukee, Wis., will open a branch in San Francisco, Cal., in the near future. It will be a general distributing depot for the entire Pacific Coast. E. L. Rettig, manager of the solid tire department of the Diamond Rubber Company's branch in that city, has been appointed manager of the new Federal establishment.

Apperson's Annual Meeting—The annual meeting of the stockholders of the Apperson Brothers Automobile Company was held in the offices of the company at Kokomo, Ind., Tuesday, October 8. Elmer Apperson, Edgar Apperson and T. E. Jarrard were elected as directors for the ensuing year. Later, at a meeting of the board of directors, officers were elected as follows: President and general manager, Elmer Apperson; vice-president, T. E. Jarrard; secretary-treasurer, Edgar Apperson.

Automobile Incorporations

MUSKEGON, MICH.—W. W. Butterfield & Company; capital, $10,000; to manufacture a self-starting device for automobiles.

NEW YORK CITY.—Automobile Information Publishing Company; capital, $10,000; to print and publish automobile trade lists. Incorporators: Albert F. Britton, Robert B. Johnston, Freeman C. Britton.

NEW YORK CITY.—Central Park Garage Company; capital, $500; to engage in the garage business. Incorporators: William E. Young, George J. Johnstone, Charles A. Frueauff.

NEW YORK CITY.—Motometer Company; capital, $5,000; to manufacture devices for automobiles, etc. Incorporators: George H. Townsend, Harrison H. Boyce, Frederick J. Moses.

NEW YORK CITY.—Never Skid Manufacturing Company; capital, $50,000; to manufacture non-skid devices for automobiles, tires, etc. Incorporators: Daniel E. Wing, George L. Lewis, Charles H. Stanton.

NEW YORK CITY.—Perfection Automobile Body Company; capital, $15,000; to manufacture and sell automobile bodies and appliances. Incorporators: William H. Mendel, William H. Mendel, Jr., James V. Simpson.

NEW ORLEANS, LA.—Ezeride Filler Company; capital, $1,000,000; to manufacture a tire filler. Incorporators: Ruffin R. Barrow, Gordon S. Orme, John H. Fulton, J. F. Anderson, Daniel D. Curran, Harry H. Osborn, J. Blanc.

SHERBROOKE, QUE.—Canada Tire Filler Company; capital, $150,000; to manufacture a tire filler.

ST. LOUIS, MO.—Auto Products Company of America; capital, $25,000; to manufacture, buy, sell and deal in chemicals, polishes, compounds, cements and automobile accessories. Incorporators: Warren W. Smoot, Eugene B. Stinde.

ST. LOUIS, MO.—St. Louis Motor Transportation Company; capital, $25,000; to conduct a transportation business. Incorporators: William R. Busch, Frank J. Busch, Knox Taussig.

YOUNGSTOWN, O.—Youngstown Taxi-Cab Company; capital, $10,000; to operate and maintain a taxicab business together with a garage. Incorporators: David Friedman, Sadie Friedman, Harris Friedman, Helen Friedman, Bert Friedman.

CHANGES OF NAME AND CAPITAL

CANTON, O.—Knight Tire & Rubber Company; increase of capital from $500,000 to $1,500,000.

CLEVELAND, O.—Cadillac Automobile Company; name changed to Cleveland Cadillac Company.

DETROIT, MICH.—M. & P. Electric Vehicle Company; increase of capital from $50,000 to $100,000.

JACKSON, MICH.—Clarke-Carter Automobile Company; name changed to Cutting Motor Car Company.

MUSKEGON, MICH.—Continental Motor Manufacturing Company; increase of capital from $500,000 to $2,400,000.

NEW YORK CITY.—Wrights' Garage; capital, $2,000; to engage in the garage business. Incorporators: William R. Dickie, Earl D. Wright, Elizabeth D. Wright.

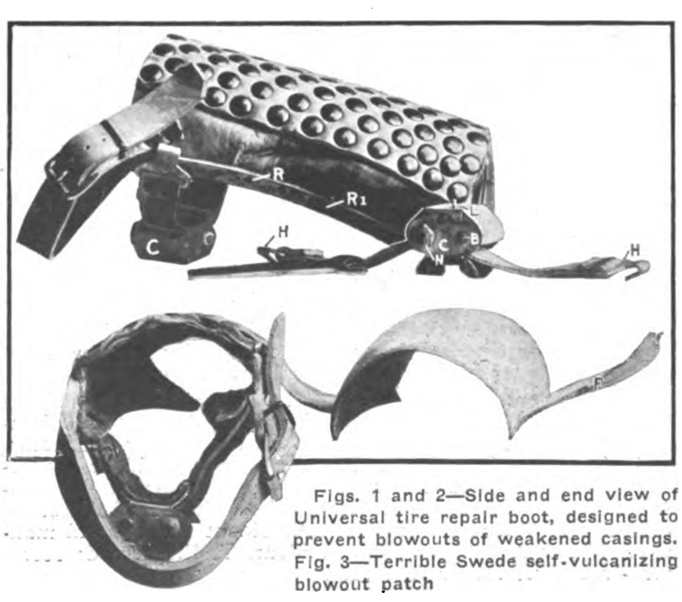
Universal Tire Repair Boot; Star Plug Switch; Automatic Valve Grinder; Wink Anti-Back-Kick Crank; Terrible Swede Tire Patch; Sound Intensifier for Hunting Noises; Rexo Vibrator Signal

Universal Blowout Preventer

ON the strength of the fact that one ounce of prevention is better than nine pounds of cure, the Universal Tire Protector Company, Angola, Ind., has brought out a repair boot by means of which threatening blowouts may be prevented. The Universal boot, Figs. 1 and 2, consists of two layers of specially tanned chrome-leather which are secured together by rivets R passing through a malleable iron rim R. The process of tanning the leather renders it so soft and pliable that the two layers easily adapt themselves to the shape of the casing onto which the shoe is applied. The method of securing the shoe to the casing is by means of three straps of the same leather as the boot itself. One of these straps has its two sections fixed to the bead portions of the boot and may be drawn tight by a buckle attached to one end of the strap. The other two straps are also made in halves which are held together by the connecting part C, Fig. 1. The latter is pierced by two bolts B, the heads of which are shaped as nuts N. The bolts carry ratchet wheels which are engaged by pawls secured to the inside casing of the part C. The pawls may be lifted out of engagement with the ratchets by pressing the end of the levers L secured to them and projecting through the casing C. When the nut is turned it winds up the strap half attached to it, both bolts being adapted for this work so that any desired tension put on the straps the hook ends H of which engage the rims R of the boot. The Universal boot is made for tires of 2.5, 3, 3.5, 4, 4.5 and 5 inches section and in the following lengths: 9, 12, 15 and 18 inches. It is furnished either with plain or studded tread, the latter type being designed for use in connection with non-skid tires.

Star Spark-Plug Switch

An accessory by means of which fouled spark-plugs may be easily located is made by the Star Motor Device Company, 1900 Broadway, New York City, is shown in Fig. 7. The switch or tester comprises three parts which are securely fixed together and one tester is permanently attached to each spark-plug through a slot which is punched in the sheet metal part of the device. This slot fits around the top end of the binding post and to it is fastened a channel-bent wire, one end of which is equipped with an insulated grip. The tester is normally in the position shown in Fig. 7, but when the engine begins to miss fire the tester wires of three cylinders are turned down so that the free end of each contacts with the shell of the plug, thereby shorting the current. This procedure is carried out with each three plugs short-circuited, and when the motor stops the cylinder whose plug is not short-circuited is proved to be the missing one. If the switch is then so regulated that the end of the wire is within .03125 inch of the shell and the other cylinders are put in operation, the following observations may be made with the missing cylinder: If a spark jumps between tester wire and shell, the plug is fouled; if no spark occurs the trouble lies in the wiring of the plug, and may be easily detected by following up the conduit leading from the distributer binding post to the plug.



Figs. 1 and 2—Side and end view of Universal tire repair boot, designed to prevent blowouts of weakened casings. Fig. 3—Terrible Swede self-vulcanizing blowout patch

The Automatic Valve Grinder

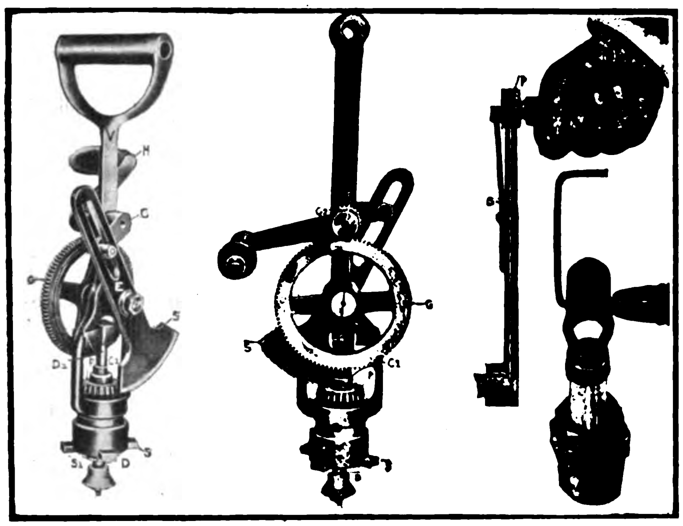
A novel type of valve grinder which has been designed on similar principles as the breast drill is being sold under the name of the Automatic valve grinder by the Specialty Machine Company, 95 Liberty street, New York. In this valve grinder the valve is kept rotating alternately in two directions, being lifted periodically and dropped back on its seat in a different angular position. The principle of operation is easily understood upon reference to Figs. 4 and 5. The device is actuated by turning the handle H of the crank C which is pivoted at P on the support V. The extension E of the segment S is slotted and the end pin of E rotated by the crank C simultaneously reciprocates in this slot and moves the extension from one side to the other. The effect of this motion turns the pinion P alternately in two directions. This pinion P is fixed to the shaft D, which is coupled to the shaft D1 by a clutch C1. The gear G1, mounted on the crank C, also actuates gear G, the inner side of which carries a cam which periodically lifts the roller R. When this occurs the clutch C1 is lifted and the same refers to the shaft H carrying the valve. As soon as the cam has passed under the latter drops and the valve again contacts with the seat, but in a different angular position as before. It is now rotated until the roller is lifted again. In order to permit the use of this valve grinder with the valve of motors of different sizes, the spring S1 is provided which is so adjustable that a greater spring pressure may be used in grinding in a large valve than a small one.

Flat Spring Wink Safety Crank

The legion of safety cranks which forms the missing link between the ordinary crank and the self-starter has been increased by another design. This latest addition is the Wink Crank, Fig. 6, which operates on an extremely simple principle. The handle of this crank is pivoted on the pin P and when the crank is used is in the position shown in Fig. 6. As soon, however, as backfiring occurs in the motor, the reversed rotation of the crank pulls the handle out of the operator's hand, due to the tension of the spring S which holds the handle in the cranking position. In all other ways this crank is constructed like the ordinary type, the inner end being shaped to fit over the keyed end of the crankshaft and acting without the agency of a ratchet joint. This crank is a product of the Wink Crank Company, 2106 Superior Viaduct, Cleveland, Ohio.

Terrible Swede Blowout Patch

A three-ply, 16-ounce fabric blowout patch vulcanized with high-grade Para rubber is being manufactured by the Hagstrom Brothers, Lindsborg, Kans. This patch is shaped to fit the inside of a vulcanized casing and has two flaps F at-



Figs. 4 and 5—Automatic valve grinder. Fig. 6—Wink safety crank, using a flat spring to counteract back-kicks. Fig. 7—Star spark-plug switch for easy locating of misfires

tached to it which fold around the bead of the casing between the same and the rim. It is not necessary in the use of this patch, which is named the Terrible Swede, to vulcanize the same in place in the tire. It merely needs to be inserted in the casing and is there vulcanized by the heat produced in the tire while running. It is made in three sizes.

Detectorphone to Locate Knocks

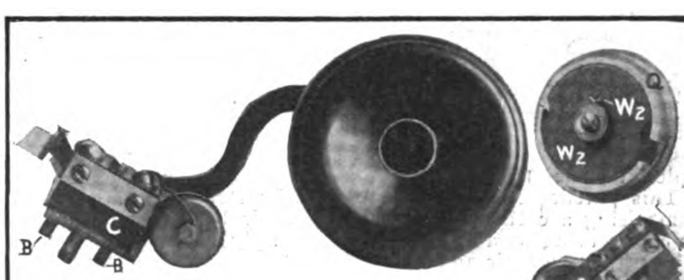
Locating knocks is no easy work, and to facilitate it the Boston Talking Machine Company, 41 West street, Boston, Mass., has designed the Detectorphone, by means of which sounds may be greatly intensified and their difference easily noted. The device, Figs. 8 and 9, consists of a sound receiver through which sound enters the apparatus, the electric conductor and intensifier, the transmitter and the operator's receiver in which the electric undulations are again transformed into sound. The exterior of the device is seen in Fig. 8, and attention is called to the push-buton P which when depressed closes a circuit and puts the instrument in operating condition. Fig. 9 illustrates the interior construction. The part C contains a coil, the armature of which is contained inside A and is subject to sound vibrations entering by way of the steel rod R when the latter is in place as in Fig. 8. The current is supplied by a dry cell inside the Detectorphone casing, which takes up the space marked on its outside (in the illustration) C1. The undulating current flows from one end of the battery through the coil and the casing of the device, while the other end contacts with a metal screw on the insulated face of the part Q. The end of an insulated wire surrounding this insulated face contacts with the wall of the casing and both wires, which are silk wound, are connected to the operator's receiver, which is held to the ear while the push-button P is pressed.

In the use of this device it is necessary to first become accustomed to the normal sound or sounds of the motor by listening to it at various portions of the power plant. Being once familiar with the characteristic sounds produced by the various parts, automobilists will by a quick inspection of their motor with this device be able to locate a knock positively and with ease.

Rexo Electric Vibrator Horn

The low-priced electric horn has been given another impetus by the action of the Dean Electric Company, Elyria, Ohio who, have brought out the Rexo, Figs. 10 and 11. The principles on which this device is constructed are the same as those that serve in the Tuto horn made by the same company. A steel diaphragm is fixed inside the flanged portion P of the horn casing by six screws S, tightness between the casing and the diaphragm being insured by the use of a circular brass washer consisting of three sections. To the center of the diaphragm a bolt is fixed and when the latter is struck by the vibrating armature of the electric magnet, which constitutes the actuating member of the appartus, the vibrations are imparted to the diaphragm, producing the warning sound which resembles that of the Tuto. The Rexo horn is 11 inches long and the megaphone has a diameter of 6 inches. The horn is finished in brilliant black, with the fittings either nickel or brass colored. The equipment of the horn includes silk-covered cable and a push-button switch.

The mechanism actuating the diaphragm is contained in the horn casing which has two portions P1 and P2, the latter serving as a cap. When P2 is removed, the contact mechanism, Fig. 11, becomes visible. A is the armature of the electric magnet and A1 an adjusting screw for the contact breaker B. The contacts T1 and T2 are insulated from one another, and while from T1 an insulated cable leads directly to one end of the magneto winding, the contact from T2 is through the screw A1, the contact breaker B and the screw S1. When by pressing a button in the circuit the contact is closed the magnetized vibrator coil attracts the armature which has the part B attached to it, thereby interrupting the circuit between B and A1. B, which is a flat steel spring, returns to its original position, and as it closes the circuit the cycle begins over again. The horn comes fully equipped with cable and push-button.



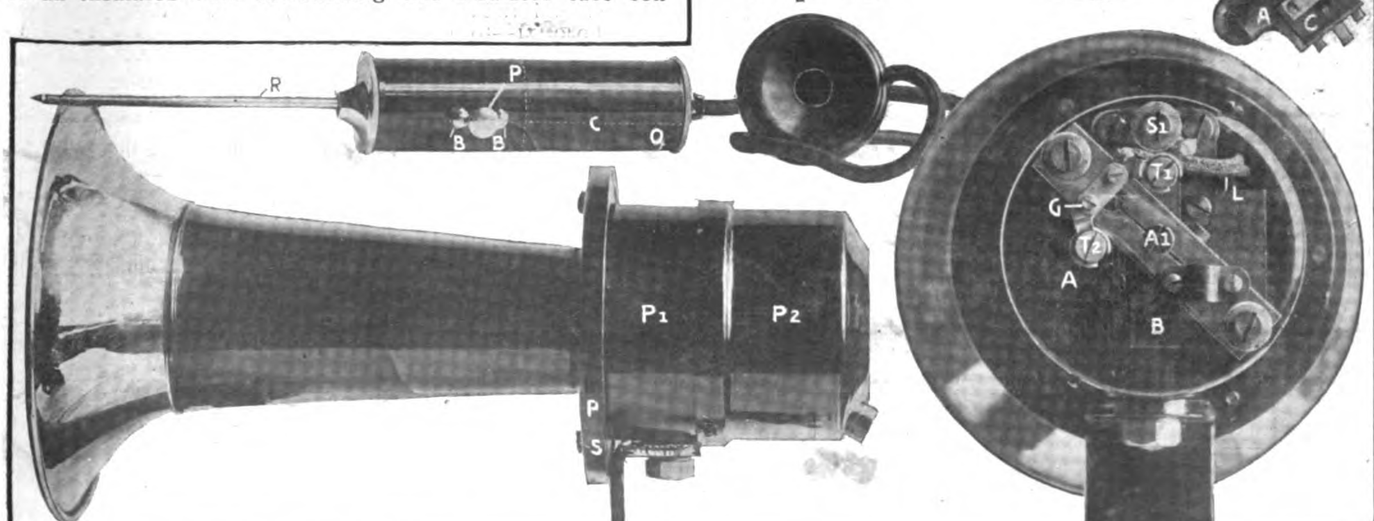


Fig. 8—View of Detectorphone which may be used as a stethoscope in diagnosing the ills of the motor. Fig. 9—Interior construction of the Detectorphone, comprising a coil-and-diaphragm mechanism, similar to a telephone construction. Fig. 10—Side view of the Rexo electric vibrator horn. Fig. 11—Rear end view of Rexo horn, showing the vibrator mechanism and terminals

INTERNAL Combustion Motor Valve—Being a sleeve which regulates the passage of gases between the interior of the cylinder and gas passages in the head.

The subject-matter of this patent, a valve mechanism, is illustrated in Fig. 1. An open-ended cylinder C is fitted with a removable head H which incloses its open end and which has admission ports A and exhaust ports E communicating with the interior of the cylinder. A partition P divides the head H in two sections, which are referred to in the patent as admission and exhaust belt. In the cylinder head a sleeve valve V is inclosd, which controls the ports.

No. 1,040,613—to Ernest Windsor Bowen, London, Eng. Granted October 8, 1912; filed November 25, 1911.

Brake Lever Lock—In which the brake lever carries a lock holding a dog in place on a toothed bar.

This patent refers to the combination of a brake lever L which carries a movable dog D adapted to engage a toothed bar B with a fixed abutment in the plane of a portion of the dog D. To enable the brake lever to be locked relatively to the toothed bar, a lock L1 is secured to L, which is fitted with a bolt; the latter may be projected by the working of a key so as to take a position between the dog and the fixed abutment and to engage both.

No. 1,040,844—to Peter F. Augenbraun, Stamford, Conn. Granted October 8, 1912; filed September 9, 1909.

Non-Collapsible Tire—Being a pneumatic design of substantial construction.

In Fig. 3 is shown the pneumatic, non-collapsible tire described in this patent comprising a substantially flat tread portion T and a seat portion. Fabric layers F are permanently embodied in the tire; of these an outer layer O extends down from the tread portion along the sides, while a layer P is arranged parallel with the tread and a third layer C is circular in shape, its office being to give rigidity to the fabric structure. Adjacent to the seat portion of the tire a riding cushion R is located, whose central portion is raised toward the tread portion of the tire. An oppositely disposed interior surface S co-operates with the cushion R.

No. 1,040,920—to Henry G. Fiske, New York City. Granted October 8, 1912; filed July 1, 1899.

Carbureter for Automobile Motors—Working on a multiple-jet principle.

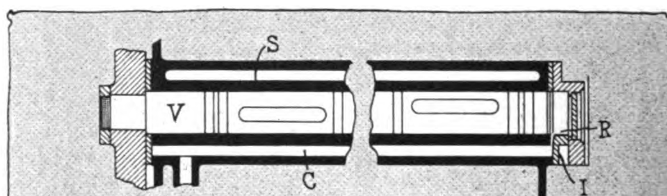
This patent has reference to a carbureter design, Fig. 4, comprising a casing including a reservoir R, with an extension C serving as a carbureter fuel supply chamber concentric to the reservoir and being shaped as an arc. This chamber is connectible to the intake manifold of an engine; it is divided into a number of circular chambers which are connected by leads C1 to the reservoir R and have independent air inlets. In each circular chamber is an independent nozzle and a controller C2 which consists of an inverted cylindrical sleeve valve movable by engine suction.

No. 1,040,414—to George P. Rettig, Richmond, Ind. Granted October 8, 1912; filed September 7, 1910.

Rotary Valve for Combustion Motors—Constructional detail for lubricating a rotating cylinder valve.

The rotating cylinder valve feature described in this patent consists in the use of a channel C, Fig. 5, formed transversely in the seat S of the valve V. In the mouth of that channel a segmental insert I forms a restricted passage R.

No. 1,040,738—to Emil A. Nelson, assignor to Rotary Valve Motor Company, Detroit, Mich. Granted October 8, 1912; filed February 5, 1910.



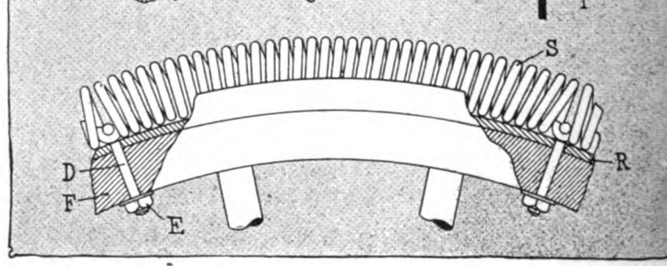
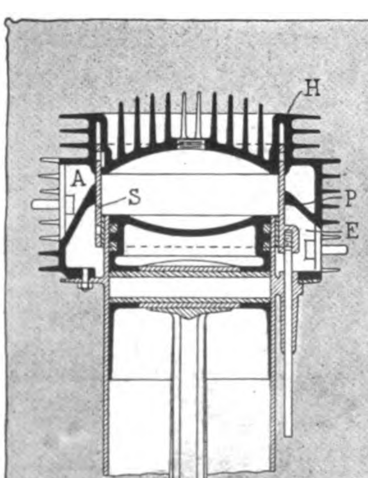


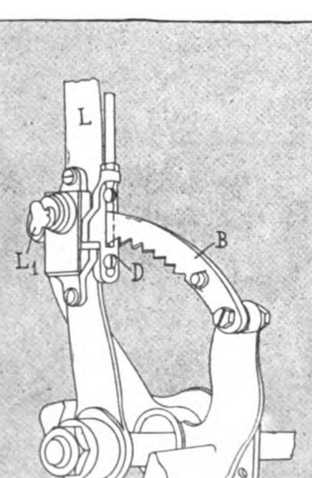
Fig. 5—Nelson rotary valve. Fig. 6—Van Smith spring tire

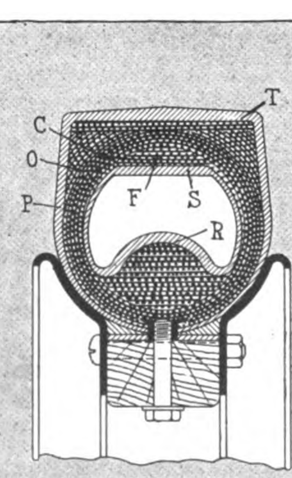
Automobile Spring Tire—In which resiliency is obtained by the use of coiled springs encircling the rim.

This patent refers to a wheel having a rim R and felloe F, the rim being of the channeled type and containing in its inner portion a coiled spring tire S. The latter consists of a number of coiled springs arranged end to end and terminating in hooks. Between the hooks pass fastening devices D which extend radially through rim and felloe.

No. 1,040,471—to Charles Van Smith, Kansas City, Mo. Granted October 8, 1912; filed September 3, 1910.







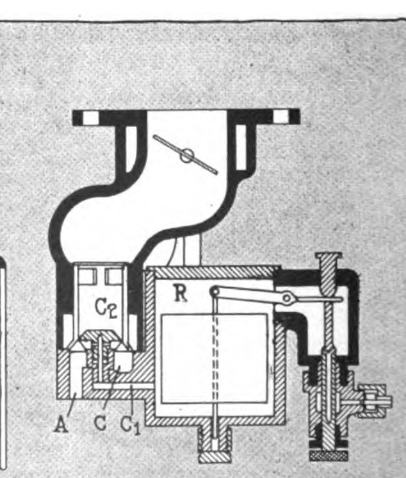


Fig. 1—Bowen sleeve valve. Fig. 2—Augenbraun brake-lever lock. Fig. 3—Fiske tire. Fig. 4—Rettig carbureter

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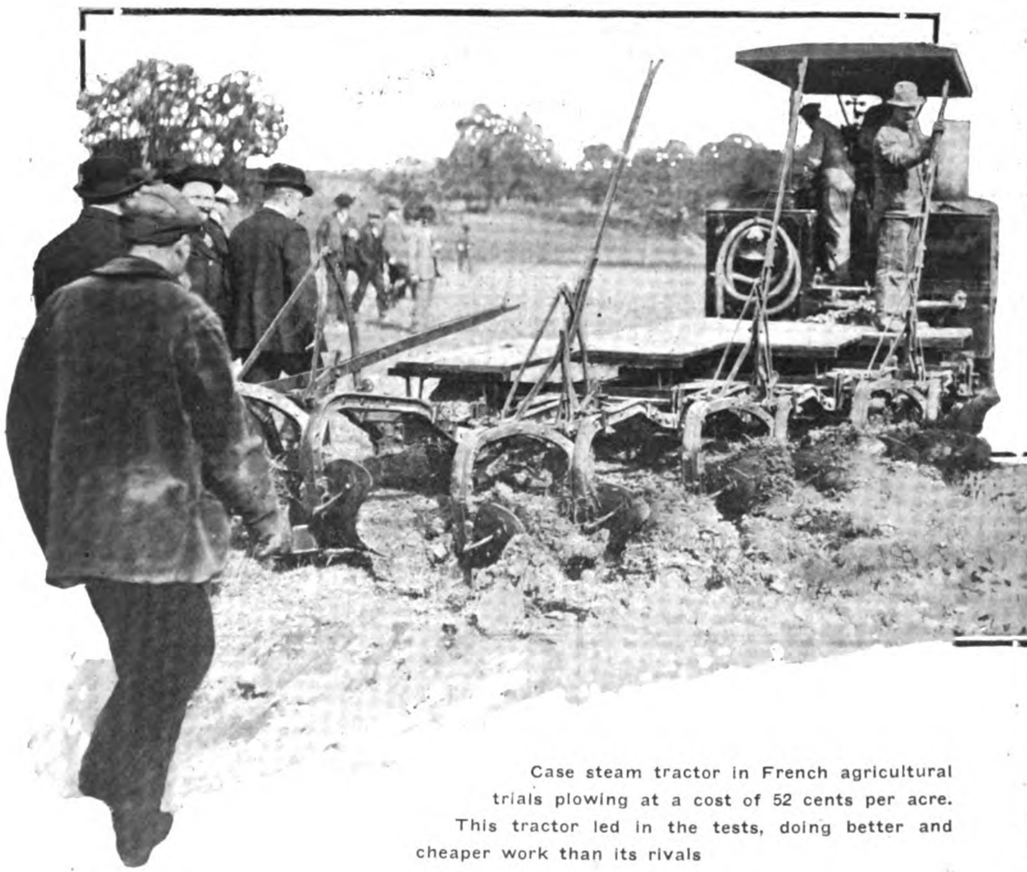
The Automobile

Motors Invade Agricultural Realm



Case steam tractor in French agricultural trials plowing at a cost of 52 cents per acre. This tractor led in the tests, doing better and cheaper work than its rivals

MOTOR PLOWING COSTS

CASE
52 cents per acre

DE MESMAY
74 cents per acre

LEFEBVRE
$1.16 per acre

BAJAC
$1.20 per acre

FILTZ
$1.22 per acre

INTERNATIONAL HARVESTER
$1.50 per acre

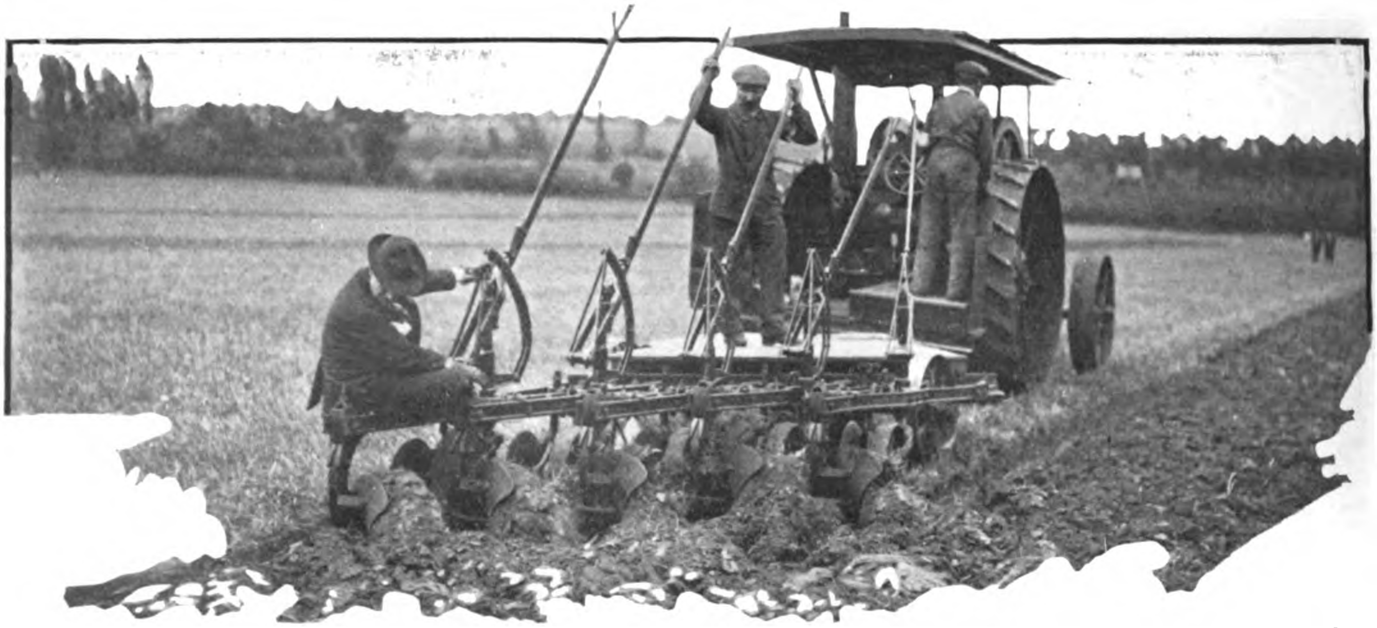
VERMOND & QUELLENNEC
$2.62 per acre

GILBERT
$5.20 per acre

BOURGES, France, Oct. 7—France and America have just competed in the most important plowing competition held in this country, in which honors were very evenly divided. The event, put on foot by the Central Automobile Club, with the assistance of the Agricultural Commission of the Automobile Club of France, united twelve machines of widely different types, nine machines taking part in the practical tests. The competition was decided on the amount of plowing done, the depth attained, ease of operation, fuel cost and freedom from breakdowns. Owing, however to the machines varying enormously in original cost, amount of work they were able to perform and number of men required to handle them, it was a difficult matter to class them in order of merit. The demonstration they gave was the most valuable yet seen in France.

On the first day the ground was bad, having a stony subsoil into which the plows stuck as soon as they attempted to reach a reasonable depth. On the second day the ground was heavy, but with a much greater depth of soil. The third day, which should have been devoted to deep plowing, was changed into a demonstration, for it was found that the ground, which had been offered by a local farmer, was so bad that no machines cared to tackle it on a competitive basis. It afterwards transpired that having very great difficulty in plowing this land to any depth by the use of horses or oxen, the farmer had conceived the idea of letting the motor machines work on it, but had neglected to state its particularly difficult nature to the committee. The ground was not uniform; thus the weak machines withdrew altogether, and the more competent appliances were held back on the ground that if they got a bad patch an unfavorable impression would be created among the public. The cost figures are considered the most authentic which have been obtained to date in such competitions.

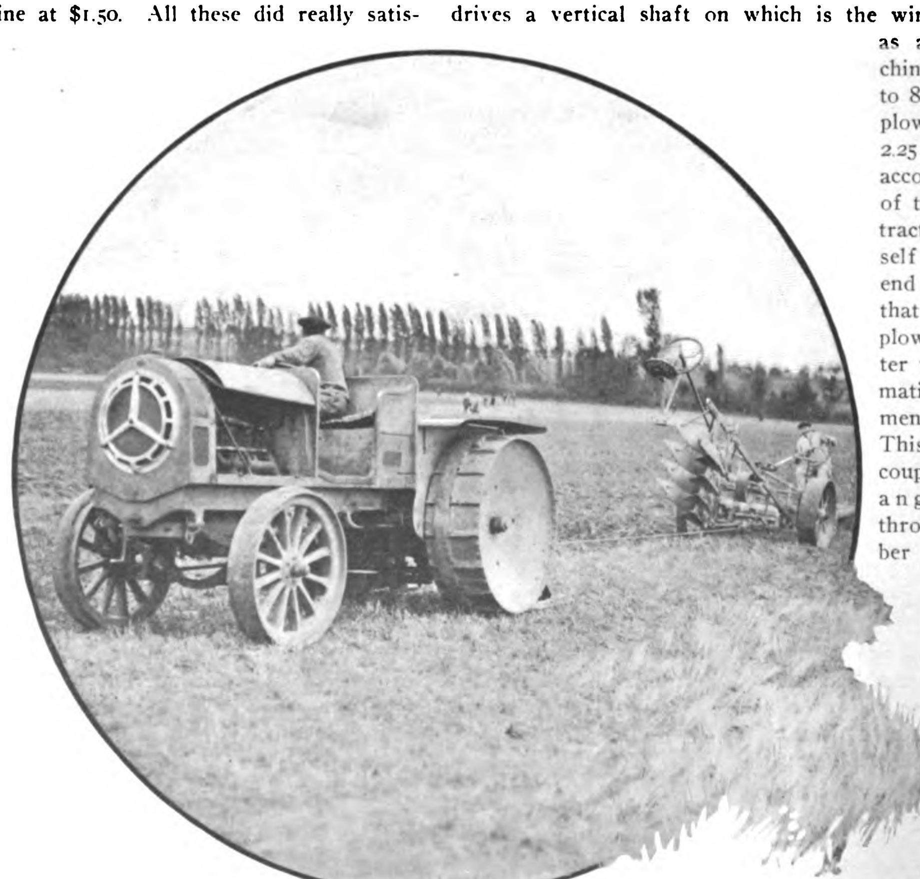
Considered from a fuel cost basis only, the most successful machine was the J. I. Case Company's steam tractor, which worked at the rate of 52 cents per acre, using compressed coal bricks of the type commonly employed on the French railroads.



Single-cylinder gasoline tractor of International Harvester Company plowing at $1.50 per acre

This was the only steamer in the competition, all the others being of the internal combustion type and all but one running on benzol. As an offset against the low price of the Case steamer must be set the fact that it employed three men, while practically all the other machines worked with either one or two operatives. The next in order of merit on a cost basis was the De Mesmay at 74 cents per acre. There was no comparison, however, between this machine and the American, for while the latter did deep plowing, and a large amount of it, the French appliance was really only a motor hoe which, with a two-blade plow attached, did a mere surface plowing. Very closely placed after these two were the Lefebvre caterpillar type plow at $1.16 per acre, the Bajac at $1.20, the Filtz at $1.22 and the International Harvester Company's machine at $1.50. All these did really satisfactory work, but with so many other factors to consider, it would not be equitable to judge of their value on a fuel cost only. The remainder cannot be considered very practical machines, for the fuel cost varied from $2.62 for the rotary Vermond & Quellennec to $5.20 for the small Gilbert.

The two American machines were the respective firm's standard models, the Case being the company's 30-horsepower steam tractor hauling a platform with eight plows, and the International Harvester machine being the 25-horsepower single-cylinder gasoline tractor working with five plows. Compared with the Americans the French machines were designed for work on small areas, they were more complicated and better finished.



Bajac drum type plowing at $1.20 per acre

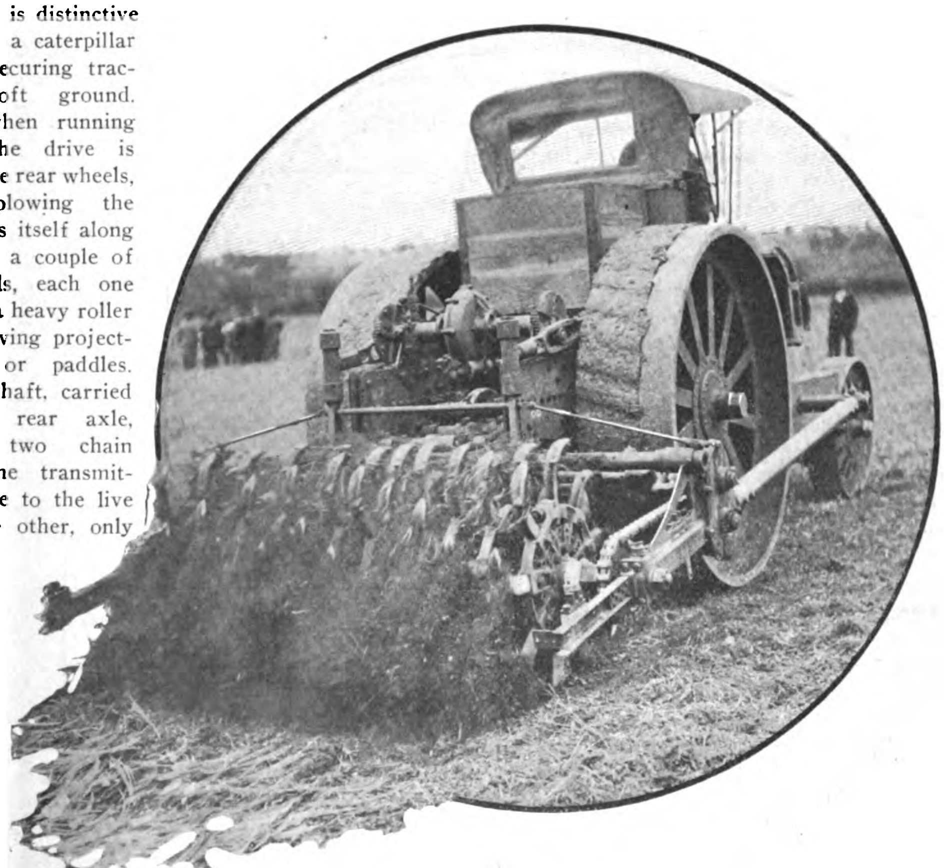
Bajac, Lefebvre and Filtz gave about equally good results, although representing three entirely different types of machines. The Bajac, which is built by the Bajac Company in conjunction with the De Dion Bouton Company, is a tractor with a winding drum having a sufficient length of cable to haul a plow across a field about 100 yards in length. The tractor carries its motor, a four-cylinder of 35 horsepower, identical with those used on the Paris omnibuses, forward under a bonnet, transmits through a clutch and a propeller shaft to a combined gearbox and differential housing, and takes final drive by transverse shafts having pinions meshing with internal gears on the large diameter road wheels. The propeller shaft is continued rearwards and drives a vertical shaft on which is the winding drum. Used as a tractor, the machine has a speed of 6 to 8 miles an hour; its plowing speed is from 2.25 to 3 miles an hour, according to the nature of the ground. As the tractor has to place itself on the opposite end of the ground to that occupied by the plow and haul this latter to it, a quick automatic locking arrangement is necessary. This is obtained by a couple of stout triangular frames through the base member of which projects a stout steel prod. Suspended at the rear, these two frames can be raised and lowered by means of a winding drum operated by the driver, and when lowered one of the sides of the

De Mesmay gasoline motor hoe worked at a cost of 74 cents per acre in the tests

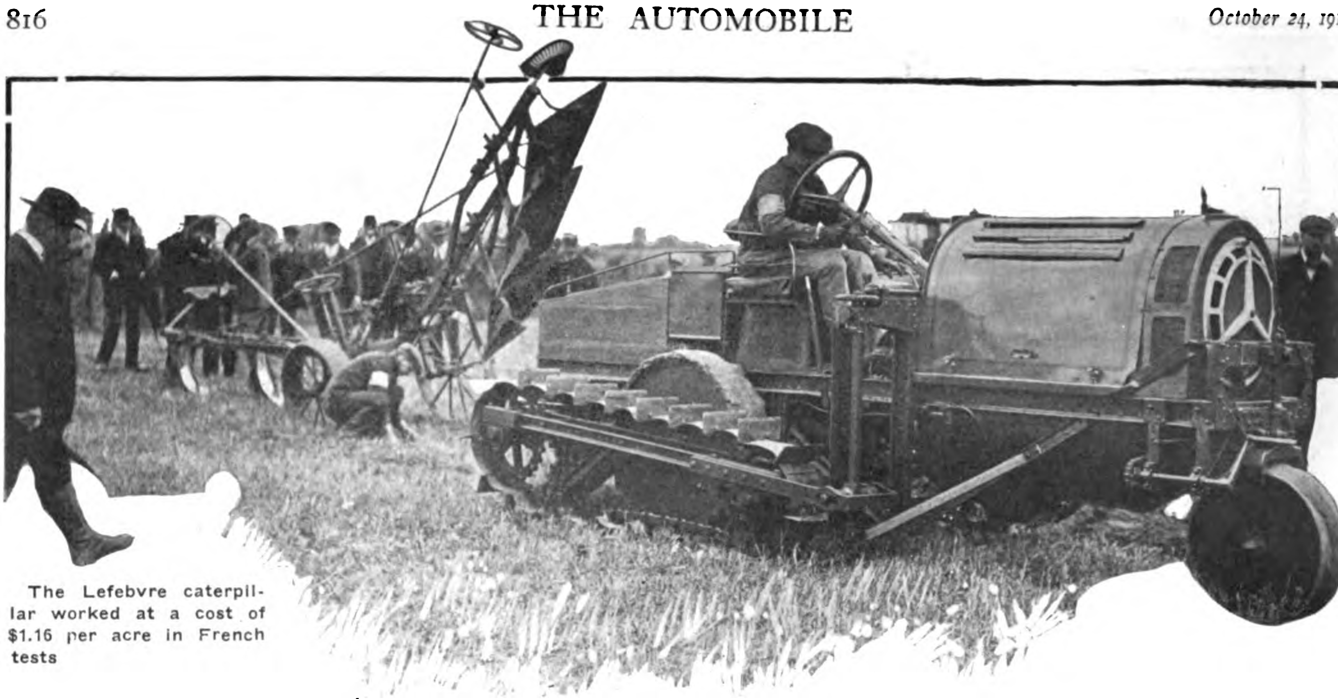
triangle is in contact with the road wheel and another is on the ground. By backing a short distance the prod is forced into the ground and the greater the strain on the cable the more tightly the rear wheels are wedged. A certain amount of time is naturally lost in running backwards and forwards on the field, but the losses are reduced to the minimum by the automatic locking device. The machine requires the services of two men, one operating the tractor and the other working the balanced plow.

The Lefebvre is a direct hauler, being a three-wheel tractor to which a balanced plow is attached. The motor is in front under a bonnet, and the single steering wheel is controlled by means of an inclined steering column with worm and sector. The machine is distinctive by reason of a caterpillar device for securing traction on soft ground. Normally, when running on roads the drive is through to the rear wheels, but when plowing the machine hauls itself along by means of a couple of endless bands, each one surrounding a heavy roller chain and having projecting blades or paddles. On the jackshaft, carried behind the rear axle, there are two chain sprockets, one transmitting the drive to the live axle and the other, only brought into use when plowing, carrying the power to a large chain sprocket on each side of the tractor. The tractor is provided with an external trussed frame, the fore end of which can be raised or lowered by a worm and screw belt driven off the motor; at the front end of this frame is a sprocket of the same diameter as the rear one, and a chain surrounding the two. Around the chain, and attached to it, is a broad leather band carrying the projecting blades already mentioned. The front end of the frame being lowered the blades enter the ground and by the rotation of the chains drive the machine ahead.

The Filtz machine is a four-wheel bogey carrying a 25-horsepower gasoline motor under a bonnet, having the driver's seat in the center and the radiator at the extreme rear. Through a cone clutch the power is transmitted to a propeller shaft, a pinion on the extremity of which engages with a crown bevel gear on a transverse shaft. There are two crown wheels on this shaft with an arrangement for bringing either one of the other into engagement with the driving pinion. On one end of the jackshaft is mounted a grooved pulley, outside the frame member, and there is a second and similar idler pulley also outside the frame member. A fixed cable rigidly attached to each extremity of the land to be plowed is given four or five turns round these two pulleys and according to which pinion is in engagement the machine will haul itself and its plow across the field in either direction. The tractor is light and simple, but it is not self-propelling. Three men are required, one being on the tractor and one at each end of the field to maintain the tension on the cable and haul the bogey to which the extremities of the cable are attached. This bogey has disk wheels and a couple of winding drums with ratchets, one being for the



Vermond & Quellennec rotary worked at $2.62 per acre



The Lefebvre caterpillar worked at a cost of $1.16 per acre in French tests

plowing cable and the other to haul the bogey along the field as the furrows are traced.

Three different types of rotary plows were presented, but not one of them went completely through the 2-days test. The Motoculture Française, the lightest and simplest of the three, carries a three-cylinder gasoline motor set across the frame, with single chain drive to the road wheel and a second chain drive from the rear axle to a second shaft having 100 flexible hooks mounted on it. Both chains are inclosed and a device is provided for raising or lowering the shaft carrying the plows. The distinctiveness of the apparatus lies in the fact that the ground is turned up by a set of flexible, spring-mounted hooks, rather than picks, of such a nature that they will bend if brought in contact with a hard object. The plowing rate of the machine is very slow, being less than half a mile an hour, working on a width of 78 inches. The machine might be suitable for soft ground, but was defective in heavy and stony earth. When it got on to the heavy clay soil of the second day it was unable to obtain traction. The motor, too, was underpowered, the engine continually overheating.

There were two Vermond & Quellennec machines, similar in principle but differing considerably in construction. Only one actually plowed, the other being held up first by mechanical troubles, then by reason of its inability to get over the soft ground to the field. The more successful of the two has a Schneider four-cylinder motor of about 4 by 5 inches, similar to the motors used on the Schneider buses in Paris. It drives the rear wheels through a clutch, gearset and jackshaft meshing with an internal gear on the rear wheels. In addition a second jackshaft is driven off the rear extension of the propeller shaft and carries a sprocket at each end from which the power is taken to the pick shaft by means of chains. The plowing in this case is done by very heavy, rigid picks, ninety-nine in number, mounted on the rear shaft. The speed is under a mile an hour for a width of 66 inches, and, although the depth attained is fairly satisfactory, with the 35 horsepower available, the machine cannot be considered a success, for the motor was constantly overdriven, was overheating and was frequently on the point of being stalled.

The De Mesmay and Gilbert machines are only of value for small work. They have very little power, the former having a single-cylinder motor, which is really only designed to work a motor hoe, and the latter having a twin-cylinder motor driving a single wheel and obtaining its traction by reason of a series of eccentrically mounted blades projecting through slots in the rim of the wheel. This mechanism gave trouble, and deprived of its blades the machine was unable to get sufficient traction.

The plowing was watched by a large number of farmers and also by an official delegation from the Paris municipality interested in motor plowing for the city's sewage farm. Conditions were arduous, but real work was done and orders were placed for motor plows. Both the Case and the International Harvester companies report that several of their plows are now working on French farms.

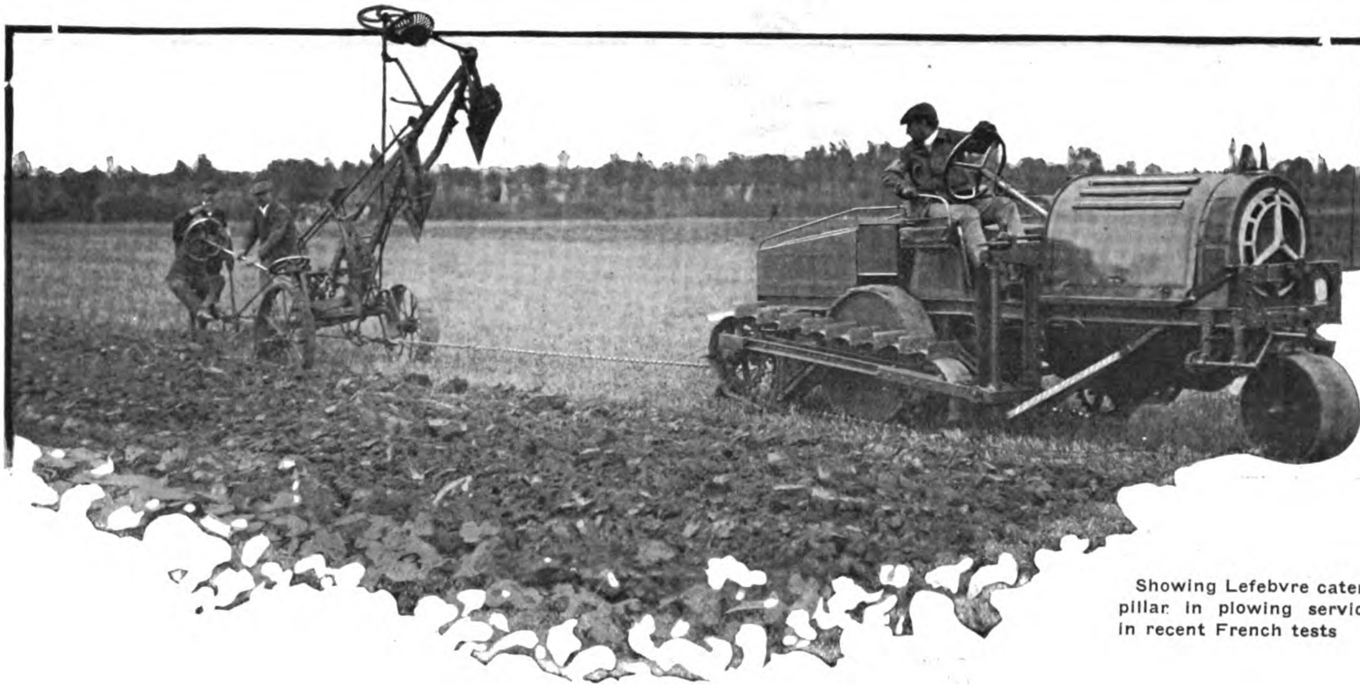
At the Winnipeg agricultural show organized by the Royal Agricultural Society of England a large number of agricultural tractors equipped with motors rated between 8 horsepower and 105 were recently exhibited and offer some figures for comparison.

The tractors haul from four to twenty plowshares when used

PLOWING COMPETITION FOR MOTOR AND STEAM DR

Machine		Width Land Plowed	Speed in m.p.h.	Depth in Inches
International Harvester Co.	1st day	74 in. 5 plows	2.2	6 to 8.2 aver. 7
	2nd day		2.6	7 to 9.4 aver. 8.2
Bajac	1st day	58 in. 4 plows	2.9*	4 to 6.6 aver. 5.6
	2nd day		2.2	5.2 to 6 aver. 5.6
Lefebvre	1st day	31 in. 3 plows	2.5	6 to 8.2 aver. 7
	2nd day		2.1	7 to 9.4 aver. 8.2
Filtz	1st day	27.5 in. 4 plows	2.8	4 to 5.6 aver. 4.8
	2nd day		2.9	5.6 to 7 aver. 6.3
Motoculture Française	1st day	78 in. 100 hooks	0.39	2.7 to 6.2 aver. 4
	2nd day			4.4 to 4.8 aver. 4.7
Vermond & Quellennec	1st day	66 in. 99 picks	0.86	4 to 7.4 aver. 5.2
	2nd day			6 to 7 aver. 6.3
Gilbert	1st day	19.5 in. 2 plows	1.6	2.4 to 4.7 aver. 3.2
	2nd day		1.7	2 to 2.3 aver. 2.1
De Mesmay	1st day	19.5 in. 2 plows	0.31	Surface plowing
	2nd day			
Case Steamer	1st day	88 in. 6 or 8 plows	2.6	5.2 to 7 aver. 6.2
	2nd day		2.2	5.5 to 7.4 aver. 6.3

*Speed of tractor only 6 to 8 miles an hour. †Benzol at



Showing Lefebvre caterpillar in plowing service in recent French tests

for plowing and some of the representative machines demonstrated ability to plow ground at $1.38 per acre. Among the exhibits was a Daimler tractor rated at 36 horsepower for which figures of cost in this variety of work were submitted. The figures showed that using gasoline as fuel the daily cost of operation, including every possible expense and working 10 acres a day, was $10.72, which would make the per acre cost $1.07.

Using kerosene the cost was reduced to $8.94 per day, or 89 cents per acre.

Conditions of actual service differ so widely one from another that any absolute standard of efficiency is impossible to reach.

One of the smaller tractors shown at Winnipeg used a six-furrow plow and in one test covering 21.5 acres it averaged 74 cents an acre.

An Ivel three-wheel tractor attracted much attention at the show. In a recent English test it was reported that a tractor of the same model using kerosene for fuel and equipped with two plowshares worked 6 acres of land in 9 hours at a cost of $5.55, or 92.5 cents an acre.

The field trials of some of the tractors used for plowing, which were displayed at Winnipeg, were interesting.

Twenty-five tractors entered the competition. The furrows were all gauged at 14 inches apart and the machines pulled all the way from four to ten bottoms. They traveled 6 miles, and the amount of land plowed depended entirely upon the number of plowshares attached to the particular machine. A fair representation of the average work done by tractors of modern type may be seen in the experience of actual users of the machines. One concern using two tractors, one of which was 20 horsepower and the other 35 horsepower, has cultivated 2,000 acres of land by their use.

One test to which this concern put the tractors was breaking up a field of blue grass sod 30 years old. The field was 15 acres in extent and the two tractors drawing plows broke up the whole field in 10 hours to a depth of 6.5 inches. With disk plows it has been found that from 65 to 80 acres a day can be worked. The tractors have two or more speeds and the usual powing speed ranges from 2 to 3 miles an hour.

Fuel cost per acre as shown in a series of tests where five plows were attached to each tractor and the acreage covered ranged from 15 to 18 per day, was in the neighborhood of 42 cents and the total cost, including up-keep, interest and insurance, was 85 cents an acre.

The tractor that performed its task quickest was an Aultman-Taylor using gasoline as fuel. It required 144 minutes to do the 6 miles. The first place as far as acreage covered is concerned went to a big Case tractor, which worked 3.79 acres in the 6-mile trip, but required 20 minutes more time.

The machine making the lowest fuel cost per acre was a Rumely using kerosene. The cost was 33.7 cents per acre. The high cost was made by a big steam tractor, being 66.3 cents per acre plowed.

The average ran around 46 cents, but it should be considered that some of the plows carried as many as twelve bottoms. In the paragraph above where the cost was given as 42 cents per acre only five plows were used.

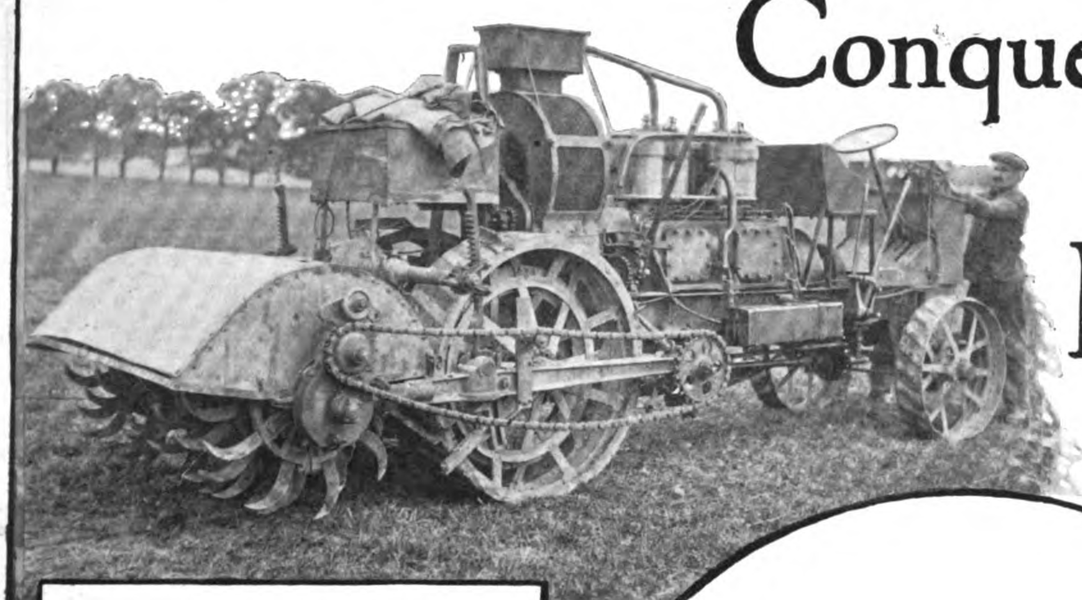
The kerosene tractor entered by the International Harvester Company required 14 minutes to make the turns, while an Avery gasoline tractor made them with a loss of only 5.7 minutes.

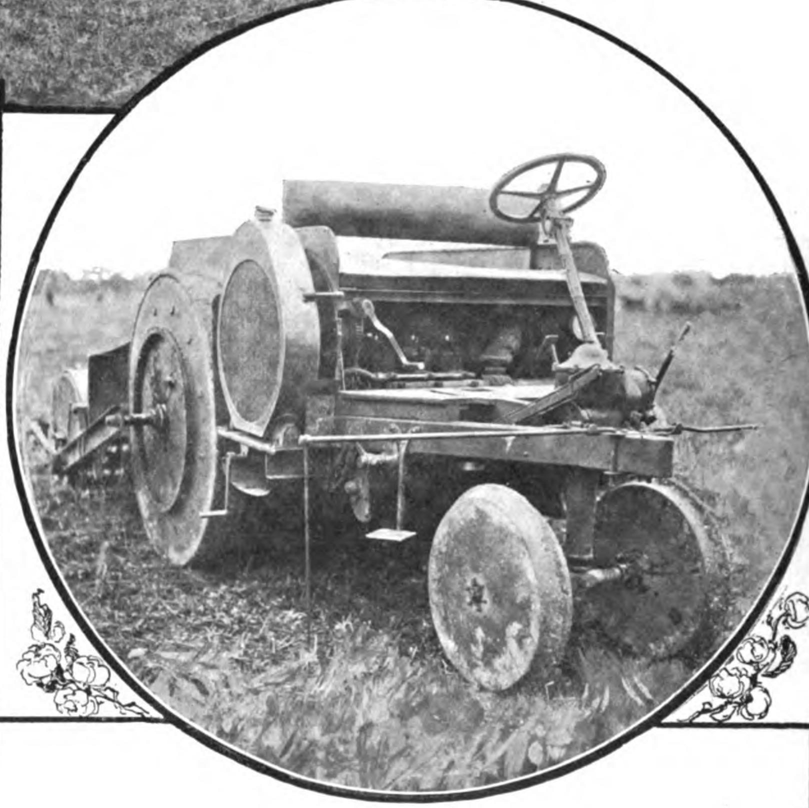
AGRICULTURAL MACHINES AT BOURGES, FRANCE

Men Employed	Fuel Used	Fuel Used, Gals.	Working Time, Hrs. M.	Total Stops, Mins.	Fuel Consumed Per Acre Gals.	Fuel Cost Per ¶ Acre†
2	Benzol	11.6 14.3	5:34 2:47	0 25	4.1	$1.50
2	Benzol	11.6 7.8	5:14 3:35	22 20	3.3	$1.20
2 or 4	Benzol	10.4 9.7	4:37 3:54	20 41	3.19	$1.16
3	Benzol	4.4 6.3	4:14 4:13	28 34	3.4	$1.22
	Benzol	10.3	3:45 1:40	0 64	9.91	$3.60
1	Benzol	13.5	5:13	0 Many	7.04	$2.62
2	Gasoline	1.6	0:44 0:58	Many Many	11.4	$5.20
2	Benzol	4.1 1.6	3:20 2:40	28 4		$0.74
3	Coal bricks	947 lbs. 661 lbs.	3:20 2:40	15 0	638 gals. of water 479 gals. of water	$0.52

a gallon; gasoline at 38 cents a gallon; coal at $7.25 per ton.

Conquering the Farm





Top Illustration

Vermond & Quellennec motor plow in operation during the recent agricultural competition, when this equipment plowed at the cost of $2.62 an acre. The V. & Q. plow is driven by a 4 by 5-inch, four-cylinder Schneider motor of the omnibus type, the drive being from the propeller shaft both to the rear wheels and the plowshares arranged on a rotating axle

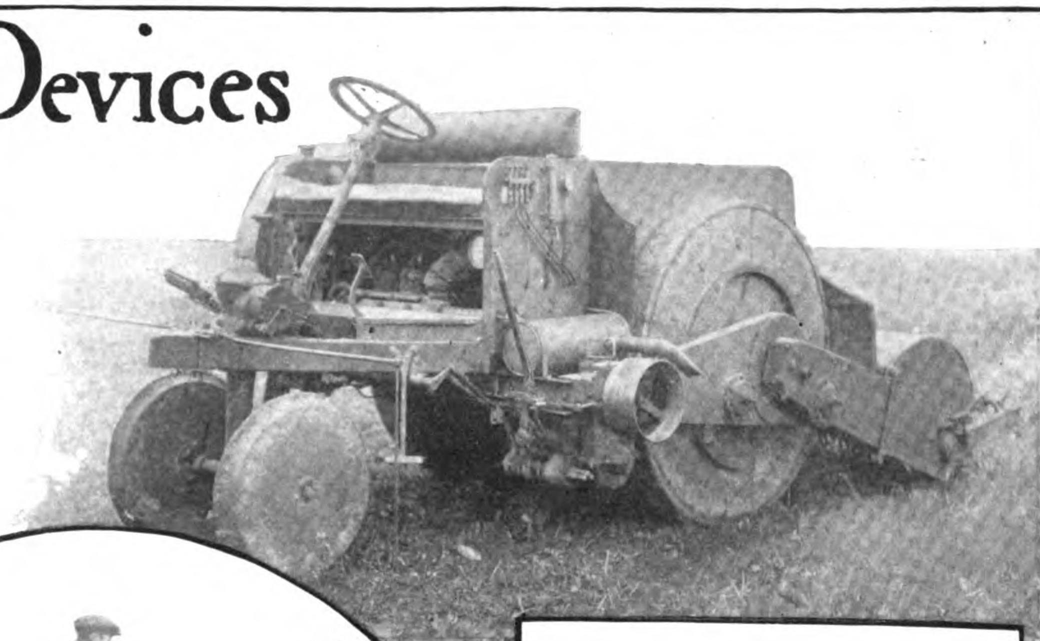
Center Illustration

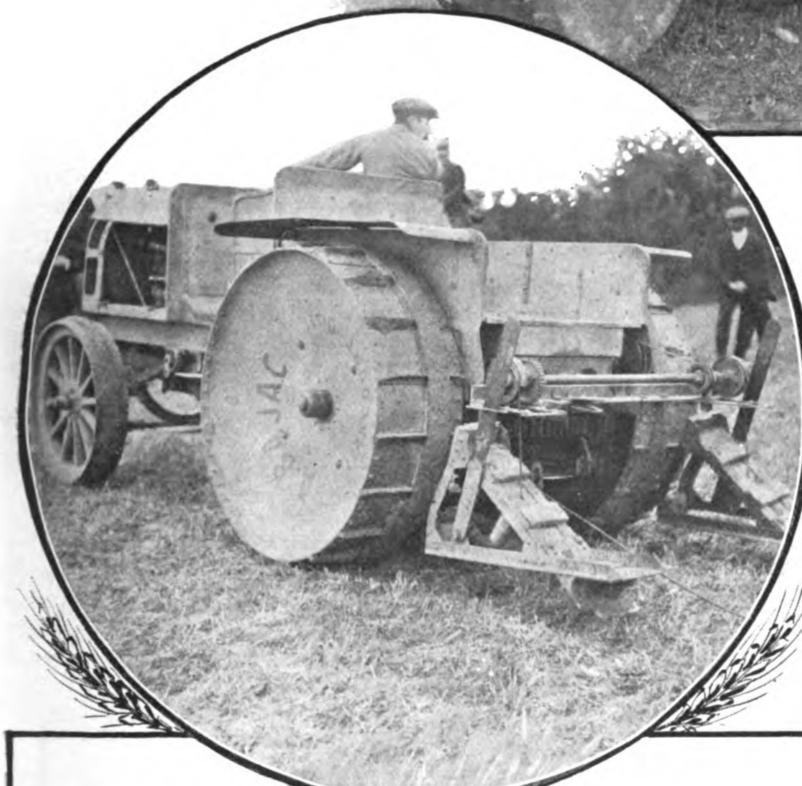
View of the Motorculture Française motor plow which was among the simplest and lightest designs demonstrated. A chain drives the road wheels and another chain the flexible spring mounted hooks which are mounted on a shaft. This type of plow is well suited for soft soil and, due to the use of an engine of low power, works slowly and at $3.60 an acre

Bottom Illustration

A typical scene during the agricultural contest, when crowds of peasants lined the paths of the motor-plows. The farming populace showed great interest in the demonstration of the novel appliances and manufacturers look forward to a lot of business with automobile farming equipment among the French peasantry during the next few years

Motor Devices Show Value





Top Illustration

Another view of the Motorculture Française tractor which, like the majority of equipments, uses benzol for fuel. This illustration shows the left side of the vehicle, illustrating the double chain drive, from the jackshaft to the axle and to the plowshare axle, both chains being incased to shield them from interference with objects on the field

Center Illustration

Tractor built by Bajac and De Dion companies, which is equipped with a 35-horsepower motor, permitting of a traveling speed of 8 miles and of a plowing speed of 3 miles an hour. The winding drum around which the propelling cable is laid is shaft-driven and vertical. The operating cost was $1.20.

Bottom Illustration

Filtz tractor driven by a 25-horsepower engine has a very automobile-like appearance. The drive to the plow mechanism is through a propeller shaft and a bogey, to the ends of which cables are attached which, in turn, are secured to the end of the furrow to be plowed, so that the machine may propel itself across the ground. This machine plowed an acre for $1.22

Peerless Increases Capital

Report Current That $1,500,000 Has Been Secured to Enlarge the Scope of the Company

Outlook Bright for Atlas Motor Car Company—Continental Motor Increases Capital to $2,400,000

ADDITIONAL finances, said to be $1,500,000, to enlarge the scope of the Peerless Motor Car Company, of Cleveland, have been secured, according to indireet reports received in New York this week. President S. J. Kittredge interested J. Robert Crouse, a multimillionaire, of Cleveland, in the project and the funds were obtained without going into the general market. Reports have been current that Kittredge was to retire from active direction of the Peerless affairs in the near future but official denials have followed the spreading of the reports.

The expansion of the truck end of the manufacturing business is given as the main cause for the new financing.

Planning to Renovate Atlas

SPRINGFIELD, MASS., Oct. 21—Attorney Edward W. Beattie, who is acting for the Atlas Motor Car Company, of Springfield, Mass., announces that despite the fact that three more attachments had been placed upon the company's property the outlook for resuming business is much brighter than ever and there is a good prospect that all the financial difficulties of the company will be settled in the near future and the concern reorganized.

At present the entire plant with the exception of the repair department is shut down, but Attorney Beattie states that if the plans under consideration go through it will mean the employment of a larger number of hands than before, when the regular list totaled 140 employees.

Continental Motor Increases Capital

DETROIT, MICH., Oct. 21—At a recent meeting of the directors of the Continental Motor Manufacturing Company the capital stock of the concern was increased from $500,000 to $2,400,000. Of this amount, $900,000 was made preferred stock and $1,500,000 common. The latter will remain in the treasury to take care of present improvements and additions to the plant, as well as to cover any dividends to stockholders. According to President Tobin, the concern is in an exceedingly prosperous condition, the entire output of the large plant being sold up through August, 1913.

Crude Rubber Easier; Price Unchanged

Crude rubber was easier in the world's markets during the past week. Quotations were practically unchanged, standing at $1.08 for up-river fine but there was an easier tone in all grades. Trade was equally balanced but some of the market sharps believe that the volume of inquiry is somewhat larger. Shipments of plantations from the East are growing steadily larger and consumers apparently are waiting for lower offerings before accepting commitments on a large scale.

Ohio Receiver to Petition Sale

CINCINNATI, O., Oct. 21—Edward G. Schultz, receiver of the Ohio Motor Car Company, having decided that it will be to the best interest of creditors and all parties in interest to sell the entire plant of the company, including the real estate, machinery, supplies, etc., at as early a date as is practicable, has made application to the court for an order to sell the property at such time, in such manner and upon such terms as the court may deem proper.

The application will be considered in open court by Wade Cushing, Judge of the Court of Common Pleas of Hamilton County, on Tuesday, October 22, at which time all creditors and others interested may appear and express their opinion with reference to said sale.

The appraisers appointed by the Court have filed their report, showing that, in their judgment, the plant as an entirety and going concern is worth $239,000 and if sold piecemeal and in separate lots, is worth $211,000. The liabilities are approximately $180,000, less the value of certain cars held by the banks.

The appraisers were A. A. Geis, connected with The Anchor Buggy Company, Wm. J. Peck, connected with The Hess Spring & Axle Company, and Cecil Evans, formerly superintendent of The Ohio Motor Car Company.

Old Knox Notes Cause Assignments

SPRINGFIELD, MASS., Oct. 21—Another result indirectly due to the recent assignment of the Knox Automobile Company and more directly due to the former difficulties of the company is that of the assignments made by William E. Wright, Albert E. Smith and Elihu H. Cutler of their real and personal property to Walter S. Robinson as trustee. The assignment was brought about because of notes held by several banks which were given by these men at the time the Knox company was reorganized in 1908. The demands of the commercial creditors of the company were satisfied at that time by giving them preferred stock in the reorganized company, but the banks holding notes of the old company endorsed by Messrs. Wright, Smith and Cutler refused to accept this stock as a settlement of their claims.

To make an arrangement satisfactory to the banks the three

Automobile Securities Quotations

The past week saw a continuation of the irregular market for automobile stocks. Goodyear gained 7 points, Goodrich 3, Firestone 3, General Motors 2 1-2, and Studebaker 2. On the weaker side were International, Lozier, Pope, which was down 3 points, and several of the other issues. The table:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co	..	..	150	165
Ajax-Grieb Rubber Co	..	..	94	98
Aluminum Castings, pfd	..	..	100	102
American Locomotive, com	34	36	43	44
American Locomotive, pfd	105	106	107	108
Chalmers Motor Company	..	..	145	155
Consolidated Rubber Tire Co., com	6	10	10	15
Consolidated Rubber Tire Co., pfd	10	20	50	60
Firestone Tire & Rubber Co., com	170	176	273	278
Firestone Tire & Rubber Co., pfd	106	108	106	107½
Garford Company, preferred	..	..	99	100
General Motors Co., common	37	38¾	36½	37½
General Motors Co., preferred	75	76½	78	80
B. F. Goodrich Co., common	*234	*238	†72½	†73
B. F. Goodrich Co., preferred	*118	*120	†106¼	†107¼
Goodyear Tire & Rubber Co., com	225	235	382	385
Goodyear Tire & Rubber Co., pfd	104	106½	104½	105½
Hayes Manufacturing Company	..	..	..	92
International Motor Co., com	..	..	17	19
International Motor Co., pfd	..	..	76	78
Lozier Motor Company	..	..	40	45
Miller Rubber Company	..	..	130	140
Packard Motor Car Co., pfd	104	106	105½	107
Peerless Motor Company	..	..	115	120
Pope Manufacturing Co., com	40	50	30	34
Pope Manufacturing Co., pfd	65	70	70	74
Reo Motor Truck Company	8	10	..	10
Reo Motor Car Company	23	25	..	22½
Studebaker Company, common	..	..	43¼	44
Studebaker Company, preferred	..	..	94	97
Swinehart Tire Company	..	..	100	101
Rubber Goods Mfg. Co., com	85	95	100	..
Rubber Goods Mfg. Co., pfd	100	105	105	110
U. S. Motor Company, com	23	25	1½	2
U. S. Motor Company, pfd	67½	68½	3¾	4¼
White Company, pfd	..	..	105	108

*Old. †New.

men took the preferred stock and divided it among themselves and exchanged their personal notes for the notes of the company which they had endorsed. All three men held executive offices in the company, Mr. Cutler at one time being president back in 1907 before its first failure, Mr. Wright, vice-president and Mr. Smith assistant vice-president and secretary, of the reorganized company. The amount of the notes cannot be learned but it is believed to be somewhere between $80,000 and $100,000. One Springfield bank has some, the others being held by banks elsewhere.

The following officers have been chosen by the corporation: W. E. Wright, president; H. G. Fisk, vice-president; A. E. Smith, treasurer; Charles H. Beckwith, clerk. A committee has been named to investigate conditions.

Dean to Make Otho System

ELYRIA, O., Oct. 21—The Dean Electric Company, of this city, has secured the exclusive manufacturing rights for the Otho electric system for lighting and starting automobiles. The device is a single motor-generator, which serves to furnish current for both lighting and starting. When the motor is in motion the system acts as a generator and when it is necessary to start the engine the functions are reversed and the system bcomes a motor. The power unit takes the place of the flywheel, thus eliminating gearing. It has no brushes or wires in the rotary part of the wheel, the winding and brushes being stationary.

Wishart-Dayton Owes $33,899

Schedules in bankruptcy filed in the United States District Court by the Wishart Dayton Auto Truck Company show liabilities of $33,899 and nominal assets of $13,569. The latter consist of one truck, a few accounts and a claim of $10,000 for damages against the Dayton Auto Truck Company. The creditors are mostly banks.

Market Changes of the Week

Lead, rubber, and tin experienced small changes in the market during the past week. Lead closed at $5.07 1-2, a loss of $.02 1-2. Rubber's decline of $.03 was due to small sales, while tin, which had a gain of $.03, fluctuating throughout the week, closed at $5.02, due to lack of speculative interests. Linseed oil, which has been constant in the market, suddenly dropped $.04, closing at $.60. This is due to the decline in seed prices at Duluth.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.	.08¼	.08¼	.08¼	.08¼	.08¼	.09¼	+.00½
Beams & Channels, 100 lbs..	1.61	1.61	1.61	1.61	1.61	1.61	....
Bessemer Steel, Pittsburgh, ton	27.50	27.50	27.50	27.50	27.50	27.50	....
Copper, Elect., lb.	.17⅜	.17½	.17½	.17½	.17⅝	.17⅝	.00 1/40
Copper, Lake, lb.	.17½	.17½	.17½	.17½	.17½	.17½	....
Cottonseed Oil, Oct., bbl......	6.26	6.25	6.27	6.19	6.04	6.04	—.22
Cyanide Potash, lb.....	.19	.19	.19	.19	.19	.19	....
Fish Oil, (Menhaden) ..	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @..	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime.	.85	.85	.85	.85	.88	.88	+.03
Lead, 100 lbs...	5.10	5.15	5.13	5.13	5.13	5.07½	—.02½
Linsed Oil.....	.64	.64	.64	.64	.61	.60	—.04
Open-Hearth Steel, ton....	28.00	28.00	28.00	28.00	28.00	28.00	....
Petroleum, bbl., Kan., crude...	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa., crude....	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine Up-river Para.	1.09	1.09	1.07	1.07	1.07	1.06	—.03
Silk, raw Ital...	....	4.40	....	....	4.40	....	....
Silk, raw Japan..	....	4.10	....	....	4.02½	....	—.07½
Sulphuric Acid, 60 Beaumé...	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs....	4.99	4.98	5.02	5.01	5.04	5.02	+.03
Tire, scrap......	.09⅛	.09⅛	.09⅛	.09⅛	.09⅛	.09⅛	....

Briscoe Resigns His Post

Organizer of U. S. Motors Makes Room for New Man Unhampered by Influences of the Past

Will Go Abroad—New Stock of $35,091,393 Company Introduced in New York Curb Market

BENJAMIN BRISCOE, president of the United States Motor Company, has announced his retirement from the leadership of the corporation to take effect about November 15. The resignation was presented to the directors 3 weeks ago, or as soon as it was apparent that the reorganization plan would go through substantially on the basis agreed to by the creditors.

Mr. Briscoe has been a prominent figure in the automobile world for many years, but has been a leader since 1910. He was one of the founders of the Maxwell-Briscoe Motor Company, Briscoe Manufacturing Company and other large and profitable concerns. He was instrumental in the formation of the United States Motor Company. He was organizer and president of the A. M. C. M. A., and at present holds the post of vice-president N. A. A. M. He is secretary and director of the Automobile Board of Trade.

Mr. Briscoe has announced that he contemplates a trip to Europe with his family, during which he will arrange several matters of importance to the extension of the export business of the company.

The new stock issues of the reorganized company have been introduced into the curb market and have been traded in conditionally since last week. All the transactions are made with the proviso that the deliveries shall be made when the stocks are issued. The new common sold as high as 11 1-2; first preferred up to 80 and second preferred at 40.

Under the proposed plan of reorganization the stock will remain in a voting trust for not to exceed 5 years, except such shares as are required for the qualification of directors. The capitalization will be:

First preferred, 7 per cent cumulative................	$11,000,000
Second preferred, 6 per cent. non-comulative..............	9,000,000
Common	11,000,000
Existing Real Estate mortgages........................	164,540
Total	$31,164,540
The total authorized capitalization will be...............	$35,091,393

In a tabulation of estimated earnings for the first full fiscal year under the reorganization, the net is placed at $1,500,000. This sum would be sufficient to pay dividends on both preferred issues and leave $190,000 for the common.

Charles H. Sabin, Henry Bronner and James C. Brady have been named as the voting trustees in whom the active rights of the shares shall be vested for a term of years.

The underwriting syndicate by which it is proposed to finance the new company has agreed to purchase for $5,720,996 all the voting trust certificates representing the stock allotted to assenting stockholders.

The Central Trust Company, of New York, has been designated as depositary for securities and claims.

The return day for the court action commenced by the Brown & Sharpe Manufacturing Company is October 28, when it is expected that the official status of the proposed reorganization will be determined.

Benjamin Briscoe, in referring to his forthcoming departure from the company, said: "I am going away for a rest and one of the main objects will be to regain the correct perspective of things. I believe that some other man, unhampered by any of the old influences and traditions of the company, can carry it through successfully. I have been asked to remain, but I feel that it would be better for me to go."

Willys Adds $10,000,000 Capital Stock

Willys-Overland Capital $25,000,000—Banker Buys $7,900,000—Willys Retains 75 Per Cent. of Stock

Conservative Expansion To Follow—No Changes in Management—Willys Retains the Presidency

John North Willys, president of the Willys-Overland Company, Toledo, O., has increased the capital stock of this company from $15,000,000 to $25,000,000 and in doing so has sold outright $7,900,000 common and preferred stock to Wm. Salomon & Co., bankers, 25 Broad street, New York City, and retains 75 per cent of the company stock himself. Under the new capitalization the division of common and preferred stock is as follows:

Total capitalization	$25,000,000
Common stock	20,000,000
Preferred stock	5,000,000

The ownership of this stock is divided between Mr. Willys and the Salomon company as follows:

J. N. Willys common stock	$15,000,000
J. N. Willys preferred stock	2,100,000
W. Salomon & Co. common stock	5,000,000
W. Salomon & Co. preferred stock	2,900,000

The purchase of $7,900,000 by Salomon & Co., in common and preferred, means that this will be for general sale and application will be made to have this stock listed on the New York Stock Exchange.

Up to the present time Mr. Willys has been sole owner of Willys-Overland stock, both common and preferred, and this issue of additional capital and its sale means that Mrs. Willys will practically take this amount of money in cash to himself.

No changes will be made in the direction or control of the Willys-Overland Company because of this expansion. Mr. Willys, who is now president, will continue in this capacity and direct the affairs of the organization as he has done in the past, and his able corps of lieutenants will be continued. There will be a gradual and conservative expansion of the company as well as of the five subsidiary companies, namely:

Kinsey Mfg. Company	Toledo, O.
Federal Motor Works	Indianapolis, Ind.
Garford Mfg. Company	Elyria, O.
Morrow Mfg. Company	Elmira, N. Y.
Gramm Motor Truck Company	Lima, O.

No changes will be made in the management of these organizations, of which the Willys-Overland Company is a holding organization, the $25,000,000 stock of the Willys-Overland Company representing the stock of these companies, which are as follows:

Kinsey Mfg. Co., capital	$3,000,000
Morrow Mfg. Co., capital	1,000,000
Federal Motor Works, capital	300,000
Gramm Motor Truck Co., capital	1,500,000
Garford Mfg. Co., capital	2,000,000

While purchasing practically 25 per cent. of the Willys-Overland stock Wm. Salomon & Co. will not be represented on the executive committee, but it is understood that the board of directors will be increased from five to seven and that the two added members will represent the Salomon capital, giving Willys a representation of five.

With the ending of the Willys-Overland fiscal year on June 30, 1912, the statement showed a profit of $3,300,000 for the previous 11 months. Prospects are that for the coming year this will be greatly increased. The company is at present shipping 150 cars per day. The output for 1913 is 40,000 cars, and for the year following 60,000 is the mark. The company will ship 15,000 cars from July 1 to December 31 of this year.

All of Mr. Willys' capital is not tied up in the Willys-Overland and subsidiary companies, but he has additional investments of $3,000,000 in other companies in the automobile business, so that his present holdings in the industry total $20,100,000.

At present the working force in the various Willys interests are as follows:

Willys-Overland, 5300; Kinsey, 1200; Morrow, 1000; Garford, 900; Gramm, 400, and Federal, 300. Total, 9,100.

These companies are engaged in the following manufacture: Kinsey makes frames and radiators for the Overland and the trade in general; the Morrow company manufactures gearset, universal joints and screw machine parts for Overland and the trade; the Federal manufactures motor and repair parts for the trade; the Garford company builds pleasure cars and trucks, and the Gramm company builds trucks.

Mr. Willys has announced some future plans for the Gramm and Garford concerns. Attention will be focused in the Gramm on bringing out a new 150-pound delivery truck, and at the Garford a new six-cylinder car to list around $2,500 will be brought out soon.

During the last 10 days rumors have been frequent to the effect that a merger of the Willys and other factories were on foot, but Mr. Willys positively denies such and officially states that the increased capitalization and sale of stock to Salomon are the only negotiations that have been on foot.

Bayerline in Charge of King Plant

Detroit, Mich., Oct. 21—The King Motor Car Company, the entire assets of which were purchased outright by Artemus Ward, of the firm of Ward & Gow, of New York City, has been placed on a sound financial basis by its new owner. Already operations have been commenced in the plant for the turning out of the new models for the 1913 season, which consist of a roadster, tuoring car and coupé. The personnel of the new company has been changed and it is in the hands of men who have had long experience in the automobile industry. J. G. Bayerline, formerly connected with the Pope-Toledo, Pope-Hartford, Oldsmobile and Hudson companies and up to a short time ago vice-president and general manager of the Warren Motor Car Company, has assumed the management, while T. A. Bollinger has been made factory manager.

It is the intention of the new King company to protect owners and all guarantees issued by the old concern will be assumed. It is also announced that a cômplete supply of repair parts will be carried in stock, and that deliveries on the new models are now being made. The cars will continue to be sold under the trade name of King.

Tractors Busy in Canadian Fields

Winnipeg, Man., Oct. 21—During the past summer 6,500 motor tractors have been breaking new land for crop next year in the Canadian west. Putting their daily average at the extremely low figure of 10 acres a day, and allowing them 60 days' work during the season, this would represent 3,900,000 acres of new land for 1913, and to this must be added the many thousand acres that have been broken by horses and oxen.

Daimler Import in Bankruptcy

Bankruptcy proceedings have been instituted in the United States District Court against the Daimler Import Company, which up to a short time ago represented the importation of Mercedes cars and trucks into the United States. The crisis resulted from alleged non-payment of rent to Harry Content & Company, owners of the premises at 751 Fifth avenue. The claim is for $1,826. The Daimler Import Company was incorporated under the laws of New York in June, 1910, and the capitalization was placed at $300,000. The recent agreement or compact with the Paul La Croix Automobile Company to handle the pleasure cars of the line and the achievement of the rights to import and manufacture the truck line by the General Vehicle Company foreshadowed some developments with regard to the importing company.

Judgments in favor of banking creditors have been rendered against the company within the past week amounting to $23,278. Nobody with any substantial interest in the company would predict its future course and Paul La Croix stated that he understood that the concern had been practically abandoned.

La Croix Threatens Mercedes Infringers

Aggressive action on the part of the American representatives of the Mercedes pleasure cars has been indicated by the announcement made by Paul La Croix, of New York, licensee of the Daimler Manufacturing Company, that infringement of the Mercedes patents and the license rights of the La Croix company will result in prosecution.

The chief element of the difficulty is that a number of Americans have purchased Mercedes cars abroad and imported them without paying license to La Croix. The broader question of patent infringement is included in the problem but is not foremost as a factor in immediate action.

Solid Tire Company for Cincinnati

CINCINNATI, O., Oct. 21—The Ideal Steel Wheel Company, a new Cincinnati corporation, has bought the former plant of the Seufferle Cooperage Company. The transaction is said to have involved $41,000. The new corporation, formed under the direction of the Kirgen-Parker Company, expects to produce a solid tire. The general dimensions of the building just acquired are 200 by 226 feet, together with several minor structures. According to the president of the company, this will be greatly enlarged. J. B. Fitch is president; J. E. Strielmeiler, the inventor of the tire, vice-president; E. H. Massey, treasurer, and Harrie Walker, secretary and manager.

Mexican Row Cuts Rubber Profits

Owing to the Mexican revolution the profits of the Intercontinental Rubber Company for the fiscal year ending July 31 showed a large decrease as compared with the previous year. The net profits from operation, available for dividends and surplus were $1,108,959, a loss on that item of $1,531,559, in comparison with the showing of 1911. Regular dividens were paid on the preferred stock, amounting to $87,500, but the distribution on the common was passed. The company earned an amount equal to 3.52 per cent. on its common capitalization of over $29,000,000. The insurrection caused a halt in commercial shipments as well as cultivation of guayule. The situation is rapidly improving in the vicinity of the company's properties and a resumption of business on a broad scale is probable in the near future.

Souther to Study Wire Wheel Rims

Henry Souther, metallurgical expert and former president of the Society of Automobile Engineers, has sailed for Europe in company with two representatives of the Standard Roller Bearing Company to inspect the plant of the Rudge-Whitworth Company in England and to visit other manufacturing plants on the continent.

It has been announced that Mr. Souther and his party will make a special study of the combination of the Sangster-Houk demountable rim with wire wheels of the type made by the Rudge-Whitworth company.

British Gale Is Thin Air

English Expert Says That There Is No Foundation for Report of Giant Company to Fight America

Government Asks Bids for Automobiles to Be Used in the Service of Various Departments

COVENTRY, England, Oct. 14—I do not know where your New York correspondent gets his information from, but he is considerably at sea when, in your issue of September 26, he writes and talks of the formation of a $25,000,000 capitalization here to compete with the American cheap cars which are coming over here in quantities. You can take it from me that there is not $25,000,000 in this country available for any sort of wildcat scheme which financiers choose to put forward, but the real trouble with the British industry is that adequate capital is lacking for dealing with it as it should be dealt with and the failure of your big combination to make good does not help things any..

The truth about this story of the $25,000,000 company to meet American competition is that one of our halfpenny papers—what you would term the yellow press—got its hair off over the success of the Ford and beat the big drum on the decline of British industry and the Americans sweeping the board. One or two of our impressionables here in trade, who were out for a bit of self-advertisement as much as anything else, played up to them, with the result that the paper gave a swagger invitation dinner to the trade to discuss things. None of the representative British houses took the trouble to go, but a few others attended at the dinner and talked, and the talk was around a wholly impracticable proposal—of Mr. William Letts—for a combination of British firms to make a cheap car and another suggestion was that a $2,500,000—not $25,000,000—independent company might be formed for the purpose. The general result of the discussion was a beating of thin air. Both suggestions were turned down as unworkable and, having digested the newspaper's good dinner, the crowd went home. And I think you can leave it at that. Our manufacturers of class cars are not tumbling over themselves to get into the cheap trade any more than are the Peerless, Packard, Pierce-Arrow and other makers on your side who are making similar class machines.—HENRY STURMEY.

Government Seeks Bid on Automobiles

WASHINGTON, D. C., Oct. 21—More than ordinary interest attaches to a call for bids issued by the general supply committee of the government departments for furnishing various branches of the government service with both gasoline and electric vehicles. The bids will be opened in this city October 29. Complete specifications are given in the blanks to be furnished manufacturers who have been asked to submit proposals. The specifications have been standardized by the Bureau of Standards, the purpose being to have trucks of a distinct type in the government service in the future. The specifications call for bids on trucks ranging from 1,000 pounds to 3,000 pounds capacity. The small trucks are intended for mail wagons, but the government does not yet know whether it will buy small or large machines or how many of each type after the sizes have been determined by actual test.

The object of asking for bids on different types of cars, both electric and gasoline, is to obtain comparative information as to prices, etc. Manufacturers are told that for the present probably not over six machines will be bought, but that this number will be increased in the future.

G. M. Profits $4,746,756

Company's Net Earnings for Fiscal Year Come to That Amount—Surplus of $2,856,082

Gross Business Totaled $64,744,496—A Gain of 50 Per Cent. Over 1911

DETROIT, Oct. 21—The annual report of the General Motors Company for the fiscal year ending July 31, 1912, has been issued. The gross business done during the year reached the enormous figures of $64,744,496, as against $42,733,303 in 1911, or slightly over 50 per cent. increase. The net profits of the year were $4,746,756. Fixed charges of $850,463 for interest on the 6 per cent. loan and dividends on the preferred stock of the company of $1,040,210 are deducted from the net manufacturing profits, leaving a surplus of $2,856,082.

At the end of the 1911 season there was a surplus in the treasury of $1,240,175 and by adding the surplus for the year ending last July the total surplus was brought up to $4,096,258.

Prior to October 1, 1910, certain inventories were made covering material and assets that are now considered obsolete. Last year a part of this obsolete material was written off and this year, following the usual rule, the directors have wiped out $2,833,594, which is practically the amount of additional surplus accumulated during the past year. After making this deduction the surplus account stands at $1,262,663.

The subsidiary companies operated at a profit of $5,770,177, but from that sum losses of $1,023,421 are deducted, covering the operations of unsuccessful concerns affiliated with the big company. The report states that all the subsidiaries completed their manufacturing schedules on time and disposed of all their product before the close of the fiscal year.

The inventories have been given a rigid examination with the result referred to above, and President Neal states that the action of the directors in writing off and abandoning the eliminated items will afford material relief to the manufacturing and sales organizations and make for further efficiency as the organizations will not have to try to salvage obsolete and undesirable models, materials and products.

With regard to the distinct plan of centralization that has been introduced since the new management took control of General Motors, President Neal says:

"Accordingly, your directors have been gradually concentrating the operations of the smaller companies with the larger and more profitable companies, or else, in some cases, eliminating the greater part of their machinery operations and so turning the operations of the smaller companies into plants merely for the assembly and distribution of automobiles. This policy was inaugurated cautiously, and necessarily has proceeded slowly. The transfer of the manufacturing operations has in most cases involved the completion of the entire operations in hand at the smaller factories and also generally the design of new models for the necessarily standardized output of the larger factories could be utilized. This process has gathered momentum during the year just closed, and will be continued in the case of several of the companies during the coming year, the machinery of the smaller plants being gradually concentrated at the larger manufacturing plants."

This explains the course of the company with regard to the Marquette and Elmore factories.

Motors for the automobiles of some of the smaller companies are made by the Northway Motor & Manufacturing Company, which produced 10,430 last year and is scheduled to make 20,000 during the current fiscal season. All the product of the motor company is not used by the General Motors subsidiaries and the surplus is sold to outside manufacturers of automobiles. According to the report, the advantage of centering engine manufacture in a special plant lies in the fact that the smaller users get a better motor for less expenditure of money, time and trouble.

The foreign business of the company, exclusive of Canada, has about doubled and was approximately $1,700,000 during the past year.

The Weston-Mott Company, which makes axles for several of the subsidiaries and the stock of which was about half owned by General Motors, has been fully purchased. The outstanding capital stock, amounting to 50.2 per cent., was purchased by exchange of securities, of which $520,000 of common and the same amount of preferred was a part.

The number of employees at the time the report was made, which was some time after the close of the fiscal year, was 17,173. This compares with the high number in 1911 of 11,474 and 1912 of 16,584. President Neal in conclusion states that during the first 2 months of the present fiscal year the receipts of the company have been over $1,000,000 more than they were in the corresponding period covered by the tabular report.

The capitalization of the company outstanding is as follows:

Preferred cumulative 7 per cent.	$14,936,800
Common	16,371,183
Total	$31,307,983

This represents an increase of $543,300 preferred and $548,853 common during the year.

The funded debt of the company October 1, 1910, consisted of $15,000,000 of 6 per cent. gold notes. Since that date the amount has been reduced by sinking fund operations to $11,922,000, the proportion taken care of and retired this year being $1,530,000. The total amount of the reduction to date is $3,078,0000, which represents a reduction of the item in the fixed charges of $184,680 per annum. The notes are due October 1, 1915, and under the original schedule the outstanding indebtedness will be reduced at least $5,500,000 by that date.

This would leave the bonded debt at $6,422,000, even if a larger proportion of the notes is not retired in the meantime.

In acquiring the Weston-Mott Company General Motors assumed $600,000 of notes issued by the company. Half of this issue has been retired and the other half is due next September.

The condensed balance sheet for the year is as follows:

ASSETS	
Fixed assets: real estate, plants and equipment	$19,280,888
Patents, agreements	1,871,436
Investments	560,499
Cash	3,080,920
Notes and accounts receivable	4,229,112
Inventories	17,578,366
Prepaid expenses	422,736
Total	$54,958,158

LIABILITIES	
Capital stock	$31,307,983
Bonds, as of July 31, 1912	12,452,000
Stocks of subsidiaries not owned by General Motors	991,838
Current liabilities	4,382,876
Reserves for dividend	261,394
Reserves for special purposes	4,299,471
Surplus	1,262,594
Total	$54,958,158

The constituent companies of General Motors are as follows: Buick, Cadillac, Oldsmobile, Oakland, Elmore, Cartercar, Northway Motor, Peninsular (formerly Marquette), Randolph, Rapid, Reliance, Welch-Detroit, Welch, Champion Ignition, Jackson-Church-Wilcox, Michigan Auto Parts, Michigan Motor Castings, Oak Park Power, McLaughlin, Weston-Mott, General Motors Export, General Motors Truck, General Motors, Ltd., General Motors Company of Michigan.

The official roster of the company is as follows: Thomas Neal, president; W. C. Durant, C. W. Nash, Emory W. Clark, vice-presidents; Standish Backus, secretary; James T. Shaw, treasurer, and W. H. Alford, comptroller.

Applying Chassis Finish

Running Gear Should Be Thoroughly Painted and Surfaced Before the Car Is Taken from the Shop

Car Owner Should Study Qualities of Various Varnishes and Should Aim at Uniformity of Color

IT is not an easy matter to obtain a varnish that will stand up and shine with a strong luster through the hard and varied service to which the average car is exposed. Such a varnish, for one thing, must have great elasticity and at the same time it must dry hard as nails. No vehicle has so much harsh cleaning and such varied methods of cleaning applied to it as the automobile. Road conditions are often bad beyond description. Some one lately returned from a tour of the West in an automobile has said that **"the highways of the United States furnish a greater variety of mud and dust, a large part of it being of the worst imaginable sort, than any country under the sun."** This explains in part, at least, why it is so difficult to keep the car in proper condition even though frequent varnishing be resorted to.

Usually the chassis presents the most neglected and unkempt appearance. It has been customary heretofore, we believe, to apply an ordinary finish to the chassis and let it go at that, which practice, it goes without saying, is entirely at odds with the actual needs of the situation.

The chassis should have thorough-going methods of painting and surfacing applied to it, and no car owner should take the car from the shop unless the evidence is unmistakable that such methods of work have been applied to the running parts. Over these parts a couple of good varnish color coats should be applied, both to be rubbed lightly with pulverized pumice stone and water. Then have the striping applied, after which arrange for a coat of clear rubbing varnish, this to be in due season topped off with a stout coat of a quick-drying elastic varnish.

Especially should the chassis varnish be capable of resisting the action of soap, much of which is used in cleaning these parts of the car. The more nearly the varnish will resist and prove immune to the action of soap and water the more valuable it becomes to both the painter and to the car owner. In trying out a varnish for its capacity to do the things here referred to **the car owner should go into something like definite details so that eventually he can choose for himself, if he so wills, the varnish best adapted for his particular needs.**

Logically the finish on the automobile hood should be baked on and it should consist of as few coats as possible consistent with a finish to correspond with other parts of the car. For a new hood, clean off dirt and grease and apply a metal primer and bake in an oven for three hours at a temperature of 175 degrees. Over this put on a knifing surface, working it down smooth and fine, and bake at 200 degrees for three hours. Then sandpaper this coat thoroughly, after which apply two coats of some reliable baking enamel. If this enamel is black bake for five hours at 200 degrees. Then two coats of a hard-drying but elastic finishing varnish, each coat baked for five hours at 125 degrees, should be put on. **Generally speaking the fewer coats comprising the finish for the hoods the more likely is it to escape cracking and fracturing from the heat of the motor.** Engine oil, dirt, rain, etc., on the heated surface of the hood is particularly destructive to any but a finish each coat of which is baked to a nicety.

The fenders of the car are parts upon which an exceptionally good finish is needed; a finish that will stand extraordinary vibration, harsh and constant exposure and severe usage. In washing the chassis with soapy water a process that has reached widespread practice, the fenders apparently come in for a full measure of this treatment, and a finish, therefore, anything short of first class is practically certain to suffer an early decline. **Such a finish should be built up over a foundation consisting of primary coats sufficiently elastic to stand the strain of the rigorous vibration.** This elasticity can be provided by the use of raw linseed oil gradually lessening the quantity in one, two, three order as the coats go on until the color is reached. In the use of japan ground color coats thin down with pure turpentine, adding one part oil to every eight or nine parts turpentine. This will furnish a graduated elasticity over which a couple of coats of varnish-color may be applied, these to be followed by a coat or two, according to the quality of finish desired, of a hard drying finishing varnish which possesses the property of being elastic. The varnish color to be used upon the fenders should be made of finishing varnish, rubbing varnish being too brittle to stand the vibration strain. **No rubbing varnish should be used upon the fender for this reason and for the additional one that it will not properly respond to the contraction and expansion under the variations of temperature to which these parts are exposed.**

Another point which the car owner seeking to develop and maintain the best possible appearance of his car should insist upon is in the treatment of the color coats. In the hurry to get the color under varnish, it is often the case that the color is not adequately dry when the varnish is put on, the result being that the color shows a shade which under normal conditions of treatment it does not possess and which, in fact, it should not possess. The color on the car, when it is given time to dry properly before varnishing, will look, and should look, precisely as the same color looks in liquid form in the mixing cup. Then you have color purity in its original and perfect shade. There are, for example, some of the greens, very beautiful when properly placed on the surface and permitted to dry solid and firm, which if smothered under a coat of varnish before being thoroughly dry will show not only two or three different shades of color, but all of these shades will vary from the true shade.

Another matter of color for the car owner to recognize as important is that of having the same shade of color, when but one color for the body is desired, established over all the surface. In a New York showroom recently the writer inspected a car painted a dark blue, closely approaching Royal blue, which ran through two or three shades. This was due, apparently, to the neglect of the painter to mix up enough color at one time to coat the entire surface. In mixing up a second batch of the color he failed to perfectly match it to the first lot and the subsequent coats of varnish had served to exaggerate the varying color shades.

The prospective car buyer may very properly subject the color on the car to close inspection for uniformity of color. A lack of this quality does much to put the appearance and finish into disrepute.

The car owner should understand and familiarize himself with the fact that virtually all colors used in automobile painting to-day are delicate and sensitive colors in that they require thorough varnish protection. Because of this need the car requires to be varnished at least a couple of times a year—say in spring and autumn. In this manner the colors are made to wear longer and appear to better advantage, while they are wearing, than would be the case in the event of deferring the revarnishing until the old varnish has quite lost its protective capacity.

Especially is the varnish protection here advised of value in getting permanent or durable wear out of the rare and lovely lake pigments now so largely used upon automobile work.

Compact Dynamometer Adaptable to Outdoor Efficiency Testing—Sprags Denounced in Germany as Antiquated—New Removable Rim—The "Bumpograph" to Save Lives and Money for Railways—World Trust in Aluminum—Sundry Topics

TRANSMISSION Dynamometer—A device has been developed by A. Wallon by means of which it should be practicable to determine the amount of power utilized for propelling an automobile at any given speed and for any actual condition of the road, by applying it to the clutch shaft, and either simultaneously or subsequently to decide the power absorbed in the gearbox and the front universal joint of the driving shaft, by applying it to the latter. Perhaps it could also be used to decide the frictions in the bevel gear and the differential when applied to the wheel-driving shafts. It is a dynamometer which, when equipped with a registering dial or roll, may be used to measure and record, in the form of diagrams, torque and torque reactions under practical working conditions. By using it first under one road condition and then under another with the same vehicle it should lend itself to determinations of the properties of various road surfaces, and similarly it might be used for establishing reliable data with regard to the traction resistance encountered with different tire treads and tire constructions. Its range of utility seems comparable with that of the Wymperic accelerometer, mentioned at length in THE AUTOMOBILE of October 10. A special field for the Wallon device lies in its suitability for measuring at the same time the power applied to a propeller shaft and the thrust of the propeller, whether in the case of boats or aeroplanes. In this application the device promises to remove many doubts with regard to the varying efficiency of propellers throughout the ranges of motor and vehicle speed, while at the same time throwing new light on the different values of different shapes for penetrating water or air.

Unfortunately the exact mechanical construction of the Wallon device is not disclosed, but the principle upon which it operates may be understood in the main features by the following description and the accompanying drawings, Figs. 1 to 6.

The leading principle is that the torque is made to cause a hydraulic pressure, and this pressure is measured. To this end the motor shaft is coupled to the driven shaft by means of a sleeve secured to the latter. In the sleeve is secured a jaw clutch to which corresponds a clutch member on the shaft. Both are cut helically with a pitch exceeding 45 degrees, so that the turning of either the shaft or the sleeve will tend to force the two clutch members apart. To minimize and regulate friction between them, ball-bearings in a suitable casing are interposed between the helicoid working surfaces. Figs. 1 and 2 show the shaft and the sleeve separately but not the ball bearings. The sleeve is closed and packed around the entering shaft so as to form a sort of dashpot in which, however, the relative movement of the parts is exceedingly small, as the space is completely filled with fluid, preventing displacement of the clutch surfaces. The only movement possible is that necessary for transmitting pressure through the inclosed fluid to the attached manometer. The movement required of the ball-bearing is therefore also very strictly limited, as it must be to make the construction practicable. The manometer may be of ordinary construction, registering or merely indicating, and is connected with the interior of the sleeve by means of such a swiveled valve as shown in Fig. 4 inserted in that end of the sleeve in which the piston and clutch formation of the motor shaft is located. [This arrangement apparently makes it necessary to connect the sleeve with the driven shaft by means of two semi-circular arms or other equivalent elements allowing space for the manometer and the registering apparatus. At this point the fragmentary description suggests that the device may still be in its experimental stage with regard to its mechanical execution for use in automobiles.—ED.]

In order that this device may be used for measuring with accuracy the force applied to establish a certain pressure in the fluid, it is evidently necessary that the reaction between the helicoid surfaces of the clutch, with the intermediation of the ball-bearings, shall be proportionate to the forces by which they are produced. This reaction is represented in the diagram Fig. 3, being the resultant R of the tangential force due to the torque C and of the force P_s which the fluid pressure P exerts upon the cross-sectional area s of the shaft. The tangential force takes the form $C \div r$ if r is the radius of the shaft, and as r, s and a, the latter being the pitch angle of the clutch surfaces, are constants in any one apparatus, the resultant R is bound to be proportional to the torque and capable of furnishing a measure for it. The factor of proportionality may be calculated more simply by applying the theorem of virtual displacements, so-called. If it is assumed that the torque C causes a rotation w of the shaft with relation to the sleeve, then the work of the torque is Cw. The stroke of the piston—the longitudinal movement of the shaft—corresponding to w is $hw \div 2\pi$, in which h is the pitch of the helical surfaces. The work of the pressure is then equal to $Ps \times hw \div 2\pi$. When there is equilibrium between the work done by the torque in displacing the clutch and the work done by the clutch in effecting a pressure upon the fluid—or, in other words, when the power is transmitted integrally from the driving to the driven shaft—the two values become equal, or

$$Cw = Ps \times hw \div 2\pi$$

from which

$$C = P \times sh \div 2\pi = PK$$

if K is the constant factor corresponding to $sh \div 2\pi$ in any given apparatus.

Applying the usual formula for converting the force into horsepower [under the French notation in which 60×75 kilogram-meters corresponds to 33,000 foot-pounds in the English notation], the above value for the torque is equivalent to the following for horsepower:

$$\text{Horsepower} = PK \times 2\pi n \div (60 \times 75)$$

and this takes the simpler form of PnK' by summarizing the constant factors as K'. In order to simplify calculations with any given apparatus its dimensions are so co-ordinated that K' becomes a simple factor, preferably a power of 10.

A dynamometer constructed on this principle is very robust and gives readings whose accuracy depends upon the sensitive-ness of the manometer used with it. As the quantity of liquid moved in it is very small, the variations in torque are not masked by any effect arising from the inertia of parts, even if the variations are rapid, and the diagrams taken from it should be reliable. It is also not affected by centrifugality owing to its great compactness, and it may be operated at a speed up to 1,500 revolutions per minute or more.

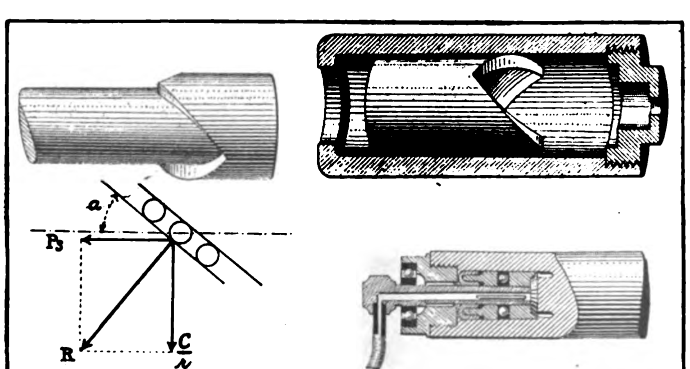
[On the other hand, since PnK' means that the manometer pressure should be multiplied by the number of revolutions and the product by a certain constant factor, a revolution-counter with registering device must be synchronized with the manometer register if it shall be possible to compare two or more performances which are not conducted with exactly the same motor speed, and this a constant one pending the duration of the test. It also seems that the friction of the piston-shaped end of the driving shaft would influence pressure-readings relating to rapid variations of power, though not those relating to a constant power development, since this friction must be considerable in order to make the piston so tight that no leakage can take place. These discrepancies may be only apparent, however. A complete description of the apparatus might show them to be obviated in some manner.—ED.]

Figs. 5 and 6 indicate how the device is used to measure both the power applied in driving an aeroplane propeller and the thrust against the atmosphere into which this power is transformed. In the position represented in Fig. 5 the thrust is received by the collar A (the thrust being toward the propeller), and the reading of the manometer will then indicate only the torque transmitted to the sleeve. But by releasing the collar A from rigid relations to the frame, as indicated in Fig. 6, and fixing collar B in the frame so as to absorb end-thrust from the sleeve, the manometer will show a pressure smaller than before, as the propeller thrust, now released, works oppositely to the pressure caused by the spreading of the clutch. By determining the factor of loss in transmitting the propeller thrust, or pull, to the clutch elements, the equation by which the propeller efficiency may be determined takes the form

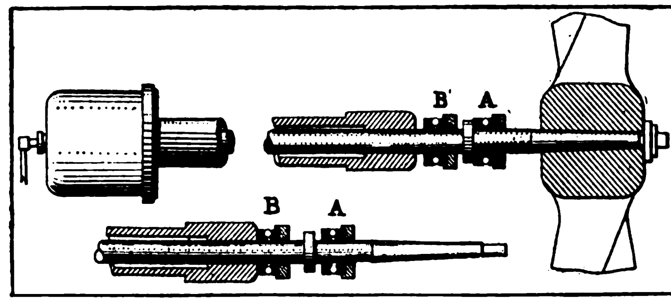
$$P_1 = C \div K = P_2 + (T \div S)$$

in which P_1 is the previous manometer pressure, equaling the torque C divided by a constant K, and P_2 the new manometer pressure, T the propeller thrust and S a constant expressing the loss in the transmission of the thrust.—From *La Technique Moderne*, October 1.

LOCATION of Sprags—An exhaustive analysis of sprags, with special reference to the compulsory equipment of German army motor trucks with these devices, has been prepared by engineer Schwerdtfeger of Frankfurt-am-Main. He is of the opinion that it would be better to rely on good brakes and supports this opinion with a number of diagrams taken from truck and touring car practice and with many accompanying calculations. The most important viewpoints with regard to the reliability of the sprag deal with the uncertainty



Features of the Wallon transmission dynamometer
Fig. 1—End of driving shaft. Fig. 2—Sleeve filled with fluid
Fig. 3—Diagram of reactions. Fig. 4—Valve to manometer



Wallon dynamometer applied to propeller shafts
Fig. 5—Arranged to measure the power. Fig. 6—Arranged to measure thrust

of making the sprag take hold in the ground if the latter is hard and uneven and the sprag is held at a small angle, which otherwise would give the best support once a resting point were found, and with the danger of having the vehicle climb over the sprag if its angle is large. If the last-mentioned trouble is obviated by tying the sprag up to a maximum angle, it may not take hold in soft ground. If a double sprag is used, the likelihood is that only one of the points will take hold at first, and in that case a turning of the vehicle around the point which has become fixed is to be feared. The most important conclusion is that a sprag, if it must be fitted, should be hung from the front portion of the vehicle and not so as to take effect under or behind the rear axle. The argument in this respect is taken from calculations showing to what extent the application of a sprag takes the load off the driving wheels at different angles of the sprag and at different inclinations of the road surface. It is especially accentuated that the greater the gradient of the road the more of the load will be taken off the rear axle, and that consequently, when the vehicle is to be started to go forward again, the difficulty in obtaining traction for the driving wheels will be in direct proportion to the need of it. As another reason for the abolition of sprags in favor of strong brakes, it is mentioned that there may be need of stopping a vehicle when it is going down a steep hill as well as when it is going up and that therefore if one sprag is necessary or desirable, two of them should in reality be fitted, capable of acting in opposite directions. Any other view would seem to stigmatize the sprag as a survival from the time when brakes would hold only in one direction.—From *Der Motorwagen*, September 10 and 20.

HARMONIC Noises—Most modern automobiles produce a humming noise at certain vehicle speeds while quite silent at other speeds, both higher and lower. The phenomenon is noticed in new cars as well as in old ones but perhaps mostly in those of light construction. As silence in operation is one of the properties most sought by constructors and most remunerative to manufacturers as well as pleasing to users, it is worth the while to seek the cause. It is perhaps to be found in the law of harmonics. It is well known that when a sharp note is sounded in a room its volume is much increased if there are objects in the room capable of emitting the same sound by vibration. One piece of cut-glass responds to one sound, another to a sound of different pitch. A note produced on a violin or by the voice is strengthened by resting one foot on the pedal of a piano, thereby leaving those chords free to vibrate which correspond to the tone produced. Frequently piano keys are seen moving as of their own accord when a person sings or a dog barks sharply. In the electric field similar things take place. Induction coils and transformers have been ruined by the great tension produced when the vibrations of one high tension current got into harmonic relations with those of another.

It seems probable that the different parts of an automobile, being made of steel and all vibrating more or less when the motor is working and the vehicle is shooting over the inequalities of a road surface, may get into similar harmonic relations under certain combinations of circumstances varying for different vehicles. A certain motor speed and a certain vehicle speed, combined, may set up vibrations in different parts of the chassis which strengthen each other and swell to the volume of a noise, the musical note which is primarily produced being spoiled by the accompanying discordant vibrations of other parts. It is noticed that a vehicle will emit such noises when going at a certain vehicle speed on third gear-speed but not when going at the same gait on the high gear, the inference being that in the latter combination the motor vibrations and those of the frame do not concord. In the American Ford cars which always travel on high gear the sound is produced always at between 40 and 45 kilometers per hour, but it does not come from either the motor alone or the chassis alone; for, when going down hill at the same speed but with the motor out of action the sound is not observed. Also, with any car, when the stage is reached at which the noise is heard and one then advances the spark and thereby interferes with the mathematics of the motor's vibrations, the sound disappears suddenly—only to reappear at another combination of motor and vehicle speed, however.

While probably no mathematical stringency is applicable in the case of automobiles to avoid the noises referred to, the observed facts seem to point a way to their suppression by experimental methods, perhaps especially by tying up those parts which are capable of regular periodic vibrations with others which are not so constituted.—After Antonin Marechal, engineer, in *Pratique Automobile,* August 10.

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REMOVABLE and Demountable Rim—An engineer by name Laisne of Douai, France, has had made for himself a removable rim in which it is the main feature that the pneumatic tire is held by its two beads in a thin and elastic steel ring which at one point is split transversely and that this steel ring is held between the hooked flanges of a much stouter two-piece rim, one side of which is demountable. The other and larger part is, in the case of a wood wheel, secured directly upon the felloe and is recessed circumferentially at the edge which lies upon the felloe to receive an annular flange of the demountable side of the rim. At three or four points of the thinned edge of the permanently fixed rim portion there are shallow recesses formed to accommodate wedge-shaped lugs on the interior side of the overlapping annular flange of the other portion. These lugs are split, the slit going through the overlapping flanges as well, and in line with each of them a lug with a bolt hole is secured to the same rim portion, probably by autogenous welding, and by passing a bolt through this hole from the opposite side of the wheel felloe and under the permanent rim portion and drawing it tight with a nut, the shallow split lugs are drawn into the recesses under considerable tension, and in the same operation the thin elastic steel ring with the inflated tire, having been first placed in its proper position with relation to the permanent portion of the rim, is securely locked. The split lugs and the recesses may be formed by stamping with a die.

As applied to wire wheels the permanent rim portion is formed so as to replace the wheel felloe and the spokes are secured to it in the customary manner.

The valve hole in the elastic steel ring is slightly flanged so as to fit into the valve hole of the permanent rim portion, thereby protecting the valve stem and obviating rotation of the steel rim. To fit the latter to the tire it is only necessary to compress it, making the edges at the transverse split overlap and reducing the ring's diameter, and then to place it inside of the tire and allow it to expand, by which action it engages the retaining beads of the tire, and the latter may then be inflated the split in the steel ring being closed because the circumference of the ring corresponds accurately to the interior circumference of the tire.

The advantage of the construction lies largely in the fact that only the thin steel ring, with the reserve tire mounted on it, is to be carried as a spare part.—From *Omnia*, September 28.

FROM Automobile to Railway—Taking his inspiration from the registering devices which have been used for demonstrating the properties of shock absorbers on automobiles, for example, at the Massachuetts Institute of Technology, Mr. L. Schlüssel, an engineer, proposes in the August number of *Bulletin du Congrès des Chemins de Fer* to use similar devices for the important work of locating weak spots in the rails and roadbeds of railways, thereby obviating accidents. The principle of the mechanism in question is usually that a weight is secured to the free end of a horizontal leaf spring of which the other end is fixed in the floor or other rigid part of a vehicle, and that a registering stylus records on a roll of paper the movements of the weight, which correspond in an exaggerated manner to the jouncings to which the vehicle is subject. Mr. Schlüssel has developed the theory of the movements of such a weight with great detail and many diagrams and maintains that the installations of such suitable recording devices on railway trains, if supplemented by daily inspection of the diagrams taken from them, would not only serve the purpose of locating dangerous spots, but would also save the railway companies much money by locating the stretches where inspection and repairs are unnecessary.—From *Le Génie Civil,* September 28.

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MANGANESE in Castings—At the fall meeting of the Iron and Steel Institute Mr. Coe, of Birmingham, who first called attention to the special behavior of cast iron under the influence of manganese, submitted the results of new investigations of the changes of volumes and temperatures which take place at the moment of freezing in white and gray iron containing this alloy. It appears from this work, which supplements the broader work of Professor Turner on the same subject, that in white iron the manganese causes an expansion at the moment of solidification of the molten mass which is independent of the carbon content and that this expansion reaches maximum at an alloy of 2 per cent. Thereafter the expansion dwindles again, reaching zero at 5 per cent. A new maximum comes at 7 per cent., a new zero at 10. Increasing the alloy still further, a maximum comes at 12 per cent. with a zero following at 15.3 per cent. The expansion remains constant between 21 and 39 per cent. of alloy.

In the case of gray iron there is a minimum expansion at 1.6 per cent. of manganese and thereafter a gradual increase up to 10 per cent. Another maximum was observed at 17.5 per cent.

Hardness is increased up to 2 per cent., then drops between 2 and 2.65 per cent. and thereafter rises steadily, according to Coe's observations.—From *Giesserei Zeitung,* October 1.

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ALUMINUM Makers Combine—The expected coalition of French and American producers of aluminum has come in the form of a new enterprise incorporated with a capital stock of $6,400,000 at Whitney, N. C., under the name of the Southern Aluminum Company. It was founded by the combination of the *Société Aluminium Francaise* and the American Metal Company, the latter previously known as a group in the *Metallgesellschaft* of Frankfurt-am-Main. The combination was presaged through discoveries of new economical processes for extracting aluminum from bauxite and the relations of these processes to the chemical composition of the bauxite beds in France on one side and in America on the other.—From *Giesserei Zeitung,* October 1.

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New Life for Old Rubber—It is claimed that frequent washing with a solution of 1 part of ammonia and 3 parts of water will keep rubber articles from getting hard and brittle with age. Immersion in the same fluid will to some extent restore the softness to old rubber if it is not too thick.—*Exchange.*

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To Remove Rust—It is recommended to rub the rusted part with a woolen rag saturated with a mixture of lactic acid, one part, and oil of lavender, two parts.—*Exchange.*

Diesel Motor Explained

Developed from Experimental Coal Dust Motor—Present Oil Engines Aggregate 1,000,000 Horsepower

THE name oil engines today covers a number of types which utilize fuel oils varying in specific gravity from .68 to 1.0. After the nature of the fuel they use they are sometimes called gasoline, paraffin or kerosene engines, and they may be advantageously divided into two classes, light and heavy oil engines, depending on the density of the fuel used in them. Light oil engines comprise principally gasoline engines of various design, developed after the original Daimler motor, in which fuel averaging .72 in specific gravity is used. The second class includes motors utilizing heavy oils which, unlike the light fuels, cannot be simply carbureted, but must be preheated or prepared for combustion by atomization, as in the Diesel engine.

Priestman and Hornsby-Ackroyd engines comprise the so-called explosion engines. In these engines liquid oil is supplied to a heated bulb or baffle-plate and there vaporized, being then mixed with the carbureting air and ignited.

Diesel engines may be divided into two classes, Diesel type proper and semi-Diesel type. In the former, pure air is compressed to about 500 pounds, when oil is squirted into the cylinder at still higher pressure, causing its spontaneous combustion. In the semi-Diesel type only half the air compression need be used, the ignition temperature being reached by contact with a hot bulb.

Long and expensive research only made possible the Diesel engine of today, which, though now acknowledged as the most important type of oil engine, was not long ago but in its making. In 1892 Dr. Rudolf Diesel applied for his D. P. R. (German patent) and arranged with the Augsburg-Nuernberg Maschinenfabrik and Alfred Krupp of Essen to make all the necessary experiments and tests, a special laboratory being equipped in Augsburg.

It soon developed that Dr. Diesel could not realize his first ideal, the production of maximum temperature just before the combustion which should be isothermic. Water-jacketing proved necessary and a disappointment in view of the original expectations. Nevertheless, Diesel and his backers continued their work and in 1897 produced a 20-horsepower motor surpassing in thermal efficiency all previous internal-combustion types. Licenses were then sold, but until 1903 the Augsburg-Nuernberg stood practically alone as its manufacturer, due to difficulties first met by the licensees. In 1898 the Allgemeine Gesellschaft fuer Dieselmotoren, A. G., Augsburg, was formed, which acquired all rights to the Diesel designs. Vertical single-acting, horizontal single and double-acting and reversing marine types have since been developed and the total horsepower of Diesel engines in use today approximates 1,000,000.

In external and internal-combustion engines where useful work is produced from heat a heat fall is utilized, which may be measured by the number of thermal units made mechanically available by the transformation of the heating fluid which passes through the engine and whose temperature is simultaneously reduced. The fall of temperature, however, is in itself no measure of the heat fall, depending as it does on the manner of introducing and abstracting the heat-carrying fluid from the engine. As only a fraction of the heat introduced may be utilized mechanically there is a ratio between the heat theoretically abstractable from the fluid and between what is actually obtained in the form of power; this ratio which is always a true fraction is called actual thermal efficiency. But as the amount of heat which theoretically may be utilized is also but part of the heat introduced, the ratio between these two values is also a true fraction, the theoretical thermal efficiency. The latter is in turn greater than the actual thermal efficiency, and their ratio is referred to as efficiency ratio. The latter is for condensing steam engines using saturated steam, 60 to 80 per cent.; for condensing steam engines using super-heated steam, 50 to 70 per cent.; gas engines, 80 to 88 per cent., and oil, including Diesel engines, about 75 per cent.

Dr. Diesel first attempted to obtain maximum thermal efficiency through the use of a constant temperature of combustion in his engine cylinders, but as the abstraction of heat from the gases could not be effected at constant temperature, it was not possible to obtain the thermal efficiency of .855 which he expected and which would correspond to .25 pound of coal per horsepower-hour. In this connection it should be noted that the first trials were made with coal dust.

In the gas engine the heat is introduced theoretically at constant volume, the mixture being completely burned or rather exploded before the piston begins its power stroke. In practice this is not the case, and part of the mixture is added at increasing volume; this results in a loss. **In the Diesel engine the fuel is introduced comparatively gradually and the pressure remains almost constant, giving a flat top to the indicator diagram; but this is theoretical, and in practice the top of the curve is only approximately flat.**

One difference, then, between engines working on the Otto and Diesel cycle lies in the compression pressures used, the maximum pressure in Otto-cycle engines being 130 pounds per square inch, higher pressures giving rise to preignition; while in oil-engines of the Diesel type the pure air charge is compressed at a pressure of about 32 atmospheres, or almost 500 pounds per square inch, this being possibly due to the pressure of pure air only. The high pressure raises the temperature to about 700 degrees Centigrade, when, at the top of the piston stroke, the oil being injected meets with a high enough temperature to cause its ignition without a spark or hot tube. In the semi-Diesel engines the compression pressure is only one-half of that just cited, and ignition is by a hot bulb. Both types of Diesel designs are immune from preignition, a great advantage.

Up to the present most Diesel engines have been designed to operate on the four-stroke cycle, corresponding to the strokes in four-cycle gas engines. **But Diesel motors may also be constructed to work on the two-stroke cycle, by having a blast of air enter the cylinder at the instant the exhaust valve opens, whereby not only perfect scavenging is obtained, but also a full charge of pure air, which is then compressed.** Each down stroke is a combustion stroke. This type of Diesel motor is now making great strides.

The essential parts of a Diesel motor, whether working on the two or four-stroke cycle, are: A working cylinder containing a piston, the latter's connecting rod and crankshaft, water cooling for the cylinder, and an air valve, a fuel valve and an exhaust valve; furthermore, a fuel pump regulated by a governor and a high-pressure air compressor for atomizing and injecting the fuel. In addition to these members the two-cycle motor requires a low-pressure air-compressor or blower for supplying the scavenging air. The valve driving shaft in the four-cycle motor runs at half engine speed, in the two-cycle type at full crankshaft speed.

It may be added, in conclusion, that in the four-cycle motor the exhaust pressure is slightly in excess of and the intake suction slightly below atmospheric pressure, while in the two-cycle type very little time is left for exhaust and scavenge, and a much better torque than in the four-cycle design is obtained.—From a lecture of Capt. H. Riall Sankey, R. E., reproduced in the *Journal of the Royal Society of Arts.*

Foreign Constructions Designs and Practices

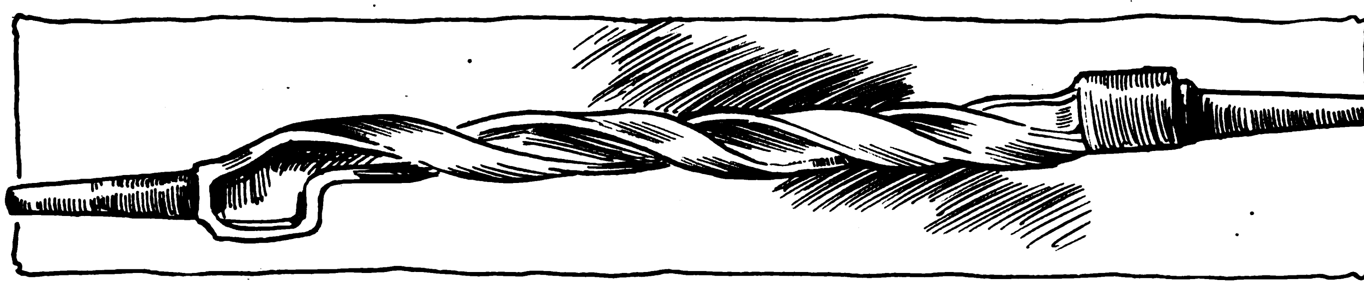

Fig. 1—Rear axle forging of chrome nickel steel after receiving nearly four complete twists in its length without showing distress of the fiber at any point

Steel Parts Must Be Thoroughly Tested Before Use—Samples Selected Are Tested to Destruction

STEEL as it comes from the mill is in the normal state so far as the purchaser is concerned. The steel, after it is rolled, is allowed to cool naturally. Annealed steel is the result of this process.

Normal steel then is an annealed product so far as actual practice is concerned, but when bars of normal steel are taken and used to make drop forgings, the steel must be subjected to a high heat and the forging process thereafter introduced may be looked upon as anything but gentle treatment. If the steel is required to assume an intricate shape demanding several forging operations, unless an annealing operation is introduced between successive forging operations the steel will be bruised and torn. Such forgings may look quite as good as they would were they properly processed.

Since it takes more time and adds more to the cost of production to anneal forgings during the forming process it is imprudent on the part of purchasers of forgings to take too much for granted. When the government contracts for forgings, a government inspector is always present at the forge and little by way of slighting the work is permitted by him. In the process of making automobile forgings instead of having an inspector on the ground reliance is placed on the integrity of the forger. In most instances the results are not such as will reflect adversely upon the forger's honesty and skill, but instances of poor results are too frequent to warrant disregarding the precautions of which the government takes the fullest advantage, even to the extent of sending several inspectors, rather than to depend upon the vigilance, skill and honesty of a single inspector. **In a word, the government does not expect too many accomplishments in a single man.**

The inspection of drop forgings for the purpose of locating faults such as seams and fissures is a difficult undertaking. If the plant wherein the forgings are made is operated for the avowed purpose of turning out none but good sound forgings the operation and annealing process will get good attention and inspection will be frequent.

The final inspection may take place after the forgings are sand-blasted, the idea being to uncover any faults that may be hiding under the scale which forms all over the surface during the forging process. But if the policy of the forger is to make forgings on a commercial basis, if an electric or autogenous welding equipment is a conspicuous part of the plant equipment, then every fissure or other faults will be plastered with soft iron; and, too, in a plant of this character, since the management exhibits a rare type of honesty, the workmen sit back on their haunches, slighting the processes to save their backs.

If common prudence demands that forgings be critically inspected before any work is done upon them in the machinery process, the question is, how is this inspection process to be conducted? If a laboratory is at hand, test proofs may be taken from the parts and the physical properties of these test proofs may be determined. But this somewhat long and rather expensive process will scarcely serve the end. The test bar may not be cut from the weakest part of the forging.

Test Part to Destruction

The way to find the defect in a part is to test the part to destruction.

Every automobile after it goes into the hands of the purchaser is tested to destruction.

The reason why the purchasing public consents to be the laboratory of the destruction test is due to the promise advanced by the maker that the test will take 10 years to complete it. The purchaser desire to work, and diligently, too, for a period of years at the destruction test before reporting results to the maker of the automobile. But the average user is led to believe that all the incidental tests are conducted to completion in the maker's plant. In order, however, for the maker to approach the user's test to destruction of the finished product, it is believed that it is imperative for the manufacturer to make destruction tests of the parts—enough of them to inspire confidence—before the automobiles are assembled and sold.

Consider axle forgings: Not a few of them are welded at the middle. Were one of these welded axles subjected to the torsion test, as shown in Fig. 1, it would fail at the weld.

A test to destruction by the torsion process is simple to make. All that is necessary is to set the part up in a stout tool, as a back-geared lathe, and by turning over the tool slowly, usually by hand, twist the part.

A first-class axle forging will perform as shown in Fig. 1. Welded axle forgings will fail at the weld. Forgings of other parts will show equivalent characteristics. The torsion test, if it is applied to one in ten of the forgings offered, will tell the tale of success or failure so thoroughly that success will attend the effort and the cost of the tenth forging will be negligible. If one in twenty of the forgings is twisted the information thus afforded will be of great value. A test of even one in each 100 forgings will be of great value. But the test to destruction by torsion should be made by the purchaser of the forgings. It is not enough to permit the forger to respond to the occasion.

In one instance of testing to destruction, front axle forgings being tried, the first seventeen axles failed at the weld. On the other hand, an extra price of $12 per axle was paid to the forger to get one-piece axles in this case. It would have been far better to pay the lower price for welded axles, for then the metals selected for use would have been more suitable to welding. In this case of failure the steel was specified knowing that it would not respond to a welding process, but the selection was justified because the specifications required and stipulated that the axles were to be forged in one piece.

Referring to welds, they belong to a bygone day—the period of iron. Steel is not pure enough to serve in a welding process if good strength of the weld is required. **Even weldable iron when the weld is made at a temperature so high that good steel would be destroyed, offers nothing better than 82 per cent. of the strength of the unwelded section, and the range of weld strength for good weldable iron is from the maximum of 82 per cent. down to a minimum of 34 per cent. of the strength of the unwelded section for steel, and the better it is the worse it behaves in the welding process, the strength of the weld is too indifferent to be given a moment's consideration, referring of course to the blacksmith's weld.**

Referring to the autogenous weld, if soft iron is run in between the members to be welded it is self-evident that the strength of the weld cannot be greater than the strength of the soft iron. But even the soft iron will fall below its normal strength, due to the abuse to which it is necessarily subjected in the welding process.

A very simple torsion testing equipment is selected in Fig. 2. An old stout lathe with a hollow spindle was fitted with a second head in place of the tailstock. The hollow spindle at both ends came handy in crankshaft testing. The flange F of the crankshaft is butted on to the face plate and clamped there too by dogs, D. The last throw at the other end is shown dog fastened to the tail end face plate. The lathe was worm-geared to a slow speed electric motor.

This tool was used from time to time to twist all sorts of forgings. A standard for each type of forging was first established. **All forgings which fell below the standard were delivered at the laboratory for further and detailed investigation.**

Method for Coloring Metals

The separation of the oxides of iron, manganese and nickel on the anode from ammoniacal solutions of their salts was recently dealt with in an article in the *Elektrochem, Zeitschrift.* The object was to produce colored films on the surface of a metallic article.

For a good adherence of the film, it was found necessary that the surface of the metal used as the anode should be free from grease, polished and free from foreign matter. The removal of the grease is best effected in an electric cleaner containing an alkali carbonate or a cyanide. By this process saponifiable as well as unsaponifiable matter is removed, this holding true especially if the article which is to be covered is alternately applied to the two ends of the conduit immersed in the electrolyte.

The investigations were carried out with iron or steel anodes in all cases. Ferric axide and manganese dioxide can easily be deposited as adherent layers of varying color, and under suitable conditions the process may be of commercial value. This is particularly the case with the deposit of manganese dioxide which is produced with a voltage of from 1.75 to 2.5.

From ammoniacal nickel solutions the deposits produced are not as satisfactory. The conditions under which the precipitation takes place are very limited and difficult to control. The color is unattractive and the deposit adheres badly. The potential required for the deposition of the oxides varies considerably with the metal. In the case of iron, a deposit which consists of partly ferrous iron is apparently obtained with very small potentials. As the potential rises, the amount of ferric iron in the deposit increases. In the case of manganese, no oxide at all is deposited below 0.4 volt, and in the case of nickel, the formation of the peroxide seems to be closely connected with the production of molecular oxygen; and consequently it only appears at potentials which allow the evolution of gaseous oxygen.

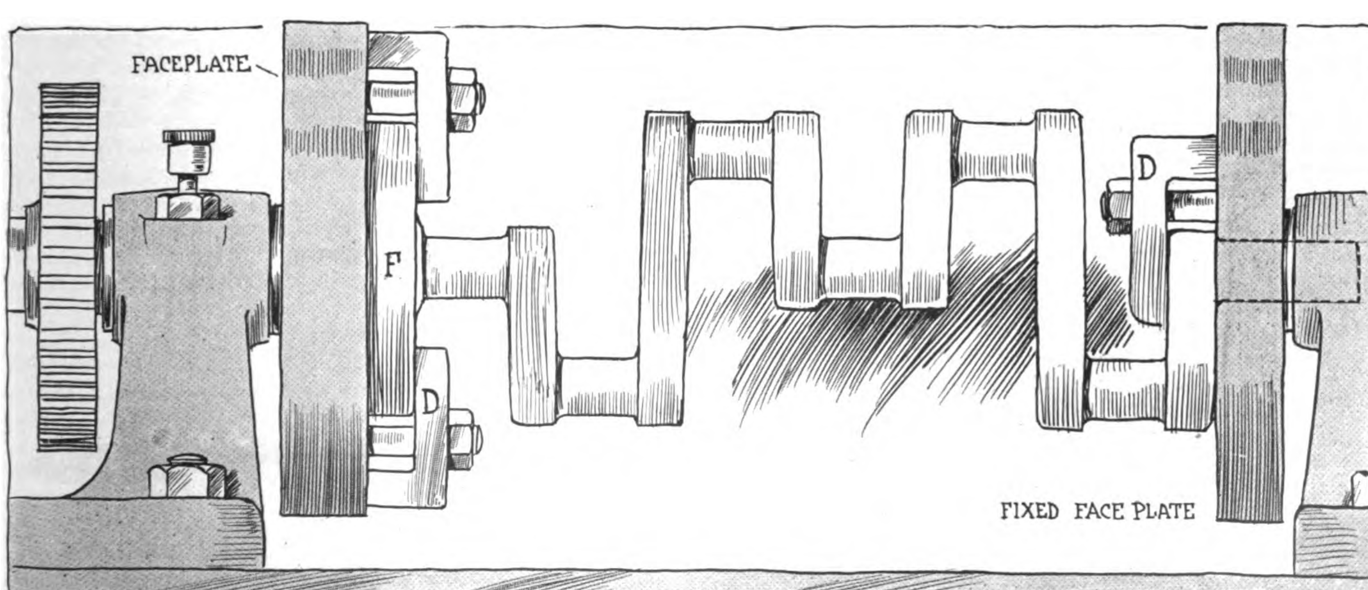

Fig. 22—Showing a crankshaft in an improvised torsion testing machine made out of old lathe, but which gives most satisfactory results in foreign shops

Fig. 1—Alco service building for metropolitan territory, located conveniently in Long Island City, L. I.

Alco's Metropolitan Service Building

Facilities to Serve Territory of 15,000,000—Three-Fold Nature of Plant Provides For Supplying of Parts, Repair of Cars and Trucks in District

GIVING complete and efficient service at lowest possible cost to the user of an automobile is the problem confronting the manufacturer-dealer today. Buyers are more and more demanding facilities for prompt supply and mounting of spare parts and adjusting whatever parts of their cars require to be adjusted, and they demand these facilities to be furnished at little or no expense to them.

Companies planning service departments for the territory of New York City and its surroundings are following up either of two possibilities in deciding the location of their service plants. One is to middle West Side of Manhattan, between Thirty-fourth and Seventy-second streets, which neighborhood is at present largely filled with tenements and flats; the other location is Long Island City and its suburbs, especially Astoria. While a number of large service departments have been placed in the section of Manhattan just mentioned, there is no doubt that the available space on the island which forms the heart of New York City is limited, it may even be said that if 10,000 commercial cars were to be used in Manhattan today instead of 4,000 now operating, it would not be possible at this moment to house them. Foreseeing future developments, many concerns are placing their service departments in the boroughs across the East River, thereby reserving ample opportunity for expansion in time to come. Nor should it be forgotten that real estate in Manhattan costs far in excess of what its price is in Long Island City.

To the group of service departments which has crystallized in the latter place during the past two years, another building of a representative company has been added early during this year. The newcomer is the department of the manufacturer of Alco cars, which is conducted jointly with the New York City branch of the Providence company.

The new service building, opened several months ago at Long Island City by the American Locomotive Company, covers a floor space of 315.33 by 98.66 feet and has a useful height of 15 feet, giving a total floor space of almost 31,200 square feet and a total volume of 468,000 cubic feet. For 9 hours every day ninety men work on the premises to repair pleasure and commercial Alco cars, to ship parts to machines in need of them and to carry on the office work necessary in this connection. The Metropolitan district, which embraces Greater New York, including Staten Island and Long Island, Southern Connecticut, and portions of New York State and New Jersey, with an approximate population of 15,000,000 souls, is served from this center of activity.

In constructing this department, the Alco company took every care in creating an establishment with all the manufacturing facilities required to keep cars going through years of service. Pursuing this plan, the construction of the building is as up-to-date as its equipment, and the method of operating it is part of the efficient line-and-staff organization for which the locomotive manufacturing company is famed.

Built for the Future

Facing Jackson avenue with a front of 282 feet and extending almost 100 feet toward the tracks of the Long Island Railroad, which passes hardly 60 feet behind the building, the service structure is bounded by an uncovered yard at its right side—looking from Jackson avenue—and by a similar free spot on the left, where the boiler room is stationed adjacent to and below the level of the building. The front wall, which, like the other three walls, is worked in red brick, is fitted with six double-section sliding doors, each of which is 12.5 feet wide and 15 feet high. In addition thereto a 4-foot door leads into the reception room whence visitors of the plant are conducted to the specific department with which they have business to transact. The wall facing the uncovered yard has four sliding doors of the same construction and dimensions as the front side. The other two walls are not interrupted by doors and, as reference to Fig. 3 shows, all the wall area excepting the structural supports is taken up by large windows which afford ample general illumination throughout the working day.

In a building of this size the selection of suitable systems for lighting and heating it is an important and not an easy problem. As to the question of illumination, electric light is, of course, the sole method applicable in an establishment of this kind, but it, too, offers a choice of various systems. Among the possibilities of arc, incandescent and Cooper-Hewitt illumination, the company chose the most widely used method, namely, the incandescent light. Throughout the building, tungsten electric lamps of the Mazda type are used, which are dropped from the ceiling by means of cables, much in the manner used in offices and garages.

To provide full utilization of daylight, the four walls of the building are practically all glass, except for the structural supports; but these, as reference to the shop illustrations show, decrease the entrance of light very little. All the windows are composed of an upper and lower half each, which again consist of nine approximate squares. Not only do these windows permit of plenty of light to reach the benches and machine tool shop, but they also provide full light for the men working on complete automobiles positioned in the middle of the shop, a large skylight which extends also over part of the office-and-supply room section, is used. Another skylight serves to light the cloak room. Both skylights are shown by cross hatching in Fig. 3.

A similar problem as the selection of the best-suited lighting system is that of an advantageous method of heating the building during the cold season, hot-air and steam circulations being the options in this case. It was perhaps because the first-mentioned system, which is now finding its way into many factories, calls for equipment too large and elaborate for a service plant, that the company preferred the steam-heating system. A series of coiled pipes, which are laid along the walls of the building, form the passageways for the steam which is generated in the boiler room.

Structure is Fireproof

The building is largely what is generally referred to as fireproof, being all steel and brick, except the concrete floors, and save the substructure of the roof, which latter is made up of strong wooden beams. To increase safety against conflagrations, all the rules of the fire department concerning water, hose, pails and chemical extinguishers are being observed carefully.

All electricity is obtained from the central station which is located about 1-2 mile away from the Alco building. This electricity is used for lighting and whatever power is used in the building for driving the shop equipment as well as the ventilating fans which are stationed throughout the establishment. By this expedient, the boiler room is made to serve the heating system exclusively, which, of course, facilitates its operation and reduces the otherwise greater force of men needed in this portion of the plant.

The inside of the building is divided into three sections by two fire-walls, which extend from front to back wall. By this arrangement the three departments of the service building devoted to repair work, office and supply operations and storage, respectively, are effectively separated. These departments are dimensioned as follows: Repair shop, 146 feet wide and 89 feet deep; central section containing office and supply departments, 98 feet wide and 95 feet deep; storage or garage department, 36 feet wide and 98 feet deep; the depths being calculated as averages, as they vary from end to end in each department, due to the converging shape of the building along its longer dimension. The rooms formed in each of the three sections are separated from each other by partitions finished in oak.

Taking up the departments in turn, the repair shop with its 13,000 square feet commands prime attention. It is entered by trucks through the four sliding doors, already mentioned, and by individuals by way of a small door leading through the fire-wall, from the office department of the building. The shop department has a concrete floor formed with twelve pits provided for working under automobiles. In one corner it is lowered as a centrally inclined square which serves as a wash rack. The roof is of the horizontal type and is carried on a network of steel beams and a wooden substructure supported by three longitudinal rows of posts spaced about 20 feet from one another.

As the floor plan, Fig. 3, shows, ten of the twelve pits are located in two rows in the center of the repair shop and in alignment with the second and third doors. They are, therefore, arranged so that they are equally easy to reach from any part of the shop, without necessitating a great deal of space to be spared for passages. Each pit is 3 feet deep. Work on cars themselves is done in that portion of the shop which is shown by dotting in Fig. 3 and which comprises more than three-fourths of the floor space. The only portions of the shop where no cars are placed are a long and narrow field extending

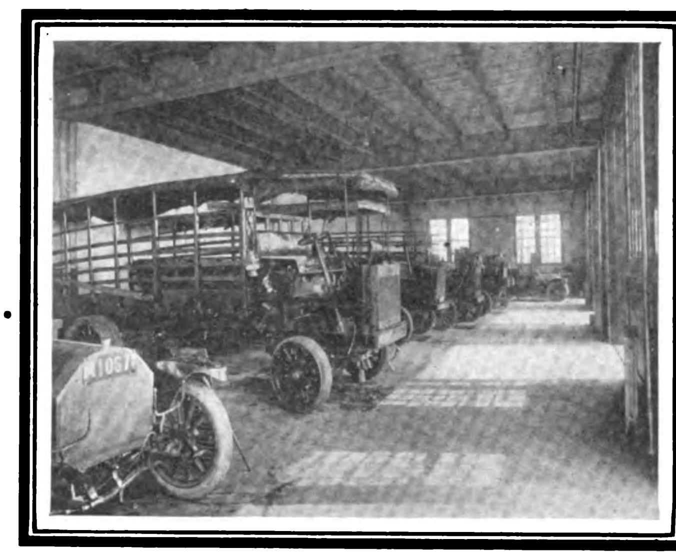

Fig. 2—Interior view of the garage where cars and trucks stopping for quick repairs are stored

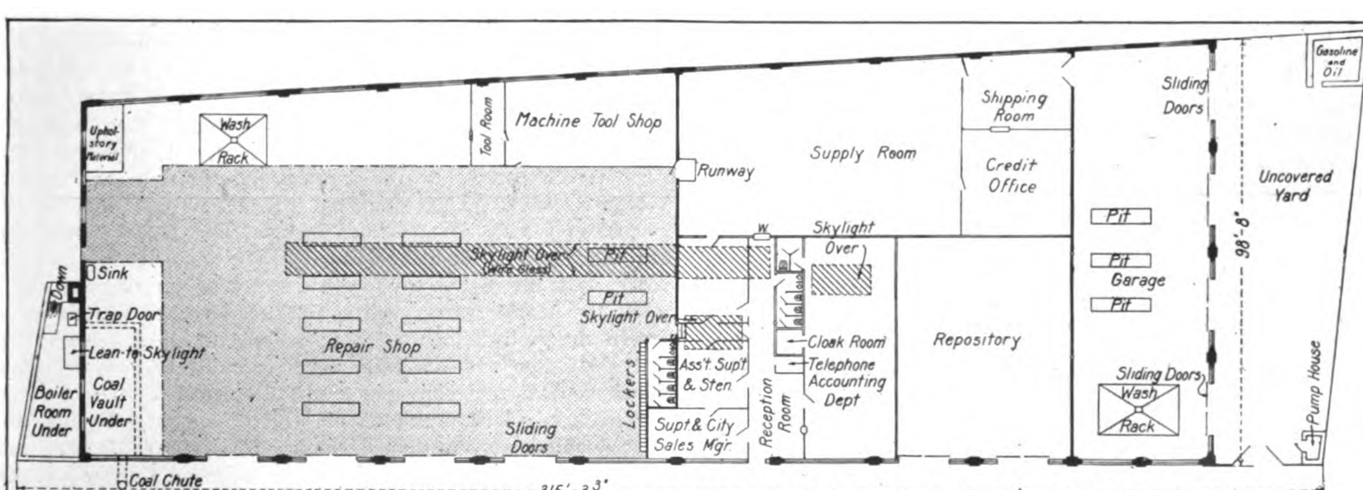

Fig. 3—Floor plan of new Alco service building in Long Island City, showing the division of the brick building into three departments, serving as shop, office and supply room, and garage, respectively. The shop is shown by dotting, while the cross-hatching denotes skylights supplying ample access of daylight throughout the building

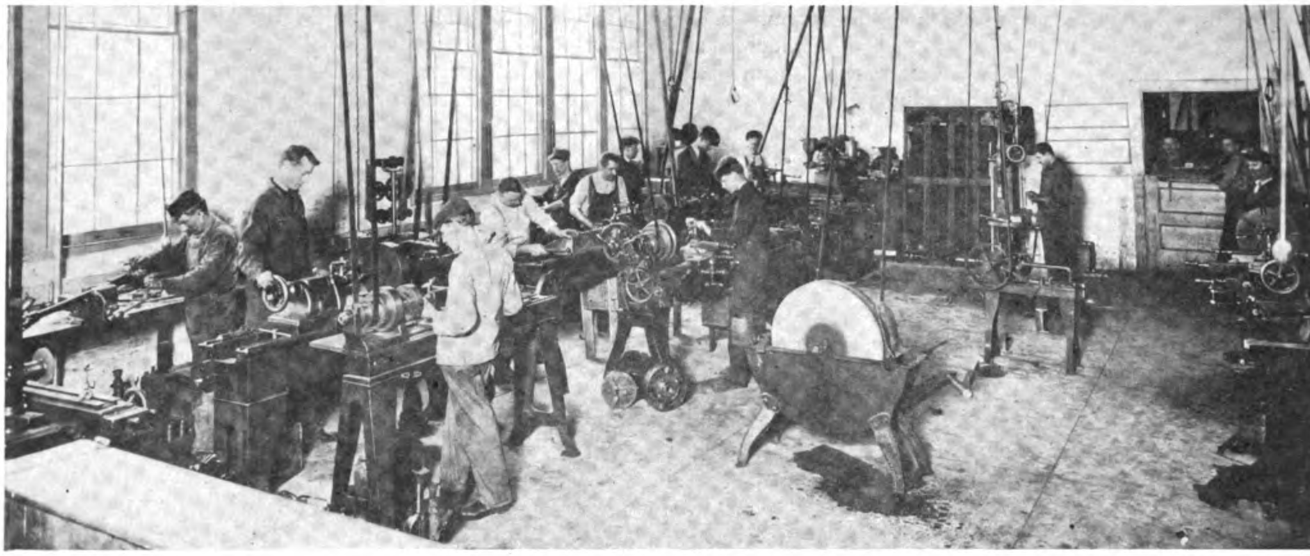

Fig. 4—Inside of machine tool department of the repair shop which is equipped with every desirable facility

along the back wall of the building as well as the left front corner. The first-mentioned portion holds the machine-tool shop and tool room, as well as the benches, wash-rack and upholstery-material storeroom. The corner at the left end of the building front contains the forge, which forms the principal part of the blacksmith shop.

The machine-tool shop is separated from the rest of the shop by a screen partition; another partition divides it into two sections, the larger of which contains the machine tools and the smaller one the tools proper, which are used in the machine tools and in bench work. The entrance is by way of a door leading from the main repair shop into the machine tool department, whence another door opens into the tool room. A window between the latter and the bench department permits of handing tools out and in between that department and the tool room.

Equipment of the machine-tool department consists of a large and a small lathe, several drilling machines, drill presses, grinders, emery wheel, arbor press, planer, shaper and a few other shop tools. These tools are all very neatly arranged, as Fig. 4 shows, and they are driven by belting from shafts extending along the back side of the repair department. One motor is used to drive the shafts, it being located halfway

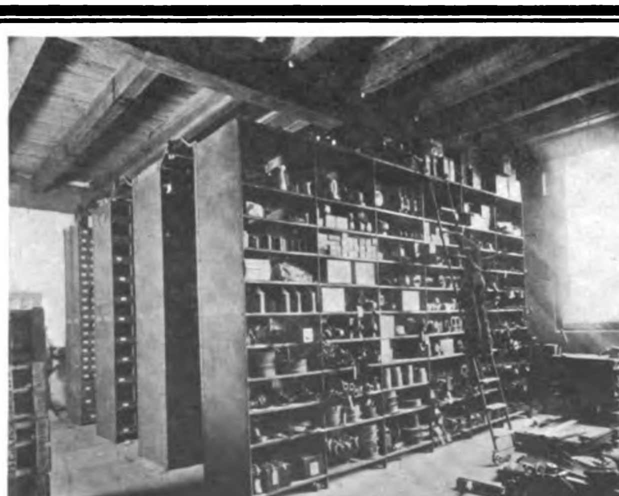

Fig. 5—View of sheet-metal shelving in stock room of Alco service building, Long Island City. This room will hold $80,000 worth of parts

between the tool room and the wash rack. Close to the motor and driven by the same an air compressor is mounted on the cross-beams carrying the roof, being connected to two tanks having a combined volume of 30 cubic feet, approximately.

In the left front corner of the machine tool shop the foreman's desk is in place. Outside of the screen partition and directly in front of his station is the recording clock and the time-card rack. Fig. 3 also shows a door, the upper hall of which is formed as a window, between repair shop and supply department, also located in close proximity to the foreman's quarters. Farther in front along the same fire-wall, the lavatories and workmen's lockers are arranged.

Shop Has Two Main Sections

The central portion is divided all along its length into two sections, the front being the office department, which is 49 inches deep, and the rear the supply room having a depth of 46 feet. The office section in turn is subdivided into manager's, stenographers' and telephone department, accountants' office and repository for supplies used in the building. The cloak room is located adjacent the telephone switchboard. The passageways and doors are clearly shown in Fig. 3.

The supply room contains $50,000 worth of stock. Its details appear in Fig. 6, showing the floor plan and arrangement of the contents of the room. The supply room, as situated between the two fire-walls and the lengthwise partition separating it from the office department, has one door piercing each of the fire-walls and one through the partition. The door between the supply room and the repair shop, as has been stated before, is formed as a window through which materials may be passed from the supply room to the shop. A second window of the same type is shown at W, opening into the extension of the reception room. The equipment of the supply room is arranged in a very advantageous manner, the shelves containing the repair-part stock being located in six double-shelf rows directly in front of the window between supply room and shop, while the heavier parts, such as motors, wheels, materials coming in sheets, bar stock, etc., are orderly arranged between the last shelf row and the right subdivision of the supply room which contains shipping and credit departments. The shelves are of a standard multiple-unit steel design, and besides the four double rows mentioned, another row is located along the partition between this room and the office, and these shelves are used to store tires and their parts. Rims are assembled in a group in front of these shelves and radiators form a similar group. The location of the supply-room clerk's desk and of his files is also shown here.

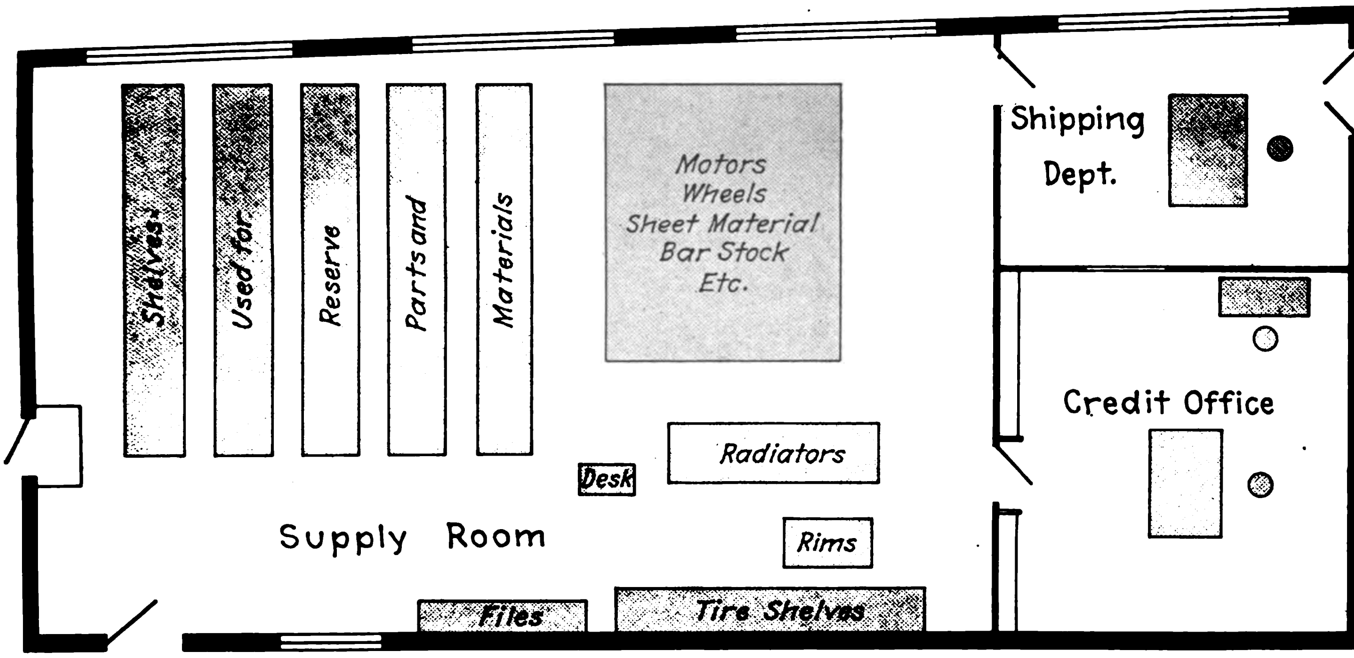

Fig. 6—Floor plan of Alco stockroom, showing layout for storage of various parts

Parts returned to the company are delivered to the credit office before going back to stock, while outgoing parts are recorded and charged by the shipping department. Since the business of these departments is closely interwoven with that of the supply room proper, their location in immediate proximity of the stock is a good stroke of efficient arrangement work.

The repository, which is also part of the central section of the building, serves for storing cars that remain at the service department for some time, either before or after being repaired. In this department is also kept the overflow of supplies from the supply room proper. The two sliding doors leading to Jackson avenue and the interior doors, inside the building, appear in the floor plan, Fig. 3.

From the shipping office, the only door between the central and the right-hand section of the building leads into the garage. The latter serves as a stopping place for the companies' cars which commute from Manhattan as well as for cars which have been repaired and are just about to be delivered to their owners. The garage is 36 by 98 feet in size, and is equipped with three pits of the same size and shape as the repair-shop pits. The three doors leading into the uncovered yard, which has a width of 30 feet, permit of free entrance and exit of the cars in the garage. In the front portion a large wash rack is provided, above which washing apparatus are fitted.

Certain parts of the equipment of the service department are stored outside the building, principally for reasons of safety, but also to save space inside the walls. Among these units is the boiler room shown in the floor plan, at the left front corner of the building. The boiler is stationed underground and is located next to the coal vaults which are charged from the street.

Ninety persons constitute the force which is employed in the entire service department. Two-thirds of these, or, to be exact, sixty-two men, work in the repair shop; the latter are ordinarily distributed about as follows: Five men on benchwork, from eight to ten men in the machine-tool shop, four doing blacksmith work, and the rest operating on the floor of the shop. In the supply department about six men are constantly employed, while the garage requires the services of two men. The boiler-room attendant, doormen, gasoline-tank man and about eighteen men in the office make up the rest of the force.

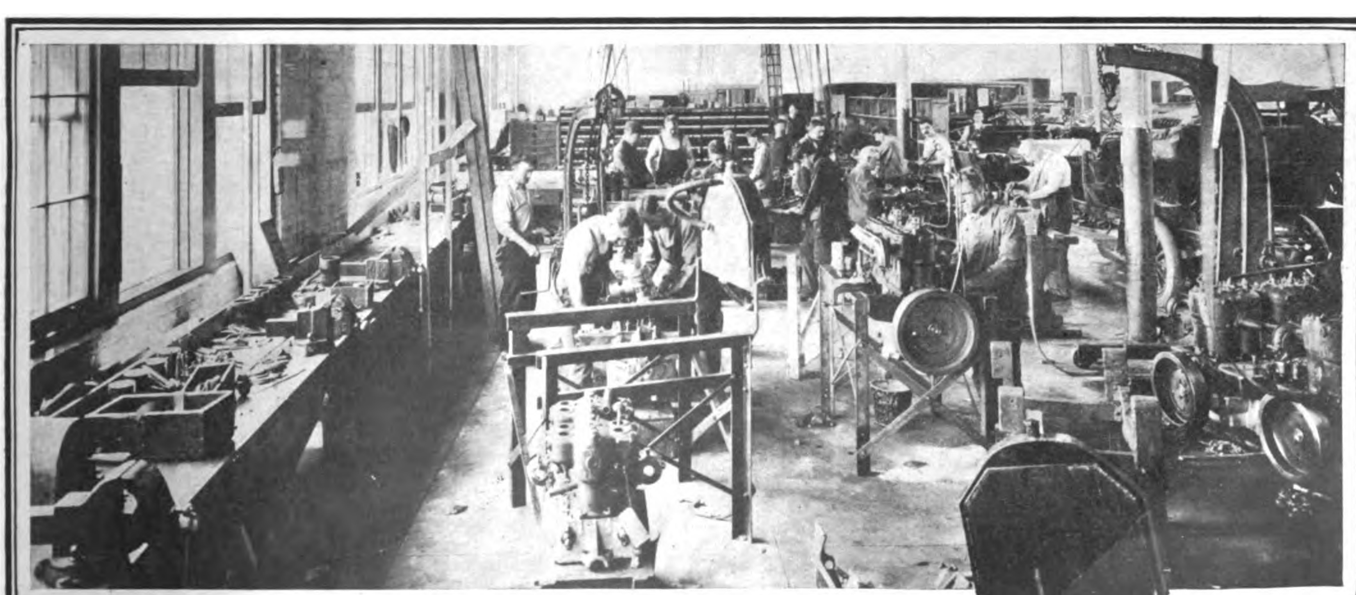

Fig. 7—Bench-room department of repair shop at Alco service building

Automobile Frame Steel

Heat-Treatment Applied to Straight-Carbon Steels of Suitable Composition Greatly Enhance Their Value

Many Manufacturers Should Give More Attention to Their Frame Specifications to Insure Durability

Paper presented by C. M. Hall, Sales Manager of the Parish Mfg. Co., at a recent meeting of the Detroit Section of the Society of Automobile Engineers.

IN order to fully understand the factors entering into the choice of materials of construction of the automobile frame it is necessary to consider the following points: First, the relation of the type of frame design of tne material; second, untreated steel as against heat-treated steel; third, the dynamic strength of the steel.

Automobile frame design may be broadly divided by the manner in which the shocks and strains caused by bad roads and by the vibration of the engine are to be absorbed. The material to be used will depend upon this design to a very large extent. The shock and vibration may be (1) deadened; (2) overcome by mass; (3) mitigated by springiness; (4) absorbed by sturdy construction. The first class makes use of a wooden frame, the argument of the manufacturer being that the wood kills or deadens the vibration. With the increased size the strength demanded by the greater load and power of the new cars, this material has been very nearly eliminated from the field, and does not pertain to this discussion.

The second class may be likened to the bed of a heavy planer or milling machine. The mass of the frame is so large and heavy in comparison with the vibration that the automobile negatives the latter. Such is the argument of the manufacturers of this type of car. In general, we may say that the first class is prone to weakness, while the second class is characterized by an extremely heavy or unwieldy car, necessitating additional driving force. Both of these divisions are now in the minority.

Frames Are Often Springy

The third class may be best described by the following incident: A party was riding in an automobile of this class with one of the company officials. While passing over some street car tracks the front wheels caught in the track. The front part of the frame was twisted out of line for the moment, but upon the release of the wheels it sprung back into alignment. The official remarked that the incident explained the principle of the design of the frame of that particular car; that is, springiness. This class is generally characterized by a light frame, with the side bars usually of small section. In order to make this design at all feasible under hard running conditions the steel should be of the very best—heat-treated alloy steel. Only too often is this requirement disregarded by the manufacturer. As the major portion of the strains to which the frame is subject enters through the hanger end of the side-bars they reach the front cross-member practically unimpeded. As the cross-member acts as a stay, or brace, at this point, there must necessarily be a focus of the separate forces at this section of the side-bar. This results in a tremendous strain at this point. If the section is not of sufficient size, nor of suitable steel, a break results. This is not a rare, but a common occurrence.

The fourth class is generally typical of the larger and higher-powered cars, which have what we may term sturdy construction. The side-bars are of suitable section, and usually of heat-treated, chrome-nickel steel. The frame is substantial, but not unwieldy, the higher physical properties of this particular steel making an extremely heavy frame unnecessary. The shocks are to be entirely absorbed by the springs and frame, so that only a very small proportion shall actually reach the body of the car. Engineers are divided as to the relative merits of these last two classes, as is shown by the numerous automobiles of each type. But whichever of the two is used, the character of the steel entering into the frame construction must be carefully considered. As will be shown later, alloy steel without heat-treatment is of little value, while heat-treatment applied to straight-carbon steels of suitable composition greatly enhance their value.

The motor truck is now entering the market in a most aggressive manner, so that mention should also be made of it. The design of a suitable frame for a motor truck is a much simpler affair than that of the pleasure car. Leaving aside the actual design, the two important features to be considered—as far as the materials of construction are concerned—are the use of the I-beam or of the heat-treated channel section. Metallurgically, there should be no hesitation at all as the former cannot compare with the latter. The rolling mills of many steel companies producing these I-beams and rail sections aim for quantity rather than for quality. The steel is generally crushed down to size with as few passes through the rolls as possible, giving a structure which is absolutely unfitted for the use in view. Among the manifold causes of failure there was shown in New York City last winter the crystallization set up by cold weather and its disastrous results. Although no steel will entirely resist this tendency to cold crystallization, the structure of heat-treated steel is such that the influence of cold is many times less upon it than upon the coarsely crystalline I-section.

A decade ago, when the automobile steel frame was in its infancy, cold-rolled, low-carbon Bessemer steel was the only metal on the market for this sort of construction. This steel generally analyzed from 0.07 to 0.10 per cent. carbon. From this statement, however, it must not be assumed that such steel was ordered to specifications. Far from it. Indeed, in the eyes of the automobile manufacturer at that time, steel was simply steel. Then, with the ever-increasing ascendency of the open-hearth process and the decline of the Bessemer process, open-hearth, cold-rolled steel was specified. The steel mills, using the argument of the better quality of the open-hearth steel, increased their profits charging $2 or $3 more a ton for their steel if open-hearth was specified; otherwise the purchaser probably was given open-hearth steel anyway. Prices were soon equalized, however, and at the present time all sheet steel used in automobile frames is open-hearth. (There are only four Bessemet sheet mills now in operation in this country.)

Cold-rolled steel was specified at first simply for the bright finish obtainable. Having obtained this foothold, for many years its was practically the only steel in use. With the lowering prices 2 years ago hot-rolled steel came into use, and will probably supplant the cold-rolled material within a short time.

The growth of the steel frame business was somewhat hampered in the beginning by the difficulty experienced in obtaining sheets of sufficient length and width. The sheet mills were formerly rolling at a maximum width of some 8 inches, while a frame of 100 inches in length was considered large. Educational methods have now resulted in sheets double the width, while a side-bar requiring a 350-inch sheet is not at all unusual.

With the increasing weight and size of the car came the demand for a better and stronger steel. This requirement was filled for the time by the use of a higher carbon steel, giving an elastic limit of some 30,000 pounds per square inch. Then, in 1905, came the revolutionizing process of using alloy steel, together with a suitable heat-treatment, with the formation of the Parish Manufacturing Company, at Reading, Pa. This company experimented with various types of nickel, chrome-nickel and manganese steels—heat-treated—which resulted in the present types of chrome-nickel steel and special carbon steel now used by them. The true worth of this chrome-nickel steel as against carbon steels may be appreciated by noting the dynamic strength and quality figure given in the last part of this article.

Selection of Steel for Frame

The problem of selecting the proper steel for an automobile frame is an all-important one, for upon the strength and proper construction of this frame will depend the safety and lives of the automobilists. Moreover, a faulty frame necessarily results in a useless machine. A large part of the frame troubles probably never reach the ears of the manufacturer. The owner of a broken frame will often have it repaired in some crude way by a blacksmith rather than forego the use of his car for some weeks. If the automobile manufacturers were aware of, or would admit, the large percentage of frame failures they would pay more attention to their frame specifications.

The steel must be chosen with a view to the metallurgical and mechanical treatments in mind, and with due regard to the peculiar conditions to be met with in finished car or truck. It is well known that various elements, such as carbon, manganese, phosphorus, sulphur, etc., affect steel in divers ways. Some are injurious; others confer added elasticity, hardness or toughness and increase the efficiency of the steel for certain usages peculiar to automobile frames. In short, this means a special steel, which upon further treatment will be the best for the existing conditions.

Metallurgists will tell the uninitiated that raw steel resembles granite, in that it is made up of innumerable crystals, often too small to be seen with the unaided eye. A little thought will convince one that the qualities and properties of the steel will be directly dependent upon the size and arrangement of these crystals. The closer the crystals interlock with each other, the stronger the steel. Also, the smaller the size of the crystals, the greater the number of crystal faces which will fit into each other. Upon this internal structure will depend the physical properties of the steel. The control of the structure—assuming a proper chemical composition—is vested in the metallurgical treatment which is given the steel. Chemical composition—special steel—must go hand-in-hand. One is useless without the other.

This heat-treatment is not to be a hit-or-miss affair, but must be conducted rationally and in a technical manner under the direction of a competent metallurgical engineer. For each heat of steel a separate treatment must be worked out. Steel of high quality—and such only should be used in frame construction—is very susceptible to a few degrees of heat at high temperatures. This is easily demonstrated by the use of a testing machine in conjunction with accurate pyrometers. Heat-treatment such as should be used in connection with the heat-treatment of automobile frame steel must be most accurately adjusted and carried out. This, of course, will necessitate very careful work on the part of the metallurgist and of those under him. The results obtained will amply justify the efforts expended. Heat-treatment in general is as yet in its infancy, but specialization in this particular branch of metallurgy will have a rapid growth.

Let us consider the effect of heat-treatment properly adjusted upon the frame steel. A strip of straight carbon open-hearth steel was pressed into a channel. Photomicrographs were then taken of a section of this channel. This steel is characterized by the laminations given it by the rolling operation; by very coarse crystallization (inherent to raw steel); and by lines of weakness due to the crushing of the crystals in the forming operation. That is, the steel is so strained and stressed that it is wholly unsuited—in its present condition—to frame conditions. And yet many manufacturers persist in using such steel and wonder why their customers complain that the frame is unsatisfactory!

The channel was then heat-treated by the Parish process and photomicrographs taken of the same section. A great contrast between the untreated and the treated steel was observed. A fine, even grain has replaced the coarse crystallization and all signs of weakness have been obliterated. The working strength (elastic limit) of the steel has been nearly doubled, as is shown by the following results:

	Untreated	Treated
Elastic limit, lbs. per sq. in.	28,950	57,300
Tensile strength, lbs. per sq. in.	50,600	85,000
Elongation, per cent in 2 in.	37	28.25

The effect of using untreated stock for frames is that the structure of the steel is very uneven and shows much weakness. Many other examples illustrating the advantage of heat-treated steel over untreated steel might be given. From both the technical and practical point of view, heat-treated steel—of suitable composition and physical properties—has no equal.

An automobile frame is subject to two general classes of stresses: static and dynamic. By static stresses are meant the weight of the dead load, such as machinery, body, passengers, etc. It is upon this total load and its distribution that the design of the frame with its component members is usually arrived at, allowing for a certain factor of safety. But there are also other extremely important stresses to which the automobile frame is subject on account of its inherent make-up and which are too often neglected in selecting material for the frame. These stresses are set up by the vibration of the engine and by the constant bumping on uneven ground. The latter may be partly or wholly taken up by the springs, but the former can but pass into the frame itself. These continual shocks and alternating stresses, though primarily small in amount, soon play a very important part in the life of the car. To these complicated kinematic forces and fatigue-resisting power are given the name of dynamic stresses. That these are not a direct function of the static strength is shown by numerous every-day failures in all lines of steel construction, and which cannot be attributed to any other cause by dynamic weakness.

THE RULE for finding the piston displacement of a motor cylinder is that of finding the cubic contents of a cylinder, which is as follows: Multiply the area of one end by the length of the cylinder, the product will be the cubic contents of the cylinder. The rule for finding the area of a circle consists in multiplying the square of the diameter by .7854. The formula for finding piston displacement is: $D^2 .7854\, S\, N =$ piston displacement, in which D is the diameter of the cylinder, S length of stroke, N number of cylinders.

Therefore, to find the piston displacement of a motor with 5-inch bore, 6-inch stroke and four cylinders, substituting the numbers for the letters of the formula, it would read: 5^2 (five square) $\times .7854 \times 6 \times 4 = 471.2$ cubic inches.

Modern Repair Service

An Outline of Its Functions and a Standard on Which Departments May Be Organized

Every Man's Work Must Be Laid Out and Clearly Defined to Permit of Efficient Operation

From a paper by C. Roy Watson, published in the September Bulletin of the Society of Automobile Engineers.

THE function of the car service department is to take care of the cars after they are sold; to supply repair parts; educate repairmen; supervise the character and extent of agents' repair shops and policies; settle claims for defective parts, and operate a local branch for repairs, etc.

DUTIES OF THE CAR SERVICE DIVISION

ORDER DEPARTMENT. General foreman of car service	A Repair stock...	(1) Manufacture and storage of repair parts. (2) Handling, packing, shipping.
(1) Records, lists, prints, etc., of parts, tools and material. Pricing (2) Ordering, accounting and maintenance of repair stock..........	B Claims	(1) Receiving and cleaning of specimens. (2) Investigation and judgment. (3) Storage. (4) Adjustment, allowing stock or credits.
(3) Correspondence ..... (4) Ordering of shop. Outside repairing and work	C Educational N..	(1) Class room. Models. Car and instructor. (2) Compiling of instruction book. Educating agents' men. Answering technical queries, and directing apprentices in repair and shop work. (3) Traveling repair organizer and overseer.
	D General repairs.	(1) General repairing and overhauling, shipped in from outside.

ORGANIZATION OF CAR SERVICE DIVISION

General foreman of car service division.....		
(1) Order clerk......... (2) Stenographer .... (3) Stenographer	A Repair stock foreman	(1) Manufacturing foreman. (2) Stock renewal man. (3) Order clerks. (4) Order checker. (5) Packer. (6) Shipper.
(3) Records man.........	B Claims foreman.	(1) Clerk. (2) Handyman.
(4) Accountant	C Instructor	(1) Traveling overseer.
(5) Typewriters .... (6) Errand boy	D Repair shop foreman	(1) Repairmen. (2) Repair apprentices.

A—Repair Stock.—The main requirements in connection with the repair parts stock are that the parts be reliably and promptly supplied, properly ordered, equitably priced, and interchangeable. Two or three sub-stocks for storing, at suitable shipping distance, are necessary for promptness, as very few agents can finance a complete stock which in several cases runs as high in price as $50,000.

As time passes and men whose minds are storehouses of facts leave, the lack of thorough records, generally neglected in the rush days of the industry, calls for a thorough supply of drawings, lists and records of supersedence, interchangeability, etc. All the plans, tools, and a wisely estimated stock of the special materials and intricate process, parts and assemblies made by outsiders should be bought and stored when it is suspected that the supply of such repair parts will be neglected or stopped in the future.

B—Claims Department.—The claims department of an automobile factory is distinctly an item of expense, but a necessity; and when equitably and diplomatically managed makes a quiet bid for happy loyal owners.

C—Educational Department.—The educational work is, first, to supply trained repairmen, and post agents and their foremen on new models; also to oversee and develop agents' repair shops to a high standard. Of course, this work is a direct expense, but when really productive pays indirectly many times its cost.

The instructor, a thorough man in both general information and the lore of the car, with teaching and managing ability a classroom with sectional models and a car.

Overheating During First Few Miles; Method of Adjusting the Schebler Model L; Tapping Sound from First Cylinder; Mercer Cars Are Overslung; How To Shift Gears Readily; Best Non-Freezing Solution

Engine Overheats in 2 Miles

EDITOR THE AUTOMOBILE:—I drive a 1911 Hudson 33, and I find in running the first mile or two the engine gets very hot, but on a long run it seems to be all right.

1. Can you suggest anything that would cause this or is it a natural consequence? The 1911 Hudson's fan is in the flywheel, that being the only cooling fan. Also, can you suggest any preparation that would tend to keep the temperature down in the engine, such as something to mix with the water.

2. Also, I would like to know what is a good thing to keep the water from freezing in the radiator, and is it necessary to use lighter oil in cold weather, or can the oil I am using be thinned down?

Hartford, Conn. S. F. FRENCH.

—1. This is a very strange case and the first time that THE AUTOMOBILE has heard of a motor that would overheat in 2 miles and be all right in 10. The overheat, since it is of such short duration, will not harm your motor and you may disregard it unless it becomes more serious. It might be that owing to your location you have to climb a steep hill when starting out or that you travel with your spark retarded too far. Keep your spark advanced as far as you can without permitting the motor to knock.

2. The answer to this question will be found elsewhere on these pages in answer to another inquiry. Do not attempt to thin down your oil. Medium cylinder oil will give you satisfaction. It is a big mistake to endeavor to thin down thick or heavy oil by adding oil of a lighter grade. The only place where it is safe to use mixed oil is in the gearset or the differential.

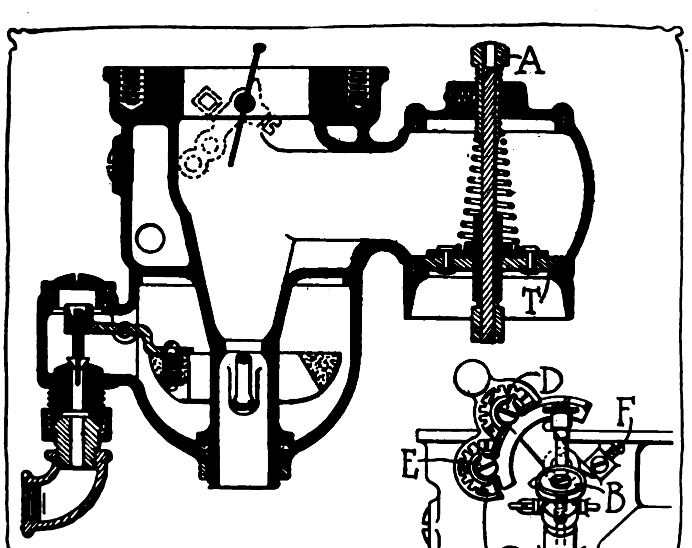

Fig. 1—Adjustment points on the Schebler model L carbureter

Adjusting Schebler Model L.

Editor THE AUTOMOBILE:—How can I adjust a new model L Schebler carbureter to my car so it will run well at all speeds? I have had the carbureter some time, but have never attached it as I did not know how the adjustments should be made.

Toronto, Canada. FRED. BLACKSTONE.

—First make sure that your ignition is properly timed, and

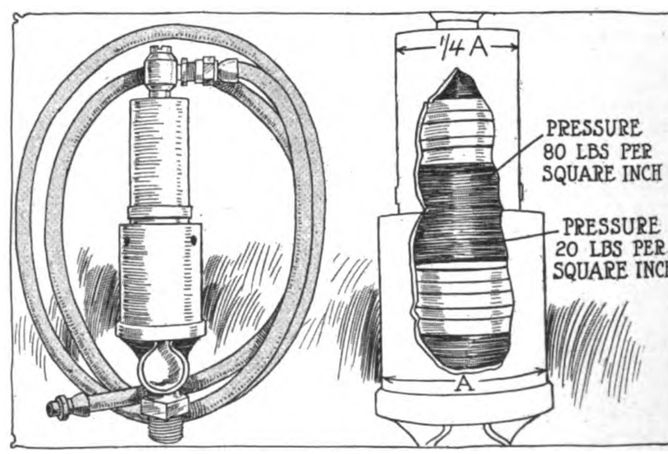

Fig. 2—Use of the differential piston, showing Mayo spark plug pump

that you have a good hot spark at each plug; that your valves are properly timed and seated, and that all connections are tight, and that there are no air leaks of any kind in these connections.

Adjustments on the auxiliary air valve A, Fig. 1, are made first so that it seats firmly but lightly at T; then close your needle valve by turning the adjustment screw B to the right until it stops. Do not use any pressure on this adjustment screw after it meets with resistance. Then turn it to the left about a turn and a half and prime or flush the carbureter by pulling up the priming lever C and holding it up for about 5 seconds. Next, open your throttle about one-third, and start the motor; then close your throttle slightly and retard your spark and adjust throttle lever screw F and needle valve adjusting screw B, so that the motor runs at the desired speed and hits on all cylinders.

When a good adjustment with your motor running idle is secured, do not touch your needle valve adjustment again, but make your intermediate and high-speed adjustment on the dials D and E. Adjust pointer on the first dial D, from figure No. 1 toward figure No. 3, about half way between. Advance your spark and open throttle so that the roller on the track running below the dials is in line with the first dial. If the motor backfires with the throttle in this position, and the spark advanced, turn the indicator a little more toward figure No. 3; or if the mixture is too rich, turn the indicator back or toward figure No. 1 until you are satisfied that your motor is running properly with the throttle in this position, or at intermediate speed. Now, open the throttle wide and make your adjustment on your dial E for high speed in the same manner as you have made your adjustments for intermediate speed on dial D.

It is found that in the majority of cases in adjusting this carbureter the tendency is to give too rich a mixture. It is suggested and recommended in adjusting the carbureter, both at low, intermediate and high speed, that you cut down the gasoline until the motor begins to backfire, and then increase the supply of fuel, a notch at a time, until the motor hits evenly on all cylinders. Do not increase the supply of gasoline by turning the needle valve adjusting screw more than a notch at a time, in your low-speed adjustment, and do not turn it any after your motor hits regularly on all cylinders. In making the adjustments on the intermediate and high-speed dials, do not turn the pointers more than one-half way at a time between the graduated divisions or marks shown on the dials. By following these instructions the adjustment should be satisfactory.

The Best Non-Freezing Solution

Editor The Automobile:—Will you kindly advise us of some chemical which you know to be good to add to the radiator water to keep it from freezing where the temperature never reaches zero.

Norfolk, Va. D. M. Bell.

—There are three well-known anti-freezing compounds which

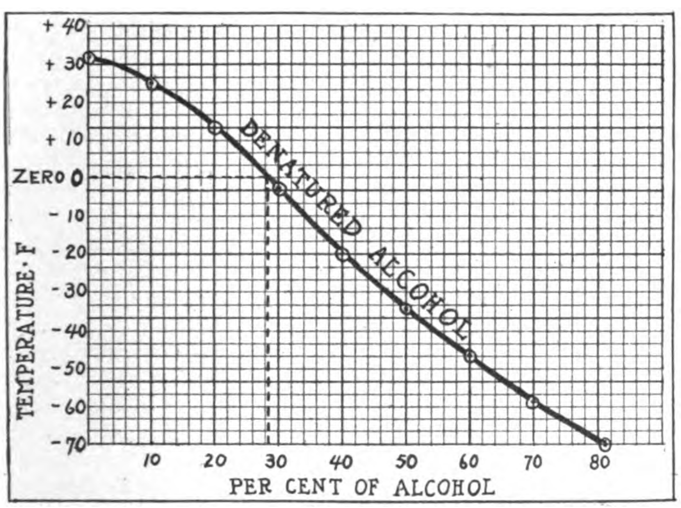

Fig. 3—Freezing points of various solutions of denatured alcohol and water

have been used extensively and which have proved themselves to be valuable for this work. They are alcohol, glycerine and calcium chloride. Besides these there are many others that are good, but they nearly all have some drawbacks that prevent them from being as useful as would otherwise be the case.

About the most popular of all the solutions to use in the motor is the alcohol. Wood alcohol or denatured may be used. The cost is small; denatured alcohol may be purchased for 60 cents per gallon and the price of wood alcohol is about the same. The advantages of alcohol are that it is very easily handled and that there is no action on the metallic parts of the circulating system. The denatured alcohol is especially perfect in this respect, while the wood alcohol has a tendency of developing formic acid under the influence of heat when in the presence of oxygen. Formic acid has a mildly corrosive action which will harm the metal in the radiator if the action continues for a long period of time. The danger of the formic acid, however, is so slight that only the most particular of automobilists need worry about any deleterious effects from its use.

The freezing point of the wood alcohol is lower than that of the denatured alcohol, as may be seen in Fig. 8. It would seem therefore, that less of the wood alcohol would be required, but the objection to this is that the boiling point is also less than that of the denatured alcohol and therefore more of it is required in order to counteract the evaporation. When wood alcohol is added to glycerine, however, in the proportion of half to half, the boiling temperature is raised considerably as will be seen in Fig. 7, which shows the boiling points of the pure wood alcohol and the alcohol and glycerine when added to the water at different percentages.

The specific gravities of the wood and denatured alcohol solution will also vary considerably and, although this is not an important feature in many respects, it may be brought out as illustrating another point of difference between the action of wood and denatured alcohol. It will be seen that the wood alcohol has the lower specific gravity as well as the lower freezing point for a mixture of a given percentage.

Taking wood alcohol alone the following solutions may be used:

Freezing Point	Wood Alcohol	Water
+ 5 degrees Fahrenheit	20 per cent.	80 per cent.
0 " "	25 " "	75 " "
— 5 " "	27 " "	73 " "
—10 " "	31 " "	69 " "
—15 " "	35 " "	65 " "
—20 " "	38 " "	62 " "

When using denatured alcohol the freezing point will be as shown in the diagram at Fig. 3. In tabular form for temperatures between 5 above and 20 below zero Fahrenheit, the denatured alcohol solutions will be as follows:

Freezing Point	Denatured Alcohol	Water
+ 5 degrees Fahrenheit	24 per cent.	76 per cent.
0 " "	29 " "	71 " "
— 5 " "	32 " "	68 " "
—10 " "	34 " "	66 " "
—15 " "	37 " "	63 " "
—20 " "	40 " "	60 " "

Glycerine possesses many characteristics which would seem to stamp it as the ideal non-freezing agent. The boiling point is high and, as will be seen in the diagram Fig. 7, does not change the boiling point of the mixture regardless of the percentage added to the cooling water. Glycerine reduces the freezing temperature materially when added to the water, but does not do so as rapidly as wood or denatured alcohol, as may be seen in Fig. 5. When reducing the freezing temperature to such an extent

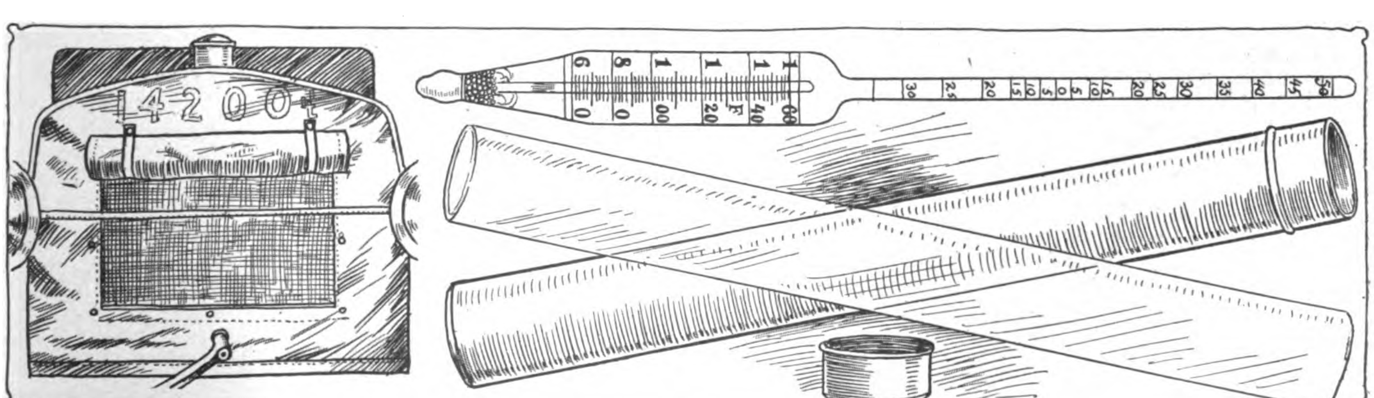

Fig. 4—Useful form of radiator cover; freezometer for determining freezing point of alcohol solution

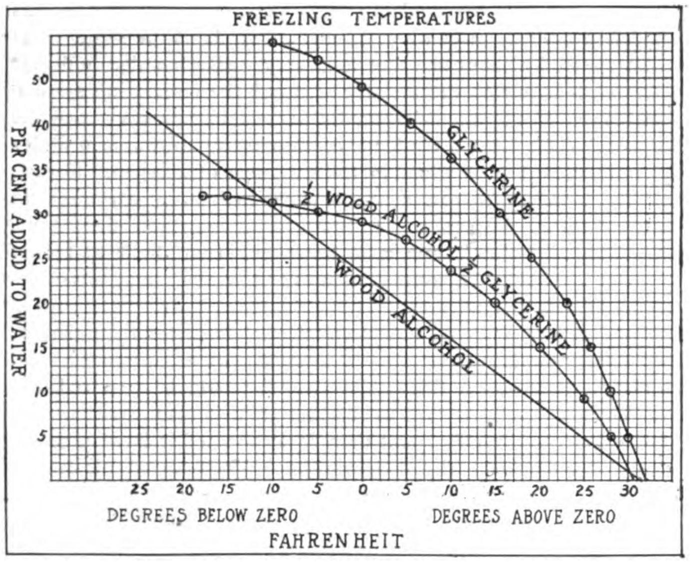

Fig. 5—Freezing points of glycerine and glycerine-and-alcohol solutions

that the water will not freeze in a cold climate it is necessary to add so much that the water tends to become gelatinous and for this reason it has been mixed very often with wood or denatured alcohol in a very successful attempt to combine the merits of the two. When glycerine alone is used the mixtures that are required for different temperatures will be found in the following table:

Freezing Point	Glycerine	Water
+28 degrees Fahrenheit	10 per cent.	90 per cent.
+15 " "	30 " "	70 " "
+ 5 " "	40 " "	60 " "
0 " "	48 " "	52 " "
— 5 " "	54 " "	46 " "
—10 " "	58 " "	42 " "

It will be seen from the above table and from a study of Fig. 8 that the enormous quantity of glycerine which has to be added at the lower freezing points will naturally stand in the way of the success of the use of this material where the climatic conditions are such that temperatures below zero will be reached. It is for use under such conditions that the addition of alcohol to the solution has been recommended by many, and which has become decidedly popular in the last few years. When the glycerine and alcohol are used together they are used in equal quantities. This mixture, which is purely mechanical, has not as great a tendency to rot the hose connections as a pure glycerine solution would have. It has more water in it than would the latter and is thus more free to pass through the radiator and other parts of the circulating system without doing harm. On the other hand, there will be less alcohol in this solution than there was in the pure alcohol solution and the result of this is that there will not be so much evaporation and necessary replacement of the cooling fluid after the motor has been run for a time. The glycerine and the alcohol are stirred up together and added to the water in the following proportions:

Freezing Point	Mixture	Water
+20 degrees Fahrenheit	15 per cent.	85 per cent.
+15 " "	20 " "	80 " "
+10 " "	24 " "	76 " "
+ 5 " "	27 " "	73 " "
0 " "	29 " "	71 " "
— 5 " "	30 " "	70 " "
—15 " "	32 " "	68 " "

A study of Fig. 5 will show that the freezing curve of this mixture drops off very rapidly toward the end. When a 32 per cent. mixture has been reached the line of freezing is almost vertical and a very slight change in the mixture will cause an enormous drop in the freezing temperature. It is remarkable that while a 30 per cent. solution of the mixture will have a freezing point 10 degrees higher than a 30 per cent. solution of the alcohol alone, still a 32 per cent. solution of the mixture will have a freezing point about 10 degrees below that of a 32 per cent. solution of the alcohol. When using the mixture the quantity of glycerine will remain constant for a couple of months, although the alcohol will have to be frequently renewed to make up for what has evaporated.

We now come to calcium chloride, $CaCl_2$, and water. This compound has been recommended by many and is very good, although it has its dangers in the difficulty of securing the chemically pure article. In buying the calcium chloride for use in the cooling system of an automobile the crude article costing about 10 cents a pound should not be purchased. The chemically pure article costs about 25 cents a pound and is very satisfactory. The objections to the use of the material is its tendency to set up an acidic action in the radiator. Chloride of lime, which should be kept out of the radiator, is often a constituent of the commercial calcium chloride and care must be used in getting the chemical from a reliable concern who will guarantee the purity of their products. With the calcium chloride solution the percentages are given by weight instead of volumes as are the other tables:

Freezing Point	Calcium Chloride by Weight	Water by Weight
+10 degrees Fahrenheit	15 per cent.	85 per cent.
+ 5 " "	17 " "	83 " "
0 " "	19 " "	81 " "
— 5 " "	21 " "	79 " "
—10 " "	22 " "	78 " "
—15 " "	23 " "	77 " "
—20 " "	25 " "	75 " "

In Fig. 8 the specific gravities of this mixture are given. These would be of use if the motorist had a hydrometer. He could then take a sample of his solution from time to time and test it for its specific gravity; from this he would know the freezing point which corresponds to it. He could then add more calcium chloride if it were necessary to lower the freezing point. For instance, if the specific gravity were 1.12 by looking at the curve, Fig. 8, it will be seen that the freezing point is 10 degrees Fahrenheit. There is an interesting instrument on the market called a Freezometer which is a hydrometer especially adapted for use with denatured alcohol. The readings are directly in terms of the freezing point. The appearance of the device is shown in Fig. 4. It is used as follows:

The scale in the stem of the Freezometer reads from plus 30, or 30 degrees above zero Fahrenheit, to —50, or 50 degrees below zero Fahrenheit, and indicates the freezing point of the solution tested. Take a quantity, either of the fresh solution before filling the radiator, or if a test is desired of that in use, draw from the radiator sufficient to float the Freezometer in the test tube supplied with each instrument. Put the Freezometer in the solution and read the line on the stem to which it sinks. This point will show the degree at which the tested solution will freeze, provided the thermometer, in the lower part of the body of the instrument, shows the temperature of the solution to be 60 degrees Fahren-

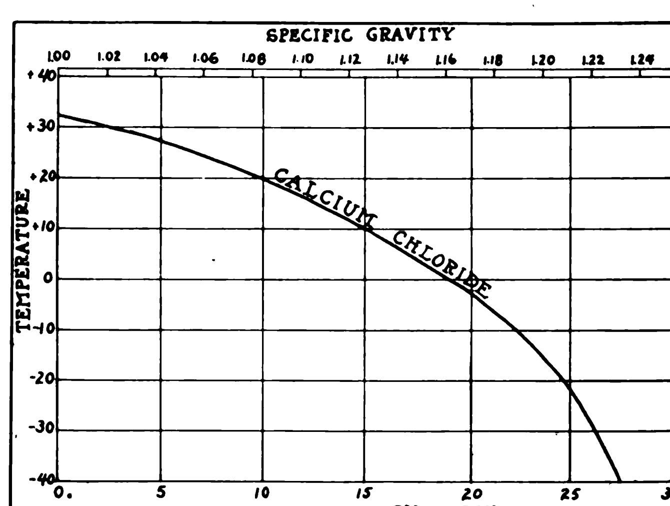

Fig. 6—Freezing points and specific gravity of CaCl and water solutions

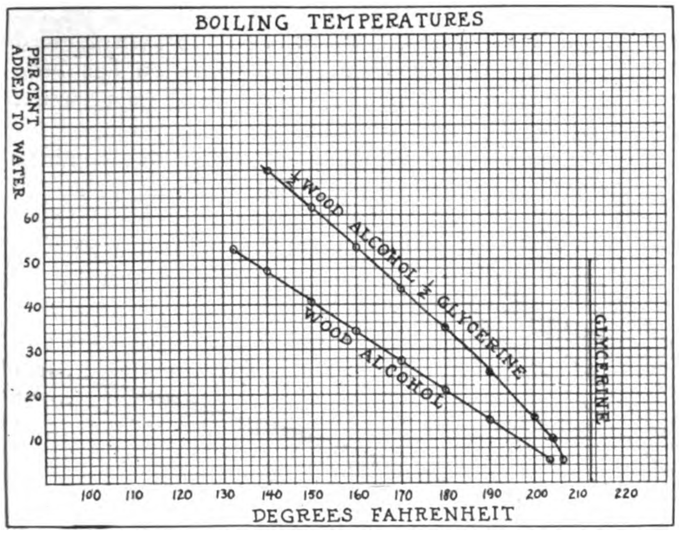

Fig. 7—Showing temperature of the mixture of alcohol and glycerine boils

heit when the test is made. If the thermometer shows a temperature below 60 degrees Fahrenheit hold the test tube closely in the hands until the solution is warmed up to 60 degrees, which will require but a few minutes, when the correct reading of the Freezometer can be taken. If the thermometer shows a temperature above 60 degrees Fahrenheit, the correction table, which is also printed on the reverse side of the thermometer scale in the bulb of the instrument, should be used.

The use of blankets over the radiator when the car is standing will keep it warm for a long time. The curtain-like device shown in Fig. 4 has been adopted by some. It is of very neat appearance and can be rolled up as shown in the illustration. Others place a sheet of newspaper across the front of the radiator permitting the suction of the fan to hold it in place and allowing the motor to run while the car is standing to keep the water continually warm. When leaving the car in a cold garage a cluster of electric lights placed beneath the hood of the car and a blanket thrown over the hood and radiator will often keep the motor warm for a long time while the owner is occupied elsewhere.

Any of the above devices will keep the water from freezing and they have all been tried and found all that has been stated above by numerous automobilists. There are no experiments in the above list of solutions, every one being practical.

Simple Way to Shift Gears

Editor The Automobile:—I have read with much interest the different means suggested for shifting from a higher gear to a lower one, all of which are practically the same except the different means used to obtain the result. I am of the opinion that the simple instruction to shift to neutral, allow the clutch to engage for an instant, throw out the clutch and instantly shift to the lower gear, all of which can be done in 3 seconds and on the steepest hill without any clashing of gears or material loss of speed, is the best instruction to give. This leaves the driver to learn from experience the required speed of car and motor. .

San José, Cal. Willis.

Tapping in Front Cylinder

Editor The Automobile:—I am driving a four-cylinder gas car, one of the best makes. I have noticed for some time a tapping in one of the cylinders and have taken it up with the local people who have a good machine shop, but they do not seem to be able to get it out. I was speaking recently, with a view of purchasing, to the manager of one of the best make six-cylinder cars; he told me at the time that a tapping might be expected in a six-cylinder car, but did not mention a four-cylinder. He stated it was usually in the cylinder next to radiator, and caused by cold air striking the more exposed cylinder causing a contraction or expansion of the metal. Will you kindly advise me if such is the case and if there is any known way of taking it out.

Baltimore, Md. C. Summers.

—The idea of air striking the cylinders and causing a tapping sound from any expansion, contraction or any other cause is absurd. The fact that the sound you hear is a tap and not a knock would seem to indicate that it is somewhat in the nature of a valve. In The Automobile for October 17 the adjustment of the valve was explained and it might be well to follow the directions given therein to see if this will eliminate the trouble. Should the tap still continue after the valves have been adjusted up as closely as they should go, look at the cam followers to see if they are worn. If so, the parts which are gone will have to be renewed. It very often happens that the exhaust will leak through an opening in the pipe with a sound that is sharp enough to be mistaken for a tap. The correction of this is obviously in closing up the opening. This will have to be done by the means which are best fitted to the particular case in point. If you are mistaken in the sound and it is after all a knock, look for a loose connecting-rod bearing, carbon in the cylinders, loose wristpin bearing, broken piston rings or loose main bearings. Sometimes a rapping sound is caused by the fan striking the radiator or by a broken circulating pump.

Mercer Cars Not Underslung

Editor The Automobile:—Will you please tell me how the Mercer cars are hung? I claim they are overhung and my friend says that they are underslung.

Hoping you will answer this, I remain,

Andover, Mass. J. D. Crary, Jr.

—The Mercer cars are not underslung, both the frame and the springs being above the front axle.

Use of Differential Piston

Editor The Automobile:—In a recent issue of Thf Automobile I noted a spark-plug pump which was condemned by the Editor because it did not use a differential piston. Would the pump have operated if such a device had been used?

Elyria, O. J. S. Smith.

—The pump would no doubt have operated successfully as there is now such a pump on the market, it is illustrated in Fig. 2. It will be realized that the pressure follows the law brought out in the diagram in the same illustration. Total pressure divided by area will give pressure per square unit. Therefore since the pressure in any part of the vesel must be the same, when it is divided by a smaller area a greater pressure per square unit will result.

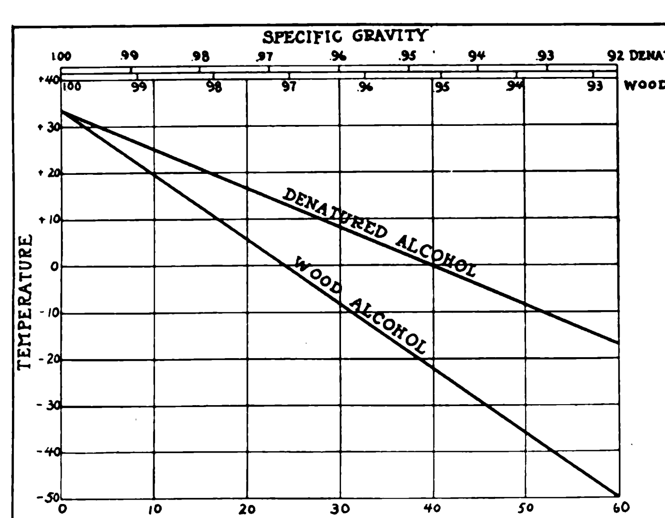

Fig. 8—Comparative chart of denatured and wood alcohol solutio

The AUTOMOBILE

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Paraffin Motor Fuel

THE use of paraffin as a motor fuel instead of gasoline is receiving much attention in Europe today because of the excessive prices charged for gasoline, which during the last year reached the high mark of $1.12 per gallon. In a recent test a motor car was given an official run of over 2,000 miles with paraffin as a fuel but with provisions made to start on gasoline and switch to paraffin when ready, the switch being accomplished from the driver's seat as easily as turning from the battery current supply to the magneto in an ignition system. The test demonstrated that paraffin is a fairly satisfactory fuel: The engine after stops of 20 minutes was re-started on paraffin although it was customary to re-start on gasoline and switch to paraffin. The motor demonstrated flexibility by propelling the car for 1.5 miles at 6.14 miles per hour and also accelerating to 40 miles per hour in 51 seconds.

The Englishman in particular is quite desirous of seeing the paraffin carbureter developed; in fact, to such an extent that a public competition of paraffin carbureters has been called for and an American citizen living abroad has offered a prize of $2,500 for the best design. He is nevertheless somewhat skeptical as to how long paraffin will remain at its present low price. He has had a lesson during the last year on how the oil interests can advance prices when public attention turns to a certain product such as crude oil, which has more than doubled in the last 13 months since its consumption has been considerably increased by the more general introduction of the Diesel heavy-oil engines.

But the cost-of-fuel argument is not entirely confined to Europe; it has reached our shores and complaints are coming more from owners of high-powered cars than from the cheap-car owners. The complaints are being heard from those who are getting but 7 or 8 miles per gallon out of gasoline and not that much. Now that fuel is selling in metropolitan garages at 25 cents per gallon it brings the fuel cost alone for operating such a car up to over 3 cents per mile. The owner of the small light-powered car is getting 25 and 27 miles per gallon or an expense of less than 1 cent per mile.

There is no question but that the American car owner is going to face higher fuel prices during the touring season of 1913 and when that condition comes public attention will be focussed on the carbureter makers more than ever before. With them it will then be economy first. Up to the present the car owner and the maker, as well, have been demanding speed. Carbureter makers were demanded to make special adaptations of their stock product for different cars in order to get higher speeds, without any special regard to consumption. Now this is changing and already two or three American concerns have been abroad picking out the most satisfactory carbureters for the American field with the object of pushing their manufacture in this country. In nearly every case fuel economy is one of the big essentials of the foreign device.

That there is room for vast improvement in fuel consumption in America is admitted on all sides. Every engineer admits it, the car owners admit it, the carbureter makers admit it, all admit it. It would have been better today for the industry if the fuel economy tests of 3 or 4 years ago had continued and had developed as the hill-climbs, the road reliability runs and the road races. But makers scoffed at them. Who cares about fuel consumption? The bigger question was, could you go over 60 miles per hour and could you climb all hills on direct drive? But the lane is turning, and the owner who today is paying for his follies of 3 years ago is alert to what must be available a year or two hence and he is goading the car maker and the carbureter maker on. Both of these parties have made good in the past and there is not any reason why they will not make good in the future.

The necessity for carrying a supply of gasoline for starting purposes when using paraffin or other heavier fuels cannot be considered any difficulty in that the small tank capacity necessary for the gasoline supply can be made as a compartment of the standard fuel tank. Owing to the fact that greater mileage per gallon has been obtained from paraffin the net result is that with mixed fuels there is a greater fuel capacity in a given cubical space than with gasoline alone.

The present trends of attention towards heavier fuels again impresses the automobilist with the fact that while heavier fuels offer certain difficulties in carbureting, yet pound for pound, they give more power than the lighter fuels. The troubles in starting with heavier fuels in cold weather have been, to an extent, overcome by the self-starter.

Elbert Hubbard on Ideal Salesmanship

"When You Sell a Man an Automobile You Do Him a Benefit," One of the Messages in the Fra's Recent Address to the Convention of General Automobile Sales Association at Indianapolis

"WHEN you are out with very learned people, if you don't know what to talk about, just talk about electricity," he says. "You will never shock anybody. If you are out to a dinner party and there comes a little lull in the conversation, here is what you will say:

"'Electricity, speaking of electricity—of course it is not really what you are talking about. Speaking of electricity; that is the great mystery. Nobody knows what it is. All we see is its manifestation!' You are perfectly safe in saying that. If you don't know anything about electricity you will have to back up and sidetrack and start something else, but usually it goes all right."

And in the presence of that man, casting around in the vacuum which I am pleased to call my mind, seeking something to say, it came to me all at once: "Electricity, the great mystery, nobody knows what it is; all we see is its manifestations," and was just going to say it, when he said it himself! He beat me to it. "Good-by," I said, and I ran down the steps, caught a trolley car, jumped on the front end and over the head of the motorman I read a sign, "Don't talk to the motorman." That suggested an interview, and so I said: "Partner, what is electricity?" "It is the juice," he said. He knew. I said: "Where do you get it?" "Everywhere," he says; "it always was. Edison didn't invent it; it is God's best gift to man." I said: "I thought woman was God's best gift to man." "Same thing"—a great mystery. Nobody knows what it is. It is very dangerous if you don't know how to handle it." I said: "Does electricity make this car go?" "Sure," he said. I said: "Tell me how." He told me. I had not known before and I do not know now. I said "How do you know so much about this subject?" He said: "I have been taking an International Correspondence School course. I get $65 a month for holding down this job. I am going to have charge of the electric light station next month at $125 a month." I says: "I get off there at the corner," and the car stopped within a foot of where I wanted to get off and as I stepped off the car I said: "Good-by, my friend." He said: "Good-by, old man," but he never looked up at me. He was just intent on carrying that car through in perfect time, at proper speed and getting me off on terra firma. And as the car moved away I said to myself, "There goes an educated man. He is onto his job and he is getting ready for a better job."

If you don't like that definition of education, then you take the definition of President Eliot, of Harvard, who says that **that man is best educated who is most useful.**

Can you imagine a better man than a man who has a good job, who holds it down, and who is getting ready for a better job? You get your business organization going and the office runs on momentum. All you have got to do is to go along and look in once in a while, scare the boys a little, cut them down, fire a few and put in a few more, and the thing goes.

Not so with salesmanship. You deal with humanity. Humanity is a strange thing. Nobody ever got beyond the sky. You don't know what it is. Man is an electrical manifestation. That man, that motorman, was right. Man is an electric phenomenon, a generator. He takes up energy into his system and gives it off again. He is only here for a day. Life is motion. We are doing things, making things, interesting humanity.

Ten years ago it would have been impossible to have got this number of men together—men in competition with each other. We were all afraid of each other a few years ago. Ah! we had trade secrets. Now, here we are all together. I look into your hearts; I look into your happy, smiling faces, and I feel this afternoon here that there is but one atmosphere, there is but one feeling—brotherhood.

We come into life without our permission. We are being sent out of it against our will, and over the vision of our dreams there steals a thought that we have been used by an unseen power for an unknown purpose. We guess what that purpose is. We are here for a mutual benefit. We will not be here so very long. You help me and I will help you, and soon Death will come and rock us all to sleep. In the world where Death is there is no time for hate.

We are business men. We grow by elimination, by discarding things, and we know now as sensible men, leaving the question of ethics and morality absolutely out of the proposition, we know **the only way we can help ourselves is to help humanity. When you sell a man an automobile you do him a benefit.**

If you want to make money don't cut down expenses, but increase your income; increase your efficiency. And any man who owns an automobile is a better man than the one who does not. I say plunge; yes, mortgage if necessary to get the machine, and you will work out all right.

The other day I went into Tiffany's trying to sell them space in a magazine. Says the advertising man away down deep: "We are not selling any jewelry now. People are not buying any shiners." You remember how our old friend Hinky Connors, of Buffalo, launched upon the world an immortal epigram, to wit: "Them as has shiners wears them."

Now, the question is whether you will spend your money for shiners or automobiles. You are going to blow it in some way, anyway. So then I went to Sherry's and tackled their advertising man, and when I did he said: "The people are going out in the country." And I find it is so. I own a hotel. I feed the automobilists at a dollar a meal. We have them from one week-end to the other at East Aurora, and every Saturday and throughout the week. They don't go to the lobster palaces in the cities; they go to towns like East Aurora, where they can get a single meal for 75 cents—and the automobile increases the efficiency of the man.

Most of us go through life on one cylinder. We overeat. We underbreathe. We are full of hate and doubt and fear and apprehension, and the result is that we are about 33 per cent. sick 33 per cent. of the time. Anything that takes people out in the country, out away from the gases and noises and smells of the city, out through the green fields—that thing is a benefit; and so I repeat, when you sell an automobile you do him a benefit.

The man who buys the automobile and runs it gets his money's worth, and the man who makes one gets a profit on it always and forever, and the fellow who writes advertisements insists on getting his pay, but the **dealer is up against it a good deal of the time, and I think one reason is this: The dealer is isolated. He lives by himself. He is not in communication with other people. He does not get together with people in conventions like this.**

A convention like this enlarges your view. You get the perspective from both ends. You get acquainted with people. You get rid of your fears, your doubts, your grouch —and I want to see the dealers get together. I want to see a combination of dealers that will put the makers on their knees. I want to see you salesmen get what you are worth, and only a few of you do.

Everybody profits by good roads. I was delighted to hear the plea made for this road to run from the Atlantic to the Pacific. Why not? Do you know that in America we have only one railroad that runs from tidewater to tidewater? That is the Panama railroad, 46 miles long. It has one engine. I want to see an automobile road from tidewater to tidewater, and I expect to see it.

The proposition is a good one, that every automobile manufacturer should pay 1 per cent. of his gross income for a year into this project, and if they will do that this project will go through. I dont think there is an automobile manufacturer in America who can afford to stand out on that question. He will have to come in to save his face. This thing will go through.

Salesmanship Headwork

Boost All Products, But Boost Your Own Products Best Is the Theme of John G. Jones at Indianapolis Sales Convention

MAKING a selling talk is a hard job when you are talking to salesmen, but when you talk of four and six-cylinder motors surcharged with energy it is a dangerous job unless the rules of the game, the traffic rules, are obeyed. I am told that the one big problem of the dealer is in the making of profits from his distribution. I am further told that the manufacturers of the country are manufacturing today successfully and at a fair profit. There is a reason.

The manufacturers have found that they must do everything along scientific lines, and they are following the practice of sensible business methods. They have gotten down to as low an overhead as it is possible for them to strike.

Efficiency is prominent in every department, and the corelation of the various departments is one harmonious whole. That is why they are successful.

A great part of the trouble of the dealers has been in rebating or commission cutting. It is only poor salesmanship that must cut the advertised price for the good article. There may have been times when you were forced to give expensive joy rides to poor prospects. I believe that time is past. There may have been times when you would almost have to give the buyer the whole of the commission in order to get the game started and to get the people into the habit of using your product. But that time has passed.

There is no business man in the United States today, if he is approached by a real salesman imbued with the excellence and the value of his product, and knowing it from every angle, who is not willing to talk business. This convention is the keynote of a new era in the management and conduct of the dealers' organization.

Dealers must realize that they, as well as the manufacturturers, must have efficient organization; but it is up to the manufacturer to help the dealer; not only to help him in the way of giving him supplies and sending an efficient salesman around to visit him and to give him the talking points of his special product, but it is up to the manufacturer to get a central body. I would suggest that the 419 manufacturers in the United States to-day get together and take up the problems, not of each individual manufacturer, but the problem of the distribution of the automobile.

The bankers are training young men in their ranks all over the country in the economics of banking, in banking principles, in commercial law, in corporation finance, and they are doing it by a standardized course. I think if the 419 car manufacturers would put up $50 apiece a year they would be able to have an organization that would send out efficiency information to the dealers; it would tell them how to get the best results out of their territory, whether that territory were a city, state or county; it would teach them how to organize; it would teach them what kind of salesmen the manufacturers were finding making successes in their own organization.

This would not interfere with competition. **The cleaner and higher class the competition is the greater the demand for that product.** And that is the one point that I want to drive home to the dealers today; that is, the education of their salesmen. **If you have a large territory to cover, an important territory, don't take a salesman on your staff unless he gives you his whole time.** The automobile is too important, and you have to learn too much about it, and you have to be keyed up to too high a pitch to be able to do anything else and sell it successfully. The automobile is deserving of the whole time of a salesman.

In the choosing of the salesman I would suggest a few qualifications that are absolutely necessary to the success of your organization.

First of all, natural qualification; then the prime condition of the salesman: Personality, ambition, honesty and courage; acquired qualifications, confidence three ways, enthusiasm, earnestness, application, preparedness, observation, self-analysis.

As a business proposition it pays to be honest with one's self, with one's firm and with one's customers. In that way only will the salesman retain his own self-respect and the confidence of his customers.

There are salesmen who are known as one-trippers. They cover the district and they have told so many untruths about the product that they are selling that they are not able to go back.

Then there are those other salesmen who inspire confidence in themselves and in the product that they are selling. That kind of a salesman can go back and sell his customer a second car; he will go back and sell him a third car—because the buyer knows that the integrity and the honesty of the man that he is dealing with are back of that product which he is buying, but no honest man can sell a dishonest product.

Courage—It takes courage to be honest under all circumstances, and courage is one of the prime qualifications of the salesman; courage to go up against a man when you know that someone else has offered him a cut in commission on his product; courage to go up there with the enthusiasm based on the knowledge that your product is so much better that it is just the thing that that customer wants; so much courage that that little obstacle in your way, in the way of making the sale, is forgotten and wiped away. If it is wiped away in your own mind there will be no impression left in the mind of the man to whom you are trying to sell.

Acquired Qualifications—They are a little different from the natural qualifications. All men are not born salesmen, but every man with innate ability to get hold of true business principles, and with enough personality to meet his fellowmen, can train himself to be a salesman. After all, selling is nothing more than making the other man believe that he wants what you have got to offer; make him believe that he wants it badly enough, or, rather, well enough to get his name onto the dotted line and pay over his hard cash.

You can train salesmen, and in so doing train them first of all in honesty; then train them in courage; then train them in the essential qualification of the business, which is enthusiasm.

It matters not whether a salesman be selling an $800 car or whether he be selling a $10,000 limousine, if he is himself satisfied, if he believes that the product he is selling is the best there is to be had for the money and the most serviceable that his prospect can buy, that man can come pretty near making the other man believe that a $1,500 car is as good as a $10,000 car at the time. It is not a question of price in the selling. It is a question of sizing up the product to the amount of money you are going to ask for it.

With the dealer first of all is the product; with the salesman first of all the customer that he is going to sell and serve. There is not a man in this convention today, if he goes out in the morning imbued with the idea that he is going to sell some man or woman the best automobile that there is in Indianapolis or that there is in Detroit or in any other town, he is going out to make a clean-cut sale because he has, first of all, a belief in his product.

Earnestness—A man can be enthusiastic without being earnest. There is a manufactured enthusiasm that does not ring true in all cases. But earnest enthusiasm—not too earnest to permit a smile once in a while when you are telling all the fine qualities of your product; but that earnestness that drives home the point; that drives it home every time the salesman makes it—that is the selling qualification that they can't get away from. I don't care how strong the opposition is that you meet with, and I don't care how much another dealer is cutting and rebating. **Meet your prospect with honesty and courage and confidence in yourself and in your product, with enthusiasm, with earnestness,** and your prospects will forget the little rebate that has been offered to them.

Have patience with men whether they are in the market for your kind of a car or not; one may want a $2,700 car and another a $5,000 car. Don't get sore at those fellows that buy Fords. Ford is doing the best work for you automobile dealers today that has been done in the country. He is educating the people to buy automobiles.

The first watch that my father gave me was an Ingersoll. The Ingersoll keeps time, but I am making a little more money now and I can afford to pay more than $1.90 or $4.60 for a watch today, and the Ingersoll is in the discard. If you could see the discard corners of automobile buyers in America you could start a Ford second-hand shop; so don't knock Ford—boost him, and boost every other car that comes into competition with your own product. **A boost gets more than a knock anywhere, and a knocker only belongs on the outside of the door and not on the inside of a prospect's home.**

Don't think for a minute that all that the salesman must know is just enough to be able to go out and discuss just one thing, just the automobile. **The more interesting a salesman can make himself in his community the more re-**

spect he can command from the people with whom he expects to do business—the easier it is for him to get next to them.

It is important that the salesman be a broad-minded business man, an efficient business man, with a knowledge of the laws of supply and demand; with a knowledge of credits; with a knowledge of advertising; with a knowledge of money; with a knowledge of investment. He should be a man with all men. He should be able to talk banking with a banker. He should be able to talk manufacturing with a manufacturer; and he should be able to talk those subjects intelligently. That is efficiency. And when a man gets hold of business principles and grasps them tight he will soon find out that when he meets men he is gaining their respect. He has added to personality an irresistible force of a broad education along tangible business lines, and that commands respect.

When you have told the story of your car have you said all, or are you ready to go on talking about your prospect's business? Are you able to interest him, if he has not bought that car, to such an extent that when the next man comes around to try to sell him he will remember you, and he knows that you are coming back?

The last point—that is specialization. Take a prospect and go after it. Don't go after ten men at the same time. While you are going after ten men there is some salesman tacking close after each one of them, and while you are only giving each man who is a prospect one-tenth of your selling qualifications and power, there is some one else there who may not be as good a salesman as yourself, that is, if you systematized your work, who is getting the order from him.

Don't let salesmen run riot over your territory. Take your Bradstreet, your Dun and your directory and inform yourself until you have the names of all the persons in your territory carded up, and when your salesmen come in in the morning, say to John Jones, "Here are six names. I want you to see those parties today. They are on the east side of town." And when Tom Smith comes in, say to Tom Smith, "Here are six names over in another district. They have seen our advertisement. They have inquired about our car. They are interested. Go out and see them and don't see another man in that county."

Systematize and hustle along the right lines, and if you hustle along the right lines you will see your efficiency is growing, and you will see that the manufacturers will soon be coming after you for pointers. That is the game. Systematize the work of your salesmen. Don't send salesmen out who you don't think are qualified in every respect to represent you.

Don't knock the product of any other manufacturer. Boost them all.

The automobile industry has come to stay. There have been more good things killed by knocking than by any other one means. When you begin to suggest a negative idea to a buyer, by telling him that the Cadillac is not good, or the Chalmers is not good, you are putting that prospect into the frame of mind where he says, "My God, is there a good car?"

Boost, but boost your own product the best.

Taxis Form an Export Element

NEW ORLEANS, OCT. 18.—Taxicabs form a large percentage of the motor cars exported to Latin America through this port. With the increasing amount of smooth-surfaced streets in that section of the world, taxicabs are taking the place of the time-honored coach. In all Latin American cities the public coach service is an institution that was inaugurated shortly after the coming of the Spaniards and has flourished despite the advent of street-cars and automobiles.

Coach fares are very cheap, being regulated by the municipal governments. The best coaches, really elegant equipages, are hired for 50 cents per hour, but the medium class, which is more generally used, can be had for 37 cents an hour. This low rate has made it necessary to quote almost as low rates for taxicabs and as there is little variation in the coach rates throughout Latin America, it will be found that taxicabs usually may be had at a slightly higher rate than is charged for the first-class coaches. The low rates and the time saved have made this class of motor car very popular and most Latin American cities, where the streets are improved, has doubled or tripled the number of taxicabs found in American cities of the same size.

Freight Cars Are Scarce

Present Shortage of 31,000 Will Probably Increase to 60,000 at the Crest of the Crop Movement, Says J. S. Marvin of N.A.A.M.

WITH a net shortage of freight cars reaching beyond 31,000 reported by the railway associations for the fortnightly period just past and in view of the probability of a still greater shortage during the next month, the automobile industry is interested to know whether conditions are going to improve before the height of the shipping season of the industry.

James S. Marvin, traffic manager of the National Association of Automobile Manufacturers, has returned from a trip through the manufacturing centers and states that shipments are moving, but that in the event of a general stringency of the freight car situation the automobile industry would have to take its chances with other shippers.

Mr. Marvin said: "Since May 1 I should say that the railroads have added about 5,000 wide-door freight cars to their equipment and that the total number of automobile cars on the American railroads on January 1, 1913, will approximate 50,000.

"Conditions this fall have no parallel in the history of the world. The demands for cars to move the unprecedented crops and the general demands of business are sharper than ever before known. The busiest part of the automobile shipping season is still some distance in the future and if the weather remains good there is a prospect that the traffic demands may be satisfied. The movement of the crops has not reached its crest, but the agricultural wealth of the country is moving in tremendous volume right now.

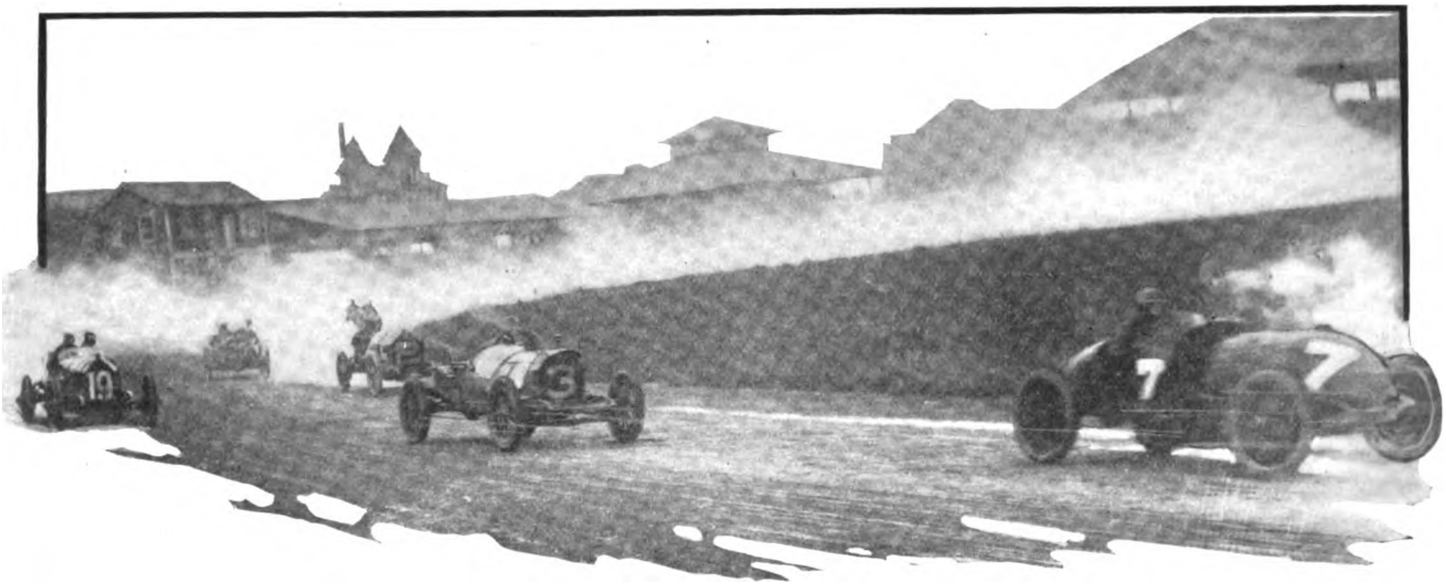
"The railroads are doing everything in their power to prevent congestion, to give them due credit. They are quite as anxious as the shippers possibly can be to keep their cars moving under profitable loads and have adopted special rules for quickening terminal work.

"Reports have reached us that automobile freight cars are being used for other kinds of traffic. I will say that in the case of an eastern road, for instance, where there are thousands of automobile cars in the equipment, it is exceedingly difficult to regain possession of cars that have been consigned with freight to some section where the demand for rolling stock is feverish. The existing plan of interchange in the use of cars is far from the ideal and the solution of the problem is still to be met.

"The elaborate car service departments installed by all the railroads have frequent records of cars absent from the service of their owners for months at a time. It is hardly to be expected under present conditions that a western road would go out of its way to return cars of an eastern colleague at a time when the demand for cars in the territory of the western road was far in excess of the possibility of supply."

It is considered quite likely that the total net shortage of cars at the crest of the crop movement will approximate 60,000. After passing the crisis the volume of shipping has usually decreased slowly but steadily for a month and then rapidly for another month. At that rate the car situation should be cleared by February 1, when the season for shipping automobiles is at high tide. If the country enjoys good weather in December the traffic men look for a natural development of the situation, but an early blizzard at a time when the shipments are still extraordinarily heavy might serve to produce a congestion the like of which has never been known.

Possibly with such a contingency in view the great producers of automobiles have made an early start with their shipments. The annual report of General Motors shows that its receipts for the first two months of the fiscal year were $1,000,000 in excess of last year. The Overland company has adopted methods to accelerate deliveries of sold cars and Ford shipments have made an entirely new mark as to volume for this time of the year. In addition to these precautionary measures, indicated by the increased volume of early shipment, every large producer has endeavored to provide for a supply of cars to transport its output. The railroads have assumed a hopeful atitude as to general results and promises and agreements have been made by them to avoid a repetition of last spring's congestion.



Getaway of the George H. Robertson Trophy, 25-mile free-for-all, at Brighton Beach, which was won by Neil Whalen in a National

Brighton Races Success

Eight Interesting Events Run Off—Wishart, Lewis and Whalen All Star—Over 4,000 Spectators

DESPITE lowering clouds which kept down the attendance, the race meeting staged at Brighton Beach Saturday was the best presented to metropolitan lovers of speed in many a long day. There was a sharp brush in each event run off and the suspicious circumstances of some former meets were delightfully absent. The promoters probably lost a little money because of the clouds, but the impression made on the public was distinctly favorable to future meetings.

The card was divided into eight events and two exhibitions and the running was done in precise accordance with the schedule and rules. The first event started sharply at 2:30 o'clock and the interminable delays of other days was absent.

The feature race of the day was the George H. Robertson Trophy event at 25 miles, free-for-all which was handily won by the National driven by Neil Whalen. At the start the Buick Bug made the pace, closely accompanied by Wishart's Mercer Special. The hot gait they pursued resulted in the retirement of both before the midway station had been passed. The National had been laid off the pace in the early stages and when the Bug went out with a blown tire and Wishart's mount faltered, Whalen came along with the blue car and tin-canned to the wire. The National was chased determinedly in the last 5 miles by Ferguson's Mercer and the speedy Stutz came booming at the end, but the National had been aided in establishing a wide gap by reason of the sprint of Wishart's Mercer which had lost a lap earlier in the race. Wishart tried to pass the winner and in the duel that followed the other cars were lost.

A full score of cars participated in the various events and a national tinge was imparted to the card by the appearance of such names as Mortimer Roberts, William Chandler, David Lewis, Ray Howard, Neil Whalen, Spencer Wishart, Ralph Mulford, Caleb S. Bragg and others in the list of

The handicaps were well filled, a dozen starting in the 5-mile event and eight in the 10-mile contest and the class events drew good fields. The allotment of handicaps proved to be a good job as the finish in each of the condition races was uncertain until the final lap.

The opening sprint was for cars having a total piston displacement of less than 230 cubic inches and drew a field of six, from which the R. C. H. entry was scratched. This event did not develop much of a struggle, but was interesting from the fact that the winner was a Mason Special, which was making its metropolitan début. The distance was 5 miles and the Mason, under the handling of M. Roberts, jumped into the lead after one false start and set a winning pace to the wire. The E-M-F was a handy second and the Hupmobile, running very steadily, was third.

The second event was for cars of 231-300 cubic inches piston displacement and had five entries originally. To these was added at the post the Mercer Special, handled by Wishart. It was known that the car exceeded the class limit by a small amount of piston space, but this fact was overlooked in the rush before post time. The Special got away smartly and cut out a rapid pace, accompanied by Ferguson's Mercer. A bigger Mason driven by Roberts made a bid in the early part of the race, but carbureter trouble soon made its appearance and the car retired to the background. The Bergdoll kept up with the procession throughout and in the final mile passed all but the Mercer pair. The finish showed Wishart's car in front with Ferguson's second and the Bergdoll third. Protest was immediately lodged with Referee Pardington and Wishart admitted that his car was outside the class. The official disqualified the Wishart Mercer and placed Ferguson's mount first and the Bergdoll second.

The third race was at 10 miles for the Poertner Trophy for cars of 301-450 cubic inches piston displacement. It brought out only four starters, Stutz, G. J. G., Pope Hummer and National. The National started well but retired after making 1 mile because of a blown tire in front of the grandstand. This left the Stutz out in front, where it stayed to the end. The Pope kept going until it had made 9 miles, but was unequal to the task of standing off the rush of the G. J. G. The Pope was not in good condition, but the G. J. G. ran a creditable race. The Stutz had the speed of the party and as subsequent events proved might have beaten the National even if there had been no tire trouble.

The Borax Trophy at 5 miles came next with a field of four: a Mason, Mercer, Buick and National. The National again suffered a blow out, but managed to finish. The Buick retired after tire trouble at the head of the stretch, where its disablement almost caused a disaster to following cars. The Mercer, driven by Wishart, had a nice trip landing in front, the length of the stretch ahead of the Mason, which was handled by Mulford.

The Whiting Trophy, an invitation race for Mercer cars at 5 miles brought out a field of four and Ferguson's mount took first from Wishart's car, while Mitchell was third and Wolf fourth.

The 5-mile handicap developed a fine race. The Buick Bug was given the position of honor on scratch because of its past history. The Stutz and National started 10 seconds ahead; Ferguson's Mercer, 20 seconds, which was the same rating given the Bergdoll. The remainder of the field was given various handicaps, the limit man being the Flanders (Wood), who had 75 seconds.

The Bug failed to catch the field and was not prominent at any period of the race. It was a duel between the Stutz and the National until the last mile, when the latter lost some of its speed and allowed the Bergdoll to nose it out for second money. The Stutz made fast time and finished the race in 4:27.50, or 67.29 miles an hour.

The last race of the day was the 10-mile handicap, with the penalizations rearranged to correspond with the performances in the preceding race. This placed the Stutz on scratch with the National and Wishart Mercer at 25 seconds, the Ferguson Mercer at 45 seconds and the rest spread out to the limit, which was given the E-M-F, 75 seconds. Wishart's car made the pace, picking up the cars that started in front of it after the third mile. The Stutz carried too much of a burden and while it keept shooting at the Mercer, it was never able to cut down the handicap so as to bring Wishart to a drive. The finish found the Mercer Special in front with the Ferguson Mercer second and the Stutz third 3 furlongs back.

A. R. Pardington acted as referee, Fred J. Wagner starter and the promoting organization is known as the Motor Dealers' Exhibit Company. The money prizes aggregated $1,450 and five handsome bits of plate went to the winners of the important races. The summary follows:

Class C, 5 miles, under 230 cu. in.

Car	Driver	Time	Car	Driver
Mason	M. Roberts	5:18.55	Herreshoff	S. Casey
E-M-F	W. Chandler		Flanders	F. Wood
Hupmobile	E. Meyer			

Class C, 10 miles, 231-300 cu. in.

Car	Driver	Time	Car	Driver
Mercer	A. Ferguson	9:33.15	Mercer	P. Thebaud
Bergdoll	E. Homan		Mason	M. Roberts
Correja	J. Quinlan		Mercer	S. Wishart

Mercer (Wishart) finished first but was disqualified as out of class.

Class C, 10 miles, 301-450 cu. in.

Car	Driver	Time	Car	Driver
Stutz	D. Lewis	9:32.50	Pope Hummer	R. Howard
G. J. G.	P. Thebaud		National	N. Whalen

Class E, 5 miles, under 600 cu. in.

Car	Driver	Time	Car	Driver
Mercer	S. Wishart	4:46.25	National	N. Whalen
Mason	R. Mulford		Buick	R. Howard

Class D, 25 miles, free-for-all

Car	Driver	Time	Car	Driver
National	N. Whalen	24:54.85	Mercer	S. Wishart
Mercer	A. Ferguson		Mason	M. Roberts
Stutz	D. Lewis		Buick	R. Howard
Mercer	C. Wolf		Hupmobile	E. Meyer

Class E, 5 miles, invitation

Car	Driver	Time	Car	Driver
Mercer	A. Ferguson	4:56.85	Mercer	L. Mitchell
Mercer	S. Wishart		Mercer	C. Wolf

Class E, Handicap, 5 miles

Car		Driver	Time	Car		Driver
Stutz	(10)	D. Lewis	4:27.50	Mason	(30)	M. Roberts
Bergdoll	(20)	E. Homan		Correja	(50)	J. Quinlan
National	(10)	N. Whalen		Hupmobile	(60)	E. Meyer
E-M-F	(35)	W. Chandler		Flanders	(75)	F. Wood
Mercer	(15)	A. Ferguson		Buick	(scr.)	R. Howard
G. J. G.	(25)	P. Thebaud				
Mercer	(25)	C. Wolf				

Class E, Handicap, 10 miles

Car		Driver	Time	Car		Driver
Mercer	(25)	S. Wishart	9:30.15	E-M-F	(75)	W. Chandler
Mercer	(45)	A. Ferguson		Mason	(65)	M. Roberts
Stutz	(scratch)	D. Lewis		Mercer	(55)	P. Thebaud
Mercer	(55)	L. Mitchell		National	(25)	N. Whalen

English High-Gear Tests

Royal Automobile Club Tries Out Pathfinder on 1,934.75-Mile Run with High Gear Continually in Mesh

LONDON, Oct. 17—Under the observation of the Royal Automobile Club, a 27-horsepower Pathfinder car weighing 2,975 pounds was driven over a course of 1,934.75 miles with the high gear in mesh at all times. The car traveled from Land's End to John O'Groats and back; the course includes a number of hills, all of which were taken, though sometimes with difficulty, as in the case of Berridale Hill, which the car mounted, but at the seventh attempt to do so. Another factor which made travel difficult at times was inclement weather. The automobile is of the standard Pathfinder make, its engine having been measured by the R. A. C. officials as 105 by 133 millimeters, and the machine has traveled some 7,000 miles before the test. After the trip was over the car was taken to Brooklands track for some speed demonstration work, and attained a speed of 55.92 miles an hour. This latter performance was conducted independently of the high-gear test and no credit was given for it in the official R. A. C. certificate, which covers only the factors entering into the original tests.

A similar test was made about 3 weeks ago on a 59.9-horsepower, six-cylinder Napier car, having cylinders of 127 millimeter bore and 127 millimeter stroke and weighing 5,472 pounds. The high-gear ratio, which was used throughout the trip, is 2.7 to 1 and the full wind area 10.3 square feet; the tires used on the car were 35 by 6 inches. Over a course of 795.875 miles, from London to Edinburgh and back, the car was driven in high, excepting for a short distance, where the driver had to drop in low gear due to the presence of troops in the road. The car was also put to a test on Brooklands track and went at the rate of 75.69 miles an hour. During the London-Edinburgh-London trip the car consumed 23.1 gallons of gasoline, being 29.1 gallons per mile.

Rain Spoiled Sport at Rockingham Park

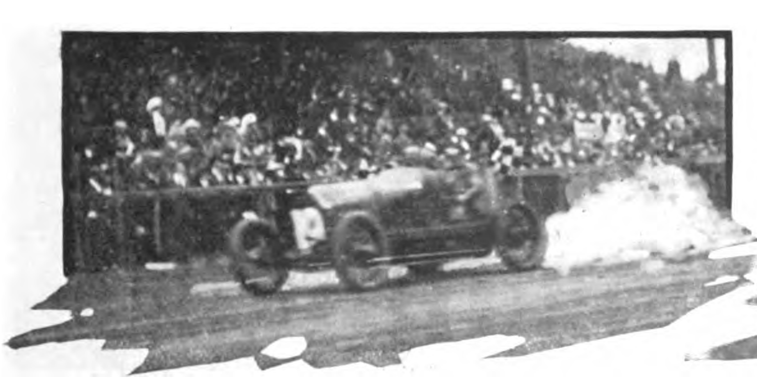
BOSTON, MASS., Oct. 19—Rain put an end to the automobile race at Rockingham Park, Salem, N. H., today, after seven of the ten events had been run. There were more than 5,000 people at the track. When the rain set in the race was called off permanently, having been postponed once before. Iselin and Higgins were the heroes of the day. The summary of the races follows:

5-Mile, Non-Stock, Under 300 Cu. In.

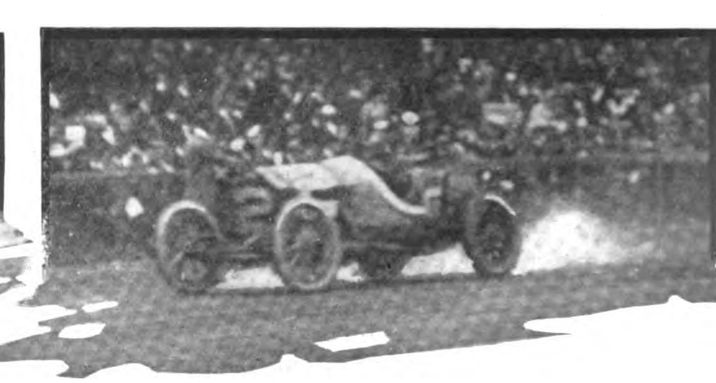
Car	Driver	Time
Mercer	C. O. Iselin, Jr.	5:30
Mercer	H. Cutting	
Buick	S. S. Bigelow	
Hudson	C. Smith	

10-Mile, Non-Stock, Under 300 Cu. In.

Car	Driver	Time
Studebaker	D. Higgins	13:15
Penn	J. Pugh	
Hudson	H. Warren	
Mercedes	A. D. Young	



Spencer Wishart, who won two of the Brighton races in a Mercer



David Lewis, who won two events in a Stutz

Six Cars Still Perfect In Lake Michigan Run

Heavy Rain Converts Dirt Roads Into Morasses and Causes Withdrawal of Four and Points on Five

ESCANABA, MICH., Oct. 22—**Special Telegram**—Rain falling yesterday and today put a period to the hopes of four of the contestants in the Chicago Motor Club reliability run around Lake Michigan and only 2 days of the schedule have been run off. It turned some of the dirt roads into swamps and made the going on the improved roads uncertain and difficult. The 18 and 20-mile an hour schedule in force today was too much for all but six of the contesting cars. In addition to the three cars that withdrew, another has not been reported at a late hour tonight and five were penalized for work or lateness. The perfect score division in the touring class includes: Case 2; Staver 4; Abbott 6 and R. C. H. 7. In the roadster division the only clean scores are carried by the Moline pair.

Only One Penalization At Oshkosh

OSHKOSH, WIS., Oct. 21—**Special Telegram**—Fourteen cars finished the first day's run in the sixth annual reliability contest of the Chicago Motor Club with perfect scores. Only one of the fifteen contestants which lined up at the start of this strenuous run around Lake Michigan fell by the wayside. When the cars had checked in here tonight after their first leg of 171 miles from Chicago the only car missing was National No. 8, entered by Chicago Spring Wheel Motor Company, equipped with spring wheels made by the entrant. This car had trouble with its rear axle in the morning and failed to check in at the noon control at Milwaukee. A wire received here says that the National is on the way and will be in Oshkosh before the morning start.

R. C. H. entry No. 7 broke its rear axle just before lining up at the start this morning. The press car, also an R. C. H., was started as No. 7 and probably will continue in the contest in that capacity. Another R. C. H. was started out from Chicago to carry the press men about 3 hours after the rest and by spectacular driving caught the tour here only a few hours late.

The threatened arrest of N. H. Van Sicklen, Sr., one of the judges in the pilot car, was the only incident of the day. The Oshkosh chief of police considered it his duty to arrest the pilots for throwing confetti on city streets, but was talked out of it.

Starting this morning under a cloudless sky, the tourists found good roads all the way to Milwaukee. From there on the quality of the road varied from best to bad. Most of it was fine gravel, and near Fond Du Lac a stretch of about 4 miles of cement was found which enabled the tourists to make up lost time. A driving rain was the only uncomfortable feature of the afternoon, but it lasted only an hour. It was sufficient to make mud roads for the rest of the way to Oshkosh. Tomorrow's run takes the tourists of Escanaba, in northern Michigan, a distance of 177 miles from Oshkosh. Noon control is to be at Oconto, 89 miles away. The road tomorrow includes some dirt which, with today's rains, probably will be mud. With the exception of a few miles the road is expected to average fairly good through Neenah and Green Bay to Oconto. Thence to Marinette. From there to Escanaba there is a stretch of fine macadam, 63 miles in length, built under bounty from the state.

ESCANABA, MICH., Oct. 22—**Special Telegram**—Six out of fifteen cars in the Around-Lake-Michigan tour completed the second day's run to Escanaba tonight with clean scores. Five received penalties today, one had not checked in at 10.30 o'clock and three have withdrawn from contest. Gray's National Number 8 withdrew at Racine, Velie, number 101, withdrew at Oshkosh this morning, and the R. C. H., 110, went out this afternoon with a frozen motor. Practically all trouble to cars receiving penalties was due to the rain which continued almost without cessation from noon yesterday till this afternoon. Roads which would have been good in dry weather were made so sloppy that mud and water splashed in magnetos and carbureters. There were two hills with mud so deep and so thick that cars stalled and had to be helped up.

About 50 miles of state-built macadam between Marinette and Escanaba and upon the stretch and west boulevard the cars could make 50 miles an hour. Much time lost in negotiating bad stretches was made upon these roads. Velie number 1 received two demerits for cleaning its carbureter which was stopped up with mud. Staver, No. 3, eight points for same; Bergdoll, No. 5, broke its steering knuckle near Green Bay but Monson, the driver, put in a new one and got into night control less than 3 hours late, sustaining 161 points penalties. Bergdoll, number 104, was stuck for 30 minutes in mudhole but pulled itself out with a winch driven by the motor, receiving 30 points for lateness. Stutz No. 109 came into Escanaba several hours late on account of battery trouble and its fenders bent by broken tire chain, sustaining 182 points. Stutz No. 102 has not checked in and is over 6 hours late. Branstetter's Kissel, acting as pilot had carbureter trouble at noon and the Case threw confetti for rest of day. The Staver pacemaker also had carbureter trouble from rain and mud and referee Root nominated the Velie as pacemaker for the day. The R. C. H. press car chugged through in good order but had a narrow escape from upset when it skidded to the edge of a 12-foot ditch. Skillful driving kept it from going over the edge.

The Midland, carrying starter Watts, was held up at Green Bay and both Watts and the driver Kavanaugh, were arrested for scaring a horse and wrecking a buggy. They were not detained long. Five cars finishing with perfect scores are: Koease, Staver No. 4; Abbott, R. C. H., No. 7 and the two Moline cars driven by Wicke and Salisbury.

Today's run of 177 miles from Oshkosh to Escanaba was covered at regular running schedule of 20 and 18 miles per hour. It took hard driving to maintain this schedule through the mud. Noon control was Oconto.

Hardest Run Is Wednesday's Schedule

Tomorrow's run from here to Newberry is expected to be the hardest of trip on account of the naturally poor road conditions and excessive rain, although the distance is only 125 miles with the running schedule reduced to 13 and 11 miles per hour, with noon control at Mantique.

The rules of the contest provide for penalities on account of work on the road and lateness at either of the daily controls. The points are reckoned on a basis of one for each minute spent in repairs or making adjustments for each man so engaged and also for lateness at controls a demerit is charged for each minute after the regular checking time of the car that intervenes before the car checks in. A leeway of 3 minutes is allowed at all controls. Larger penalizations are likewise levied for certain kinds of repair work.

SUMMARY OF 2 DAYS OF CHICAGO MOTOR CLUB RELIABILITY

No.	Car	Driver	Penalties 1st day	Penalties 2d day
1	Velie	John Brolley	0	2
2	Case	J. Hanson	0	0
3	Staver	E. Knudson	0	8
4	Staver	G. Monkmier	0	0
5	Bergdoll	A. Monson	0	161
6	Abbott	A. M. Robbins	0	0
7	R. C. H.	B. Parke	0	0
8	National	R. B. Gray	Not reported withdrawn	
		ROADSTER DIVISION		
101	Velie	M. H. Luce	0	Withdrew
102	Stutz	R. E. Maypole	0	Not in
104	Bergdoll	T. Rooney	0	30
105	Moline	J. A. Wicke	0	0
106	Moline	F. G. Salisbury	0	0
109	Stutz	C. Anderson	0	182
110	R. C. H.	M. Barney	0	Withdrew

Ford Wins Iowa Run Driven By Its Owner

Final Scores Not Announced, But Paige, Chalmers and Warren Are Placed First In the Various Classes

DES MOINES, IA., Oct. 21—The fourth annual Little Glidden tour of the Iowa Automobile Association which closed Saturday night after an 850-mile circuit over Iowa, was won by a Ford roadster, owned and driven by Dr. R. W. Soper, of Luther, Ia. The Ford won, in addition to the sweepstakes cup, the first prize for cars selling at $800 and less. The other prize winners and their classes were as follows: $800 to $1,200 cars, Paige; $1,200 to $1,600, Chalmers; $1,600, Warren.

No scores were announced by the referee but it is shown that the Ford came through with an almost perfect score. The only penalty imposed was caused by faulty gasoline which caused Dr. Soper to stop his motor. Penalties inflicted by Referee C. A. Knedler, of the American Automobile Association, were for time on magneto, time on steering gear, time on gasoline tanks and time on tires.

The Paige, winner in its class, was the same car and driver which recently finished well in the Buffalo run. The Chalmers winner was a 1909 veteran, driven by August Gronau, of Des Moines.

Postponements and fear of the weather so late in the season kept down the number of entries materially but outside of this feature the run was by far the most satisfactory ever pulled off in Iowa. Never before have Iowa towns along the route of an endurance run gone to such arrangements to provide entertainment and comfort for the contestants. All the towns and many of the farm houses along the route were decorated and the roads had all been dragged so that for the most part they were as level as a floor.

The White Pole Association, which is the good roads association back of the route from Des Moines to Council Bluffs by way of De Soto, gave the tourists probably the warmest reception of any received. The White Pole enthusiasts had provided a loving cup as one of the prizes and for this reason took unusual interest in the run. Many of the automobile owners along this road met the contestants at De Soto and went through all the way to Council Bluffs, which was the first night control. The second day out, the run traveled from Council Bluffs to Sioux City, following the west bank of the Missouri River. The third day brought the tourists into Ft. Dodge for the night control. Waterloo was the noon control on the fourth day; the motorists there met the tourists and a 2-hour stop was made while Waterloo and Waverly enthusiasts gave the visitors a banquet. Cedar Rapids was reached in plenty of time for the night control.

The final day gave the contestants a 200-mile drive into Des Moines by way of Oskaloosa, and the east branch of the White Pole road. The last car had checked in at 5.10.

The object of the Iowa reliability run is largely to create interest in good roads and the run this year certainly had proof of the fact that the Hawkeye state is a leader in the good roads movement. Almost every town along the 850-mile route has some sort of a good roads organization and many of these associations had provided some kind of a showing for the benefit of the contesting cars.

Blue Book Tourist Back at Denver

DENVER, COLO., Oct. 19—Trail-blazers who set out to secure data on the Denver-Salt Lake route in particular and Colorado roads in general, returned to Denver this evening after having covered 1,300 miles in a White six-cylinder car furnished by the White company, of Cleveland, for this particular expedition, which was carried out under the direction of the Official Automobile Blue Book. In the party were John P. Dods, of the Blue Book; Nathan Lazarnick, the New York photographer; James A. Harris, advertising manager of the White company, and D. Walter Rheineck, also a White man.

The party left here October 7 with the intention of laying out an official route to Salt Lake City, but after reaching Grand Junction, Colo., plans were changed and the return to Denver was made over the Rainbow route to Pueblo. The change in plans was brought about by the discovery that the Utah people have not completed their road work. They evidently have failed to realize the importance of improving the trail, so after a short trip into Utah out of Grand Junction, Dods and his party decided not to go to Salt Lake, delaying the routing of this stretch for another month, when it is the intention to send out another Blue Book car and secure all the necessary data to make the route complete.

On the outgoing journey the White six poked its nose along a trail that led through Buena Vista, Leadville, Wolcott, and Glenwood Springs to Grand Junction, a distance of 365 miles. Then, upon finding that Utah was not ready, the return trip was started, going through Gunnison, Salida, Canyon City to Pueblo, from which point the party went north to Denver, the distance on the return leg being 300 miles. In addition to the main expedition Dods covered several other stretches that connected with the main line, collecting road data.

"We took 450 photographs on the trip," said pathfinder Dods upon the completion of the trip. "When we reached Grand Junction we went out into Utah a few miles to find that no work had been done in the desert and that heavy rains had made the roads bad. On consultation with the Grand Junction people we decided to defer the rest of the routing for a month.

"On our way back to Denver we saw some wonderful sights. We saw the Black canyon of the Gunnison from the cliff road, 2,000 feet up. The new road over the black mesa was not completed and we had to use the old road, which has dangerous, sharp turns on a 28 per cent. up grade. It took us 4 hours to get up 5 miles, a rise of from 1,600 feet to an altitude of 10,500 feet. It's a wonderful country."

Stutz Wins Feature at Narberth

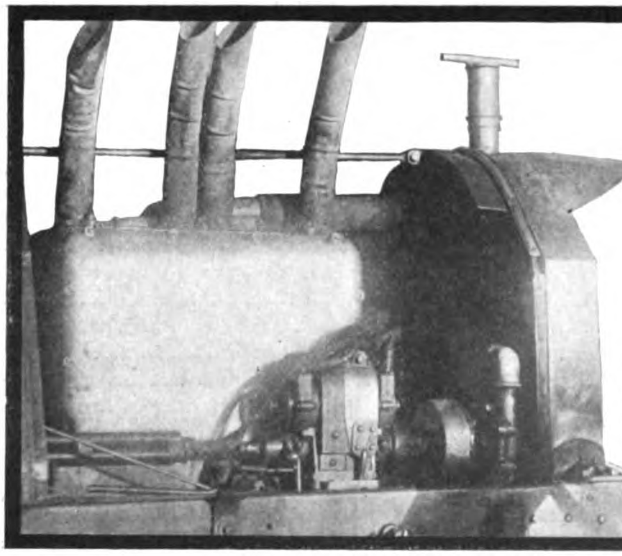
PHILADELPHIA, PA., Oct. 19—As an additional feature to the getaway day attractions of the Inter-County Fair, which has been in progress throughout the past week at the Belmont race track, Narberth, a series of automobile races was conducted this afternoon with several well-known local motorists as the contestants.

In a 50-mile free-for-all race the Stutz car, S. R. Blockson driving, romped away with the honors from a field of six cars, the event being declared finished at the conclusion of 48 miles owing to the withdrawal of all the other contestants but one, which car was too far behind at the time to figure. Time for the 48 miles, 45 minutes. The track was in excellent condition and the attendance was large. The time made in the feature race was considered remarkably fast.

Richmond Show to Be in Horse Arena

RICHMOND, VA., Oct. 21—The Horse Show building has been secured by the Richmond Automobile Dealers' Association for their first automobile show, which will be held February 16-23. The sum of $10,000 will be expended in putting on the exhibition, which promises to be one of the greatest events of the kind ever held in the South. There is a total floor space of 13,000 square feet and up to date there remains but about 2,000 square feet to be allotted, with quite a number of local dealers and accessories firms to hear from.

Thomas B. Hutchinson, of Nw York, is general manager of the association.



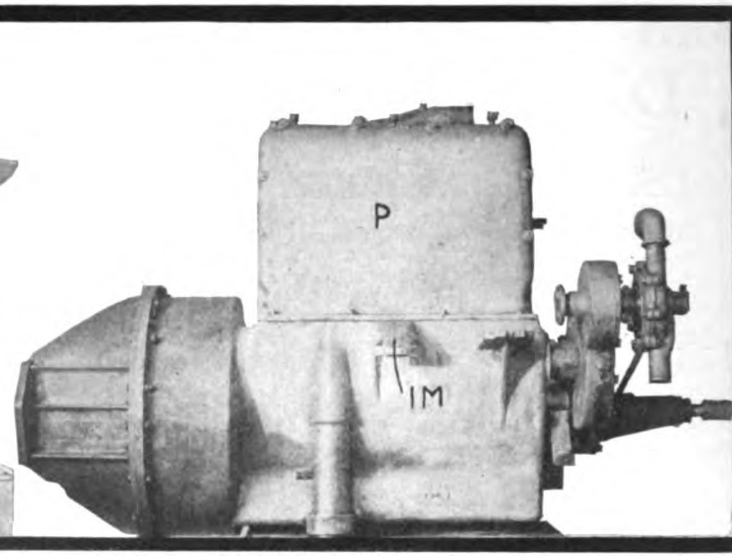


Fig. 1—Right side of Duesenberg-Mason motor showing external exhaust pipes and large cover plate which conceals valve mechanism, as shown in Fig. 5

Fig. 2—Right side of Duesenberg-Mason motor, with valve cover plate P, intake manifold M, and showing unit combination of motor and gearbox

Mason Racer Analyzed

Winning Car in Two Milwaukee Races Photographed Immediately After Contests—Details of Motor and Chassis

Lubrication of Motor and Carbureter Details of Special Interest—Novel Valve Operation Used

NOW that the 1912 racing season has come to a close, it is time to compare notes. The American cars which have competed in the big events of the year have acquitted themselves most creditably. They have all shown themselves to be mechanisms of stamina of which we may well be proud.

In the small car races which have been held in conjunction with all the big racing meets this year, the Mason machines have excited much interest for their consistent performances. Early they began to get a name for themselves at the Algonquin hill-climb, in which they were the runners-up, winning in their classes; later at Galveston and Elgin they carried off the small-car honors, which their most recent achievements have been the winning of the Pabst and the Wisconsin Motor trophies races, held in connection with the Milwaukee program.

"What is there to these cars which causes them to perform so well?" was asked.

There are several things which help to make a good car, and one of these is undoubtedly the motor. The Mason Special motor is of peculiar construction and is exclusively the design of F. S. Duesenberg and his brother. The engine involves a number of principles upon which patents have been applied for. The most important are those which relate to the valve and rocker arm construction and to the method of oiling these.

The car in which Mortimer Roberts won the Pabst race is illustrated herewith. Perhaps the keynote of the success of this car, and the others of the Mason team this year, was struck by Mr. Duesenberg when he stated that "the machines are not built for extreme speed, but rather for durability under extreme conditions."

The motor is suspended from the frame at three points, the front support providing a swivel, allowing the engine to adjust itself to unequal road conditions, without strain.

The cylinder casting is a monobloc type, and the crankcase is made in one piece. The crankshaft is easily reached through the large opening, Fig. 10, and has two bearings, whereas the camshaft has three.

An idea of the overall dimensions of the motor may be gained from the monobloc cylinder casting dimensions. The length of this casting is 18.5 inches; the height 14 inches; and the width 6 inches; it being faced on top, both sides and bottom, the latter where it rests on the crankcase, and the other three facings to receive the water-jacket plates.

Looking at the two right side views, Figs. 1 and 2, of the motor as it appears in Roberts' car, the gases exhaust through the top of the hood, the four vertical pipes conducting them outside. Such a means of getting rid of the exhaust makes for least resistance to the outward flow. In Fig. 2 the extreme simplicity of construction is brought about through the use of the cover plate P completely inclosing the valve mechanism, and excluding all foreign matter and making possible the peculiar oiling of the valves and their parts, which is to be a patented feature.

Figs. 6 and 7, of the left side of the Duesenberg motor, show the two sets of spark-plugs arranged horizontally. The large diameter water connections are also illustrated.

The waterjackets deserve mention, as the cylinder casting is found open on both sides, and on the top. The left side open space is covered by the aluminum plate of which the inlet water connection WC, Fig. 7, is a part. The plate WP on the right

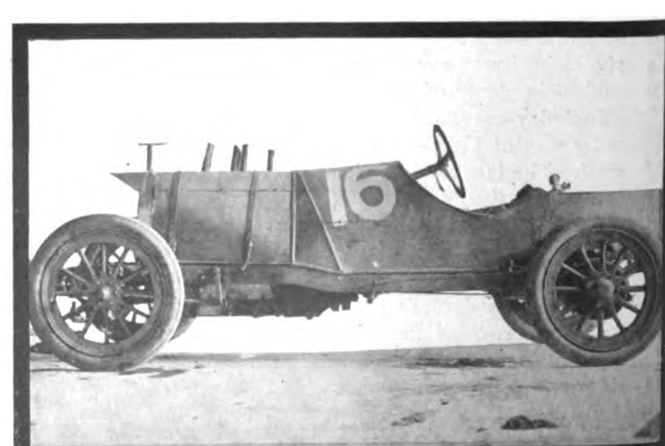


Fig. 3—Mason Special racer which won the Pabst Milwaukee trophy, showing vertical exhaust pipes in top of hood

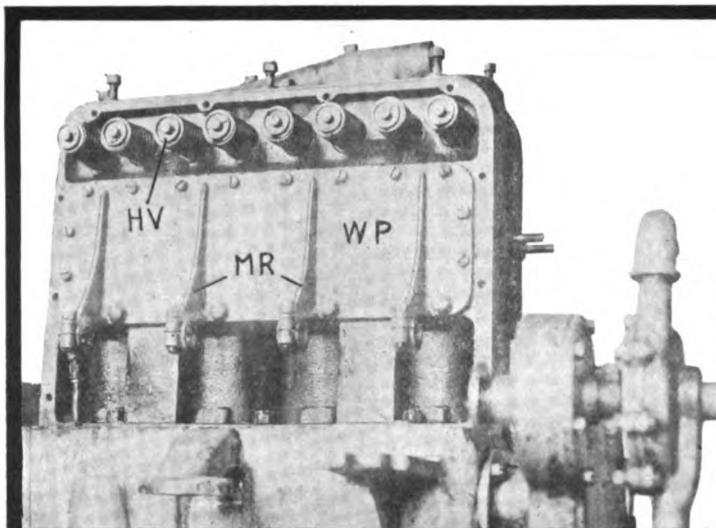


Fig. 4—Right side of Duesenberg-Mason motor, with cover plate P, Fig. 2, removed, and showing plate WP forming the side of the water-jacket, and having bearings MR for the shaft carrying the valve rockers shown in Fig. 5

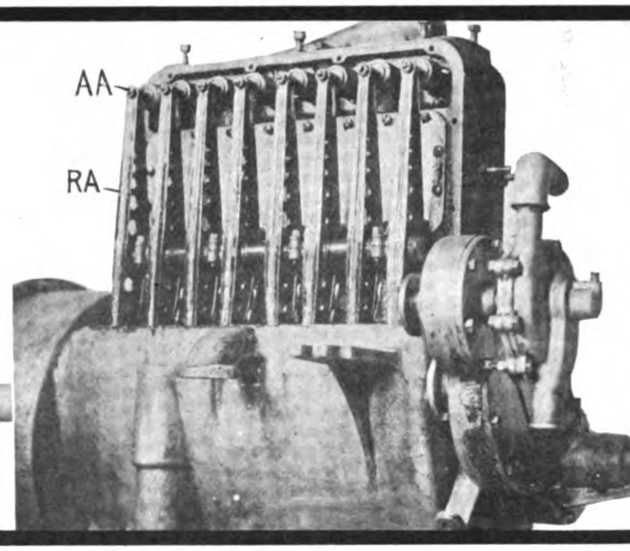


Fig. 5—Right side of motor, showing long valve rockers RA, the lower ends of which bear on the cams and the upper ends on the valve stems. Adjustments AA in the upper ends make provisions for wear and necessary valve timing

side, Fig. 4, carries the four supports MR for the rocker arm shaft. The top jacket opening is covered by the plate which also forms the water outlet manifold to the radiator.

The motor has a bore of 3.875 inches, and the long stroke of 5 inches, giving a bore-stroke ratio of 1:1.29. The valves are placed horizontally, opening directly into the explosion chambers, thereby eliminating valve pockets. The inlets have a diameter of 1.875 inches, and the exhausts are .0625 inch less. The lift of both is .34375 inch. In placing the valves horizontally over the cylinder heads, the designer's idea was not only to reduce the wall area of the combustion chamber, but to put the exhaust openings in such a position that the burnt gases would have a very much freer exit than could be obtained by any other arrangement.

On the opposite side from the valves, plugs are placed, Fig. 6, in the centers of which the spark-plugs are located. These plugs or valve caps make it possible to inspect the cylinder heads and the piston faces and to remove carbon therefrom.

The valves are of the conventional poppet variety with a 30-degree bevel. The stems are 5 inches in length and .4375 inch in diameter. The stems are of carbon steel electrically welded to the 3.5 per cent. nickel steel heads. The ordinary type of coil spring serves to close them, but opening is accomplished through the use of long rocker arms, Fig. 4. The lower ends of these rockers rest against the cams, which are an integral part of the camshaft, and the upper ends are in contact with the ends of the valve stems. These ends are provided with adjustments which allow for taking up of wear, and for fixing the clearance between stems and arms.

The contact points of the rocker arms are hardened. These arms have a length of 14 inches. The distance from the point of cam contact to the center of the arm pivot is 6 inches, while from the rocker shaft to the valves is 8 inches. This greater length above the rocker shaft gives quicker cam than valve action, making for quiet cams.

The peculiar piston construction is illustrated in Figs. 8 and 10. There are three piston rings which are placed in each groove. One is twice as wide as the other two, and is placed inside the two narrower ones. The ring joints are beveled. The pistons have a length of 4 1-2 inches, only 3 1-4 inches of which length is in contact with the cylinder walls, the center being a broad shallow groove, done to decrease the wear, and to aid in oil distribution. The pistons are of gray cast iron; the cylinders of cast iron; the connecting-rods of carbon steel.

Another peculiarity is the method of conveying the explosive mixture to the intake valves. Looking at the views which show the valve side of the motor, Figs. 8 and 9, the inlet N is integral with the crankcase, and the inlet passages are cast as a

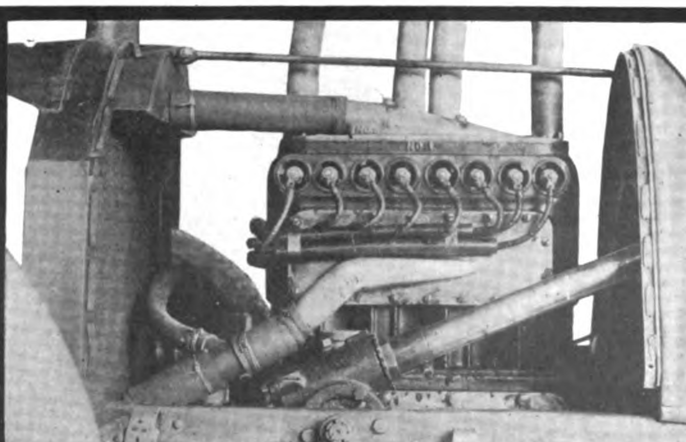


Fig. 6—Left side of Duesenberg-Mason motor, showing spark plugs mounted horizontally in plugs in the sides of the combustion chambers. The large water connection pipes appear

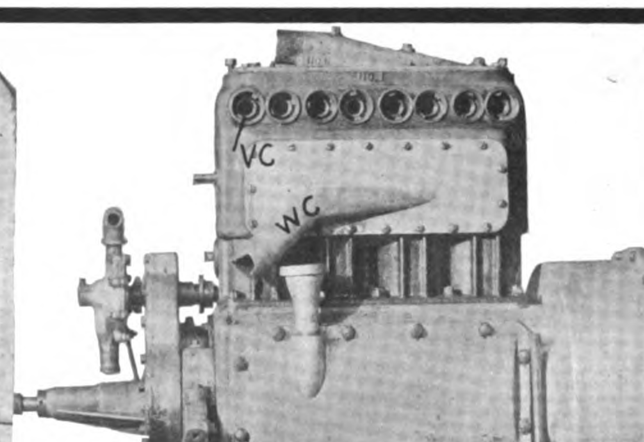


Fig. 7—Left side of motor removed from chassis of Robertson's car after the Pabst race. The large crankcase inspection plate is shown with its oil filler

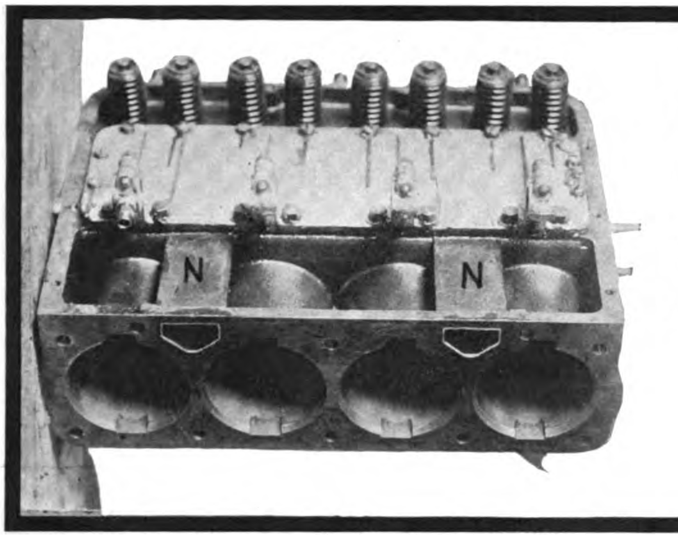


Fig. 8—Duesenberg-Mason motor with intake passages N which connect with the integral manifold in the crankcase and deliver direct to the cylinders. These passages register with openings N in the crankcase, Fig. 9

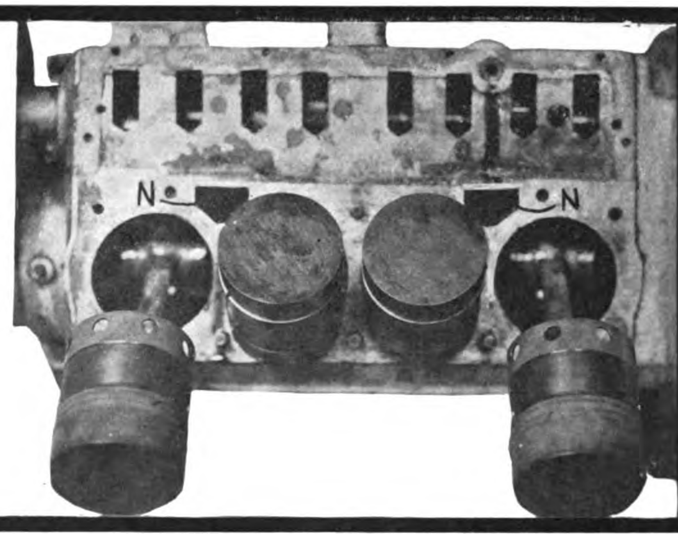


Fig. 9—Details of pistons in motor, showing recesses in central portion, perforations at lower ends and the use of two rings, each of which is a compound one made up of one full-width outer ring and two narrow inner rings side by side

part of the crankcase, and pass from them into other passages cast integrally with the cylinder casting. Part of the cylinder passages are seen at N. After entering the crankcase at M, Fig. 2, the gas is split up into two parts, passing upward to the intakes, one integral passage going to each two cylinders, thus the gas passes back of the rocker arms, and up to the valves.

The oiling of the motor is interesting. The main crankshaft bearings, connecting rod bearings, and cylinders are provided with lubricant by splash from the dipping of the ends of the connecting-rods into oil troughs. There is a trough for each rod end. The oil flows into the base of the motor which has a capacity of 2 gallons. From this point it is pumped up into the hollow rocker arm shaft and to the four rocker arm shaft bearings and the bronzed-bushed rocker arm bearings. From the latter, it is forced to the cams through oil leads which pass down the rocker arms from their bearings. From the cams the lubricant flows again to the oil troughs under the connecting-rod ends, and its cycle is complete. The four troughs are provided with outlets or regulating tubes which govern the level in them. These regulating tubes are so arranged with slots that by raising or lowering them, the level of the oil may be varied from .25 inch to .75 inch. For racing purposes, the level is regulated for 1 inch.

The feature of the oiling scheme on which the patent is asked is the lubrication of the valve stems. The aluminum coverplate P, Fig. 2, is oil tight, and when the motor is running is considerable speed, the splashing of the connecting-rod ends into the troughs creates a mist of oil which rises through the slots in the top of the crankcase through which the rocker arms pass, and on up to the valve stems, lubricating them. The idea of this scheme is that wearing of the valve guides is prevented, giving the stems perfect contact with the guides. This lubrication of the stems also serves to keep the exhaust valve stems cool, preventing their becoming blue black for more than .25 inch into the valve guide when seated.

Passing from the power plant to the transmission system and running gear, the gearset has three forward speeds, and is mounted at the rear axle, being contained in a special case bolted to the axle housing. The gear ratio is 2.6 to 1. The differential carriers are a part of this case. Special axle shafts are used, the flanges which bolt to the rear wheels being integral with these shafts, F, Fig. 12. This was done with the idea of increasing the strength, thus increasing the factor of safety for high-speed work. The axle shaft flanges F have nothing to do with the holding of the wheels in place, their function being simply to drive.

The propeller shaft is inclosed within a torque tube the rear end of which bolts to the forward end of the gear-box. Two radius rods extend from the front end of the torque tube to the axle housing, in the conventional way.

The front axle, an I-beam type, has a 3 1-2-inch central drop. Front springs are half-elliptic; rear, elliptic. The frame has a 2-inch drop at the dash, and 4.5-inch drop at the rear. Its rear width is 34 inches, and it narrows to 30 inches in front.

The car carries 32 by 3.5 inch tires. Its wheelbase is 104 inches, and its weight about 2,000 pounds.

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In cases where it is desired to attach rubber to metals, this end may be obtained in the following simple manner, given in *Brass World*. To prepare the metal for the securing to it of rubber, it is first electroplated in a suitably concocted solution. The latter, proposed by Leo Daft, Rutherford, N. J., is composed of water and copper, zinc and antimony salts mixed in respective proportions of 60 to 38 to 2. To obtain the salt, the metals are mixed in the given proportions by weight, dissolved in nitric acid and precipitated by a sodium carbonate solution, after which they are redissolved in cyanide. The metal to be plated serves as cathode, while a piece of alloy in the given proportions of the three metals named is the anode. After the metal has been electroplated, the rubber is vulcanized in place.

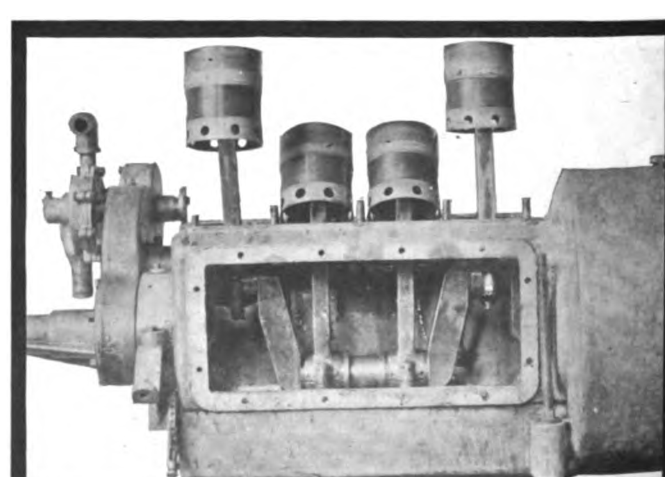

Fig. 10—Crankcase of Duesenberg-Mason motor, showing accessibility of four connecting rod bearings when inspection cover plate is removed

M. A. D. A. Holds Up Cash Prize to Bragg

Milwaukeeans Refuse To Settle Until Driver Pays Entry Fee—Loss at Meet $43,000—Bank Account Attached

MILWAUKEE, WIS., Oct. 21—Bart J. Ruddle, manager of the recent Milwaukee road race, said today, that the M. A. D. A. refuses absolutely to turn over to Caleb S. Bragg the $5,000 in gold offered as first prize in the Grand Prize contest, until such a time as Mr. Bragg pays in cold cash the balance of the entry fee of $1,000, upon which he has made a deposit of only $125 and there is still due $875. Bragg claims he will refuse payment of this fee because no fee was exacted from David L. Bruce-Brown, now dead, and Manager Ruddle declares that this is a poor subterfuge.

The M. A. D. A. lost approximately $43,000 on the speed carnival, and its officers regret deeply that the association's poor position should be taken advantage of by two of the participants, Bragg being one and Ernie Moross being the other. Moross late last week filed a claim for expenses for 14 days for himself, Burman, Horan, Decourcey and Toney, but payment was immediately refused because the Moross outfit played 1 day stands in Pittsburgh, St. Louis and other cities during the time it charged for expenses at Milwaukee. Moross also filed a protest against the award of fifth place in the Grand Prix to George Clark's Mercedes, because he claims Burman was running as well as Clark when the race was called off. It develops from this claim that no fifth place was awarded, Referee A. R. Pardington having placed only four cars which actually finished the race. The M. A. D. A. did, however, make a gift of $500, equal to the fifth place prize, to Clark, who was 40 miles ahead of Burman when the race was called.

The expenses of the meet were approximately $118,000 and the total receipts only $75,000. While no financial statement will be issued to the public, for the reason that the affair is a private matter of the association, it is stated that the principal expense was the construction of the course, upon which $55,000 was expended. The prize list amounted to $20,500, which added to the road expense equals the total revenue.

A garnishee of about $375 placed on the bank account of the M. A. D. A. several days after the races has caused considerable inconvenience, but President Isaac G. Hickman says he is confident that this will be only temporary and the embargo will be lifted before the end of the week. The garnishee served to delay payment of a number of checks, among them that of Starter Fred J. Wagner, whom Manager Ruddle wired on Friday to be patient until early this week, when the matter will be cleared up.

"No one will lose a cent, though our deficit is enormous," said Manager Ruddle. "We are going to pay penny for penny, and what is more, we are going to have the international cup races in Milwaukee in 1913. The matter of financing the deficit is well under way and it will be a matter of only a week or so before we will be able to liquidate every debt contracted legally."

Manager Ruddle will go to New York late this or early next week to make preliminary arrangements for the running of the big cup races on the Wauwatosa course next summer.

Outside of the expenditure of $10,000 by the M. A. D. A. for improving the course for next year, Milwaukee county will put $60,000 into one road forming the course early in the spring. This work will consist of paving the North Fond du Lac road from the city limits to the Town line road with concrete having a roadbed of 25 feet. The work will be started April 1 at the latest and be ready by June 15 or July 1.

It will be news to some people that the proposed improvement of North Fondy road was to have been done this year, and in time for the running of the cup races, but because no assurances could be given by County Highway Commissioner H. J. Kuelling, that the stretch would positively be ready by Sept. 10, the M. A. D. A. requested that the work be held off until the spring of next year.

Ralph De Palma, who was seriously hurt in a collision with Caleb Bragg's Fiat in the last lap of the Grand Prix, is driving a wheeled chair around Trinity hospital and the neighborhood these days. He made his first public appearance on Saturday night, when he wheeled himself into the banquet hall.

ENGINE DIMENSIONS OF THE MASON SPECIAL

Crankshaft bearings:
- Front—1.875 inches diameter; 4 inches length.
- Rear—1.875 inches diameter; 4½ inches length.

Camshaft bearings:
- Front—1.125 inches diameter; 4 inches length.
- Center and Rear—1.125 inches diameter; 2 inches length.

Connecting-rod lower bearings—2 inches diameter; 2¼ inches length.
Wristpin bearings—1.125 inches diameter; 2.625 inches length.
Jacket space—.375 inch thick.
Cylinder, and jacket walls—.25 to .3125 inch thick.
Connecting-rod length, center to center, 10.1875 inches.
Length of pistons—4.75 inches.
Piston rings (three of bull-ring type)—inside ring .625 inch wide; outer rings .3125 inch wide.
Flywheel—15.25 inches diameter; weight 60 pounds.
Crankcase opening—5.5 by 16 inches.
Horsepower—58 at 2300 revolutions per minute.
Bore—3.875 inches.
Stroke—5 inches.

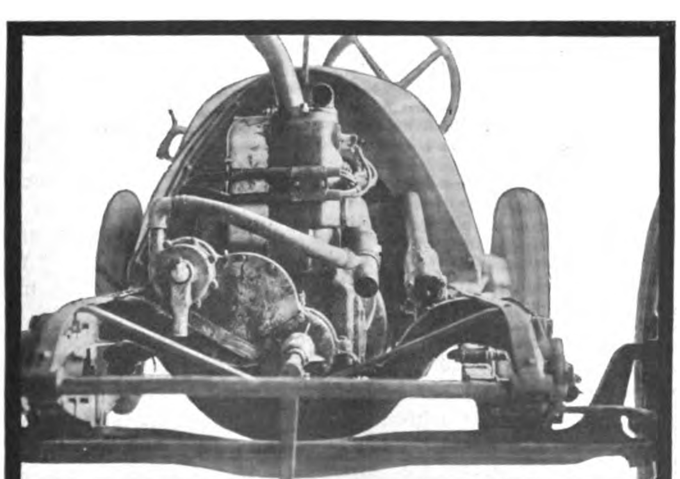

Fig. 11—Front view of Duesenberg-Mason motor with radiator removed. The waterpump location is shown, and also the water intake pipe connections

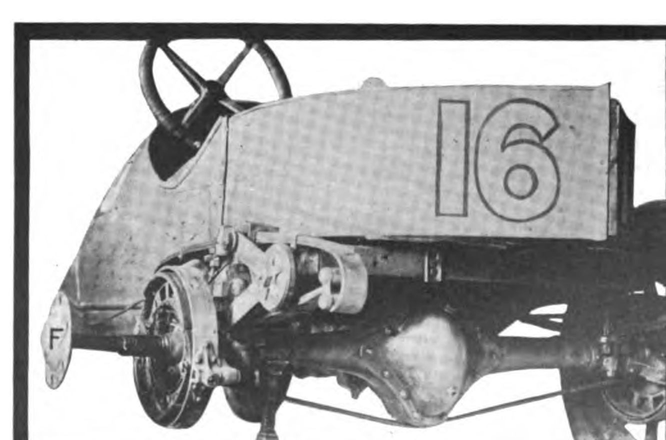

Fig. 12—Rear axle details of Mason racer with axle drive shaft withdrawn, showing integral, drive shaft flange F, which simply drives the wheel

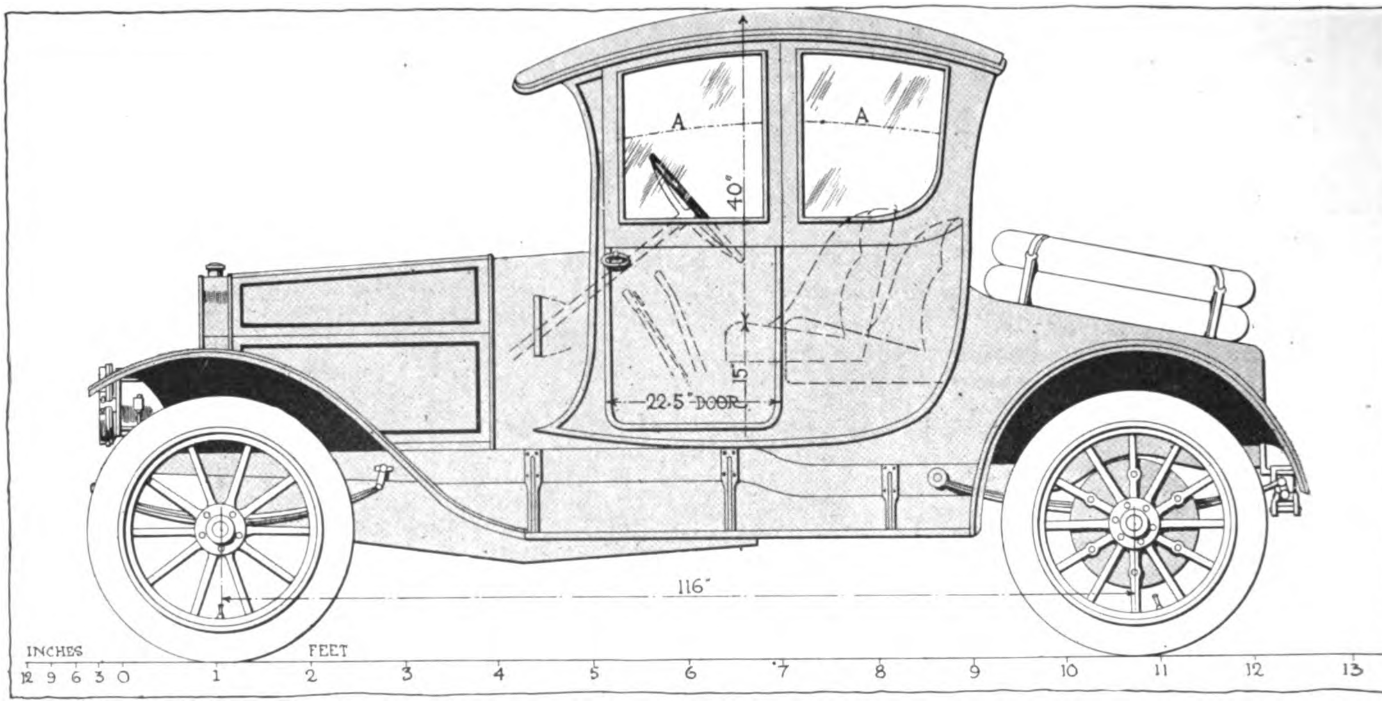

Fig. 1—Side view to scale of coupé design for 1911 Cadillac runabout

Cadillac Coupé Design

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Three-Passenger Design for 1911 Cadillac Runabout for $1200—Drawings To Scales Shown

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By GEORGE J. MERCER.

NOW that the approach of winter is in sight, car owners who are not already provided for are busy with ideas as to the best method to pursue to make the machine comfortable for use during the cold weather. The question of the cost of a new body or the cost of alterations to the old body and other expenses that a new body design may bring about, such as larger tires, new rear mudguards, changing the dash and gasoline tank, repainting the chassis, etc., resolves itself into these expenses being added up and balanced against what would be a fair increased valuation of the car as a finality. In other words, the business proposition is: If money is to be spent on a new body to be used on an old chassis, how much money should be spent to make the investment profitable?

The present market price of the car, the use and the treatment that the machine has received, which, of course, determines its present usefulness, and the plans of the owner regarding the style of body required, all tend to make the query one that must be answered individually. Therefore, it is proposed to give several successive body designs of coupés and shown on as many different makes of cars. Most of these cars will be of a uniform size that will permit of many of the designs of bodies being transposed to another make of car than the one selected.

The immediate subject in hand, however, and the idea to which this article will be confined, is the description of a coupé body design that is shown mounted on a 1911 Cadillac runabout chassis. This body design has several distinctive features that will be taken up and described in detail as the article progresses, and an early model of the Cadillac car has been chosen because the visible features are not radically different from the latest model. Also, this article is intended to assist the owner who will be most appreciative, and to assist him in making something that is old look like new is consistent with this intent.

The features to be considered when rehabilitating a car of an earlier model are: First, the general condition of the motor, springs, tires, etc., and assuming that these are fairly good, the next step is the consideration of the new parts that are to be added. This model is made to take a coupé body and is so specified in the maker's catalogue, therefore the springs and tires are ample, as the design of body here illustrated is very light and will weigh, when finished, about 550 pounds.

The new parts added to the chassis are the mudguards, front and rear, and a new design of hood. It can be assumed that any car that has been in use for two seasons will have guards and hood that show service, and the replacing of these parts is a cost that can in part be charged up to depreciation. Especially is this true of the guards.

The positions of the gear change and brake levers, the foot pedal and the steering wheel remain normal. The gasoline tank wil require to be shifted toward the rear on account of the seating arrangement. It is moved back about 6 inches or until the seat covers it, or it can be placed in the rear compartment back of the body. The old dash can be made over to the shape of the cowl, provided it is not needed for use when the summer body is replaced. In this instance it will be best to use a new dashboard, and cheaper wood can be used that is customary, because it will be out of sight at all times.

One of the essentials of a body design for a pleasure car is that it be so constructed as to fulfil the requirements specified for the comfort of the users.

A design of body that is intended for use in winter is naturally made heavier than one intended for summer. It must protect the occupant from cold and storm and therefore it is closed in with a permanent and substantial framework and panelling. The proportions inside should be ample and yet no room wasted, and the exterior proportions must not be ungainly.

Common custom has established proportions for the interiors of closed bodies, and these proportions are suitable for the majority of normal persons. The design shown herewith is made in accordance with this rule, and Figs. 1 and 2 show the dimensions for head room and seating arrangements.

This coupé body is designed to carry three people inside, all seats facing forward and each seat is individual, this being accomplished by offsetting the seats as illustrated on the plan view, Fig. 2. The body is made as wide as an ordinary limousine, or 58 inches overall, measured across the widest part, but the taper toward the back and front, as illustrated in the plan, Fig. 3, is sufficient to prevent a bulky end appearance. The extra width in the center of the body is necessary, because the steering wheel in the standard car is so positioned that the seat for the driver must be placed with the inside of the seat approximately in the center of the car, and he occupies the whole right half of the body, however wide it may be. In this case the driver's seat is placed 3 inches toward the right side from the center. The seat on the left side, which is a counterpart of the driving seat, is placed with a space of 10.5 inches between, and this is the width allowed for the knees of the person seated in the middle. This latter seat is set back 7.5 inches and the width necessary for comfortable seating is gained by this offsetting back of the middle seat. The width of the seat-room allowed is 18.5 inches for the driving seat and 17 inches for the other two. The depth is ample to allow of thick upholstery at the back and the seat cushions slope toward the back, the thickness of the forward seat cushion being 5 inches and of the middle seat 8 inches. Extra room on the right side of the driving seat provides ample working space for the change and brake levers, and the entrance to the car on the right side is fairly comfortable, only the levers presenting some difficulties.

A further general description of the interior measurements shows that the head-room allowed over the cushion is 40 inches. This is maximum height for average people, but as the stretch for the limbs is also maximum, the forward seat being back 30 inches from the dash, the height from the top of the cushion to the floor has been made only 15 inches, or 2 inches less than regular. This is a gain of 1 inch off the total height of the body and helps to give a low, rakish appearance. Of course, the arched roof contributes to the low effect. With this the maximum height is obtained at the entrance and the contour of the roof follows a line that approximates the slanting line of the top of the seat cushion.

The windows are a part of the body that require space inside for pockets or grooves to receive them when lowered. On this body design the maximum room inside is required for seating, so the windows are lowered only part way. Line A-A, Fig. 1, shows these side windows in the lowered position. The frameless glass for windows is used on both sides and back, while at the front the glass is bound with a wood or metal frame and made to swing outward as a visor in the customary manner. The method of using the frameless glass has been described in a previous issue of THE AUTOMOBILE and will not be repeated at this time. In regard to its use, there are several good points in its favor, one being that the body is made to look very much lighter. Also, if a good workmanship job is made of assembling the glass into the body, they should last longer and look better when old than those with wood frames, because these latter depreciate quickly. It is no doubt possible to provide for and make tight against the entrance of rain, but this up to the present time is largely an experiment. The appearance of the frameless glass is so striking, however, that it is bound to come into public favor. The glass at the rear of the body is stationary and the front glass is made to swing as previously mentioned.

The lines of a body design that give it a distinctive character and make it stand out as individual are those that depart from the straight horizontals and perpendiculars. There are always enough of these foundation lines in evidence, and, while it is not an absolute rule, nevertheless it is a very general one, that a body line is improved from an artistic point of view whenever it deviates from the direction of these two standards.

A very good illustration of this is the ready acceptance by the public of the sloping hood, as illustrated in Fig. 1. This line is not only more pleasing to look at than the one generally used,

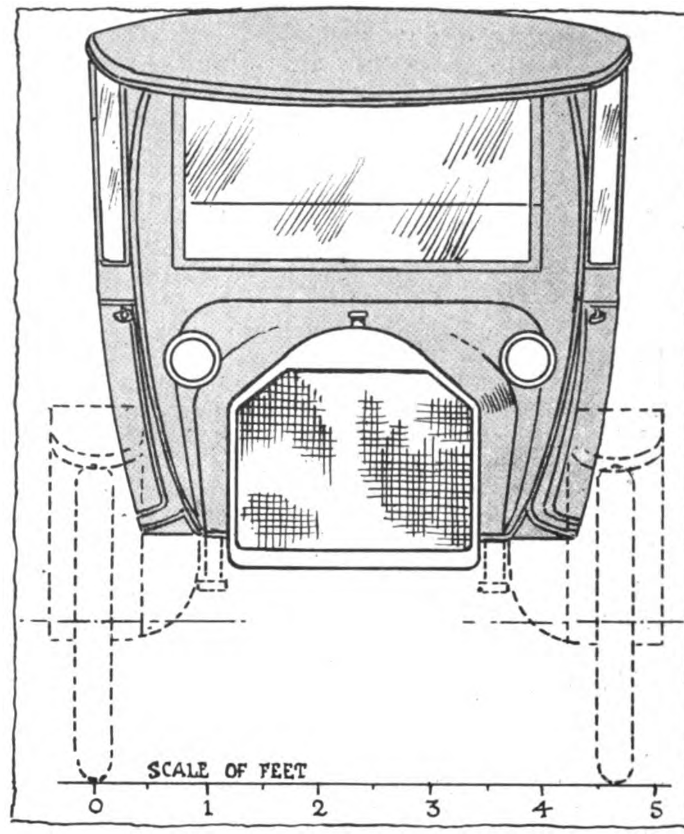


Fig. 3—Front view of Cadillac coupé design

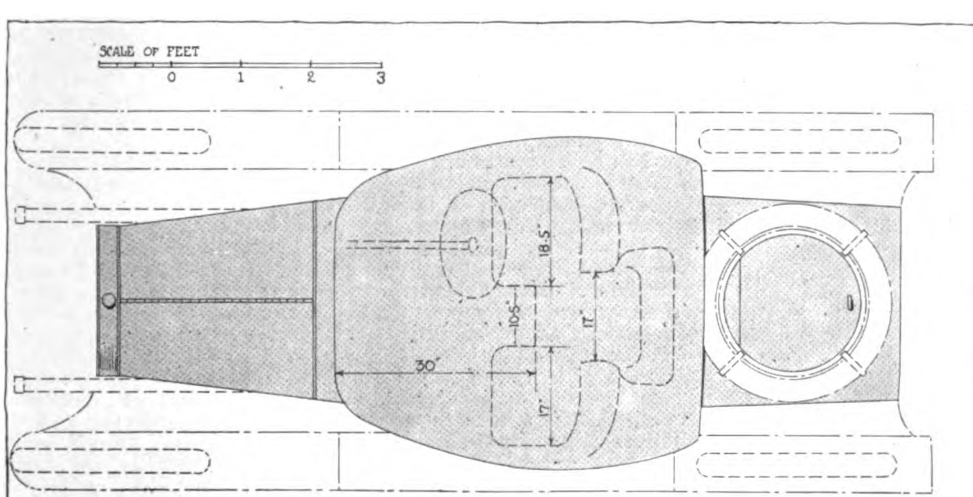


Fig. 2—Seating plan of suggested Cadillac coupé

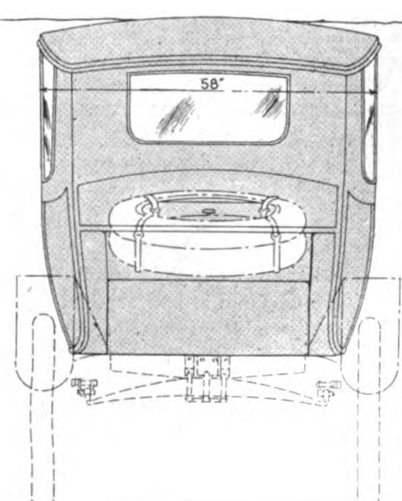


Fig. 4—Rear view of coupé

but it serves the additional purpose of making possible the elimination of the wood dash from sight and decreasing by so much the wind-resisting surface.

With the design as illustrated the upward line of the hood is continued beyond the dash and, to the body proper, this cowl is quite long, because the runabout steering wheel column is long and the body is placed back to accommodate this. If the touring car chassis, which has a shorter column, is used, the cowl will be proportionately shorter. In the sides of the cowl are recesses to receive electric dash lamps, which are of the standard pattern in general use and, together with the dome lamp in the roof of the body, are supplied from a battery located under the seat, the installing and wiring being attended to at the time the body is made.

Attention having been given to the general description of most of the body parts except the rear compartment, it can be briefly summarized as having a carrying space of 38 inches long with an average height of 12 inches and a width of 30 inches. It serves the purpose of a general catch-all and, as in the case illustrated, it may be made tight against rain and water from the washer. Moreover, it may be locked, so that it should be useful and safe to carry all that the owner desires. The top is made strong to carry two tires and the door for entrance is made within the space of the rim. Individual requirements will take up the details of this part, as it may be made in any form that the owner desires.

The question of cost depends to a large extent upon the method of construction, style of trimming, appointments, etc.

The body as designed has the lower panels and the cowl and rear compartment of metal, either steel or aluminum; the framing of good ash; the upper panels of .375-inch whitewood, and the roof of laminated whitewood, with .25-inch plate-glass windows, electric dash and dome lights and battery under the seat. A choice of trimming materials in broadcloths or cords may be made from the best sample books, a choice of style of trimming, with pockets, silk curtains and toilet case to match, choice of carpet rug, a good, common-sense finish and method of workmanship throughout.

Painting the body and mounting on the chassis should cost approximately $1,200. Additional charge for new mud guards and new hood and painting the chassis would amount to approximately $200. Tire holders of a simple pattern should be furnished with the body without additional charge.

This approximate expense of $1,400 has to be mentally balanced against the possible extra service that the car will give, if it is so equipped. Is the car worth this added expense if sold in the open market? This and other questions will have to be answered individually. The field is a large one and this is presented as one of the possibilities. The design of body is sensible; it is roomy, and if built by a reputable builder it will wear well and give service for a long time, because the weight is under the average. As the design is well in advance of the general style it will even up until it is worn out.

The most appropriate colors for a design as illustrated will be either a dark green or blue with the trimming either of a shade to match or a decided contrast and much lighter. The silk curtains and the carpet should always match the cloth. This question of trimming and the colors for the painting are best selected from samples, which any bodybuilder could supply. The principal task is the decision of a suitable body design, and the one here presented is suitable for almost any car having a wheelbase of from 110 to 125 inches. Each seat being individual the car is capable of accommodating three people comfortably, thereby avoiding the unpleasant crowding of three people on one seat. A roomy carry-all is arranged on the space behind the body. The front need not be made with a sloped hood if the extra expense is a consideration. Having decided on a body design, close figuring can be used to trim out the fancy features, and while the body will not be as good as if more money was spent on it, nevertheless a great deal can be accomplished with a little money if the buyer is in earnest.

Progress in Automobilism

English Engineer Reviews Advances of the Year—Paraffin as a Fuel, Quietness, Lubrication and Cleanliness Featured

Extracts from Address of President T. B. Browne Before Institution of Automobile Engineers in England

IN London alone there were licensed during the year ending August 31 last 2,510 motor omnibuses as against only 533 drawn by horses; the number of motor cabs licensed for the same period was 7,860 with only 672 hansoms and 1,982 four-wheeled horse cabs.

That the cost of running commercial motor vehicles is being continually reduced, especially where efficient organization exists for their maintenance in large numbers, is shown by the fact that one of the largest motor omnibus companies has now reduced its running costs to about 15 cents per car mile, whereas when I read a paper on the subject of running costs before this Institution in February, 1910, the equivalent figure was about 18 cents, so that the motor omnibus is now in a better position to prove a very formidable competitor to the electric tramcar.

It is very difficult to arrive at an exact estimate as to the number of motor vehicles running in this country, as there is at present no arrangement made for striking off the register those vehicles which are worn out, destroyed by fire, etc., but the total numbers registered for Great Britain and Ireland have been given as follows:

November, 1910	Motor cars	124,860
	Heavy motor vehicles	7,406
November, 1911	Motor cars	150,697
	Heavy motor vehicles	9,195

As nearly a year has elapsed since the last figures, the approximate number of registrations at the present time might be estimated as follows:

Motor cars	170,000
Heavy motor vehicles	12,000

Excellent results have so far been obtainable with paraffin with engines running on steady loads, but the extremely irregular load of an automobile engine has so far proved a serious obstacle to the proper carburetion of paraffin and the heavier oils. There is also the possibility that the price of any substitute will rise as soon as the demand for it becomes great, just as has been the case with the price of the heavy oil used in the Diesel engine, which was sold not so long ago at 38s., or $9.50 per ton, whereas it has now risen to over $20 per ton. However, it cannot be gainsaid that the whole question is one of supply and demand, and therefore the greater the number of satisfactory substitutes for petrol that are found the lower the price is likely to be. The enormous increase in the number of commercial motor vehicles that we are about to witness should not tend to raise the price of petrol for pleasure cars, if we are able to use a heavier oil as a fuel for the propulsion of the former. Petrol is distilled off the crude oil at temperatures ranging from 50 deg. C. to 150 deg. C., but if we can use an oil distilled off at a temperature range of from 50 deg. C. to 200 deg. C. the supply would be increased threefold; so that it can readily be perceived how this would affect the price of the fuel to the consumer.

No serious attempt to use the Diesel principle for automobile propulsion has yet been made, and there are, of course, considerable difficulties in the way which must be overcome before it can be successfully applied.

In the first place, with the comparatively small powers required, it would be very difficult to reduce the weight sufficiently to enable it to compare favorably with the petrol motor, and the mechanical efficiency of these small sizes would in all probability be rather low. Then, again, great difficulty would be found in applying it to the irregular loads and speeds of an automobile, so that much experimental work would have to be done before success could be expected. The success which has resulted with the use of Diesel engines on ships where these objections do not apply can, therefore, be no guide as to its suitability for automobile work.

The use of solid fuel in the shape of carbon has been proposed for automobiles, and at least one vehicle has been built with a suction gas producer. This would have to be designed on much lighter lines, and of smaller dimensions, than those at present used so successfully and economically with stationary gas engines, but those who have made a special study of this system, and who are therefore qualified to know, have stated their opinion that it should be quite practicable to bring the dimensions and weight of the apparatus down to the required limits without impairing its efficiency, so that the subject is well worth the consideration of designers, at all events for the heavier types of motor vehicles, though difficulties will probably occur in regulating the gas supply to suit the irregular load experienced with an automobile.

At the recent meeting of the British Association some of the papers read were of the greatest interest to automobile engineers, and I might specially refer to those read by one of our past presidents, Dr. Dugald Clerk, F.R.S., on the subject of gaseous explosions and internal combustion turbines.

The interesting point with reference to explosions brought out was the difference in the time taken to explode a gas when in a state of turbulence, and when in a state of comparative rest. In the experiments quoted a fan was used to create a turbulence in a 10 per cent. mixture of coal gas and air, with a result that the time of explosion was shortened from 0.13 seconds to 0.03 seconds when the speed was raised from 2000 to 4500 revolutions per minute.

This result accounts for the fact that it is possible to obtain satisfactory ignition with motors running at high speeds.

Perhaps the work which has been done of recent years in studying the indentations caused by phonographic records may lead us to some definition of "amount of noise," but the fact is that no one has as yet suggested a definition for a unit of either noise or smell.

The noises in the transmission gear of an automobile proceed from several sources. The most troublesome of these is undoubtedly that caused by the gear wheels of the change-speed gear. With the universal adoption of direct drive on the top gear, this can only occur when recourse is had to the lower gears, when the drive is transmitted through two pairs of spur wheels in the gear box. The introduction of ball bearings has intensified the trouble from this source, as it is well known that plain bearings do not conduct the sound emitted by the gear wheels to anything like so large an extent as ball bearings. Some experiments which I conducted with ball bearing camshafts several years ago bore this out to a surprising degree.

Another serious source of noise has been that due to the bevel gear used in the transmission. In chain-driven cars great difficulty was experienced in quieting the bevel gear owing to the comparatively high speed at which it was run. Its removal to the back axle, with the introduction of the live axle, rendered the problem not quite so difficult, but it has still been found a very serious one. **It has also been found extremely difficult to prevent the teeth of the bevel gears from warping during hardening. Here again great improvements have been made by the adoption of a process for the local hardening of the teeth, leaving the disc of the wheel soft, and by making the back axle as compact and rigid as possible.** The fact remains, however, that no spur or bevel drive in the transmission of an automobile ever gives absolute silence, although by the methods mentioned above the noise can be considerably reduced.

For this reason there is a tendency towards the adoption of worm gear, which has been delayed in many cases by the fear that this would be less efficient than the bevel gear. In some instances where it has not been carefully designed, this has certainly been so, but some recent experiments carried out in America have proved that the difference in the efficiency of the two types of gear is negligible where properly designed gears are used.

The difficulty with the splash lubrication was chiefly due to the fact that the connecting rod big ends which dipped into the oil were of such comparatively large dimensions that a slight rise in the level of the oil by reason of the tilting of the car due to a gradient or the movement of oil due to its inertia, caused a very much larger amount to be thrown up than the normal.

At last a thoroughly efficient way out of the difficulty was found, and was first tried by one of the London omnibus companies. This consisted in fitting a small vertical pipe to the lowest point of each big end, the lower end of the pipe being arranged in the form of a small scoop. The level of the oil was reduced correspondingly, so that, the orifice of the scoop being quite small, a very little extra amount of oil was splashed up by the scoop on to the sides of the cylinders if the level were temporarily increased by tilting, etc.

The oil into which the scoops dip is usually carried in small troughs situated under each scoop, so that the tilting of the engine does not materially affect the level.

This method has been found most efficient, and since its adoption the unpleasant smoke from the exhaust of automobiles has become a thing of the past.

A very great improvement has been recently made in the cleanliness of the automobile by the prevention of drippings from gear boxes and axle cases by the provision of a vent in the shape of a small aperture in the top of the case fitted with a short length of tube open to the atmosphere. It was found that the rise of temperature due to the churning of the oil often resulted in a rise of pressure in the gear case of as much as 4 pounds per square inch, which accounted for the fact that, in spite of careful provision in the shape of stuffing boxes, the oil still worked out and dripped on to the road, or found its way on to the surfaces of the brakes.

One of the chief causes of the unpleasant odors emanating from the automobile in the early days of the movement was the imperfect mixture, resulting in the products of the partial combustion, including the deadly carbon monoxide, being expelled into the atmosphere.

With modern carbureters, the variations of which are innumerable, there should be no excuse for any emission of unpleasant exhaust. At the same time it must be stated that a good many cars are run to-day with a much richer mixture than is necessary for perfect combustion. It is well known that a certain percentage of mixture too rich for perfect combustion gives slightly more power than the perfect mixture, but the gain is so slight that it is certainly not worth using for any but racing purposes, and it has the further disadvantage of increasing the tendency to carbon deposit.

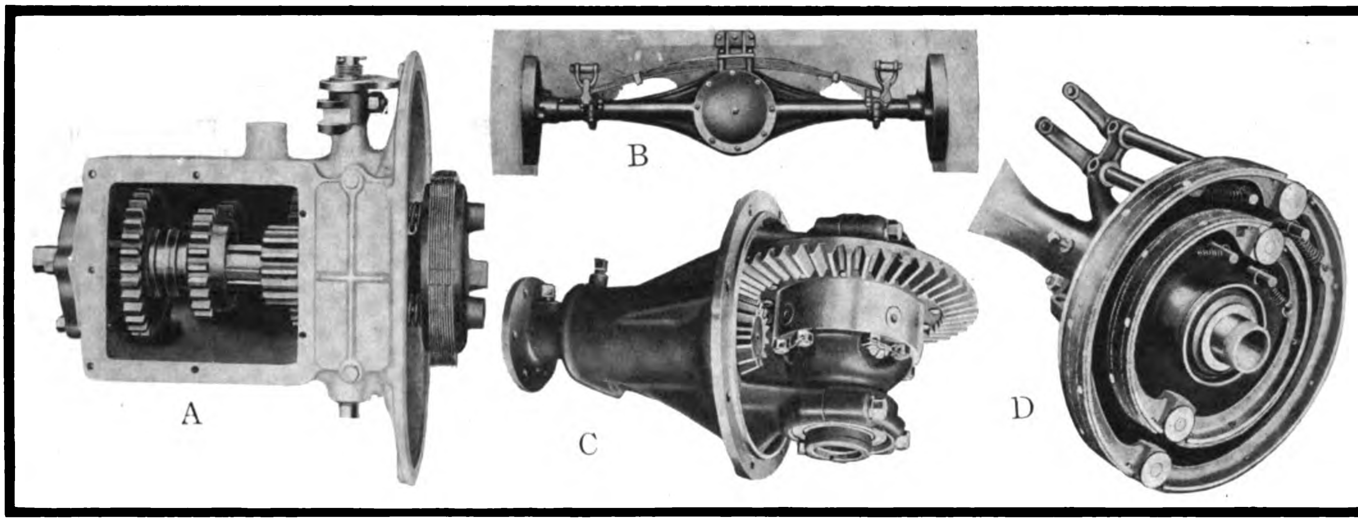
There is still, of course, room for improvement, and such parts as the tires and springs are obviously very far from having reached their final stage of development.—From *The Autocar*, October 12, 1912.

Harking Back a Decade

FROM *The Automobile and Motor Review*, October 18, 1902:

The great reliability run of the Automobile Club of America was finished at New York on Wednesday evening. There were seventy-nine entrants and sixty-five covered the route to the end. According to unofficial announcement there were twenty cars to complete the whole course without penalization. Of course, this list is subject to alteration when the judges, umpires, referees and officials have considered the results from all angles. In the honor list are four Whites, two Packards, two Grouts, two Stevens-Duryeas, two Searchmonts and one each of the following makes: Prescott, Lane, Haynes-Apperson, Knox-mobile, Stearns steamer, Oldsmobile, Fredonia and Foster. There were thirty-five different makes represented in the run. During the whole affair not a single serious accident occurred as the result of horses becoming frightened by the tourists. Entering Boston the column contained at least 300 automobiles. The run was from New York to Boston and return. The contestants were classified into three divisions according to weight in running condition without passengers. Class A was for cars under 1,000 pounds; Class B, 1,000-2,000; Class C, over 2,000 pounds. Of the clean score cars there was one in Class A; fifteen in Class B and four in Class C. There were ten steamers in the perfect score list and ten gasoline cars. Class A cars performed well, but the honors of the run went to those in the middle class. Practically all the disabling mishaps that occurred to contestants in this class were due to accidents. There was a big handicap on the heavy car class on account of the low average speed allowed by the rules. Poor workmanship and construction led to quite a number of penalties to some of the entered cars, but these were not very serious.

The new plant of the Winton Motor Carriage Company, at Cleveland, O., is located on a site of 12 acres. The four buildings, which are all of one story, cover an area of about 100,000 square feet. A feature of the building is the fact that the structural framework is raised in the center of each to provide windows and skylights from above.



F.g. 1—Gearset, axle, differential and brakes in the Detroiter car, showing principal features of each

Detroiter Embodies Latest Improvements

Left Drive, Center Control, Long-Stroke Motor, etc., Found in Product of 2-Year-Old Company

BEGINNING its second year, the Detroiter does not show any changes in a mechanical way. Some of the body lines have been straightened out giving a very graceful design which taken in conjunction with the long cowl gives the car an excellent appearance.

The motor is of the monobloc type, the four cylinders having the waterjackets cast integrally. The intake manifold passes through the casting in a unique manner, the intake pipe from each cylinder passing between the cylinder from which it leads and its neighbor and projecting from the opposite side of the monobloc casting. The passages are thus between the first and second cylinders and between the third and fourth; the pipes which pass between each of these pairs suffice for the two cylinders between which they pass. The passage is beneath the waterjackets and not through them so that the water circulation is not interfered with by this arrangement while all the advantages of a preheated charge are obtained. The intake manifold is Y-shape, each branch of the Y connecting to one of the intake leads. The carbureter is carried on the bottom of the Y as shown in Fig. 2. The short pipe above the intake is the water inlet.

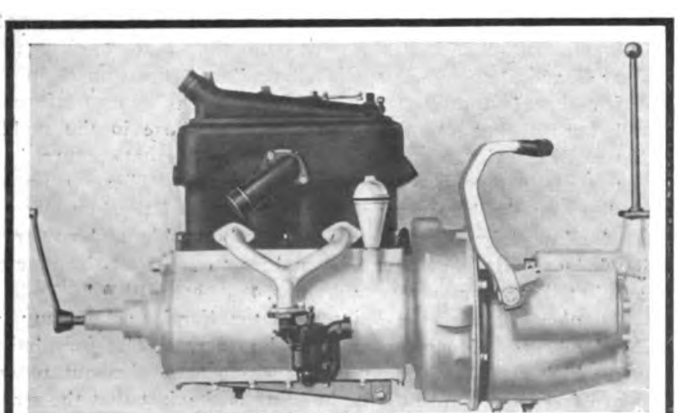


Fig. 2—Left side of unit power plant, showing carbureter mounting

The bore of the motor is 3 3-8 inches and the stroke is 4 3-4 inches. This gives a stroke-bore ratio of 1.4, which is somewhat higher than usual practice in the lower priced cars and should give good reserve power for hills at the same time making the motor economical as to fuel consumption. The material from which the cylinders are made is soft gray iron. The pistons also are composed of this material. A feature of the design of the Detroiter which is unusual is the reaming of the cylinders and the grinding of the pistons to exact diameter, 3.375 inches. The pistons are 4 3-4 inches in length and fitted with three concentric rings all of which are located above the wrist-pin. Before assembling the motor the complete set of four cylinders is weighed and balanced exactly to secure smooth running as far as this can be done by a static balance. A running balance is obtained on all rotating points cutting down vibrations to a minimum.

Other parts of the motor follow standard practice and design. The connecting rods are of I-beam section, and are carbon steel drop forgings heat treated. They are balanced in the same manner as the pistons. The connecting-rod bearing at the crank-pin end is of square projection, measuring 1 7-8 inches each way. The crankshaft is a high carbon steel drop forging carried upon two large heavy duty annular ball bearings. The grinding work at the bearing surfaces is done within extremely narrow limits to give a maximum life of both the shaft and the bearings.

Silence in the valve action of the Detroiter has been obtained by enclosing this part of the motor by oil-tight and sound-proof casing, Fig. 4. The valves are made in two parts welded together by a new process. The heads are of gray iron while the stems are of low carbon steel. They are all of the same size and interchangeable in every way. The action of the valves is adjustable in the usual way by turning a nut on the end of the valve stem. The nuts are of unusual size, however, to distribute the wear over a larger area and render frequent adjustment necessary. The push rods operate in bronze bushings which can be renewed when necessary.

Careful grinding is a feature of the camshaft, the limits being 1-1,000 inch throughout the length of the cam and bearing surfaces. The bearings are ground to .937 inch in diameter and the lengths of the bearings are 2 1-2 inches at the end and 1 1-4 inches in the center. The camshaft is actuated from the rear of the motor. The timing gears in the Detroiter being located at this end of the motor, it has been found easier to lubricate them in this position and they have also been rendered less noisy. The gears are cut helically and are three in number. The crankshaft and magneto gear are of steel while the central time shaft gear is composed of special gray iron. The gray iron timing gear is bolted to a large flange forged directly on the camshaft for this purpose to overcome the objections to keys.

The oiling system used is the circulating splash. The oil is carried in the lower part of the crankcase and is drawn from there by a circulating pump which sends the lubricant through a sight feed located on the dash. From the latter point the oil flows to the forward end of the crankcase and then passes through a system of four-splash troughs, one being located beneath each cylinder. The connecting-rods dip into the oil contained in these troughs and splash the oil to the cylinders, crankshaft, camshaft and all the internal bearings of the motor. In addition to this, the flywheel runs in oil and lubricates the clutch and gearset. Excess oil drains back to the reservoir through standpipes and is recirculated through the system after having passed through a fine mesh strainer.

The cooling system is thermo-syphon, operating through a vertical tube radiator having three tiers of copper tubes. The face area of the radiator is 24 by 26 inches. Large waterjackets are used in connection with this system to facilitate the circulation and make it as rapid as possible. A fixed spark Bosch high-tension magneto is used.

Power is transmitted through a multiple-disk clutch to the three-speed gearset. The clutch consists of twelve internal and eleven external crucible steel disks housed within the flywheel. It runs in a continual bath of oil and engagement is secured by three large helical springs. The gears in the gearset have a 3-4-inch width of face, a large engagement area being thus secured. The gears are of high carbon steel heat treated and hardened in oil. The main and lay shafts are carried on heavy duty annular ball bearings. Practically the entire gearbox can be disssembled through the handhole on the side. The gearbox is suspended by a sub-member to the main frame and forms the rear member of the three-point suspension.

From the gearbox, the drive passes through a universal joint to the propeller shaft and thence through another universal joint to the bevel gear differential. The differential and drive gear assembly are of unit construction, the bevel drive gear or pinion being capable of removal by taking the cap from the rear axle, shown at B, Fig. 1. The drive pinion shaft shown at C is mounted on a double-row ball bearing at the gear and next to the pinion and on a single-row ball bearing at the forward end. The differential set is carried on two large double ball bearings,

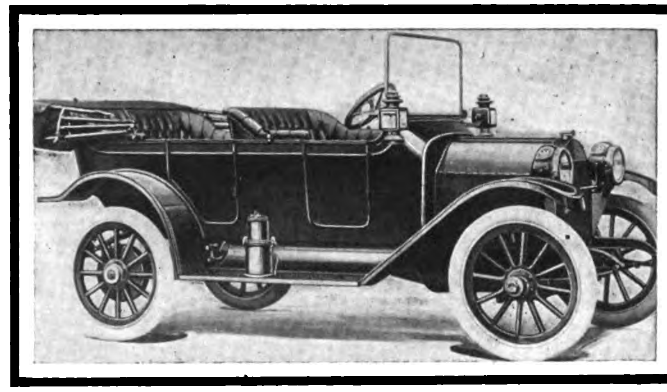


Fig. 3—Five-passenger touring car on the Detroiter chassis

one on each side of the gear. The ratio between the bevel gear and the pinion is four to one. The teeth are five diametric pitch with the short addendum formation and have faces 1-4 inch in width.

The rear axle is of floating construction with a pressed steel housing. The housing, which sustains the weight of the car in this construction, is designed to carry 3,000 pounds which is more than three times the weight that can ever be placed upon it when the car is loaded. The axle is shown at B, Fig. 1. As will be noted in this illustration, the rear spring is of the platform type. The springs throughout are 1 3-4 inches wide and supplied with rebound clips. The front springs are semi-elliptic, attached to swivel shackles, while universal shackles are used in the rear. All bearing points are taken care of by grease-cups.

Two sets of brakes working on double drums are employed. These are shown in Fig. 1 at D. Both brakes are of the internal expanding type. The service brake is 14 inches in diameter and the emergency brake 10 inches.

Heavy frame construction is used, the channel members being 33 inches wide in the rear and 29 inches in front, with a drop of 3 inches forward of the rear axle. The car can be turned in a 25-foot circle. Steering is taken care of by a worm and sector gear actuated by a 17-inch steering wheel. Left drive and center control are used in the Detroiter, a complete model of which is shown in Fig. 1. Tires are 32 by 3 1-2 inches and the color is Raven blue relieved by a light blue stripe.

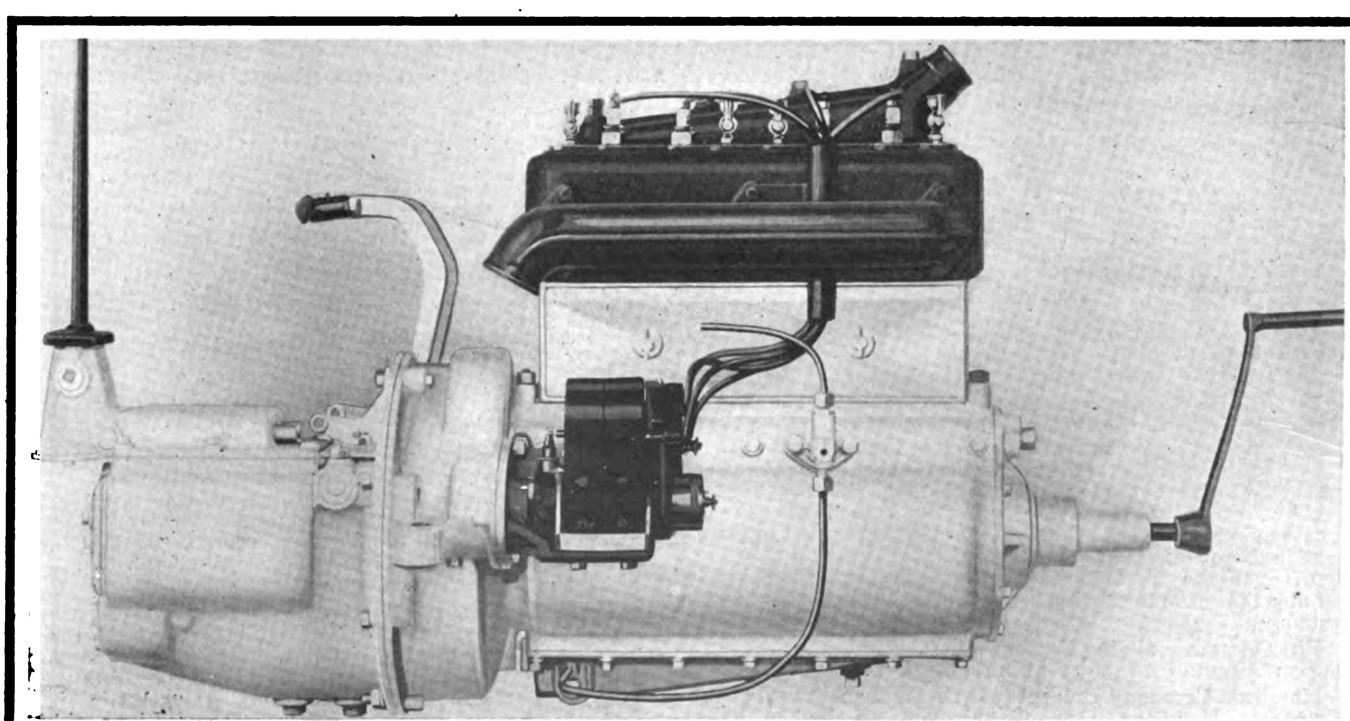
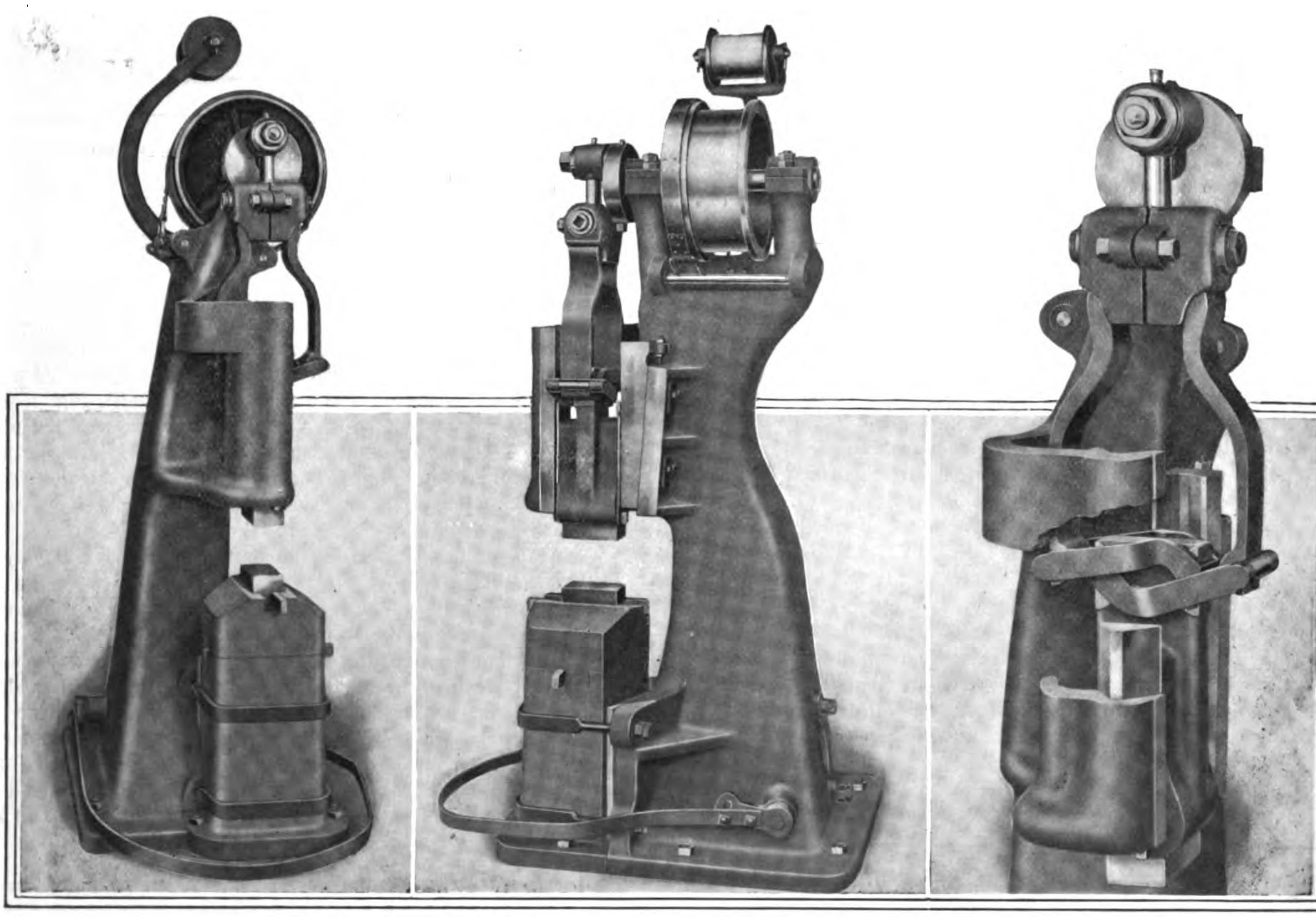


Fig. 4—Right of valve side of motor, showing magneto mounting and lead from oil reservoir to the crankcase

Factory Miscellany



Front, side and constructional view of the Beaudry Peerless ham mer which is especially adapted for tool making

In the accompanying illustration is shown a new hammer brought out by Beaudry & Company, of Boston. While also a hammer for general forging work it is especially adapted for plating and drawing steel. The feature of the hammer is its extreme quickness of blow. It is designed for continuous service and can be operated at a very high rate of speed. The hammer is made in seven sizes with rams which range between 25 and 200 pounds. The weight of the entire machine is from 1,200 to 4,400 pounds, according to the size. Another feature which distinguishes this hammer from most others is that it has no beam, coil springs, leather straps or rubber cushions. The hammer is started, stopped and regulated by a treadle which extends nearly all the way around the base, rendering it possible to operate the hammer from any side. A varying pressure on the treadle will give any desired speed or force of blow, thus allowing an experienced workman the greatest play. The anvil is a separate casting and is flanged at the bottom for the bolts which hold it to the frame. A wood filler is inserted between the anvil and the frame to eliminate vibration. As shown in the above illustrations the anvil is also secured to the frame by strap bolts and is offset so as to clear the main frame casting. The anvil has an independent and adjustable shoe die. The frame of the hammer is cast in one piece and is very rigid. It occupies but little floor-space, having a foundation of moderate size. The ram operates in V-shaped guides, it is composed of carefully machined steel and is adjustable on the connecting rod for varying heights above the dies. At all parts of the stroke the frame is contained within the guides to insure a true blow. The treadle works in conjunction with a belt-tightening pulley and a friction band brake which is capable of instantly starting or stopping the hammer. The hammer responds to the slightest pressure of the treadle and may be operated from any side. One man, of course, can take care of the hammer and do all the work with it. A highly trained man who has specialized on a hammer of this type can do wonders with it in the tool-making line, leaving very little for subsequent expensive grinding work to do. Such hammers as this are in everyday use in automobile factories all over the country.

BUSINESS Outgrows Baker Factory—The electric truck business of the Baker Motor Vehicle Company, Cleveland, O., has grown so rapidly that the business has outgrown the plant, and it has lately been found necessary to do part of the work in the open. The accompanying illustration shows several piles of pressed steel frames. The preliminary work of drilling and cleaning is being done here in the open. It may be seen in the illustration that about 100 feet of the embankment has been cut away and leveled off for the accommodation of the pressed steel frame shipments.

Fitzsimmons Building Factory—J. A. Fitzsimmons is building an automobile factory in Lindsay, Ont.

Hamilton Company Enlarged—The Tallman Brass & Metal Company, Hamilton, Ont., is preparing to double the capacity of its plant.

Wheel Company Adds—The Ideal Steel Wheel Company, Cincinnati, O., has bought the former plant of the Seufferle Cooperage Company, that city, for $41,000.

Wallis Company Working—The Wallis Tractor Company, capital $800,000, organized at Racine, Wis., by H. M. Wallis and other interests identified with the J. I. Case Plow Works, will engage at once in the production of tractors, tools, machinery and internal combustion engines. Temporary quarters have been arranged in the Case plow works, but a new plant will be erected as soon as possible.

Premier Adds to Plant—Two new additions are to be made immediately to the plant of the Premier Motor Manufacturing Company, Indianapolis, Ind. The company at first intended to wait until next spring before enlarging the plant, but it is stated that the demand for the new Little Six makes more room necessary before then. The additions will be two stories in height, one 40 feet by 140 feet and the other 48 feet by 140 feet.

Calendar of Coming Automobile Events

Shows, Conventions, Etc.

Jan. 2-10	New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11	Cleveland, O., Annual Automobile Show.
Jan. 4-11	Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-25	New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25	Philadelphia, Pa., Annual Automobile Show.
Jan. 25-Feb. 1	Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1	Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1	Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8	Chicago, Ill., Annual Automobile Show.
Feb. 10-15	Minneapolis, Minn., Annual Automobile Show.
Feb. 11-15	Ottawa, Ont., Annual Automobile Show.
Feb. 17-22	Kansas City, Kan., Annual Automobile Show.
Feb. 24-Mar. 1	Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1	Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1	St. Louis, Mo., Annual Automobile Show.
March 3-8	Pittsburgh, Pa., Annual Automobile Show.
March 8-15	Boston, Mass., Annual Automobile Show.
March 17-22	Buffalo, N. Y., Annual Automobile Show.
March 19-26	Boston, Mass., Annual Truck Show.
March 24-29	Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Oct. 21-25	Reliability Run, Chicago Motor Club.
Oct. 24-26-27	Track—San Antonio, Tex., San Antonio Auto Club.
Oct. 26	Track—York, Pa., York Motor Club.
Oct. 26-28	Los Angeles to Phoenix Road Race, Maricopa Auto Club.
Oct. 31	Track—Phoenix, Ariz., Maricopa Auto Club.
Nov. 9	Sociability Run, Louisville, Ky., Louisville Automobile Club.

Proposed Contests

Oct. 26	Track—White Plains, N. Y., Geo. T. Long.
Nov. 3-5-6	Track—Shreveport, La., Shreveport Auto Club.
Nov 15-16	Track—Richmond, Va., Richmond Automobile Club.
Nov 28	Road Race—Visalia, Cal., W. H. Lipton.

Foreign

Nov. 2-3	Versailles, France, Splash Guard Competition.
Nov. 8-16	London, England, Olympia Automobile Show.
Dec. 7-22	Paris, France, Paris Automobile Show, Grand Palais.
Jan. 11-22	Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.
April	Barcelona, Spain, International Exhibition.

Vulcanizing Plant—The Middletown Automobile and Bicycle Company, Middletown, O., is now receiving bids for a new vulcanizing plant.

Rim Company Building—The Jackson Rim Company, Jackson, Mich., has awarded a contract for a one-story factory to be 400 feet by 80 feet and to cost $40,000.

Maritime Company Building—The Maritime Motor Car Company has placed a contract to build an automobile factory at Coldbrook, N. B., at a cost of about $250,000.

Chalmers Plans Addition—The Chalmers Motor Car Company, Detroit, Mich., has plans in progress for a one-story addition, to be 140 feet by 60 feet, and to cost $20,000.

Electric Company's Factory—The Century Electric Company, St. Louis, Mo., is having plans prepared for a seven-story factory 75 feet by 110 feet. It will cost $150,000.

Indianapolis Company's Addition—The Motor Car Company, Indianapolis, Ind., has awarded its contract for the building of an addition to be 450 feet by 50 feet and of fire-proof construction.

Resilio Company Builds—The Buffalo, N. Y., Resilio Company, recently incorporated, will build a plant for the manufacture of resilio and other substances used in the making of tires for automobiles.

Lewis Acquires Detroit Plant—It is reported that the Lewis Spring & Axle Company, Jackson, Mich., has acquired a factory in Detroit, Mich., and will remove its automobile control department to the latter city.

Chain Firm Builds—The Whitney Manufacturing Company, Parkville, Conn., which manufactures chain drives for automobiles, is to erect a $40,000 addition to its plant. The new structure will be 40 feet by 180 feet and two stories high.

Plans Rubber Tire Factory—Rubber tires for all kinds of motor vehicles are to be manufactured by the St. Louis, Mo., Tire and Rubber Company. The company is to be capitalized at $150,000, and a site has already been chosen for the factory.

Bulldog Tire's Factory—The Bulldog Tire Company, Ltd., Toronto, Ont., has been incorporated with a capital stock of $300,000 to manufacture tires for automobiles, etc. Plans for a factory are being considered. William J. Tubman will be the manager.

Amesbury, Mass., Growing—The Walker & Wells Company, makers of automobile bodies at Amesbury, Mass., is having completed an addition to its factory of a building 40 feet by 100 feet, two stories high, to be used for the storage of lumber and metal.

Hardman Tire Plant Burns—The plant of the Hardman Tire and Rubber Company, Belleville, N. J., was destroyed by fire on September 26. The three-story brick building occupied an entire block, and was used, with the exception of one corner, by the Hardman company.

New Des Moines Factory—Des Moines, Ia., is to have a new automobile factory to be known as the Cannon Motor Car Company. The site of the new factory has not been determined upon. Two locations are already in view and a choice will be made in the near future.

Cutting Plant Enlarged—The Cutting Motor Car Company, Jackson, Mich., has made arrangements to double the size of the plant and additional land next to the factory has been purchased for that purpose. The new factory will probably be in course of erection by next spring.

Agner Company Moves—The Raymond C. Agner Company, Burlington, Wis., manufacturing adjustable socket wrenches, grease and oil guns and other specialties, is now located in its new factory, erected at a cost of $30,000. The output has been increased by 75 per cent.

Pope's Four-Story Structure—The Pope Manufacturing Company, Hartford, Conn., is completing plans for the construction of a four-story factory which is to be devoted to the production of a line of lower priced cars. It is said that this structure will double the capacity of the plant.

Amplex Will Enlarge—The Amplex Motor Car Company, Mishawaka, Ind., is planning to double its factory capacity so that all parts of its car will then be made at the Mishawaka factory, including the aluminum bodies. The company will in a short time put on a larger force of workmen.

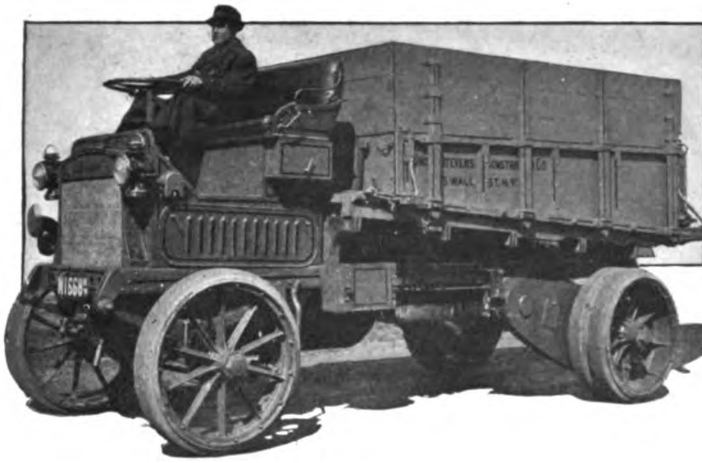
Body Plant Enlarged—The W. F. Stewart Company, Flint, Mich., manufacturer of automobile bodies, has awarded a contract for the erection of an addition to its plant. The new building will be 60 feet by 200 feet, two stories high, and will permit the company to double its capacity.

Kelly-Springfield Plans—The incorporation of the Kelly-Springfield Motor Truck Company, Columbus, O., recently, was the first step in extensive plans for the expansion of the company. The old plant at Springfield, O., is being considerably enlarged, and it is expected that the output for the next year will be in the neighborhood of 1,000 vehicles.

Federal's Building Plans—The Federal Motors Company, Indianapolis, Ind., is preparing to erect a large plant in Indianapolis, the plans having been received. The plant will consist of a one-story building several hundred feet long, to cost $150,000, exclusive of machinery. The construction will be of brick and steel and of the saw-tooth type.

Denies Failure—The temporary shutting down of the Bowling Green Motor Car Company, Bowling Green, O., for the taking of an accurate inventory, gave rise to the rumor that the company has closed permanently. This is denied by the management, which declares that even when the inventory was being taken an emergency force was at work rushing out a car load of trucks for shipment to western concerns. The full force will start to work again in the near future.

Business is so good at the factory of the Baker Motor Vehicle Company, Cleveland, O., that some of the work of drilling and cleaning frames is done outdoors


First Locomobile truck built after the installation of the new special machinery and tools in the truck plant of the company at Bridgeport, Conn.

FIRST Locomobile Truck—The Locomobile Company of America, Bridgeport, Conn., recently sold a truck to John F. Stevens. This truck was the first of standard construction, that is to say, the first to be built after the special machinery and tools had been installed in the new truck shop at the works of the Locomobile company. The above illustration shows the truck ready for usage.

Enforcing Street Regulations—The Chief of Police, Montreal, Can., has received instructions from the Mayor to enforce new regulations regarding street traffic.

Winton in Stage Service—A sixteen passenger Winton has just been put in stage service over the Olympia-Chehalis-Tenino route in the state of Washington, a distance of 26 miles each day.

Jones Heads Ford—A. W. Jones has taken charge of the Houston, Tex., branch of the Ford Motor Car Company as manager. He was formerly assistant manager of the Ford branch at Seattle, Wash.

Woodruff with Packard—C. H. Woodruff has become publicity manager of the Buick Motor Company, Flint, Mich., he formerly being connected with the Packard Motor Car Company, Detroit, Mich., in a similar capacity.

Express Uses Trucks—Twelve motor trucks are to be put in service in New Orleans, La., by the Wells-Fargo Express Company within the next year, according to advises from the general offices to the local agent.

Evans Resigns from Lozier—J. M. Evans has resigned his position as advertising manager of the Lozier Motor Car Company, which position he held for a year. In the future, the Lozier advertising will be handled by an advertising agency.

Minneapolis Show Plans—Construction of the Armory annex for the February automobile show in Minneapolis, Minn., is proceeding so rapidly that the management of the show is assured the building will be ready complete for the exhibition.

Chesborox Business Sold—The Chesborox estate at the corner of Main and Windham streets, Willimantic, Conn., has been conveyed to Fred D. and William P. Jordan, and they acquire with it the automobile business of the E. P. Chesborox Company.

Canadian Company's Contract—It is announced by the Legare Gadbois Automobile Company, Ltd., Montreal, Can., that they have contracted with the Keeton Motors, Ltd., of Brantford, Ont., for the largest number of cars ever contracted for by a distributing firm in Canada.

Humphrey with Oakland—S. H. Humphrey, who was formerly connected with the Peerless Motor Car Company, has taken the position of factory manager of the Oakland Motor Car Company, Pontiac, Mich., to fill the vacancy occasioned by the accidental death of T. W. Wilson on September 15.

Detroit U. S. Motors Moves—The United Motors Detroit Company has removed its headquarters temporarily from Woodward and Charlotte avenues, Detroit, Mich., to the Brush plant, where service will be provided owners of Maxwell, Columbia, Courier, Brush and Stoddard-Dayton cars.

Austin with Mais—L. A. Austin, who has been the sales manager of the Western Motor Company and its successor, Rutenber Motor Company, Marion, Ind., for some years past, has resigned to become the sales manager of the Mais Motor Truck Company of Indianapolis, Ind. Mr. Austin will enter on his new duties November 1, 1912.

Timken Sales Conference—The quarterly sales conference of the Timken Roller Bearing Company and the Timken-Detroit Axle Company was held at Canton, O., October 15. The following Timken men attended: W. R. and H. H. Timken, Heman Ely, E. W. Lewis, P. W. Hood, P. W. Doyle, E. B. Lausier, H. J. Porter, C. E. Gordon and E. A. Walton.

No Duty Charged—It is expected that the new ruling by the United States credit department relating to automobilists crossing the Mexico and Canadian borders, the effect of which is that there shall be no duty charged on the cars, the only requirement being that the machines must be inspected, will result in a great increase in this class of travel into Mexico. The new ruling fixes 6 months as the time limit set on this free return of the cars into the United States.

Columbus Arranging Show—The Columbus Automobile Club, Columbus, O., is arranging to give an automobile show some time during the winter. To that end a committee consisting of Herbert A. Mason, Nelson J. Ruggles, Lewis M. Brown, Ira P. Madden, M. J. Hanly, Charles C. Janes and W. E. M. Ranchous is making preliminary arrangements. The place will be decided soon and the time fixed. It is believed the show will be soon after the holidays.

Garages' Good Outlook—One of the straws indicating to the wholesale automobile dealers and the branch managers that the outlook for automobile sales is good in the Northwest is the heavy contracting for new garages in Northwestern states. Weekly reports from architects, contractors and building exchanges show that the activity is heavy, and that in all the smaller cities not supplied with good central garages buildings are being remodeled for automobile purposes.

Steel Bodies Growing—If the plans which are now under way culminate, a $200,000 automobile body building concern will be located in Detroit, Mich. H. D. W. Mackaye, secretary to the president of the Keeton Motor Company, is negotiating with certain interests in the East regarding the contemplated venture. He stated recently that the eastern capital was willing to go ahead with it, the matter at present resting entirely with himself. The idea is to manufacture all-steel stamped bodies.

St. Louis Formulating Road Laws—Good roads enthusiasts from all parts of Missouri met at the headquarters of the Automobile Club of St. Louis, Mo., recently to formulate plans crystalizing the good roads enthusiasm which has been aroused, into some definite action. It was decided to call a mass meeting to be held in Jefferson City, on November 13, for the purpose of revising the road laws and to formulate effective road regulations which will be the means of giving Missouri the best roads of any state in the Union.

Columbus Plans Speedway—A special committee of the Columbus, O., Automobile Club is canvassing the situation as to the building of a motor speedway in Columbus. The committee consists of N. J. Ruggles, chairman, Lewis M. Brown and Dr. J. W. Means. To finance the undertaking a stock company will be formed and stock will be sold to motor enthusiasts in Columbus and central Ohio. It is proposed to have a speedway of either 1.5 mile or 2.5 miles. The committee will make a preliminary report soon.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Abie, Nebr	Reo	Maseck Bros.
Albion, Nebr	Reo	Point & Allen.
Ainsworth, Nebr	Reo	M. L. Smith.
Amherst, Nebr	Studebaker	G. Christofferson.
Arapahoe, Nebr	Studebaker	A. Benjamin.
Arlington, Nebr	Studebaker	J. C. Blackburn.
Blair, Nebr	Studebaker	Warrick Auto. Co.
Buffalo, N. Y	Apperson	Barrett M. C. Co.
Callaway, Nebr	Studebaker	Corothers & Sherrel.
Chicago, Ill	R-C-H	Barry Garage.
Columbus, O	Cole	Franklin Cycle & Supply Co.
Columbus, O	Jackson	Adamson Auto Co.
Columbus, O	Lion	Brewer Auto Sales Co.
Columbus, Nebr	Studebaker	Held Auto. Co.
Columbus, O	Winton	E. J. Thornton.
Corning, N. Y	R-C-H	M. Wolcott Gar.
Crete, Nebr	Cartercar	Vaclov Sebek.
Des Moines, Ia	Moon	Van Vliet-Bradt Motors Co.
Dewitt, Nebr	Cartercar	O. W. Wiebel.
Dorchester, Nebr	Cartercar	J. Freehoff.
Edgar, Nebr	Studebaker	Edgar Auto Co.
Erwin, Ia	Reo	Southall & Hanson.
Fairbury, Nebr	Studebaker	Friessed Imp. Co.
Farragut, Ia	Apperson	Palm & Cutler.
Fort Gaines, Ga	R-C-H	W. W. Calhoun.
Grand Island, Nebr	Reo	Jarvis & Boyder.
Green Bay, Wis	Mitchell	Wash. Garage.
Green Bay, Wis	Overland	Wash. Garage.
Haverhill, Mass	Rambler	Haverhill M. C. Co.
Henderson, Nebr	Studebaker	D. Goertzen.
Herman, Nebr	Apperson	Olson Auto. Co.
Herman, Nebr	Studebaker	Schrenk & McDonald.
Ithaca, Nebr	Studebaker	J. Knapp.
Jonesville, Mich	R-C-H	Grant S. Emery.
Kalamazoo, Mich	R-C-H	Newton Root.
Kiron, Ia	Lexington	A. Kastner.
Lima, O	Oakland	Oakland Co.
Louisville, Ky	Premier	Clark M. C. Co.
Massbach, Ill	R-C-H	R. Dittmar.
Maxwell, Nebr	Reo	O. P. Madsen.
McCool, Nebr	Cartercar	Hebreck & Lincoln.
Milwaukee, Wis	Crawford	F. O. Morse.
Minneapolis, Minn	Havers	A. F. Chase & Co.
Montreal, Can	Cartercar	E. Rivet.
Montreal, Can	Cole	Royal Auto. Co.
Neligh, Nebr	Reo	C. M. Cassidy.
Newberry, Mich	R-C-H	Perry & Westin.
New Orleans, La	Oakland	W. C. Gray.
Oakland, Nebr	Studebaker	C. E. Anderson.
Palmerton, Pa	R-C-H	K. W. Detwiller.
Providence, R. I	Oldsmobile	Oldsmobile Co. of R. I.
Rockwood, Pa	R-C-H	P. E. Weimer.
St. Louis, Mo	Cole	Bagnell & Co.
Seattle, Wash	Flanders	Oregon M. Dis. Co.
Seattle, Wash	Rambler	Rambler M. C. Co.
Sidney, Nebr	Reo	Livona & Son.
So. Omaha, Nebr	Lexington	Holmes Atkins Co.
Stratton, Colo	R-C-H	A. S. Baker & Son.
Summer, Nebr	Maxwell	D. J. Yost.
Urbana, O	Mitchell	Dallas McCrery, Jr.
Utica, Nebr	Cartercar	P. S. Boone.
Valentine, Nebr	Studebaker	G. S. Brown.
Wenango, Nebr	Studebaker	C. M. Weyerds
Walnut, Ia	Apperson	Cole & Hanson
Waterloo, Pa	R-C-H	The Corn Belt Auto Co.
Wilber, Neb	Maxwell	Kohout & Greer
Williamburg, Pa	R-C-H	V. H. Hancuff & E. Shelly
Winnipeg, Can	Cadillac	C. McLaughlin
York, Neb	Cartercar	Mulick Mfg. Co.
Yutan, Neb	Studebaker	J. W. Schlesinger
Zanesville, O	Cadillac	Valley M. Co.

Louisville Purchases Truck—The Louisville, Ky., Board of Public Works will purchase a 5-ton truck in the near future. This vehicle is to be used for the hauling of broken rock and bricks to be used in the making of streets.

With Grinnell Electric—O. R. Hardwell has shifted from the position of advertising manager of the Paige-Detroit Motor Car Company to one of similar duties with the Grinnell Electric Car Company, Detroit, Mich.

Newby Traveling Representative—A position as special traveling representative, with territory in eastern Indiana, with the A. and M. Sales and Service Company, Indianapolis, Ind., has been taken by J. A. Newby, formerly manager of the United Motor Newcastle Company, at Newcastle, Ind.

License Tags Out Early—The first issue of Pennsylvania automobile license tags for 1913 will be made by the automobile division of the state highway department in December, almost two weeks ahead of the time of issue in the past, and it is expected to break all records for the first issue.

South Bend Forbids Speed—The Board of Public Safety of South Bend, Ind., has adopted resolutions forbidding the drivers of motor vehicles of the police and fire departments from driving their machines at a rate of speed greater than 30 miles an hour. The order of the board goes into effect immediately.

First Adams Fire Truck—The first automobile fire truck ever built by the Adams Brothers & Company, of Findlay, O., is just now being completed in the company's shops. It will be shipped within the next few days to Kittaning, Pa. The truck is of the one-and-a-half-ton model and has a 35-horsepower motor.

Employ Prison Labor—The Kent County Good Roads commission is planning to employ prison labor on the construction of roads in Grand Rapids, Mich. The plan successfully has been tried in Kalamazoo County. The commission is busy on the new roads for which the county recently bonded for $600,000.

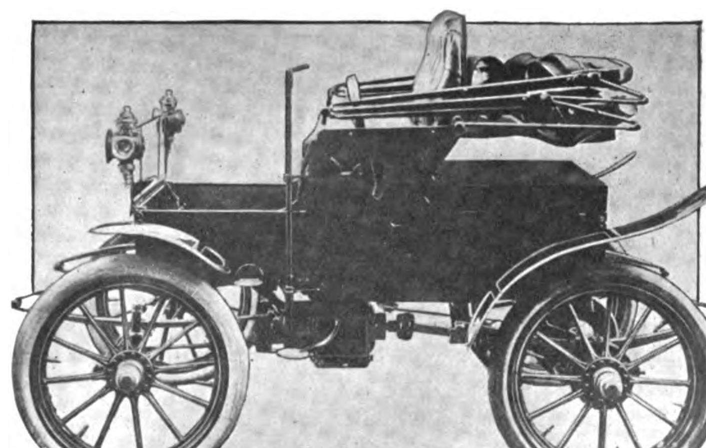
Abandon New By-Law—In consequence of an opinion from the city attorney, Montreal, Ont., that the new civic by-law prohibiting the use of steam driven traction engines in Montreal streets is ultra vires, Mayor Lavalle has given instructions to Chief Campeau to suspend further actions against those not complying with the said regulation.

Automobile Service Established—A daily automobile service has been established between Paducah and Roaring Springs, Tex., a distance of 40 miles. The Quanah, Acme & Pacific Railroad is now being extended from this place to Roaring Springs and the automobile service will be operated between the two points until the railroad is finished.

Motorists Give Talks—The Boston Y. M. C. A. directors have asked the Boston dealers to supply its motor school with men who can give talks to the students on motor construction during the winter, and the first talk was furnished by Charles Howell, of the J. H. MacAlman Company, agent for the Stearns and Columbia cars, who described the Knight motor.

Van Duesen Promoted—W. H. Van Duesen, assistant sales manager of the Abbott Motor Company, Detroit, Mich., and formerly connected with the Chalmers Motor Company and the E. R. Thomas Company, has tendered his resignation. O. F. Schreiber has been promoted to fill the vacancy in the Abbott sales organization. He was connected with the Chalmers Company at one time. M. L. Buck succeeds to Mr. Schreiber's former position.

Racine Wants Fire Engine—The city of Racine, Wis., which is in the market for a motor fire engine, is this week conducting a series of thorough tests, on the basis of which a purchase will be made. Among the companies which have sent models of their apparatus to Racine are the Nott Fire Engine Company, of Minneapolis, and the Ahrens-Fox Fire Engine Co., of Cincinnati, O. W. S. Goodland, mayor, and a party of officials, recently made a tour of the east to determine the efficiency of various types of motor-propelled fire-fighting equipment.



Shaft-driven electric runabout built by the Woods Motor Vehicle Company in 1904 which the company claims is the earliest model shaft-drive electric now in operation. The makers believe that it is the first vehicle of this type ever manufactured and sold in the United States. It took part in the parade of old models held by the Chicago Automobile Trade Association recently, running 12 miles and carrying two passengers

Martin tractor manufactured by Knox Automobile Company, Springfield, Mass., attached to a 15-ton capacity ash wagon, the combination being 12 feet high and 26 feet long

Buffalo Company Moves—The Buffalo, N. Y., Hudson Sales Company has moved into temporary quarters at 1133 Main street, opposite Summer street.

Kempton with Remy—P. E. Kempton, San Francisco, Cal., branch manager for the Splitdorf interests, has resigned to become San Francisco branch manager for the Remy Electric Company.

Building Branch House—The Fisk Rubber Company, of Chicopee Falls, Mass., is building a new branch house and service station adjoining its present quarters at 456 Milwaukee street, Milwaukee, Wis.

Orders Pathfinder Ambulances—An order for two Pathfinder ambulances has been placed with the Motor Car Manufacturing Company by the Board of Health and Charities of Indianapolis, Ind., the contract price being $5,500.

Y. M. C. A. Automobile Course—Arrangements have been made by which the South Bend, Ind., Young Men's Christian Association educational department will conduct an automobile course of 35 lessons, covering a period of 12 weeks.

Hold Lancaster Fair—Automobile dealers in Lancaster and Columbus, O., took advantage of the large crowds which invariably attend the Fairfield County fair and had large exhibits of automobiles at the fair, which was held the week ending October 5.

Bradfield Newspaper Representative—C. W. Sedwick, manager of the Indianapolis, Ind., Motor Speedway, has recently announced the appointment of H. C. Bradfield as traveling newspaper representative and chairman of the press committee of the speedway.

Warren's Factory Branch—The Warren Motor Company has announced the opening of a factory branch in Des Moines, Ia. R. E. Gresham will be manager of the branch. The service department will be featured and two experts from the Warren factory will be sent to Des Moines.

Sternberg Service Branch in N. Y.—The Sternberg Manufacturing Company, of Milwaukee, Wis., manufacturing the Sternberg commercial car, has established a direct factory and service branch at 285 East 137th street, New York. The New York branch will be known as the Sternberg Motor Truck Company.

Smith Succeeds Huylar—E. B. Huylar has resigned as manager of the Milwaukee, Wis., branch of the Diamond Rubber Company, 132 Oneida street, and is succeeded by R. W. Smith, who comes from Indianapolis, Ind. A. G. Laugher is traveling representative in Wisconsin, with headquarters at the Milwaukee branch.

Inspecting Repaired Road—State Highway Commissioner Marker has started on an inspection trip of the highways of Ohio which were improved during the present season. Commissioner Marker is using an automobile for that purpose, finding it quite a time saver over the use of railroads. It will require traveling 3,500 miles for a complete inspection trip.

Wilmington Club Elects—The Delaware Automobile Association, Wilmington, Del., held its annual meeting recently and elected the following officers for a year: President, T. Allen Hilles; first vice-president, Joseph Bancroft; second vice-president, A. B. Richardson; third vice-president, A. Greenbaum; secretary, Charles G. Guyer; treasurer, William Staniar.

Restrict Paris Operations—Announcement is made that the English Daimler Company will restrict its operations in Paris, France, at the end of this month. The central showrooms are to be closed and the headquarters of the English company confined to the repair departments in the suburbs. The retail sales department, in the hands of the various agents, remain unaffected.

In Financial Difficulties—An order in bankruptcy has just been filed by Leonce Girardot, for one time manager of the English Daimler Company in Paris, France, and earlier a member of the C. G. V. firm, now the Charron Company. For the past 12 months M. Girardot has been agent for Darracq valveless motors and the Panhard-Levassor Company, with a store in the Champs-Elysees.

Proposes Odd Ordinance—An ordinance is being prepared by Councilman Bohnert, of the Columbus, O., city council, which provides that the car of people charged with violating the speed law be locked up for a certain length of time as well as the chauffeur be jailed. Mr. Bohnert is of the opinion that locking the car up for a few hours or days in extreme cases will solve the problem of speeding.

Improves 4,700 Miles of Roads—Since the Pennsylvania state highway department took over 8,000 miles of highways in the state June 1, the department has improved 4,700 miles of roads. This total includes those that have been rebuilt under the 79 contracts so far let under the Sproul act and those that have been repaired by the road superintendents, 47 of which have been named out of 50 the law calls for.

Acme in Difficulties—William Vincent, president of the Acme Motor Car Company, 22 Commercial street, Worcester, Mass., has placed an attachment on the company's property for $1,200. He alleges that the company is indebted to him that amount for services. This is the second attachment placed on the garage stock, the first one being put on by the Worcester Trust Company. The company is still doing business despite its legal tangles.

In Doubt About Tax—A committee of the Automobile Club of Maryland, Baltimore, Md., was appointed to confer with Mayor Preston and the judges of the Appeal Tax Court to learn whether the proposed municipal tax on motor cars would apply to pleasure vehicles operating on the streets of Baltimore and whether the Mayor and City Council would have the power to impose such a tax without first being authorized by the Legislature.

Government Losing Money—Service Director Kinnear, of Columbus, O., is authority for the statement that the municipal government is losing money every day because of the few city automobiles used. He advocated the purchase of a larger number of cars in order to save the time of high-salaried employees. While it is said that some people laugh at the idea of the city buying automobiles, it is a plain business proposition and a matter of economy.

Automobile Incorporations

AUTOMOBILES AND PARTS

Austin, Tex.—The Oakland Motor Company of Jersey City; capital, $10,000; to engage in the automobile business.

Boston, Mass.—Ultra Motor Car Company; capital, $100,000; to deal in automobiles. Incorporators: R. H. Randall, Elisha A. Bagg, C. A. Parker.

Canal Dover, O.—S. Toomey Company; capital, $50,000; to manufacture and deal in automobiles. Incorporators: R. I. Toomey, T. Williams, J. S. Brister.

Chicago, Ill.—Guaranty Auto Company; capital, $50,000; to manufacture automobile parts. Incorporators: J. T. Shea, E. J. Crimski, C. B. Kittenhofer.

Columbus, O.—Columbus Auto Parts Company; capital, $25,000; to manufacture automobiles. Incorporators: R. E. Klages, C. J. Krag, C. K. Klages, J. D. Stoddart, W. D. McKinney

Columbus, O.—Kelly-Springfield Motor Truck Company; capital, $2,500,000; to manufacture motor trucks. Incorporators: E. S. Kelly, J. S. Crowell.

Des Moines, Ia.—Van Vliet-Bradt Motors Company; capital, $10,000; to deal in automobiles. Incorporators: W. E. Moyer, W. J. Bradt, C. G. Van Vliet.

Detroit, Mich.—Oostdyke Gear Shifting Company; capital, $100,000; to manufacture a gear shifting device which does away with shifting levers on the car.

Haverhill, Mass.—Rambler Motor Car Company; capital, $10,000; to sell automobiles. Incorporators: G. A. Burnham, J. P. Molloy, C. S. Goodwin, F. P. Kimball.

Holden, Mass.—J. W. McIntosh Company; to engage in the automobile business. Incorporators: J. W. McIntosh, B. M. Sickels, H. Sickels.

Houston, Tex.—Cole Motor Car Company; capital, $12,500; to deal in automobiles. Incorporators: J. J. Settgast, Fr., A. J. Binz, T. H. Buelow, D. F. Burks.

Louisville, Ky.—Southern Motors Company; capital, $100,000; to deal in motor cars. Incorporators: A. T. Hert, R. A. Whitehead, R. L. McCormick.

Waite Sales Manager—G. S. Waite has taken the position of sales manager of the W. A. Paterson Company, Flint, Mich.

Muzzy Garage Manager—W. W. Muzzy is the new manager of the High-Seventh Garage, located at High street and Seventh avenue, Columbus, O.

Lawrence a Ford Manager—The Ford Motor Company of Canada, Walkerville, Ont., announces the engagement of A. N. Lawrence as sales manager.

Establish Tire Branch—The United States Tire Company, Washington, D. C., will establish a branch at 1303 H street, N. W., about November 1, with E. H. Johansen as manager.

Morrison Gets Promotion—Harry S. Morrison, formerly a salesman for the Whitney-Barney Company, of Boston, Mass., has been promoted to be general sales manager of the company.

Butler District Manager—W. T. Butler has been appointed by the Stewart Motor Corporation, Buffalo, N. Y., manager for the district comprising northern Pennsylvania and New York State.

Lights on Standing Cars—Hereafter all automobiles left standing in the streets at night throughout Connecticut must have lights lit, the attorney-general having rendered an opinion to that effect.

Club Rewards Twenty—The Louisville, Ky., Automobile Club has paid a total of twenty rewards this summer to persons who assisted in the conviction of offenders who threw glass into the streets.

Car for Inspector—In order to facilitate the enforcement of the sanitary regulations Shreveport, La., has purchased an automobile which will carry an officer throughout the city each day on inspection trips.

Depasse Takes R. C. H. Agency—After being chief selling agent for the Ford Company for about five years, Henri Depasse has taken up the complete selling agency for the R. C. H. car in Paris, France.

Open Washington Agency—The Washington, D. C., branch of the Foss-Hughes Company, agent for the Pierce-Arrow, was opened recently at 1220 Connecticut avenue, N. W., with F. N. Prendergast as manager.

Clement Production Manager—C. M. Clement has become production manager of the Metal Products Company, Detroit, Mich., having resigned as factory manager of the Weston-Mott Company, of Flint, Mich.

To Hold Sociability—The Louisville, Ky., Automobile Club will conduct a sociability run on November 9. The intention is to make a trip to Lexington. Awards will be made to the car making the run nearest to a secret time.

Buy U. S. Motors Branch—Frederick J. Linz and L. W. Sanborn, two of the pioneer automobile men of San Francisco, Cal., have purchased the entire assets and capital stock of the United States Motor San Francisco Company.

In this building in Detroit, Mich., the Studebaker Corporation has organized a model garage, salesroom and repair shop which is used for the purpose of educating its dealers and representatives all over the country

Packard Service Building—The new building being constructed by the Packard Motor Car Company in Buffalo, N. Y., will provide for a salesroom, general offices and a service station with facilities for inspection and overhauling.

Packard Moves in Paris—Business having increased in favorable proportions, R. N. Goode, European manager of the Packard Motor Car Company, Paris, France, has moved from Boulevard Pereire to a handsome store in the Rue Newton.

Dennett Handles Trucks—George Dennett has been appointed manager of the truck department of the newly formed Pope-Hartford agency in Boston, Mass. He was with the Dodge Company handling trucks and fire wagons for some years.

Sociability to York—The Lancaster Motor Club, Lancaster, Pa., will hold a sociability run to York, Pa., on Saturday, October 26, and will be the guests of the York Motor Club at the races being held there that day and at the York club's new home along the Wrightsville pike.

Association In Maine—The Somerset, Me., Automobile Association, the first one formed in that county, has just been organized in the Pine Tree state, making its headquarters at Skowhegan. It will work in conjunction with the Maine State Association for the benefit of good roads.

New Dallas Motordrome—The new $40,000 motordrome at Dallas, Tex., was officially opened recently. Racing programs are being given each night. This motordrome is said to be the largest in the world. The track is an 18-foot saucer, .25 mile in length. Seats are provided for 10,000 people.

Takes Three Cars Per Week—The D. F. Poyer Company, manufacturing the Menominee commercial car, Menominee, Mich., has contracted with the Stoddard-Dayton Automobile Company, of Portland, Ore., to be Pacific coast distributor. The Portland company takes three cars per week on a 1 year's contract.

Chauffeurs Fight Speedometers—A proposal on the part of taxicab owners in New Orleans, La., to equip their cars with recording speedometers has met with decided opposition on the part of the chauffeurs. No reason is given for the stand taken, but it is thought an attempt to install the device would result in a strike.

Good Roads Day—The germ of good highways is penetrating all over America, the latest example being up in New Brunswick when the motorists in that region got together and observed October 12 as Good Roads Day. Members of motor clubs went out over the most important roads there putting up signs and making repairs where a little work of that kind was needed.

Preaches in Automobile—His own chauffeur, and in cases of necessity his own organist, Archdeacon J. H. Dodshon, of the southern diocese of Ohio, Episcopal church, has been performing his duties through the mining region of southern Ohio with his automobile, equipped with a portable organ. The novelty of a large touring car bearing an organ entering a little mining village that never boasted a church has been productive of much good and the Columbus man's coming always draws an interested audience.

Automobile Incorporations

GARAGES AND ACCESSORIES

ACTON, MASS.—Davis-King Company; capital, $20,000; to deal in automobile accessories. Incorporators: A. W. Davis, H. E. Mead, B. A. King.

AMHERST, MASS.—H. E. Page; capital, $12,000; to conduct a garage business. Incorporator: Dr. Henry E. Page.

BOSTON, MASS.—Walpole Tire and Rubber Company; capital, $4,500,000; to manufacture automobile tires. Incorporators: E. W. Tinkham, A. T. Baldwin, F. J. Gleason, E. C. Green, E. W. Furbush, L. O. Duclos, J. C. Blanchard, Jr.

CHICAGO, ILL.—Triangle Tire Company; capital, $50,000; to manufacture automobile accessories. Incorporators: L. A. Cohen, C. Aaron, F. M. Stahl.

COLUMBUS, O.—J. C. Sherwood Rubber Company; to handle the tire business. Incorporators: J. C. Sherwood, R. C. Crippen.

CLEVELAND, O.—The Ideal Tool & Specialty Company; capital, $15,000; to manufacture automobile accessories. Incorporators: J. C. McLoland, G. E. Penty, G. P. Moulton, J. A. Hocker, C. Fuller.

DAYTON, O.—McVey Manufacturing Company; capital, $60,000; to manufacture automobile accessories: Incorporators: J. L. McVey, C. Fraine, A. N. Burkhart, M. Galloway. R. J. McCar.

DETROIT, MICH.—The Wolverine Castings Company; capital, $100,000; to manufacture motor castings.

PORTLAND, ORE.—Motor Truck Owners' Protective Association; capital, none; to secure legislation favorable to their interest and fight unfavorable legislation. Incorporators: K. Poorman, W. M. Miller, C. L. Hamawalt, J. F. Guerin, P. W. Yett, F. P. Field, W. E. Moon, A. F. Roberts, J. J. Bryan, W. Eden, W. C. Smith, O. J. Cornell, H. F. Moon.

TACOMA, WASH.—Automobile Equipment Company; capital, $5,000; to deal in accessories.

WINNIPEG, CAN.—Canadian Motor Company, limited; capital, $500,000; to carry on a garage business. Incorporators: E. S. Sherwood.

CHANGES OF NAME AND CAPITAL

BOSTON, MASS.—American Marine Equipment Company, change of name to American Motor Equipment Company.

CLEVELAND, O.—The Auto Owners Company, change of name to the Sixth City Tire Repair Company.

Hartford's New Bumper

Comprising Four Highly Elastic Springs in Frictional Contact and Attached To Chassis Without Bolts

As a trade running-mate to its Truffault-Hartford shock-absorber, the Hartford Suspension Company, of Jersey City, N. J., has decided to add to its line a kindred article, this being a bumper. The latter not only combines the friction idea with the application of springs, but a new element designed to warrant great strength is introduced in the use of concrete as a filler for the hollow steel bumper bar used in the equipment.

The simple, fundamental feature of the Hartford bumper lies in the use of four springs which are in frictional engagement with each other and the ends of which bear directly upon the chassis frame, being attached to the same without the use of bolts which pierce the members and so arranged that none but tensile and compressive strains are set up in the material, thereby avoiding all tendency to shearing.

The four-spring idea is carried out in all types of the bumper, of which there are three; these are designed for use on overslung, underslung and Ford cars. The bumpers of these types vary in the shape of the springs and the consequent manner of securing the same to the chassis, while the concrete-filled bumper bar is common to all models. Reference to Figs. 5, 6 and 7 shows the difference in spring design and attachment of the three types, Fig. 7 showing the principal representative of the line, which is constructed for use on ordinary type of frame, the overslung, so to speak.

Construction of Spring Bumper

In Figs. 3 and 4 the details of construction of this type of bumper are illustrated, showing the four bent leaf-springs S1, S2, S3 and S4, which when the spring is assembled are held together by a bolt B and its nut N. In the assembly the bolt passes through the hole H of the arched cap or cover C which is so dimensioned that the flat end of the longest, or clamp, spring S4 projects slightly under the plane of the lower edge of the cover. As Fig. 4 shows, S4 is so shaped that if its shorter end contacts with S3, its longer or clamp-shaped end diverges from S3. The purpose of this feature of the design will be seen at once. The spring ends arranged above the clamped end of S4 are held together by means of U-bolt U which seats in a yoke Y. A central stud C1 formed in the lower side of the yoke fits into a hole bored in the spring S1 near its end. The lower cross-piece connecting the ends of the U-bolt bears in the inverted angle formed in the clamped end of S4. As the nuts on the end of U are drawn tight, as in Fig. 3, S4 is pressed against S3 and its natural shape keeping it under tension counteracts the compression caused by the tightening of the bolts. While S4 is held tightly in this way and the springs are so brought together that they cannot be moved relatively to each other except by overcoming friction between them, the clamped end of S4 is drawn tightly around the bumper bar which fits into it. To secure the spring to the chassis, in the manner shown in Fig. 7, the U-bolt or clamp U1 is used which fits into a slot S5 of the cover C. When the nuts on the ends of U1 are tightened to press the cross-piece above them against the chassis members, the end P and the point Q of the spring S4 bear down fast upon chassis, and the more they are compressed the more do the central portions of the four springs, shown along the line C2, press against the top of the arched cover C. This makes an almost rigid system of the shorter ends of the four springs, while the longer ends are capable of considerable inward bending—toward their middle angle—accompanied by friction which absorbs a fair part of the impact of a shock taken by the bar.

When such a one takes place a double action is set up by the bumper: the impact transmitted from the bar to the two spring assemblies is partly absorbed by bending the longer spring ends toward the shorter and partly by being transmitted to the strong chassis members from the arched, covered section of the spring system. The slightest impact on the bumper causes the end of S4 to grip the surface of the chassis, the spring being made of steel harder than the pressed metal of the frame. Continued and increased shock compresses the short spring ends toward their arched centers, whereby a straight upward pull is set up in the U-bolt U1. While the grip of S4 on the frame prevents the springs from slipping, it also provides a fulcrum for the longer ends to bend about, and as they do this, the friction between their surfaces as well as the change of their shape absorbs the impact. The diameter of the holes through which the bolt B passes is slightly larger than that of the bolt, so that a slight displacement of the springs relative to each other is allowed for.

How the Springs Are Shaped

As the shape of the springs is obviously of great importance, it may not be without interest to consider the process through which they are formed. The springs are made of flat plates, are cut in various lengths and each is bored with a hole near each end; so that when the ends which later form the short ones are lined up, the holes punched near them are in alignment and the springs may be held together by a pin. The holes near the other ends do not fall upon each other, but after the first-mentioned ends are pinned together, the four flat springs are heated to redness and bent, in a special tool, to form the middle angle, whereby the holes which are to accommodate the bolt B are brought above one another. The pin is then removed and the short ends are bent to the degree shown in the illustrations, as well as the long ends of S4 which is given its clamped shape. After shaping the springs are tempered and assembled with the cover, bolts and nuts, which are made of cold-rolled machine steel; this work is followed by dipping the assembled sets into black japan, which is then baked on.

The underslung type of bumper equipment differs from the first-described type only in the shape of the springs which grip

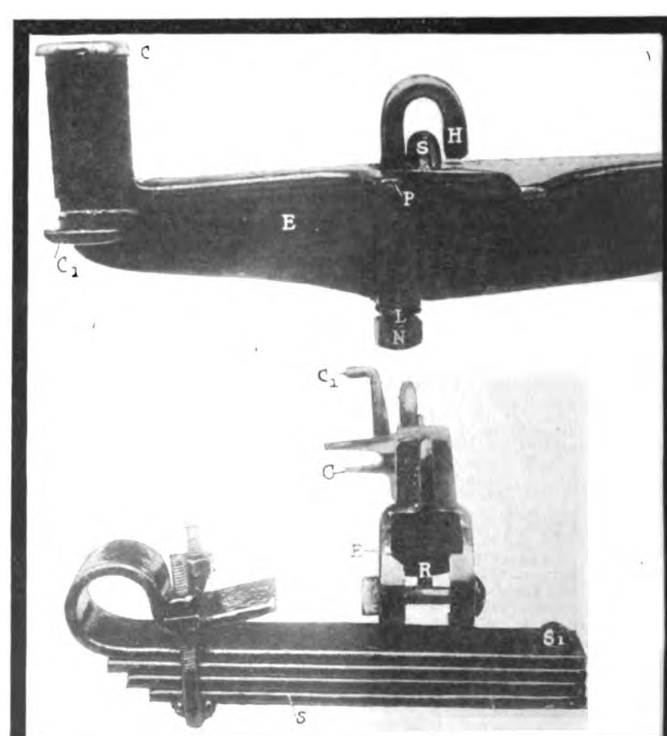


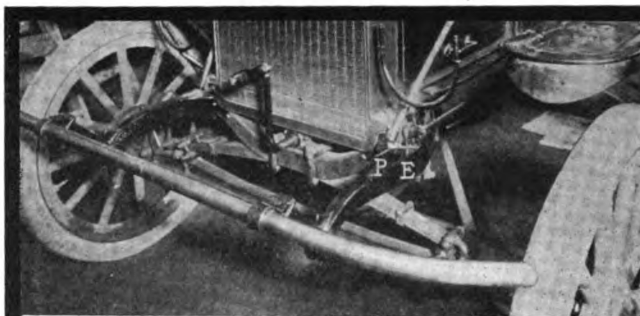
Fig. 1—Details of extension for attaching bumper to Fords
Fig. 2—Springs and extension of Ford type of spring bumper

the under surface of the chassis frame members. As a result of the different requirements the springs in this design are shaped as a flat arch. instead of with a middle, angular bend. The spring ends are formed substantially in the same manner as in the overslung equipment, and the action is the same in both models. The springs when receiving a shock press the lower end of the clamp spring against the chassis member, whereby a fulcrum is provided as before. Instead of bending around a middle angle, however, the springs are pressed around the front end of the chassis member. The springs are tempered to withstand a very heavy shock without distortion; but if the latter is occasioned in consequence of an exceptionally severe collision, the springs may be easily restored to their original shape and strength. A set of springs used with a bumper of a 1,250-pound car which ran into a tree when traveling at 15 miles an hour, showed a comparatively slight distortion, which was the only effect of the accident, neither car nor its passengers or equipment being hurt. As for the concrete-filled bumper bar, it is claimed to be capable of withstanding any practical shock.

Description of the Ford Type

Coming to the third type of bumper, which serves for Ford cars, the manner of meeting the special requirements of such service is shown in Fig. 5. illustrating the method of attaching the springs by extension members to the side members of the frame, while the details of the construction are seen in Figs. 1 and 2. The extension members E. Fig. 5. are used due to the design of the Ford frame which only extends as far in front as the radiator; by this expedient the bumper bar is placed far enough ahead of the radiator and lamps to protect them, at the same time leaving ample clearance for cranking. The general shape of the extension member E, shown in Fig. 5. makes it desirable to use four straight springs, instead of bent ones. with the Ford design, and to make this possible an ingenious method of securing the springs to the extensions has been evolved.

Figs. 1 and 2 illustrate the same. The latter illustration shows the flat springs, one of which is clamped at its end to take in the bumper bar in the same fashion as the other types of the equipment. The other end of the clamped spring is shaped with a projection having the form of a truncated cone; **this end of the spring set fits into the open end E_1 of the extension E.** In Fig. 2 both extension and springs are shown with the lower side turned up. When assembled on the car, however, the spring set is so inserted into the end E_1 of the extension that



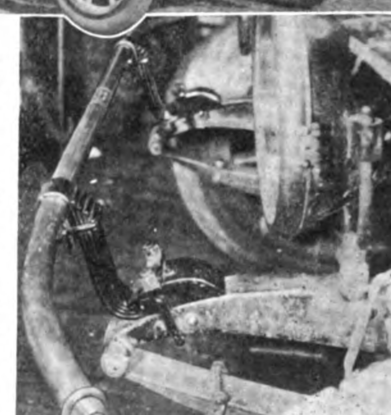


Fig. 5 — Hartford placer attached to Ford car, showing extension

Fig. 6 — Application of Hartford bumper to an underslung automobile

Fig. 7—Ordinary type of Hartford bumper in place upon a car

Fig. 3—Springs which fasten to chassis and hold the bar
Fig. 4—Details of bumper springs, arched cover and bolts

the lower surface S of the shortest spring bears against the lug R formed on the extension, which prevents the springs from bending back too far upon being exposed to an impact. Lateral tightness of the spring set in the extension is insured by the expedient of drawing the nut M a good way into its bolt which passes through the two jaws of the end E_1. Displacement in the direction opposite to that of a head-on shock is averted by the fitting of the stud S_1 into a suitably formed depression in E_1. The securing of the extensions to the cars is also obtained in an original fashion and without the use of bolts through the chassis frame. A grip on the frame is insured by the end of E opposite E_1, which end is formed with channel jaws C, C_1, C gripping the upper and C_1 the lower flange of the chassis frame. In order to permit of the channeled end of the extension E gripping the chassis frame, the apron extending from the mudguard to the frame is punched with a suitable tool. This end, however, is not directly fixed to the frame, the point of attachment being at A, where the extension is fitted with a hook-bolt H adapted to be drawn tight against the stud S by a nut N and its lock-washer L. In installing the bumper the hook-bolt is placed over the bracket extending from the frame and supporting the lamps, so that when the ends E_1 are placed as far outward as possible the extension E is fulcrumed by the hook-bolt and the channeled end is pressed against the chassis frame. The part P formed on E lies against the front of the radiator support and helps to keep the extension permanently in alignment with the chassis.

Overslung and underslung types are made in three sizes, while the Ford equipment come in one size only. Black japan finish is standard for all parts except the bumper bar, which is optional in brass or nickel.

Mertz Spring Release; Standard Tire-Tube Ball Check; Edelmann Hose Connection; Marvel Casing and Tube Vulcanizer; Exhaust-Operated Vacuum Cleaner; Westinghouse Portable Electric Vulcanizer

Mertz Valve Spring Release

A PRACTICAL, neat valve spring release, made by H. B. Mertz, 1408 Rutherford avenue, Pittsburgh, Pa., is shown in Fig. 1. While the construction is evidently simple, the device is made strong enough to compress any automobile-valve spring. It consists of a vertical bar B to whose lower end an arm carrying the fork F is secured, while slidably arranged on it is the arm A; the end of the latter is formed as a nut N working on the worm W which is fitted with a handle H. The point of the worm W fits into the central depression of the valve head. In order to keep the fork centered on the valve stem, F is provided with an adjustable gauge G which, once set, always keeps the stem in central alignment with the axis of the fork. The operation of the device is very simple, consisting in removing the valve cover and applying the fork between the retaining washer R and the pin P which keeps it from coming off the stem. At the same time the end of the worm W is set into the depression of the valve head and if the handle H of the worm is turned clockwise the retaining washer and spring are pressed upward, permitting of driving the pin P out of the valve stem, so that the valve may be lifted out of its seat.

The arm A being slidable on B and capable of coming off its upper end, it is possible to use the spring release also where this would seem impossible due to the interference of the manifold with direct application of the device. In such cases, the arm A is simply slid off the upper end of the vertical bar; after this the bar is placed back of the manifold and A is put back on it. This makes the tool adaptable for practically any type of valve.

Potter Standard Tire Valve

Taking advantage of the field for improvement in tire valves, the Standard Engineering Works, Woonsocket, R. I., offers now a design which is claimed to be a step in the forward direction and which while keeping the air tightly locked in the tube permits of easy inflation without a continued expenditure of hard work in keeping the valve open. As Fig. 3 shows, the valve is of the ball check type, and it is claimed for this design that it allows of pumping up a 36 by 4.5-inch tire within 2 minutes with one hand. This end is obtained by the expedient of using an opening area about ten times that ordinarily present in tire valves, whereby not only the pump pressure on the valve ball is increased, but the total friction between the inflating air and the valve passage is considerably diminished. In connection with this valve, the company brings out an automatic valve connection, the Standard, Fig. 2. It is of an extremely neat design and worked out very nicely, its construction being such that the valve connection may be put in place in 2 seconds and removed in 1 second.

Marvel Roadside Vulcanizer

Tire upkeep proves such a large item to the average automobilist that one cannot too often attempt to impress upon him the desirability of owning and operating a vulcanizer, even if it only be a small one, so that he may at least handle his smaller tire repairs. Among the many products which have of late appeared in the market to fill this want, the Marvel, Fig. 5, is distinguished by its applicability to both casings and tubes. Furthermore, the vulcanizer is so small it may be easily carried along with the other tools, and its simple construction makes it ready for work at a moment's notice. In short, the device con-

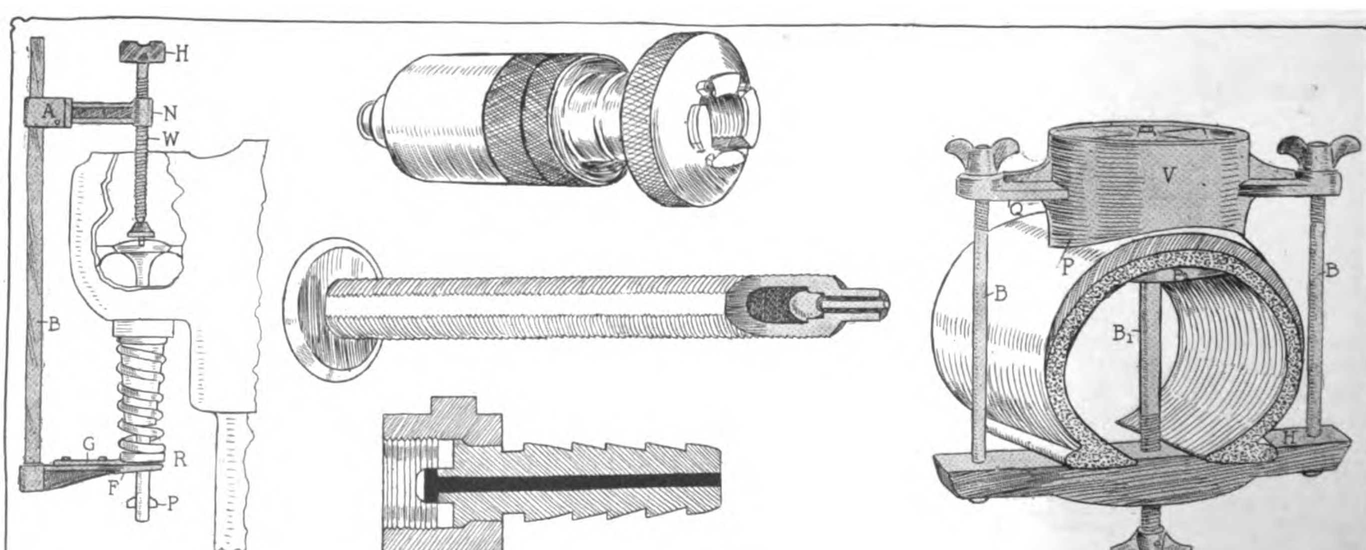


Fig. 1—Mertz spring release. Fig. 2—Potter tire valve connection. Fig. 3—Potter valve. Fig. 4—Edelmann pump connection. Fig. 5—Marvel vulcanizer

sists of two vulcanizing plates P and P1, the first of which is curved concavely and the second convexly. These plates are held in relation by the use of a holding plate H to which P is fixed by two bolts B, while the plate P1 is attached through the bolt B1. Bolts B are screw-threaded near their upper ends and work in threads in the plate Q which is integral with the vulcanizing heater V, while a thread on B1 works through plate H. The heater V is a small kettle into which gasoline is poured which when ignited supplies to plate P the heat necessary to cure the rubber applied to the tire being repaired. It stands to reason that the vulcanizer is just as easily applicable to tubes as to casings, as the curved surfaces of plates P and P1 do not interfere with the repairing of the tubes. This vulcanizer is made by the National Auto Specialty Manufacturing Company, Inc., Tama, Ia.

Edelmann Economy Pump Connection

E. Edelmann & Company, 229 West Illinois street, Chicago, have added another small accessory to their line, this being the Economy pump connection No. 45, Fig. 4. The latter is somewhat similar in design to the No. 46 connection, but it is a cheaper product, being made of but two parts, the nut taking in the pipe and hose carrier which is of serrated longitudinal section, as shown by the illustration. The connection is designed for .3125-inch hose and .25-inch pipe thread. This pump connection is being handled in the Metropolitan district by Asch & Company, 1777 Broadway, New York City, dealers in automobile accessories and specialties.

Auto Vacuum Cleaner

A vacuum cleaner for keeping the automobile free from dust without any hard work is an accessory which has many attractions, and realizing this situation the Auto Vacuum Cleaner Company, 253 West Twenty-third street, New York, has begun the construction of a suitable outfit, shown in Figs. 7 and 8. The suction, which represents the effective force in vacuum cleaning, is in this device obtained by utilizing the pressure of the exhaust gases of the engine, and efficient use is made of it through the application of a suction nozzle inserted in the line between the engine and the muffler, where the pressure in the waste gases is strongest. The manner of installation is clearly seen in Fig. 7, and Fig. 8 illustrates the details of the construction. The passage M is interposed in the exhaust line; it is designed as a T and the middle piece contains a throttle-valve by the use of which the lower T-piece may be cut off from the exhaust line. The piece T is fitted with the part N containing the nozzle, the capacity of which is regulated by an adjusting screw S. By means of the fitting F the dust-conducting tubing is attached to the pipe P; its other end carries the brush-nozzle B or the upholstering tool U. When the engine is running and the throttle V open, the air is sucked out of the tubing, being followed by new air through the brush-nozzle or the tool U, which at the same time carries along the dust being taken off the car body surface.

Westinghouse Electric Vulcanizer

Electric vulcanizers of the portable type are equally applicable in garage work as on high-class automobiles, and the latest type of this tool has been announced by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. This vulcanizer comprises a heating plate with a curved surface for casing repairs and a flat one for the vulcanizing of tubes, a fifteen-step rheostat and thermometer for regulating the temperature produced in the heating plate and attachment straps, current being drawn from any 100-125-volt circuit by a standard plug. A flexible connecting cord, 15 feet in length, is included in the equipment. The heat is produced in a metal ribbon which is embedded in mica and hermetically sealed in the heater plate, thereby being shielded from contact with air. The vulcanizer normally consumed from 150 to 175 watts for the repairing of a 36 by 4-inch casing, or about 1.5 amperes on a 110-volt circuit.

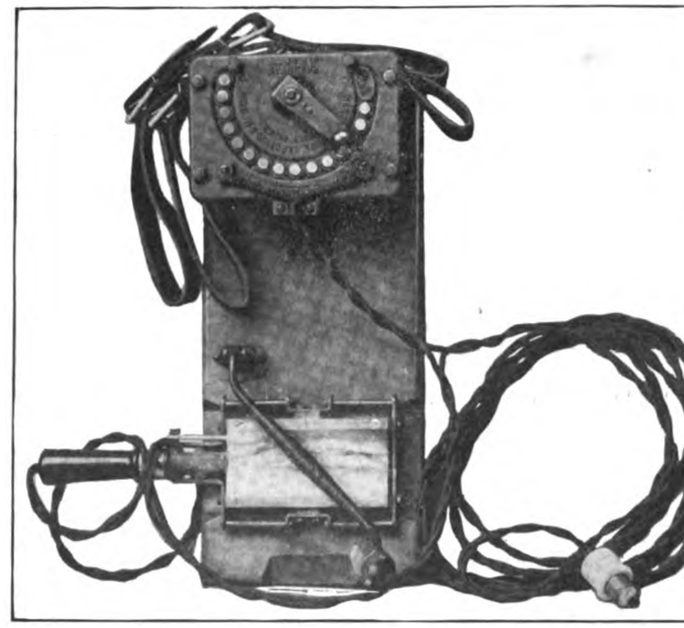


Fig. 6—Westinghouse electric portable vulcanizer for car and garage

About 20 minutes are required to complete the repair. One of the principal points in the operation of the vulcanizer is to keep the temperature at 275 degrees before starting the repair and to keep it there until the work is done. The rheostat with its thermometer permits of easy control of this factor.

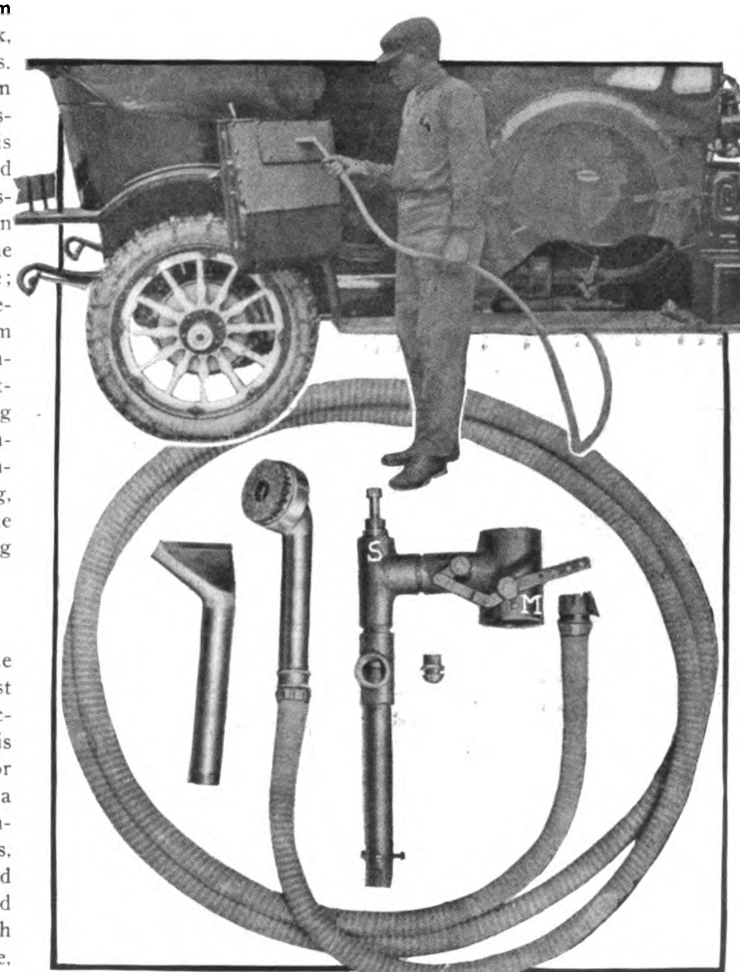


Fig. 7—Vacuum cleaner operated by the exhaust. Fig. 8—Parts of cleaner

AUTOMOBILE Top Construction—Utilizing links so made that the mechanism may be operated quickly and with ease.

The top described in this patent, Fig. 1, comprises two main forward and rearward bows, F and R respectively, which are spaced when the top is open. The lower end of R is attached to the end of a bar, B, whose other end is so pivoted at the car body that the bar points rearwardly. The front bow F is fitted at its lower end with means M for attaching it to the body, and with means M1 for securing it to the rear bow R when the top is closed. Braces B1 and B2 keep the extremities of the top material under tension, while its middle section is taut between the upper end of F and R. To close the top, B is turned through an angle of 180 degrees and B2 is dropped along the path shown by the dotted line; after this the top may be folded back and F be attached to R by engaging M1.

No. 1,041,571—to Clarence L. Bair, San Francisco, Cal. Granted October 15, 1912; filed September 20, 1910.

Wheel-Hub and Shock-Absorber—Springs surrounding bolts which bear against bosses on the axle serve as shock absorbers.

Fig. 2 shows the subject matter of this patent. A pair of spaced bosses B carried by the axle end extend into the annular depression A of a circular plate P. A central depression C opens in the opposite direction, relative to A, and from its center extends a stub axle. A pair of bolts B connect the opposite sides of the annular depression and pass through the bosses, being surrounded by springs S which are interposed between A and one side of each boss. A hub mounted on the stub axle enters C, which is surrounded by a circular extension of the hub. The hub supports a tread surface and the plane of the tread is in line with the centers of the bolts.

No. 1,041,097—to Charles L. Kennedy, Winnipeg, Can. Granted October 15, 1912; filed March 27, 1912.

Driving Gear for Electric Cars—Comprising a suspension for the motor and a worm drive between its shaft and axle.

This patent has reference to a drive for electric vehicles, illustrated in Fig. 3. A suspension S is mounted on an axis parallel to the vehicle axle, so as to be able to rock on the body. The motor M is mounted transversely to this axis; a bearing is mounted to rock on the axle A and is attached to the motor casing, and a shaft S is journaled in the bearing. This shaft has a driving connection with the motor and the axle. The above-mentioned suspension is ring-shaped and is fitted with oppositely arranged trunnions. A groove in the motor casing receives the suspension, and bearings depending from the body support the trunnions.

No. 1,041,450—to William Henry Douglas, Belleville, N. Y. Granted October 15, 1912; filed May 18, 1910.

Two-Cycle Combustion Motor—In which a valve box containing three chambers regulates the distribution of fuel.

The patent refers to a two-cycle construction, Fig. 4, comprising cylinders C, the lower ends of which are connected to an air compression chamber A. Each cylinder is water-jacketed at W, the water being charged into the jacket at a point near the bottom of the cylinder casting. A valve box communicating with the chamber A through the passage P regulates the mixture of fuel and air as well as the admission of the mixture to the cylinder. The box is divided into three chambers—V1, V2 and V3. The central chamber, V1, communicates with A. The upper chamber, V3, communicates with the lower one, V1, which in turn communicates with the combustion chamber when the piston is near its outer dead center. Fuel is fed to V2, and a valve operated by compressed air simultaneously admits air to V3 and fuel to V2.

No. 1,041,154—to Leon Palous, Berlin, Germany. Granted October 15, 1912; filed December 26, 1911.

Pneumatic Tire Construction—Comprising a triple rim, through whose use tread and tube are kept separate.

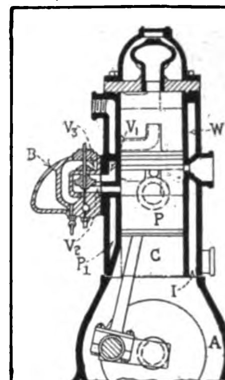
The tire construction referred to in this patent consists of three rims, an inflatable tube and a solid tread. An inner rim, R1, is concentric with the wheel, and a floating rim, R2, to which a rim, R3, is concentrically fastened, surrounds it, being held in place by the inflated air chamber A. An expansible security band S is held by radial bolts B to the intermediate rim R2, which is kept concentric with R3 by two annular clamping plates C. Bolts pass transversely through the plates C to hold them in place. A tread band T is mounted permanently on the outer rim R3.

No. 1,041,350—to Eugene Richard Riedinger, London, Eng. Granted October 15, 1912; filed July 2, 1912.

Making Tire Cores—Process for the manufacture of a filler for automobile tires.

This patent refers to the making of a tire, consisting in shaping a mixture of crude rubber, sulphur and a gas generator in ring form, wrapping it tightly with tape so that it may fit the core mold. The ring is then placed in the mold and vulcanized; in this way a core of sponge rubber is produced in the tight-fitting envelope.

No. 1,041,377—to Ira F. Trautman, New York City. Granted October 15, 1912; filed October 25, 1911.



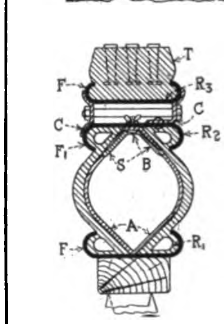
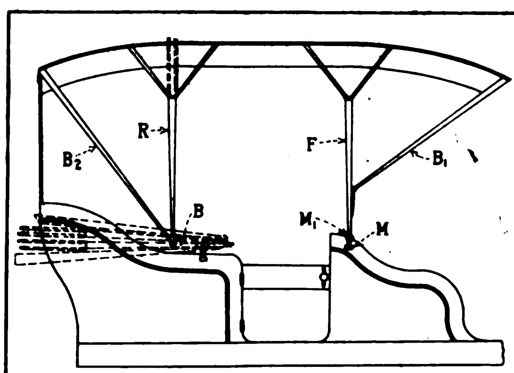
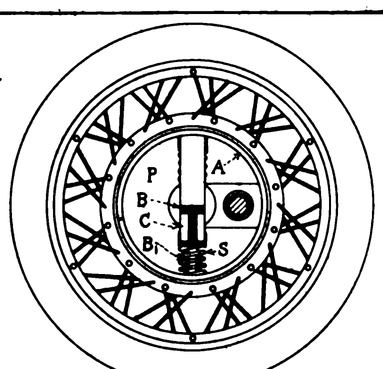


Fig. 4—Palous motor
Fig. 5—Riedinger tire





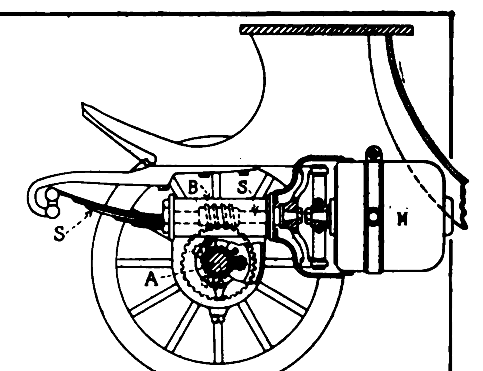


Fig. 1—Bair automobile top. Fig. 2—Kennedy shock-absorbing wheel. Fig. 3—Douglas drive gear for electrics

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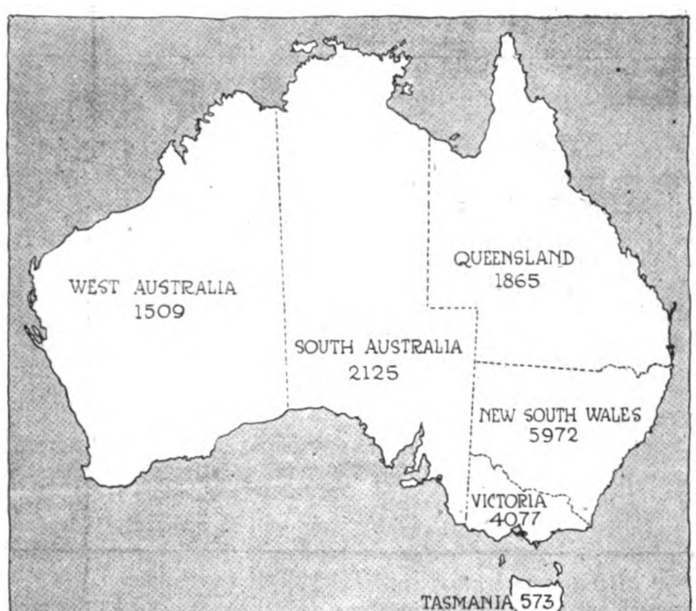
The AUTOMOBILE

Progress of the Automobile Industry in Australian States

Although Comparatively a New Continent and as Yet Largely Undeveloped, Australia Has 16,000 Cars

American Automobiles Already in the Lead and Rapidly Coming Into Greater Favor—American Cars Average 20-25 Horsepower While European Are Only 12-15

TO supplement the statistical information on the automobile industry of the United States and elsewhere already published, THE AUTOMOBILE has obtained figures showing its progress in Australia. Here is a vast continent, 2,974,581 square miles in area, with a population of 4,275,000 and furnishing great opportunities for the automobile exporter who can convincingly demonstrate the value of his wares.



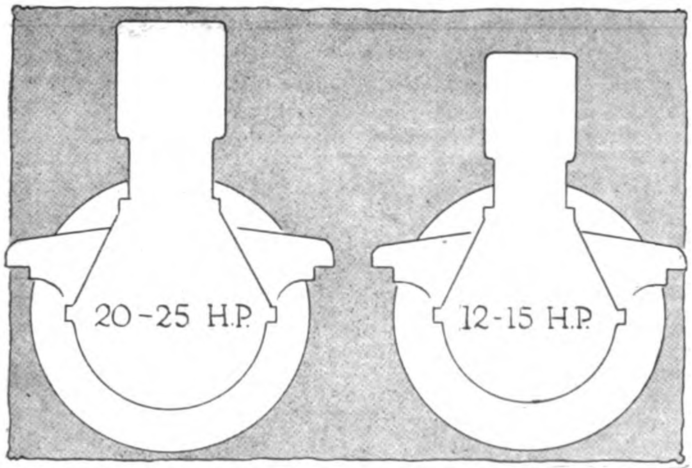
Map of Australia, showing distribution of automobiles in the various states

Many makers, chiefly European, realized the possibilities presented by this territory a few years ago and, having started early, are today reaping deserved benefits. The American manufacturer was too busy at that period with his own domestic trade to afford time for much export development. But with the growth of immense factories and standardized output these conditions are rapidly changing and at the present day the agencies of the various American automobiles established in Australia are doing an excellent business. An American car, in fact, heads the list of sales in all five divisions, or states, the Ford having a total of 900 in use throughout the continent. Second to this car stands an English product, the Talbot, with 700.

Australia is divided into five states, namely, New South Wales, Victoria, Queensland, South Australia, West Australia and the Island of Tasmania. The number of cars registered in each of these states may be seen on the map at the head of this article, while the table on page 872 gives the actual number of the various makes for each state registered up to May 31, 1912. At this date the total for the entire continent was 16,123 cars. This figure includes about 300 commercial vehicles, besides the taxicabs plying for hire in Melbourne. The taxicabs of New South Wales, amounting to about 200, chiefly Napiers, are not included, their registration being separate, whereas in Melbourne the licensed vehicle is registered in the same class as the pleasure car.

Special conditions prevail in Australia and it is possible that these may have caused some hesitation on the part of the exporter, but in this respect the American has the advantage over the European maker, owing to his experience and knowledge of requirements in the West and Canada, where the special needs are more or less closely allied to those obtaining in Australia. The establishment of agencies and provision for the supply of spare parts in wide territory are more familiar and experience has demonstrated their great importance.

A comparison between Canada and Australia is interesting The former has a population of 7,000,000 and has registered 22,000 automobiles, roughly speaking, three automobiles to every thousand of the population. Australia, with a population of just over 4,000,000, has a total of over 16,000 automobiles, which works out on a scale of nearly four cars to each thousand of population.



In Australia the American car averages 20-25 horsepower and the European car 12-15

Comparing the conditions in Australia on the mere basis of cars per population brings out the fact that in West Australia, where there is a car to every 182 people, the ratio between the number of machines and inhabitants is practically the same as in Texas, while the minimum ratio, one car to each 332 inhabitants in Tasmania, ranges between the respective registration figures up to July 1, 1912 for the states of Tennessee and Oklahoma.

An interesting difference between American and Australian statistics is brought out by the ratio of pleasure and commercial vehicles. In the United States there were, on July 1, 1912, some 860,000 cars including 31,600 commercials; while Australia has 300 truck among her 16,123 cars, or one truck to every fifty-four pleasure cars, while in the United States there is a truck to every twenty-seven pleasure vehicles. If, however, the taxicabs used in New South Wales are included among the trucks, the ratio for Australia is one truck to thirty pleasure cars, in other words, very close to that of the States.

The number of automobiles per capita in all the Australian states is shown in the table appearing on page 873. The highest number of cars for every 1,000 inhabitants, that is 5.5, obtains in West Australia, while three cars for every 1,000 of the population holds for both Victoria and Tasmania, the rest of the states ranging between these two limits. The ratios between automobiles and the areas upon which they are distributed are as follows. There is one automobile to every 21 square miles in Tasmania, to every 46 in Victoria, to every 358 in Queensland, to every 425 in South Australia, 520 in New South Wales and to every 646 square miles in West Australia. The maximum ratio for cars per capita goes hand in hand with the minimum ratio of cars per area. This however, is accounted for by the difference in the size of the territories and in the density of their population, rather than by the difference of topographical conditions. Western and South Australia are to a great extent favorable ground, so far as the formation of the same is concerned, while the two smaller states are mountainous. The high ratio of cars per capita is South and Western Australia also seem to indicate that these states are excellent selling ground for automobiles.

The peculiar character of the Australian continent is, if anything, favorable for the introduction of automobiles. Think of a space of almost 3,000,000 square miles, with a coast line 8,800 miles in length, which has only 2,345 miles of navigable rivers. Consider further that what mountainous territory there is in Australia extends parallel with the coast, while the interior of the country is practically one great plateau, excepting one group of mountains in the center of the continent and surrounded by a sandy desert 500,000 square miles in area. Leaving these arid stretches of land out of consideration, there are surfaces many hundreds of miles in size on which settlement has just about begun. In these places, as road building progresses, the automobile has a chance of sharing the business with railroads that are to come. It might even be hinted that nothing but good roads are lacking to make this land a splendid territory for automobiles.

The fact that Australia has a dry climate almost throughout calls for as little use of wood as possible, and for a prolific application of metal in wheels, body, etc. At the same time this end should be realized without undue increase of weight.

Coming to the question of prosperity of this territory, it should be remembered that the agricultural, pastural and timber industries of the five states yield about $3,500,000,000 a year. This leaves fisheries, mining and fuel production, which also are increasing every year. Then, taking all this in consideration, there is a population approximately equal to that of New York City, including one-twentieth who are aborigines, and who uses one-third the number of cars used today in the American Metropolis. This alone should suffice to illustrate the excellent possibilities of an export field which has "just been scratched." But in addition to all this comes a huge and ever increasing commerce, and as the buying public is practically concentrated along the coasts the conditions which permitted of introducing 16,000 cars within a very few years must of necessity be very favorable to the automobile industry.

As is stated in another portion of this article, Australian conditions resemble somewhat those existing in Canada and in the West. This permits of drawing the conclusion that cars should be just high-powered enough to give pleasure to the average driving owner, while excessive power would be a sheer waste of investment and upkeep, due to the prohibitive stand taken by authorities against speeding. Where speed regulations do not exist, the possibilities for speeding are generally absent as well.

LEADING MAKES OF CARS IN AUSTRALIA

Make of Car	New South Wales	Victoria	South Australia	Tasmania
Ford	324	309	196	70
Renault	256	224	37	17
Talbot (English)	251	259	164	25
Overland	107	71	19	23
DeDion	152	255	178	22
Hupmobile	140	21	4	35
Cadillac	85	12	5	8
Daimler (English)	130	105	14	12
Humber (English)	125	103	85	17
Fiat	127	93	7	12
Star (English)	201	...	91	..
Flanders	26	40	75	9
E.M.F.	15	29	13	..
Rolls-Royce (English)	12	19	4	..
Regal	21	14	14	4
Austin (English)	70	.85	9	16
F.N.	110	91	...	..
Chalmers	51	15	...	1
Napier (English)	48	36	18	17
Buick	42	7	5	1

Simplicity, strength and accessibilty are three points which cannot fail to attract the Australian purchaser. Cars going to that far territory should be trouble-proof if not fool-proof, for their care will in many cases depend upon men other than mechanics and in a locality remote from such men skilled in the art of handling automobiles.

It will be noticed in the tables that the sales in Australia lie in the direction of the small car. The large, expensively-equipped car is not seen in great numbers. Whether this can be attributed solely to demand cannot be definitely stated, but the more active salesmanship in the small car field may be a factor of more importance than would at first be supposed. The average horsepower of the American car is considerably in excess of that supplied in the cars exported by European manufacturers, the figures being respectively 20-25 and 12-15 horsepower.

Looking over the accompanying table which shows the various cars and their relative numbers as represented in the several Australian states, reveals the interesting fact that the Ford product is fully 200 cars ahead of any other make. While it might not seem reasonable to draw general conclusions from this specific instance, its importance must nevertheless not be overlooked. In addition to the delivery of a fair amount of power, this make of automobile has three points in its favor which admittedly are of great significance in Australian automobiling: These advantages are: (1) light weight and proportionately high power; (2) ample ground clearance; (3) low price, and actual cheapness, that is, good value in proportion to the retail price.

There is hardly any need to argue on the importance of the first point. Light weight means direct economy on tires as well as gasoline. In a country where all tires are imported as ready products, over distances of thousands of miles, the prices of these products are necessarily high, and conditions relating to gasoline are somewhat akin, although Borneo represents a near point of supply. Thus the light weight is in direct proportion to the upkeep of the car, and it goes without saying that in a young country, such as Australia is, when one looks at the commercial side of the matter, money is one of the most precious commodities.

As to ample ground clearance, this appears to be a necessary provision in a car lest trouble is to be courted deliberately. Good roads, though they make progress, are but in their infancy in Oceania, and sufficient clearance is doubly significant on this account as well as because of the necessity of getting down under the car for inspection and repair work.

The point of cheapness has been touched upon before, and its importance is borne out by the table showing the distribution of various products in the various territories. The fact that Renault cars rank second after Fords in number is probably due to the early introduction of this product and the energetic pushing of its business once a momentum had been obtained. Otherwise the difference between the numbers of this

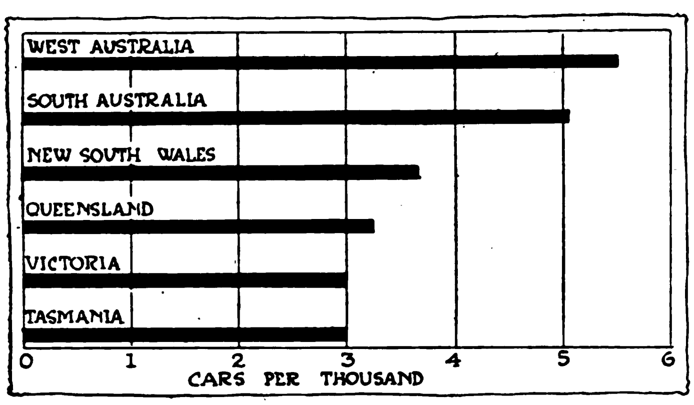


Chart showing relative numbers of automobiles to each thousand of the population in the Australian states

make and, for instance, that of Fiat cars, could not be explained.

Speaking of the advantages of American construction, the accessibility of parts, especially the engine, contrasts favorably with that in the average British design, and, while the amplitude of the power output seems to satisfy male buyers, the weaker sex takes great delight in using our machines on account of the easy riding given by the well-tempered springs. Flat, long springs are looked upon as the most suitable pattern for Australia. To elaborate on the benefit of complete equipment is, of course, unnecessary in these columns. Australians appreciate comfort fully as much as we do.

But, on the other hand, several points in which British cars are superior to ours should be kept in mind. Perhaps the most important among these is the question of wheels. Wooden wheels are short-lived in the dry climate of the interior country and therefore advisable only for use near the coasts. Wire wheels, while they are free from this defect, clog up easily where the cars operate in so-called black soil. The logical solution would be the introduction of a metal wheel different from the wire design, which latter does not permit of protecting the spokes against the soil. Next to this disadvantage comes the alleged weakness of the average rear axle on cheap cars. Australian users claiming frequently that after using the car a short time this member proves not strong enough to stand up under the severe strains which have their cause in the peculiar topography of the country.

In both advertising and methods of salesmanship there is still a good deal to be learned in the Australian automobile field. Sydney, New South Wales, can show some fine and costly garages and salesrooms, but, for the most part, both there and in Melbourne, Victoria, another main center of distribution, the garages are adaptions of old buildings, often quite unsuitable for the purpose. The lighting is generally inadequate and, as a result, it is common practice to run the prospective buyer out into a neighboring park in order to obtain the necessary light for inspection purposes. In Melbourne there is the further disadvantage that the agencies are not centered in any one part of the city, but are scattered. This is a condition of things which will doubtless improve as the sales advance.

The Australian dealer does not seem to make enough use of the capabilities of a car as selling points, but generally refers the buyer to some user who is getting satisfaction in the use of a similar car. This is a perfectly sound line of selling argument, but it need not be the only one.

A serious handicap under which the dealer in Australia labors is the illegality of speed contests. Public interest is therefore difficult to attract, except through the ordinary channels of advertisement. Such tests as the Glidden Tour or club reliability tours are unknown. Now and then there is a hill-climb or a fuel consumption test, but, from the dealer's point of view, these are of little use, for the contests are open only to members of the automobile clubs, which are run on rather conservative lines. Members of the trade, for instance, are not allowed to compete except under the loss of points by penalty as they are considered as professional drivers.

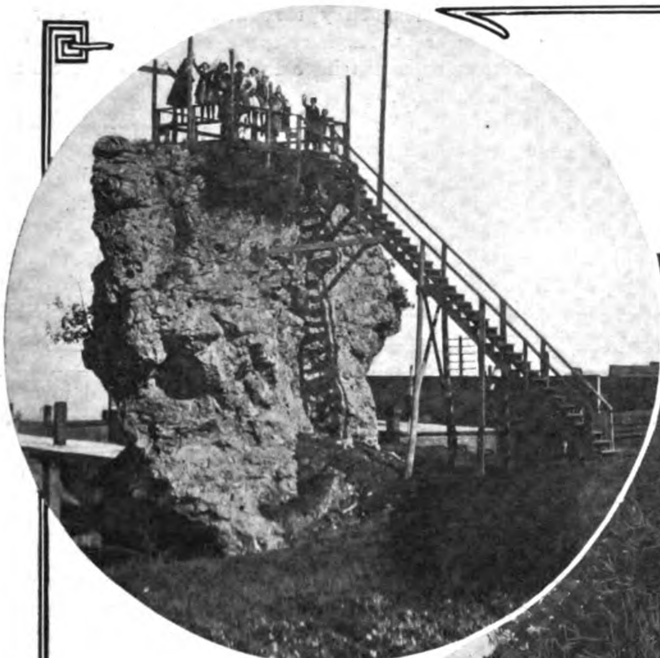
Another fact brought out by the table showing the comparative number of cars of different makes in use in Australia would seem to be the importance of the personal equation as represented by the personal energy of the salesman or agent. No other cause could be given for the difference in number of Ford cars and other low-priced American automobiles. Leaving other things out of consideration, the establishment of an Australian trade for American cars becomes a question of selecting a capable, hustling importer in that territory. There is no more potent means of inducing an agent to make good sales than to insure to him a fair portion of the selling profit. Thanks to our manufacturing conditions, it is easy for the majority of makers to sell their product at a very fair profit to themselves and to the agent, and still sell somewhat below the figure set by the selling representatives of the various European makes of cars. It is due to this fact that some Australian agents who handle two or three European or British makes, as well as a cheap American car, make more money out of the latter than out of all the others combined.

Furthermore, territories are often too extensive to be covered by one man, and in order to do efficient work the importer has to appoint agents or sub-agents which form the connecting link between him and the ultimate purchaser. For this reason, relatively liberal commissions for importer are indispensable if an American manufacturer seeks to introduce his product in Australia.

TABLE SHOWING AREA, POPULATION, NUMBER OF AUTOMOBILES AND RATIO OF CARS TO POPULATION IN AUSTRALIA

State	Area in Square Miles	Population	Automobiles Registered	Population per Automobile	Automobiles per 1000
West Australia	975,876	275,000	1509	182	5.5
South Australia	903,690	420,000	2125	198	5.06
New South Wales	310,000	1,630,000	5972	273	3.68
Queensland	670,500	575,000	1865	308	3.25
Victoria	87,884	1,350,000	4077	330	3.
Tasmania	26,215	190,000	573	332	3.

Circling Lake Michigan



Circle

Tourists at St. Ignace, showing peculiar rock

Top

Chicago tourists on muddy road up Rapid River

Side

Robbins' Abbott car driving through deep mud

Corner

An abandoned lumber camp on the route near Newberry, Mich.

Bottom

Press car receives assistance on new sand hill

Chicago's Tour In Photograph

Circle

Part of the way lay through dense forests over mere trails

Top

Starter Kavanagh in R. C. H. between Newberry and St. Ignace

Side

Brolley's Velie and one of the R. C. H. cars on a rutty road

Corner

Map of Lake Michigan, showing the route followed by the tour

Bottom

Taylor stopping his R. C. H. for water on a bridge at St. Ignace

United States Motor Company Financed by Order of the Court

While Receivers Recommend Scrapping Plants Except Maxwell-Briscoe, Flanders Investigates Property Pending Merger

Court Grants Receivers Permission to Issue $1,500,000 in Certificates to Finance Maxwell Company's 1913 Schedule and Sets Discussion of Decree of Sale of U. S. Motors for November 11

STATUS OF U. S. MOTOR COMPANY

Court orders deposits returned to dealers; provides for settlement of claims that arose between extension and receivership, in all $133,000.

Receivers recommend that all plants be closed down except Maxwell trio and ask permission to issue $1,500,000 of receivers' certificates to finance manufacturing schedule of 1913.

Certificates are a lien on all property but must be applied first to other assets than those of the Maxwell plants.

Application for a general demurrer to the jurisdiction of the court is filed on behalf of Frederick D. Bond, acting for some minority stockholders.

Walter E. Flanders and the United States Motor Company are making examinations of each others' properties in contemplation of a merger when the court tangle is settled.

Court orders decree of sale to be prepared as to form and provides for discussion of the decree November 11.

ROBERTS Walker and W. E. S. Strong, receivers of the United States Motor Company, presented their report to Judge Charles M. Hough, of the United States District Court on Monday, recommending that manufacturing of automobiles be abandoned in all the plants of the company except the three belonging to the Maxwell-Briscoe Motor Company and that the court should give permission for the issuance of a maximum sum of $1,500,000 of receivers' certificates to finance the beginning of the Maxwell 1913 activities.

Not a word was said officially concerning any reorganization and as far as surface indications go, all parties in interest contemplate proceeding toward a sale as the culmination of the present suit in equity which was instituted by the Brown & Sharpe Manufacturing Company.

Mr. Walker read the receivers' report, which was very voluminous, covering forty pages of closely written manuscript. The report described in detail the physical and financial condition of all the properties of the United States Motor Company as outlined in the accompanying balance sheet.

The recommendations of the receivers, so far as finance is concerned, were included in the following list:

To provide for the liquidation of selling companies and the full payment of the local creditors of such selling companies and of the dealers who dealt with such selling companies, where deemed advisable by the receivers.

The indebtedness to local creditors of the selling companies referred to amount to about $140,000 after setting off certain credits. The amount owing to dealers who did business with the selling companies is in the neighborhood of $120,000 net. In all, permission to pay $260,000 net was asked by the receivers on account of the selling companies. It was indicated that such a move would be good business for the embarrassed company because of the valuable assets that would be added to the estate after settlement of the scattered debts of the selling companies; that it would serve to continue the good will, an intangible but valuable element in the situation and that in case of continuance of the business it would make a favorable sale easier than if the usual outlet for manufactured product was eliminated.

The second recommendation was for payment in full to the dealers who made deposits with the United States Motor Company.

It was shown that the company held about $63,000 of such deposits and that just prior to the receivership a virtual trust fund was deposited by the company in the Central Trust Company to provide for the protection of the dealers. The court was asked to construe this fund as a trust fund for the benefit of the dealers. It was also shown that there were certain credits of the company that should be charged against this fund, making the total net amount due the dealers about $29,000. This would leave a credit of about $33,000 for the estate.

The third recommendation was for payment in such manner as may be ordered by this court to creditors who shipped goods or furnished materials or services to the company just prior to the receivership.

In this regard it was shown that claims for about $100,000 had accrued between the time certain materials were shipped to the company or services rendered the company and the appointment of the receivers.

Under the working agreement of the creditors as outlined in their letter of June 18, it was provided that all current indebtednesses of the company should be paid in cash upon delivery. The amount covered by the class of claims included in the recommendation represents materials and services contracted for under the creditors' agreement, that fell due after the recivers took possession. They could not be paid by the receivers without permission of the court.

The fourth recommendation was for continuance of the business. The receivers reported that the Alden-Sampson and Brush companies were closed down except for sufficient activity to maintain the supply of spare parts likely to be required by the cars in service. The Columbia is completing its manufacturing schedule and the receivers recommend that the plant be closed down as soon as the few remaining cars are finished, except that a certain amount of work should be done in the manufacture of spare parts for automobiles in service. The Courier Car Company was pronounced moribund and it was recommended that it remain so for the present. The Dayton Motor Car Company was reported to be finishing its manufacturing schedule for 1912 and it was recommended that the plant be closed down as soon as the present work is ended except for the making of spare parts and repair supplies. As far as the three Maxwell factories are concerned, the receivers recommend that they be closed down also, by or before December 15 unless provision can be made to finance the 1913 campaign.

In this particular it was shown that the United States Motor Company had on hand about $500,000 and sufficient quick assets, over and above the amounts asked in the first three recommendations, to make up about $800,000. That sum with $1,500,000 to be raised by the issuance of receivers' certificates at par, based upon all the assets of the corporation, would in the opinion of the receivers be sufficient to make a good start on manufacturing for 1913 and enough to carry the operations of the company for 3 months.

It was pointed out that the element of time is the vital one in the situation and that even with the utmost celerity it will be necessary to proceed at high pressure in order to retrieve the fortunes of the company.

James N. Rosenberg, attorney for the receivers, explained with much clarity to the court that unless a manufacturing schedule was framed and material progress made at once, the effort would prove futile. He said that it was imperatively necessary that there be a volume of cars ready for market in April and May and a fair supply in March and a few in February. This he said would be impossible to accomplish unless work was begun practically instanter.

The alternative, he pointed out, was that the plants must be closed down and scrapped along with the rest of the properties.

The fifth recommendation was that the court should give such directions as it saw fit respecting the sale of any of the properties or assets.

Objection was made by Judge Bisbee on behalf of the Maxwell-Briscoe creditors to the fourth recommendation as outlined by the receivers. Judge Bisbee stated that the Maxwell company was the only solvent concern of the U. S. Motors and that at a sale as scrap, the property would realize enough to pay its debts. He stated that it would work a substantial injustice to his clients in case the recommendation for the issuance of receivers' certificates should be approved, if the operation so financed developed into a failure. He said that the Maxwell creditors could be paid off at forced sale and that there was an element of chance unjustified involved in case of continuance, where the only solvent company would have to bear the brunt of the risk.

Judge Hough rather leaned toward Judge Bisbee's presentation and for a time it seemed as if a period would be placed to the affairs of U. S. Motors.

After recess Judge Hough took up the question and settled the matter by approving the recommendation of the receivers, but ordering that the lien of the receivers' certificates should be first borne by other companies than the Maxwell and that if, in case of liquidation under the certificates, the properties of the Maxwell company should be applied only to the payment of any balance that might remain after all the other assets had been used to satisfy the liquidation.

While the recommendations of the receivers were approved broadly by the court, the whole tense situation is still under high pressure. Under the order the manufacturing schedule of the Maxwell company will be commenced and in case of a sale the company would have a colorable claim to being a going concern and not scrap. But there are still two hurdles to take before the difficulties can be smoothed away. One, if course, is as to the adoption of the widely heralded scheme of reorganization and the other is to surmount the difficulties outlined in the application made by Judge Van Etter of Ulster County, E. Metzger, Kingston and George A. Knobloch for permission to file a demurrer to the whole proceeding. This action was taken on behalf of Frederick D. Bond, who declares he represents certain minority stock interests.

According to Mr. Bond, one ground taken by the demurrer is that the court has no jurisdiction of the action. He states that the complainant in this case is a corporation having a legal residence in Rhode Island and that the defendant is a New Jersey corporation. The equity suit is in New York and the demurrer holds that it should have been started either in New Jersey or Rhode Island under the federal equity procedure.

A number of additional grounds are also covered in the pleading.

If the court allows Bond to intervene with his demurrer it is conceivable that a considerable delay might take place. In case the application is denied, the right of appeal on the law point might drag in the courts for a long time, even going as far as the Supreme Court of the United States on the constitutional question involved.

At headquarters of the United States Motor Company it was stated that Walter E. Flanders recently had made an inspection and appraisal of the properties of the company and that representatives of the United States Motor Company were at present engaged in examining the Flanders plant in Detroit looking toward a consolidation as soon as the legal tangle in the United States District Court was unraveled.

Deposits of stock and claims under the proposed plan of reorganization is continuing and a tentative limit has been set for such deposits on November 9. It is said that the amount deposited already represents a material amount more than a majority.

Final action on the reorganization will be impossible until some time after November 11, but with such a large proportion of the securities and obligation on deposit it is hoped that it can be consummated without undue loss of time. The action of the court in decreeing to progress with the Maxwell program met with the hearty approval of the attorneys of the creditors.

The balance sheet, showing the aggregate assets and liabilities of the company, as compiled by the receivers will be found in full on page 904.

Judge Hough's opinion as to the recommendations of the receivers was delivered from the bench and was as follows:

The Court: Now with respect to the first application of the receivers, which is as follows:

The liquidation of selling companies and the full payment of the local creditors of such selling companies and of the dealers who dealt with such selling companies where deemed advisable by the receivers.

No general authority to the receivers to deal with all the selling companies will be given now or at any time. In my opinion, circumstances may arise in respect to any selling company, as the word is used in this litigation rendering it advisable for the receivers to liquidate themselves, to act as their own local courts, so they can pay their own local creditors in full, and the receivers are advised to prepare a separate petition as to each and any selling company which they wish to liquidate in the manner suggested.

The second proposition is with regard to payment in full of dealers who made deposits with the United States Motor Co.

In my judgment it has been sufficiently shown that there was an effort on the part of the motor companies shortly before the appointment of these receivers to create a trust fund for the securing of the said dealers who had so made deposits. Entirely irrespective of any question that might arise about deposits made so soon before the appointment of the receivers, it is in my judgment evidently advantageous from a business standpoint, that the claims of those dealers be settled, by offsetting deposits against amounts due, with the net result that there will become available, as I am informed if I correctly understand the receivers, the net sum of $33,000 approximately out of $62,000 now on deposit which is not now available to them in any case. They are authorized and directed to settle this matter in this way.

As to the third proposition regarding a payment to creditors who shipped goods or furnished materials or services in the interval between the creditors' committee circular of June, 1912, and the appointment of the receivers herein on September 12. As to those creditors it is directed that where the receivers are satisfied that any particular goods were not only furnished, but delivered to and used in a certain factory during the period specified, that certain goods and materials may be paid for and charged against that particular factory.

As to the future continuance of the business. It is directed that the receivers have authority for a future continuance of the business along the lines indicated by them in their report. They are authorized to apply for receiver's certificates to an amount not exceeding in the aggregate the $1,500,000 mentioned by them, and in such amounts as they may deem advisable, showing their reasons therefor from time to time, and that upon the issuance of such certificates, and in the order authorizing their issue, it shall be provided that the lien thereof, or payment thereof, shall be made in the first instance on properties other than those of the Maxwell-Briscoe Company, to the end that only in the event of all the other property in the hands of the receivers being insufficient to pay the receiver's certificates shall the property of the Maxwell-Briscoe Company be touched.

As to the sale of the property. It is believed that this property ought to be sold as soon as reasonably can be. The receivers in conjunction with the solicitors for the complainant are hereby directed to draft a decree of sale, concerning the form of which I give more specific directions at this time. That they do this as speedily as possible, not pausing to obtain the formal legal descriptions by metes and bounds of the real property, if any be affected, but drafting such a document as shall so show the scheme of sale proposed. That they serve notice of that proposed form of decree upon the attorneys who have appeared here today, as well as upon any who may be on the formal record on the docket of this court, and that for the purpose of discussing that form of decree an adjourned day of this meeting may be fixed. I would think that two weeks from today would be ample time for that purpose.

Mosler Loses Action

Court Holds That Canfield Patent on Chambered Spark-Plugs is Valid But Not Infringed by Defendants

Laches of Previous Owners of Patent Weigh Against Present Assignor—Case Will Probably Be Appealed at Once

JUDGE Hand, of the United States District Court, has rendered an opinion in the suit instituted by A. R. Mosler & Company against the Auto Supply Company for alleged infringement of the Canfield patent 612,701, covering a type of spark-plug which has a recess around the electrode. The opinion sustains the patent within certain narrow limitations but holds that the defendant company is not guilty of infringement.

The reasoning adopted by the court is based upon the fact that Canfield, a pioneer in the automobile industry, really devised a patentable element when he produced spark-plugs of the kind covered by the terms of the patent. Canfield, however, disposed of his patent in 1902 and later it was assigned to the Torbenson Company and afterward to the Association Patents Company, subsidiary of the old A. L. A. M. There it remained from 1906 to 1909, when Mosler purchased it.

The ruling that the patent was not infringed is based upon the fact that under the construction of the court, Mosler himself manufactured a type of spark-plug that came within the claims of the patent, long before he acquired any interest in the patent.

The words of the court are as follows:

"The suit is really against the (six) manufacturers, but whether against them or not, defendant and others have been notoriously selling these goods to a large extent for a number of years.

"Here then we have a situation where nothing was done by the patentee or his assignees for 11 years, while others risked their money in putting on the market an improved and very important device, in an industry which has developed by leaps and bounds and which has revolutionized travel for pleasure and utility. While the public has been getting the benefit of the use of the devices and the competition between the manufacturers, the assignees of this patent have sat supinely by, not even bringing one suit against any one of the many open alleged infringers.

"Then comes along an ex-infringer, on its own theory, who has bought the rights under this and another patent and asks a court of equity to fill its treasury with license fees and damage money.

"It is no excuse that complainant obtained its title only in 1909. Its claim is affected by the laches and want of equity of its assignors.

"The court will go a long distance to protect the inventor who is ahead of his times and who, unable to interest capital, finds that some one has stolen the fruits of his genius. But that is not this case.

"The patent is sustained within the limits herein dictated and it is held that there is no infringement. The bill is dismissed with costs."

Boston Electric Show a Success

BOSTON, MASS., Oct. 28—Boston's big electric show closed Saturday after 4 weeks of remarkable success, during which it is estimated that there were 500,000 in attendance. And of all the exhibitors who were pleased at the amount of business done none was more so than the men who handle the electric vehicles in Boston. Those dealers who had commercial vehicles alone found that there were innumerable places in New England where business men could utilize trucks. This was brought home to them through the co-operation of the men at the heads of the various electric light plants in the cities and towns of the New England states.

The Edison Company of Boston, the real power behind the show, had made arrangements so that the managers of the electric plants in the New England districts were allowed to give complimentary invitations to business men who used electricity or were possible users of it. With the railroads co-operating so that special excursions were run from all sections it brought to Boston to the show thousands of people each week. So out of all these visitors there were many who were anxious to get a line on what was new.

That electric motor cars would be shown was expected by some, but the greater number were surprised to find the big commercial vehicles right on the main floor. To many of these visitors motor trucks were associated with gasoline in their minds because of the fact that they had not seen any other vehicles in their territory except those operated by gasoline. So they made inquiries and examined the trucks. The dealers did the rest, for they showed how easy it was to get current from the lighting companies.

The Electric Vehicle Club has arranged now to meet every week at a luncheon at some hotel or club, and once a month have a meeting at night.

Creditors Take Charge of R. C. H.

DETROIT, MICH., Oct. 30—The condition of the business of the R. C. H. Corporation was fully disclosed to the stockholders and merchandise and money creditors at a meeting at the Pontchartrain hotel, this city, October 25.

The meeting was largely attended, the creditors present representing an indebtedness of the corporation of $1,600,000. Plans for the refinancing of the company were discussed at length and an agreement was drawn up between the creditors and the R. C. H. Corporation whereby the latter's affairs will in the future be in the hands of a creditor's committee of nine, the former directorate consisting of three.

Sixty per cent. of the capital stock is to be under the direct control of three men chosen from this committee of nine under the terms of the agreement. It was pointed out that this was done in order to protect the concern in the event of the death of the Hupp Brothers, owners of a large proportion of the stock. This agreement is to be submitted to the stockholders and creditors for their formal ratification the latter part of this week.

November 8 when the directors of the R. C. H. Corporation meet, it is expected that the entire plan will be finally adopted. The six directors who have been placed on the directorate become practically debenture holders, but it is expected that all obligations will be cleared away within the next 18 months.

The condition of the concern's affairs may best be explained by the fact that it has grown too rapidly for its capitalization. At the present time the corporation's books shows assets over liabilities of $576,000, according to the auditing of MacPherson, Weiss & Company, certified public accountants. Domestic and foreign contracts for some 16,000 cars are in hand.

The production at present is normal, the concern having 417 cars in stock at Detroit and its branches. Materials for about 1,000 more cars are at the factory. During September, 617 cars were shipped while thus far this month 342 have left the shops. By the adoption of this plan the output of the plant will not be curtailed in anyway, and at the same time the corporation's financial position will be made secure. Although the members of the new directorate have not yet signed the agreement, all are favorable to it. It is understood that the following nine will compose the committee: John Kelsey, Kelsey Wheel Company; J. F. Hartz, C. F. Hall Lamp Company; H. S. Firestone, Firestone Tire & Rubber Company; J. H. Clark, attorney; C. A. McCutcheon, American Gear Company; F. M. Randall, C. H. Fuller Company; J. H. Sieberting, Goodyear Tire & Rubber Company; C. P. Sieder, Sieder Manufacturing Company, and R. C. Hupp.

Truck Space Allotted

Practically All Ground Floor Space for Chicago Commercial Vehicle Show Divided Among 65 Makers

American-La France to Reorganize—Milwaukee Dealers Elect Officers—Denver Wants Place on Transcontinental Highway

NEW YORK, Oct. 26—Sixty-five commercial motor vehicle makers have been allotted space in the Chicago show to be held in the Coliseum, Coliseum Annex and First Regiment Armory. All of the ground floor space in these buildings has been absorbed excepting two of the least desirable, and there is a waiting list of six for these.

Last winter the show opened with eighty-two exhibitors of complete vehicles and chassis, but at the October drawing the allotments were smaller and only three or four companies went into the Armory, which, however, filled up later.

Those concerns on the waiting list are: Mogul Motor Truck Company, Chicago; Mercury Manufacturing Company, Chicago; H. J. Koehler Sporting Goods Company, New York; Ideal Automobile Company, Ft. Wayne, Ind.; Kentucky Wagon Manufacturing Company, Louisville, Ky.; Ware Motor Vehicle Company, St. Paul, Minn.

American-La France Seeks Capital

ELMIRA, N. Y., Oct. 26—In order to provide the concern with $600,000 additional cash capital, the American-La France Fire Engine Company, of Elmira, N. Y., is considering complete reorganization. The plan proposed by the fiscal agents of the engine company provides that the present bondholders will receive 100 per cent. in 7 per cent. preferred stock of the new concern with a bonus of 33.3 per cent. in new common stock. The preferred stockholders are to receive 50 per cent. in the new preferred stock and 33.3 of common, while the present holders of common stock will receive 30 per cent. in new common. With the $600,000 new preferred stock to be sold at par there will be a bonus of 100 per cent. of new common, this being offered to present stockholders on a basis of four shares of preferred to every 19 shares of the old preferred and two shares of new preferred to each 10 shares of the common.

M. A. D. A. Elects Officers for Year

MILWAUKEE, WIS., Oct. 28—Isaac G. Hickman, president of the Hickman-Lauson-Diener Company, state agent for the Ford, was re-elected president of the Milwaukee Automobile Dealers' Association at the annual meeting held on October 23. Emil Estberg, representing the Pope-Hartford and Waverly electric, was re-elected vice-president. George P. Hewitt, proprietor of the Wisconsin Auto Sales Company, Cutting, National, Westcott, Herreshoff, Little and Chevrolet agent, was elected treasurer, succeeding August A. Jonas. A. E. Raffauf, of the American Automobile Company, Pierce-Arrow agent, was re-elected secretary. The executive board consists of Messrs. Hickman, Estberg, Hewitt, Raffauf and Alton J. March, of the Curtis Auto Company, Reo representative.

Although the association wound up the fiscal year of 1910-1911 with a comfortable surplus in the treasury, reports at the last annual meeting showed a huge deficit, due to the promotion of the Vanderbilt cup races at Milwaukee this year. The association has twenty-two active members, consisting of the principal dealers in Milwaukee county.

Denver Seeks Place on Through Route

DENVER, COLO., Oct. 28—As a vital step in a persistent campaign being carried on by the Denver Chamber of Commerce, the Denver Motor Club, the Colorado State Highway Commission and other organizations, to have this city placed upon a great transcontinental highway, a trip to mark out the Denver-Salt Lake City section of the projected Midland Transcontinental Route was started this week by Charles M. Kittredge, Jr., assistant secretary of the Chamber of Commerce, and A. L. Westgard, official map-maker for the American Automobile association, New York City. Kittredge is acting as official representative of both the Chamber of Commerce and the Motor Club.

Punctureless Tire Plant Planned

DETROIT, MICH., Oct. 28—A new rubber company with capital close to $1,000,000 is reported to be planned by interests in this city and in Cleveland. It is proposed to manufacture tires which will be non-puncturable and blow-out proof, and which are the patented invention of Arthur Elliott, of Cleveland. Three patents have been issued to Mr. Elliott covering a lap-lock base, straight side walls and steel band inner liner for the tire shoe. It is understood that several rubber men are interested in the venture which is contemplating the building of a factory either in this city or in Cleveland. Negotiations are being carried on here by Charles Ritter, while the Cleveland representatives are the Standard Sales Company.

To Make New Carbureter and Clutch

DETROIT, MICH., Oct. 28—The Sprung Carbureter & Clutch Company has been incorporated to manufacture the patented devices of Edmund Sprung, which consist of a carbureter and a clutch. The former is a three-jet type, the throttle lever connecting with a sleeve which goes over the jets and which uncovers more of them as the throttle is opened. The incorporators are: Edmund Sprung, Wm. Healy, and J. S. Kennary.

List of Truck Manufacturers Given Space at Chicago Show

Coliseum

Adams Bros. Co....................Findlay, O.
American Locomotive Co. ....New York
Autocar Company ....Ardmore, Pa.
Buffalo Elec. Veh. Co..............Buffalo, N. Y.
Buick Motor Co....................Flint, Mich.
Clark Dely. Car Co..........Grand Crossing, Ill.
Dayton Auto Truck Co...............Dayton, O.
Federal Motor Truck Co...........Detroit, Mich.
Flint Motor Wagon Dept.............Flint, Mich.
Durant Dort Carriage Co.
Garford Co.........................Elyria, O.
General Motors Truck Co. ....Pontiac, Mich.
Gramm Motor Truck Co................Lima, O.
Hupp Motor Car Co................Detroit, Mich.
International Motor Co..............New York
Thos. B. Jeffery Co..............Kenosha, Wis.
Kelly Motor Truck Co...........Springfield, O.
Kissel Motor Car Co.............Hartford, Wis.
Knox Automobile Co..........Springfield, Mass.
Krebs Com. Car Co...................Clyde, O.
Locomobile Co. ....Bridgeport, Conn.
W. H. McIntyre Co.................Auburn, Ind.
Old Reliable Motor Truck Co.........Chicago, Ill.
Peerless Motor Car Co.............Cleveland, O.
Pierce-Arrow M. C. Co............Buffalo, N. Y.
Pope Mfg. Co...................Hartford, Conn.
Reliance Motor T. Co.............Owosso, Mich.
Reo Motor Car Co................Lansing, Mich.
Selden Motor Veh. Co...........Rochester, N. Y.
Speedwell Motor C. Co...............Dayton, O.
Sternberg Mfg. Co.............Milwaukee, Wis.
Studebaker Corp. ....Detroit, Mich.
United States M. Truck...........Cincinnati, O.
Velle Motor Veh. Co.................Moline, Ill.
Walker Veh. Co.....................Chicago, Ill.
Waverley Co. ....Indianapolis, Ind.

Coliseum Annex

Bowling Green Motor Car Co.....Bowling Green, O.
Chase Motor Truck Co............Syracuse, N. Y.
Dart Mfg. Co......................Waterloo, Ia.
Lippard-Stewart Motor Car Co.....Buffalo, N. Y.
M. & P. Elec. Veh. Co............Detroit, Mich.
Service Motor Car Co..............Wabash, Ind.
Standard Motor Truck Co..........Detroit, Mich.
Transit Motor Truck Co., Inc.....Louisville, Ky.
Universal Motor Truck Co.........Detroit, Mich.

First Regiment Armory

Avery Co. ....Peoria, Ill.
Baker Motor Vehicle Co............Cleveland, O.
Bessemer Motor Truck Co........Grove City, Pa.
Brown Commercial Car Co............Peru, Ind.
Chicago Pneumatic Tool Co..........Chicago, Ill.
Commerce Motor Car Co...........Detroit, Mich.
Four-Wheel Drive Auto Co......Clintonville, Wis.
General Vehicle Co..............L. I. City, N. Y.
Gramm-Bernstein Co...................Lima, O.
Harwood-Barley Mfg. Co............Marion, Ind.
International Harvester Co.........Chicago, Ill.
Lauth-Juergens Motor Car Co.........Fremont, O.
National Motor Truck Co.........Bay City, Mich.
Packard Motor Car Co............Detroit, Mich.
D. F. Poyer & Co..............Menominee, Mich.
Alden Sampson Mfg. Co...........Detroit, Mich.
Sanford Motor Truck Co..........Syracuse, N. Y.
A. O. Smith Co.................Milwaukee, Wis.
White Co. ....Cleveland, O.

Recent Legal and Trade Developments

Court Denies Injunction Against Connecticut Shock Absorber Company But Imposes a Bond for $20,000

Government General Supply Committee Opens Bids for Furnishing Federal Departments

THE United States District Court at Trenton, N. J., has denied the motion recently made by the Hartford Suspension Company for a temporary injunction against the Connecticut Shock Absorber Company in the suit of the Hartford company against Ellis, an accessory dealer of Newark, N. J., charging infringement of the Truffault patents. The court, however, imposed a bond of $20,000 upon the Connecticut company, despite the fact that the order dismissed the motion for an injuncton. The Connecticut company asked leave to intervene and defend the action and the court granted the motion.

The procedure with regard to the reason for asking a bond where the motion for injunction was nominally denied attracted a large amount of interest not only in the industry but among the legal fraternity as well.

Bids for U. S. Truck Business

WASHINGTON, D. C., Oct. 29—*Special Telegram*—The General Supply Committee of the Federal government today opened bids for furnishing various government departments with motor trucks. While only six trucks will be purchased under this opening, it is intended to use the figures submitted as a basis for further purchases. The amounts of the various bids will not be made public for several days.

Streator Assets Show Margin

CHICAGO, Oct. 28—No definite policy as to the future has been outlined as yet by the Streator Motor Car Company, of Streator, Ill., maker of the Halladay, which last week was placed in charge of a receiver, the Central Trust Company. The plant is being operated by the receiver and it is expected that by the end of the week the officers of the company will be in a position to issue a statement as to their plans. It is stated that whereas the company's liabilities are in the neighborhood of $225,000, that its assets will total $400,000.

N. A. A. M. to Meet in Detroit

DETROIT, MICH., Oct. 28—The National Association of Automobile Manufacturers has given out the complete program of its first mid-year meeting which takes place in this city November 13-15. The first day will be devoted to business meetings of the board of directors of the N. A. A. M. and of the Automobile Board of Trade. On the following 2 days, papers by a number of prominent figures in the industry will be read, as follows:

November 14—Morning: "The National Association—What Has Been Accomplished and What Can Be Accomplished," S. A. Miles; "Multiplicity of Models," G. W. Bennett; "Some Selling Problems," Hugh Chalmers; "Yearly Models," C. C. Hanch.

Afternoon—"Relation of the Volume of Motor Carriage Business to the Volume of Commercial Car Business," David Beecroft; "The Commercial Car," S. D. Waldon; "Why All Manufacturers Should Use the Standard Warranty," Walter C. White; "Traffic," J. S. Marvin; "Injudicious Methods of Selling Commercial Vehicles," M. L. Pulcher.

November 15—Morning: "Good Roads," R. D. Chapin; "Territory and Discounts," E. R. Benson; "Labor Conditions," H. M. Leland.

On the evening of November 14, a banquet will be tendered to the visitors by the Detroit members of the Association at the Pontchartrain Hotel.

The N. A. A. M. now has 101 members, having added seven at the last meeting. The new members include the following: T. J. Toner, Flanders Manufacturing Company; P. D. Schenck, Speedwell Motor Car Company; Frederick A. Brand, Broc Electric Vehicle Company; U. D. Grannis, Borland Grannis Company; Carl J. Metzger, Argo Electric Vehicle Company; V. De Palmer, Michigan Buggy Company and A. H. McFarlan, McFarlan Carriage Company.

Swinehart St. Louis Company Ready

ST. LOUIS, Oct. 26—Articles of incorporation were filed recently by the St. Louis Tire and Rubber Company, with a capital stock of $150,000 fully paid. The company is to use a building in University City, which was formerly used by one of the E. G. Lewis companies. Harry C. Barker, one of the directors of the new company, stated that the company expects to be turning out all kinds of automobile tires in about 6 weeks.

The concern will be managed by J. A. Swinehart, formerly of Akron, O. The contracts with him and the patents are placed

Automobile Securities Quotations

Stock prices declined throughout the list of automobile and accessory securities during the past week. There were only three issues that advanced and they were tire stocks. Goodyear continued its remarkable strength making new high records almost every day of the week in anticipation of a wonderfully good annual report and the possibility of a juicy melon to the stockholders. Firestone also advanced smartly and the quotations of the Miller company were pegged up. Trading in the listed securities on the New York Stock Exchange was small in volume and generally at lower figures. American Locomotive, Goodrich, General Motors and Studebaker were all off from a fraction to a point or more on account of European liquidation consequent upon the Balkan uneasiness. The list follows:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	145	165
Ajax-Grieb Rubber Co., pfd	..	..	94	99
Aluminum Castings, pfd	..	..	100	102
American Locomotive, com	32	32½	42½	43
American Locomotive, pfd	102½	103	107¼	107¾
Chalmers Motor Company	..	..	145	152
Consolidated Rubber Tire Co., com	7	10	10	13
Consolidated Rubber Tire Co., pfd	10	20	50	60
Firestone Tire & Rubber Co., com	170	176	278	282
Firestone Tire & Rubber Co., pfd	106	108	106	107½
Garford Company, preferred	..	..	99	100
General Motors Co., common	37	38¾	34½	35½
General Motors Co., preferred	75	76½	76½	78
B. F. Goodrich Co., common	*234	*238	†71½	†72
B. F. Goodrich Co., preferred	*118	*120	†106¾	†107½
Goodyear Tire & Rubber Co., com	225	235	386	390
Goodyear Tire & Rubber Co., pfd	104	106¼	104½	105½
Hayes Manufacturing Company	..	..	..	90
International Motor Co., com	..	..	17	19
International Motor Co., pfd	..	..	76	78
Lozier Motor Company	..	..	40	50
Miller Rubber Company	..	..	135	145
Packard Motor Car Co., pfd	104	106	105½	107
Peerless Motor Company	..	..	115	120
Pope Manufacturing Co., com	40	50	28	31
Pope Manufacturing Co., pfd	65	70	69	71
Reo Motor Truck Company	8	10	8	10
Reo Motor Car Company	23	25	19	22
Studebaker Company, common	..	..	43	43½
Studebaker Company, preferred	..	..	94½	97
Swinehart Tire Company	..	..	98	100
Rubber Goods Mfg. Co., com	85	95	100	..
Rubber Goods Mfg. Co., pfd	100	105	105	110
U. S. Motor Company, com	23	24¼	½	1
U. S. Motor Company, pfd	67¼	68¼	2½	3
White Company, preferred	..	..	105	108

*Old. †New.

in the capital stock at $59,100 while the balance is subscribed in cash. Swinehart, the largest individual stockholder, has 900 shares of stock and the other six who have been named directors each have 100 shares. They are: Harry C. Barker, C. M. Skinner, A. C. Einstein, W. H. Glasgow, Roy F. Britton and C. C. Collins.

Contracts will be let in a few days for the erection of an addition to the present building 30 x 100 feet in which will be placed the heavier machinery. All the machinery necessary for the operation of the plant has been received and the work of installation will start immediately.

Crude Rubber Declines 2 Cents

Crude rubber worked lower during the past week with purchases confined to the minimum of requirements and offerings checked in view of the known character of the demand and the hope that extensive buying will be forced in the more or less distant future. The level for up-river fine declined to $1.05 with pale crêpe at $1.02 1-2. This is a decline of 5 cents a pound for up-river since mid-September and 15 cents a pound for pale crêpe. The basic reason is to be found in the increasing shipments of plantation rubber. The trade would not be surprised at some immediate strength in the market but the prevailing opinion is that lower levels are to be expected because of the larger supply becoming available. Receipts at Para are estimated at 2,316 tons for September, which is well in excess of last year and about what the trade expected.

Market Changes of the Week

The most important features of the week's market was the decrease of lead cottonseed oil, and rubber, and the increase of Bessemer Steel, Open-Hearth steel, and scrap rubber. Lead dropped on Friday to $5.00 per hundred pounds, and remained at that figure to the close of the week, with a loss of $.07 1-2. Cottonseed oil dropped $.31 due to the inactiveness of trade, closing $5.67 a barrel. Bessemer steel and Open-Hearth steel experienced a $.50 gain in price, due to the large contracts by the steel companies for those products, Bessemer closing at $28.00 a ton, and Open-Hearth at $29.00. The rubber markets were weaker, due to quiet trading. Here in New York consumers either held aloof from the market or limited their purchases to comparatively small quanities for early use. Jobbing sales were reported on the basis of $1.04 for up-river Para, a decrease of $.02 from Wednesday's price.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, lb.	.09¼	.09¼	.09¼	.09¼	.09¼	.09¼	....
Beams & Channels, 100 lbs.	1.61	1.61	1.61	1.61	1.61	1.61	....
Bessemer Steel, Pittsburgh, ton	27.50	27.50	27.50	27.50	28.00	28.00	+ .50
Copper, Elec., lb.	.17⅜	.17¼	.17¼	.17¼	.17¼	.17⅛	— .00¼
Copper, Lake, lb.	.17½	.17⅜	.17⅜	.17⅜	.17⅜	.17⅜	— .00⅛
Cottonseed Oil, Oct., bbl.	5.98	5.96	5.89	5.71	5.71	5.67	— .31
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	....
Fish Oil, (Menhaden)	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals @	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime	.88	.88	.88	.88	.88	.88	....
Lead, 100 lbs.	5.07½	5.02	5.00	5.00	5.00	5.00	— .07½
Linseed Oil	.60	.60	.60	.60	.58	.60	....
Open-Hearth Steel, ton	28.00	28.00	28.00	28.00	29.00	29.00	+ .50
Petroleum bbl., Kansas crude	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa., crude	1.60	1.60	1.60	1.60	1.60	1.60	....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	....
Rubber, Fine Up-river Para	1.06	1.06	1.06	1.04	1.04	1.04	— .02
Silk, raw Ital	....	....	....	....	4.40	....	....
Silk, raw Japan	....	....	....	....	3.95	....	....
Sulphuric Acid, 60 Beaumé	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs.	5.02	5.02	5.02	5.02	5.06	5.03	+ .01
Tire, scrap	.09⅛	.09⅛	.09½	.09½	.09½	.09½	+ .00⅜

Rise in Oil May Be Reflected in Steel

Tremendous Consumption of Petroleum Products by Automobiles, Etc., May Affect Cost of Steel Processes

Price of Fuel Oil Used in Steel Mills Has Advanced 50 Per Cent. Within the Year

CHICAGO, ILL., Oct. 28—According to Standard Oil reports, the motor car is responsible for a revolution in the steel manufacturing processes now in vogue. This may result in higher prices for steel and crucible steel castings. The cause is laid to the immense consumption of the higher grade products of petroleum principally by motor cars, and by motor boats, ocean vessels and locomotives. Fuel oil, which is the residue left after the distillation of gasoline, benzine, naptha and kerosene, is at present used in enormous quantities. The Inland Steel Company uses 2,000,000 gallons of the oil per month, the International Harvester Company, 120,000 barrels per year, and the Illinois Steel Company, which formerly was a heavy consumer of this fuel, foreseeing the result of the steadily increasing prices, has been changing to other methods, and now uses very little.

Fuel oil is used extensively in the manufacture of glass, brick and tile, and in forging, annealing and founding of steel. It is preferred for the latter uses because of the absence of sulphur fumes in burning, which must be constantly guarded against in the use of other fuels. These fumes have a very injurious effect on steel, making it more brittle.

The changes necessary, according to estimates made by G. H. Jones, vice-president of the Inland Steel Company, will cost that company from $400,000 to $500,000, the cost to the industry therefore, in the aggregate, will probably run into the millions of dollars, which can only be met with by an increase in the price of steel, in all the forms affected.

The Standard Oil Company has given formal notice to the principle consumers that the Whiting refineries can no longer supply the fuel oil that they have in the past. This is taken to mean, by some, that the Standard Oil Company has discovered a process of refining by which a higher percentage of the crude oil can be turned into the better grades, and hence more profitable, kinds of oils and distillates. At present the price of fuel oil has advanced 50 per cent. within a year, which fact would eventually force steel manufacturers to abandon its use in favor of producer gas, without the edict of Rockefeller's minions.

The price of western fuel oil at present is about 2 1-2 cents per gallon, while Pennsylvania prices are prohibitive. It is said that California oils would cost from 10 to 12 cents per gallon in Chicago.

Cotton Makes the Cars Go

NEW ORLEANS, Oct. 28—Sales during October have exceeded any single month in the history of the industry in this city and tributary territory. A large cotton crop is the basis of the general prosperity which the South is enjoying. The growth of the trucking business within a radius of 100 miles of the city is proving a great source of wealth and is having a direct influence on the motor car industry, as many of the owners of truck farms live in the city and have to make frequent trips to and from the properties.

Some Elements to Be Considered in the Choice of Inlet and Exhaust Valve Sizes Discussed by Von Löw—Also the Equal Distribution of Gas Mixture to Cylinders—Fischer's Motor and Change-Gear—Wheel for Heavy Loads

INLET and Exhaust Valve Dimensions—The successes accomplished here and there in raising poppet valve motors to the same maximum power which is obtained with the best sleeveless motors of the same cylinder dimensions, or even above it, have led to renewed investigations of the proportion in valve dimensions which should be expected to fill the cylinder as completely as possible with the explosive mixture, it being understood that all the advantage of the sleeve-valve construction in the matter of power depends upon a superiority at this point. A study by Freiherr von Löw on this subject is rendered in substance in the following:

The views of constructors vary widely on valve diameters and gas velocities, as will appear from the appended table giving certain data of three representative German cars:

		Benz 1910	Adler 1910	Horch 1908
1	Rear wheel diameter	0.8 m.	0.8 m.	0.8 m.
2	Rear wheel circumference	2.5 m.	2.5 m.	2.5 m.
3	Rear wheel revolutions per kilometer	400	400	400
4	Bevel gear, numbers of teeth	25 + 62	19 + 55	13 + 42
5	Bevel gear, ratio	1 + 2.48	1 + 2.89	1 + 3.23
6	Revolutions of motor shaft at 60 kilometers per hour vehicle speed, direct gear	996	1156	1292
7	*V-max.* = highest average speed on level 8 kilometer stretch	134 km./hr.	125 km./hr.	89 km./hr.
8	*t-max.* = r.p.m. at *V-max*	2217	2412	1913
9	*h* = piston stroke	175 mm.	150 mm.	120 mm.
10	$v = \frac{h\pi}{60} \times$ *t-max.* = highest piston speed	20.1 m/sec.	18.8 m/sec.	11.9 m/sec.
11	*d* = diameter of bore	115 mm.	105 mm.	85 mm.
12	$F = \frac{d^2\pi}{4}$ = piston area	104 cm.²	87 cm.²	57 cm.²
13	*q* = area of inlet valve	44 cm.²	16 cm.²	12 cm.²
14	Area of exhaust valve	21 cm.²	16 cm.²	9 cm.²
15	Gas current velocity in inlet valve = $\frac{F}{q} \times v$	45 m/sec.	102 m/sec.	57 m/sec.
16	Current velocity in exhaust valve	92 m/sec.	102m/sec.	76 m/sec.

[The exhaust velocity, it will be noticed, is given without reference to the expansion of the gases which takes place in the exhaust valve.—Ed.]

As this table shows, Adler makes the inlet and exhaust valve diameters alike and reaches a gas velocity of 102 meters per second at a vehicle speed of 125 kilometers per hour. In the Benz car the inlet valve area is about twice as great as that of the exhaust valve and the inlet gas velocity is 45 meters per second with a vehicle speed of 134 kilometers. And in the case of Horch the inlet and exhaust valve areas are as 4 to 3, while the inlet velocity is 57 meters per second at 89 kilometers per hour.

The most favorable proportion between the two diameters can probably only be determined by systematic tests, but certain things which are to be considered in the choice of the diameter may be deduced by mere reasoning with the aid of charts. In Fig. 1 *aa* represents atmospheric pressure and *vv* a complete vacuum, while the pressure variation during the larger portion of the exhaust stroke is shown in line 1-2. At the point 2—when the piston has reached dead center at the end of the exhaust stroke—atmospheric pressure has not yet been reached; the gases in the combustion chamber retain a tension represented in line 2-3 owing to strangulation in the exhaust valve. When now the piston begins its new stroke these gases will first expand and atmospheric pressure will only be reached at point 4, and here, then, begins the real induction stroke. The line 3-4 represents the volumetric loss of explosive mixture at the beginning of the induction stroke. (Even if the inlet valve is opened as early as at the dead center, so that the tension 2-3 can expand into the induction pipe, this will make no difference, for the expansion of the exhaust gas into the induction pipe will push the fresh mixture back and the latter will not reach the cylinder till the piston is at point 4, and the expedient of leaving the exhaust valve open after the dead center is considered later.)

It is now to be examined what the effect will be of the same degree of strangulation at the end of the induction stroke. Under this condition the shortcoming in reaching atmospheric pressure, represented in line 5-6, must be equal in tension value to the pressure represented in line 2-3. The induction valve is supposed to be closed at dead center, and now the compression stroke begins from point 5. As the compression curve at this point rises much more slowly than the expansion curve falls from 2, the considerable volumetric loss represented in line 6-7 is suffered at this point, and it is noticed that this loss is about six times as great as the loss 3-4 sustained at the beginning of the induction stroke. [The proportion in the losses is about the same as between the volume of the combustion chamber and the total cylinder volume—usually 1 to 6.—Ed.]

It is hereby shown that with equal strangulation of the gas in the two valves the volumetric shortcoming in explosive mix-

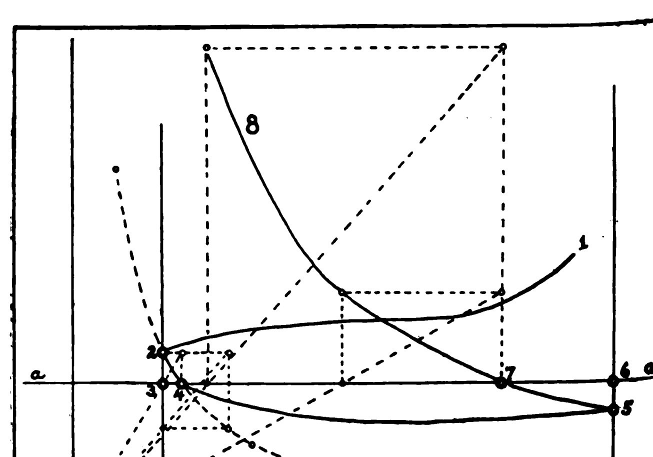


Fig. 1—Diagram showing exhaust (1—2), induction (4—5) and compression (5—7—8) curves; valves opening and closing at dead centers and being of equal diameters and lift

ture caused by the strangulation in the induction valve is decidedly larger than the loss caused by strangulation in the exhaust valve. And as these losses may be reduced, to be sure, by deferred closing of the valves, but never can be quite obviated, it seems that it should be correct to make the inlet valve larger than the exhaust valve, in accordance with the design of Benz and Horch in the above table. It is also notable that among racers those which may be considered the most important have been won with motors having the induction valves larger than the exhaust valves. [It probably does not escape the reader that, in addition to valve diameters, the valve lift and the current-energy may also play a part in determining the degree of strangulation to which the flow of gas is subject.—Ed.] On the other hand, it must be said that the leaders in the matter of enlarged inlet valves—Daimler and Horch—have lately gone back somewhat on this design; for the Daimler company now builds aviation motors mostly with valves of the same size and Horch has in his new Audi cars made the diameters equal. Lehmbeck and Isendahl in their book *Design and Calculation of Automobile Motors* recommend even to make the exhaust valve diameters twice as great as the inlet valve diameters, evidently with a view to the increase in the volume of gas caused by the explosion.

EFFECTS OF GAS CURRENT INERTIA

As already referred to, the cylinders can be filled more completely by deferring the closing of valves. This effect depends in the case of high-speed motors mainly on the expansive energy and momentum of the moved gases. But the opinions of engineers vary as much on this subject—how much the valve closure should be retarded—as they do on valve diameters. An interesting table in the book by Lehmbeck and Isendahl (opposite to page 70 in the second edition) shows that in twenty-eight motors the retardation of closure varies from 0 to 49 degrees after dead center for the inlet valve and from 0 to 22 degrees for the exhaust valve. In the case of multi-cylinder motors it may even be justifiable on account of current-momentum at high gas velocities to arrange the opening and closing of the valves differently for the different cylinders, because the customary inlet manifold for four-cylinder motors, on the plan indicated in Fig. 2, does not render an equable distribution of the gas charge to the cylinders possible. An equable distribution may perhaps only be effected by an arrangement of the manifold as shown in Fig. 3.

On the plan of Fig. 2, cylinder 1 must set the gas in the left portion of the manifold in motion, but cylinder 2 finds it already in motion and therefore gets more gas if the valve regimen is the same. The cylinder marked 3 is the next one to act, and the gas now stops moving in the left portion of the manifold and begins to move in the right portion where cylinder 4 gets more gas than cylinder 3. Whether this "more-or-less" element is a matter of practical importance may easily be decided by experiment, for example, by first cutting out the spark from the inner cylinder of a pair and afterwards from the outer cylinder. The suctions remain unchanged by this proceeding while it should be shown plainly, with a dynamometer, to what extent the power varies. A manifold on the plan of Fig. 3 gives no rise to stoppages in the currents. Cylinder 1 draws the larger part of its charge from the left branch leading from the carbureter V, but, as cylinder 4 was in action just before it, there will also be a current toward it of the surplus gas remaining in the pipe which leads to 1 from 4. When cylinder 1 ceases to draw, the gases set in motion by it move farther to cylinder 2 and, when this ceases to draw, they move farther to cylinder 3, both 2 and 3, however, also drawing directly from the carbureter, and when the valve of 3 is closed, the current moves on to cylinder 4, and so on. Through the uninterrupted flow of the gases losses otherwise caused by current-momentum are thus avoided.—From *Zeitschrift d. M. M. Vereins*, September 15.

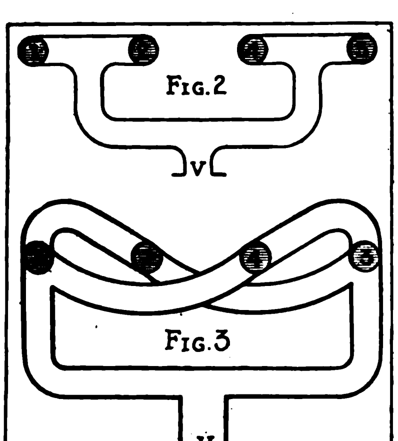


Fig. 2—Customary induction manifold. Fig. 3—Arrangement giving equal distribution of gas to all four cylinders.

SMALL Swiss Car with Valveless Motor—Among the vehicles which depart from the customary type the Martin Fischer car, which is made at Zurich, Switzerland, has attracted attention by a workmanship which is declared most admirable in conjunction with design features which appear at first glance preposterous. The different gear speeds are obtained for example, by taking a pinion mounted on the rear end of a short driving shaft, which is coupled to the clutch shaft by means of a universal joint, to any one of three internal gears of different diameters, all of which are formed in a disk of hollow conical formation, and this disk connects by a universal joint (with a transmission brake) with a driving shaft of the ordinary type, so as to take the power farther to the rear axle. The smallest of the internal gears, which of course is in the center of the disk, is of the same dimensions as the pinion, which therefore simply fits into it, the two parts forming a positive clutch giving a direct drive without any gear transmission whatever. In order to bring one of the other gears into action, shifting forks of the usual kind are made to displace, longitudinally, a bearing-block in which the rear portion of the short driving shaft rotates, and this movement in conjunction with a cam-plate brings the pinion on the end of the shaft into mesh with one of the internal gears. The construction is evidently intended for a vehicle which may be driven practically all the time on the high gear, as continued driving on any of the other gears involves a considerable angular deflection of the short driving shaft and consequently much wear of the universal joint. The clutch in this vehicle is an open multiple plate clutch composed of alternate fiber and brass or bronze disks and is operated without lubrication. The gear-box, containing the universal joint and the short driving shaft

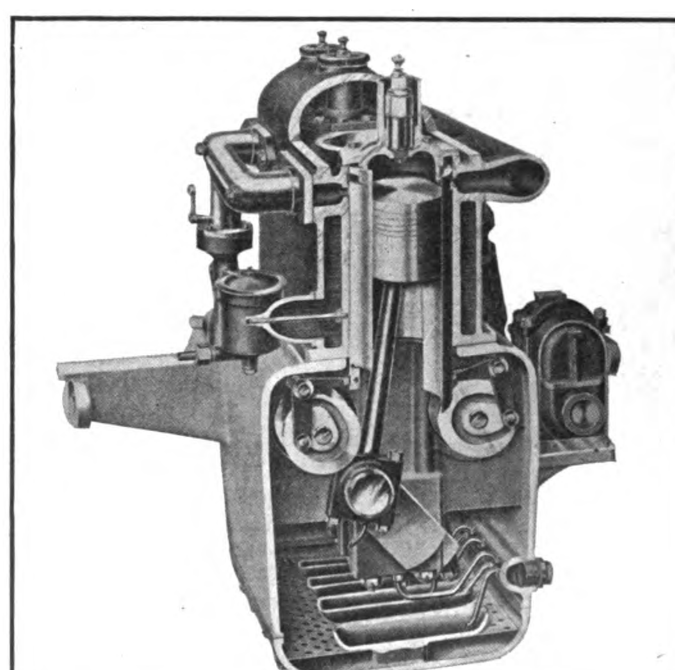
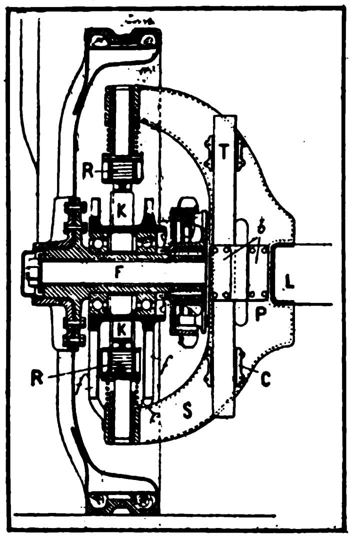
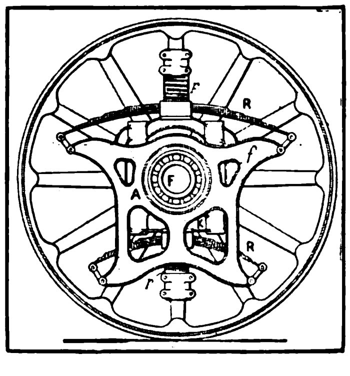


Fig. 4—Section through the Martin Fischer valveless motor

Figs. 5 and 6—Section and partial side view of the Heilmann truck driving wheel as made for vehicles with chain drive. The spring suspension is in the wheel plane and axles are dispensed with

with bearing-block, cam-plate and locking provisions, is located immediately behind the clutch, suspended at three points.

The motor used in this car is shown in Fig. 4. The cylinder bore may be conceived as a cylinder with two opposite bay windows of crescent-shaped cross-section. In these enlargements of the bore two valve bodies of the same section are ensconced, so as to leave an exactly cylindrical bore for the piston, as usual, and they are arranged to be moved up and down by the means plainly shown in the illustration, one operating the inlet and the other the exhaust of gases by means of ports at their upper ends. They enclose each only about one-fourth of the piston surface, so that one-half of the cylinder wall has the same chance for being properly cooled as in a poppet valve motor, and with a view to the same purpose of safeguarding the cooling—which has proved the most difficult feature to bring into permanent working order in sleeve-valve motors in general—an elastic ring above the combustion chamber assists the piston rings in pressing the two valve segments tightly against the built-out portions of the cylinder wall, at the same time securing the compression. The enlarged surface in contact with the cooling water also helps to bring about the desired thermic condition. Manufacture of the valve segments is facilitated by producing them in one piece and afterwards splitting this into two perfectly symmetrical halves. This motor has been operated successfully but no data are at hand with regard to its efficiency.—From *Auto-Technik*, September 13.

HEILMANN'S Truck Wheel—A wheel intended for use on trucks of heavy load capacity has, after several years of experiments, been so far perfected as to attract favorable notice from the technical committee of the Automobile Club of France. It is designed by a Mr. Heilmann, well known as a prolific inventor and especially as the designer of an electric locomotive. Its construction is shown in Figs. 5, 6 and 7. The objects of the construction are to dispense with the use of axles, to bring the load directly in line with the wheel plane, to permit the lowering of vehicle body and load and the increase of wheel sizes, and to reduce the swaying of the vehicle body and the load, not only by lowering the center of gravity but especially by increasing the width between springs and to improve the spring suspension.

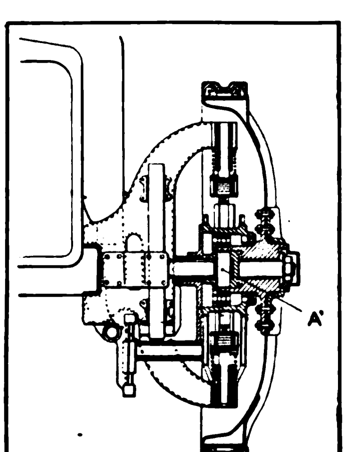


Fig. 7—Heilmann front truck wheel

The spindle F receives the hub of the wheel and is integral with the sliding pieces T which have a vertical movement in the guides C upon the heavy U-shaped bracket S, the latter being securely riveted to the vehicle frame L. Guide plates P in friction contact with bronze bands *b* assist in maintaining alignment and transmitting traction effort to the chassis. The springs are placed between the wheel hub and the ends of the bracket. Special precautions are taken to insure that the spring action shall always act accurately in the plane of the wheel. To this end, there is mounted upon the wheel hub proper, which has a long parallel, bearing upon the spindle, another hub revolving upon a double row of ball-bearings. This second hub comprises a middle portion A carrying two stems which are guided vertically in the frame K and are located in the central plane of the wheel. On each side pressed steel horns *f* support the ends of leaf springs R. The frame K serves to join the two spring clips and is continued above and below in the form of rods which are clamped in the arms of bracket S. Intermediate portions of them serve as guides for helical springs which are stiffer than the leaf springs.

The front wheel requires a somewhat different construction which may be figured out by an analysis of Fig. 6 showing a divided spindle and a pivot pin A upon which the outer portion of the spindle may turn, while the shaft portions of frame K are also journaled in the ends of the bracket S. The construction seems to be too complicated to enlist serious interest in its details but at least shows to what lengths a capable mechanical mind finds it necessary to go in order to find a supposedly acceptable substitute for current construction in the matter of the running-gear for automobiles.—From *Bulletin Officiel*, September.

ELECTRIC Smelting Ovens—The Sweedish *Elektrometal* company has patented the method illustrated in Fig. 8 foı smelting iron and steel. The free polepieces from each phase of a two-phase alternating current are connected each with one of the two electrodes, or groups of electrodes, which hang down into the furnace and from which the current, with formation of an arc, goes into the melt; and the other set of polepieces of both phases is connected with the conductive furnace lining. The oven is mounted upon the iron plates 10 which at the same time can act as conductor for the resulting current of the phases. If the lining consists of magnesite, dolomite or silicious substance which is not sufficiently conductive when cold, a layer 11 of graphite, which is not thermo-conductive but is electro-conductive at any temperature, must be placed on top of the iron plates. But if tar or pitch is used as a binder in the lining this is unnecessary. The electrodes 12 which are connected with the free terminals of the phases are adjustable and pass through a cooling-box in the masonry. This construction is said to admit of de-sulphurizing and de-phosphorizing of the melt.

The design of an electric resistance oven intended to obviate the great radiation of heat occurring in the

(*Continued on page* 906)

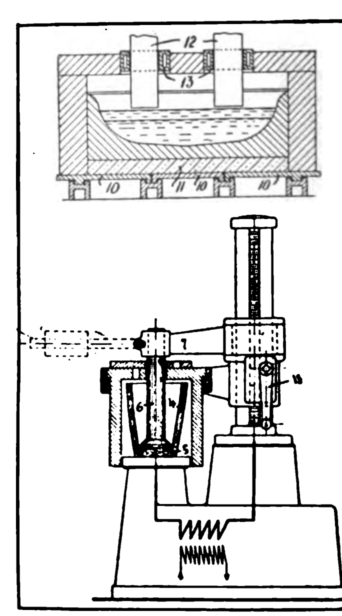


Fig. 8—Electric arc smelter. Fig. 9—Electric resistance smelter. New types

Welding Copper by Flame

An Italian Engineer Relates Experiments with Copper and Its Alloys under Oxy-Acetylene Flame

Paper read by Dr. E. Carnevali, Royal Polytechnic School, Turin, Italy, before the Institute of Metals, London, England, September, 1912.

I HAVE undertaken the study of the oxy-acetylene welding of various metals, iron excepted, largely used in modern industry, particularly copper and its principal alloys and aluminum. In this study I have tried to reproduce as closely as possible the conditions which can be obtained in practice.

I propose to divide this group of researches on the oxy-acetylene autogenous welding of metals largely used in practice, other than iron, into two groups, as follows:

First Group: Oxy-acetylene autogenous welding of copper and its principal alloys.

Second Group: Oxy-acetylene autogenous welding of aluminum.

Copper—A first series of experiments was carried out with pure copper, containing 99.9 per cent. of the metal, the welding metal being copper wire of equal purity, supplemented in certain cases by a small quantity of phosphorus, in order to obviate possible oxidation of the metal during the process of welding.

The samples were cut off round wire-drawn rods, measuring 35 millimeters (1.25 inch) in diameter; each sample was sawn half through, and the edges were thrust apart in the form of a V at an angle of about 45 degrees. After welding, some of the samples were cooled in air, while others were subjected to various thermic and dynamic processes; and, being thus prepared for mechanical experimentation, were so treated as to undergo a notable diminution of their original diameter in order to ascertain the success of the welding operation, care being always taken that the weld should be in the center of the sample. Before and after the mechanical tests, from each sample a portion was taken from the zone of welding, and a portion from the immediate neighboring zone, for purposes of microscopic examination. In Tables 1 and 2 a summary is given of the experiments and observations made in this first series of researches. A microscopic study of the samples was directed to the zone of welding, including the structure of the portion added for the weld, also the original structure of the metal and its structure in the intermediate stage. This research exhibits clearly the change induced by the process of welding in the mechanical properties of the metal, as also the profound alteration of its structure.

The microscopic examinations showed the great development which the copper crystals underwent, a development due to the high temperature attained by the fused metals in the process of welding. The suboxide formed during the process and dissolved within the metal. On the contrary, where the metal used for the weld consisted of phosphorized copper, the suboxide was practically eliminated; but coincidentally with that elimination a very slight modification in the mechanical properties of the metal was noted. This proved that the small quantities of suboxide disseminated in the zone of welding had but little effect in the way of changing the properties of the metal. The difference of structure between the original metal and the metal added in welding could be detected by the eye. After a torsional test to try the merit of the weld, the metal was not deformed by the strain to which it was subjected and the rupture under test did not take place in the fused and welded zone, but in the neighboring zone, following the margin of the weld circles in the original metal that had not undergone fusion.

A more minute investigation, while showing continuity between the welding material and the original metal also reveals in this intermediate zone the pressence of innumerable tiny vesicular cavities, imparting to it a peculiar loose granulation, apparently due to the presence of oxides.

In every case of rupture in the welded sample when tested the rupture took place along the margin of the chamfer. The explanation of this apparently curious fact is easy enough, if we consider under what conditions the welding of copper takes place. The great thermal conductivity of copper, for one thing, is well known; this conductivity, indeed, is so great as to make the process of welding big masses extremely difficult, if not impossible. We know also how easily that metal absorbs gases at high temperatures. In the oxy-acetylene process of welding the tongue of the flame is rich in hydrogen and in carbon monoxide, products of combustion which are easily absorbed by the metal during the heating up that precedes fusion.

When the internal surface of the parts which are to be welded begins to melt, then the metal used for the weld is applied thereto, its fusion taking place with extreme rapidity, the period of heating being very brief, as the metal used consists of fine-drawn wire. Cooling and solidification also ensue quickly; while from the mass of metal which heated up more slowly, that is, from the original surface of the chamfer, the gases absorbed in great quantity during the period of heating which preceded the actual welding are eliminated coincidentally with the fall of temperature.

But the elimination of these gases is not complete, as the main mass of the added welding material is at this time quite solidified, and so their occlusion determines the formation of small vacuoles along the original surfaces of the welded parts, that is, along the surfaces of chamfer. These surfaces, pitted with vacuoles and considerably oxidized (despite the precautions observed during the process of welding), constitute a plane of weakness when the metal is subjected to strains and stresses, and it is consequently along them that fracture takes place.

The inevitable existence in the zone of welding of a weak surface of low resisting power being admitted, it will be easily understood how, when carrying out mechanical processes on the weld, as, for example, by hammering, which are intended to assimilate the structure of the welded portion to the original structure of the metal, we obtain a very low efficiency factor, if not one equivalent to zero. This will be noted on referring to the data set forth in Table 2, and for this reason I have not thought it opportune to insist on these mechanical processes in the course of the various series of experiments.

Of greater efficacy, on the other hand, are thermal processes, such as reheating for about half an hour to 750 degrees or 800 degrees Centigrade, to which several samples were subjected after welding, as may be gathered from the results set forth in Tables 1 and 2. A favorable effect on the mechanical properties of the welded metal might be expected from this treatment.

TABLE 1—SHOCK TESTS WITH THE CHARPY APPARATUS ON PRISMATIC RODS, 10x10x60 MILLIMETRES, WITH SEMICIRCULAR NOTCH HALF-WAY DOWN, 2 MILLIMETRES DEEP (DISTANCE OF SUPPORTS, 40 MILLIMETRES)

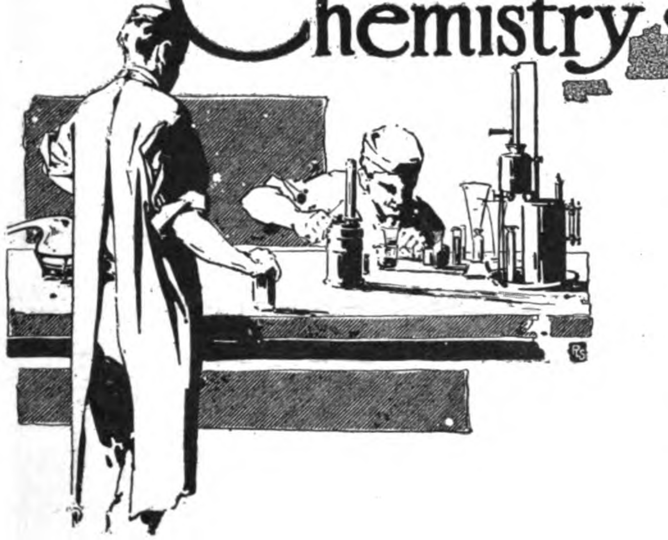
BOB (WEIGHT) = 22.45 KILOGRAMMES

h = 1.3363 METRE

Number of Sample	Initial Dimensions of the Sample	Thermal Treatment	Angle of the Indicator	Breaking Test Kgs. Mm.	Remarks
1	Rods, 35 mm. in diameter.	....	110°	8.936	Not welded.
2	Rods, 35 mm. in diameter.	Reheated	109°	9.194	Not welded.
3	Rods, 35 mm. in diameter.	Cooled in air after welding.	139°	2.464	Welded with phosphorized copper; medium - grained fracture.
4	Rods, 35 mm. in diameter.	Cooled in air after welding.	134°	3.407	Welded with pure copper; coarsely granular fracture.
5	Rods, 35 mm. in diameter.	Reheated after welding.	132°	3.807	Welded with pure copper; coarsely granular fracture.

(For Table 2 see page 907.)

The Chemistry of Cylinder Oils



Facts Based on Chemical Analysis of Cylinder Oils by W. Jones Obtained In Many American Cities and Towns

Part I

This is the first of a series of articles on cylinder oils, which will appear from week to week. Discussions are invited and the columns of THE AUTOMOBILE are open to pertinent criticisms.

By W. Jones

WHAT is a good cylinder oil? What are the standards of measurement by which a good oil for an automobile cylinder can be determined? In every field of science we have units of measurement, or standards by which values are gauged. In the financial world 6 per cent. is the present standard of money value per annum. If you pay 12 per cent. it is usury, and you cannot get it at 1 per cent.

In dealing with oils for automobile cylinder lubrication what are the standards for measurement? Salesmen speak of viscosity, of flash point, of fire point, of specific gravity, of carbon test and of acid test. What is the particular value of each in determining the merit of any oil, and in what proportions should each of these characteristics figure in the makeup of a satisfactory oil?

In this and the following articles of this series an effort will be made to analyze oils as applied to the cylinders of gasoline engines. The facts stated are deductions from chemical analyses and tests with oil. This first article is largely elementary and introductory, and many of the questions which will be suggested in the reader's mind will be discussed in succeeding articles. It is aimed to draw attention to the behavior of various oils under high temperatures and pressures so far as loss in viscosity and carbonization are concerned.

The requirements of the automobile, for a cylinder oil to give satisfactory results, are such as to make the selection of oil for this purpose a much more important matter than for any other kind of motor.

This is due to the motor being an internal combustion type, which produces very high temperatures in the cylinder. These high temperatures produce certain effects from the oil in the cylinder that we do not get in any other piece of machinery.

Our great trouble with this motor is the carbonization of the oil at the high temperature, which is of course a necessary evil.

However, all oils do not act alike in this respect. Some oils give much more trouble in regard to this carbon deposit than others, and it is with a view to determine a specification which would represent an oil that would give the best satisfaction and yet be possible to obtain in the market, at a price that would not be prohibitive. Such an oil should not only lubricate, but should give little trouble from the carbon deposit in the cylinder. An oil of this character would be represented by the following specifications:

Specific gravity should be between	0.8600 and 0.8800
Specific viscosity at 212 should be not over	1.200
Carbonization should be between	0.3% and 0.5%
Flash point	350°F. to 400°F.
Fire point	400°F. to 450°F.
The acidity should not be over	0.003%

The oil should show no action on metallic iron, after 48 hours immersion, and heating to 400° Fahrenheit.

In starting this work it appeared to be the best plan to begin with the deposited carbon in the cylinder. We therefore obtained a fairly good-sized sample of this troublesome substance for analysis, which we found to consist of:

Carbon	86.34%
Metallic Oxides (Iron with a small amount of Copper)	3.96 "
Oil	9.70 "

We would expect to have this deposit fairly saturated with oil, which was the case, but we were a little surprised to find such a large amount of oxide, which simply means one of two things, either the oil carried enough acid to corrode the metal of the cylinder, and thus produce the oxide, or that it was produced by the abrasion due to the presence of the solid carbon. In either case, it would seem that the wear on the cylinder and piston would be rather heavy. The causes for this wear will be taken up later on, when we come to consider the individual oils.

It being impossible from the observed results to tell what, if any, special kinds of oils were producing these results, or if any special oil would carbonize more than another. We decided to make tests on those oils which were in general use, or which were recommended by the automobile manufacturers. We therefore sent a circular letter to all the large builders, asking what oil they recommended or were using for their machines. To this a large number of replies have been received, and it has been a surprise to see what a wide variation has been recommended as the most suitable, ranging from the very lightest Russian oil to the heaviest American oils.

It does not seem possible that there can be enough difference in the construction of the engines to call for any such difference in the oil required, and while there may be a vast difference in the handling or management of the engine, even this could hardly call for any such difference in the oil.

We have obtained samples of the oils recommended, and representing oils in general use. These samples have been subjected to the usual tests for oils of this class, such as gravity, viscosity at two temperatures, flash and fire points, and also for carbon, or what might be called carbonizable carbon; that is, carbon produced from the oil, not exactly as it is produced in the cylinder, which would, of course, be quite impossible in a laboratory test, but in such a way as to represent the results produced in the cylinder. We experimented in many ways to get these results, and finally found that we got the best and most concordant results by taking a weighed amount of the oil in a well-covered platinum crucible and raising the temperature high enough to drive off all the oil, but not hot enough for ignition, and finally increasing the heat to a full red, to burn off any carbon which may have collected on the outside of the crucible.

The viscosities are reported as specific viscosities, taking water as unity. That is, dividing the number of seconds it takes a given amount of oil to pass through a certain sized aperture by the number of seconds it takes the same amount of water to pass the same aperture. The other tests were made in the usual way.

In looking over the tests as tabulated we have a fairly wide variety of oils. In gravity we see a variation of from 0.8651 to 0.9103, in oils showing a much wider variation in the viscosity, which is from 1.7647 in No. 1867, to 18.6071 in No. 1896/e. This last, however, is a special oil for use in motor cycles. It has been included in this list for the extremely high viscosity, which we think may be of interest as we go further into the subject of viscosity.

It may be further observed that **the highest gravity does not by any means give us the highest viscosity,** neither does **the lowest gravity give the lowest viscosity. These figures do not appear to have any relation to each other in the least.**

It may also be noticed that the higher the viscosity is at the temperature of 80 degrees Fahr. the quicker it falls, so that upon reaching the temperature of 212 degrees Fahr. we find a very much wider variation for the high viscosity than for the low.*

In looking over the amounts of carbon produced from these oils we find that they follow more nearly the viscosity, although it does not do so in all cases, for we find that in No. 1890/a, where we have a viscosity of 5.7657, there is 0.80 per cent. carbon, while in No. 1894/b there is a viscosity of 4.4643, nearly one-fourth less, and a carbon product of 1.70 per cent., or over double. It is therefore quite impossible to foresee from the gravity or viscosity just how the oil is going to act in regard to the carbon deposit.

The most important determination seems to be the percentage of carbon deposited, and it would seem to decide the value of the oil so far as this carbon deposit in the cylinder is concerned, and without stating the names of the different samples we will say that oil No. 1867, at the top of the list, is an oil which has been more highly spoken of than any of the others. This would tend to show that the figures for the carbon, which, while we do not think they represent accurately the amount of carbon that would be produced in the cylinders, still show the relative proportion which might be expected from the different oils.

There is one other case which we would like to call attention to, that is, No. 1894/a and 1894/b are supposed to be the same oil. They were both received under the same brand, only one was obtained in New York and the other in Detroit.

*To explain: No. 1867 has a viscosity at 80 Fahr. of 1.7647 and at 212 degrees Fahr. of 1.428, a drop of .6219. Compare this with No. 1896 D, which is an automobile oil. At 80 degrees Fahr. its viscosity is 6.3214, at 212 degrees Fahr. it is 1.4285, a drop of 4.8929 or practically eight times that of No. 1867.

Use of Castor Oil

Pharmaceutic castor oil, the colorless product used for medicinal purposes, is the only vegetable oil that is recommended for purposes of lubrication. When a motor is in a delicate state, or, if it is desired to make a long, high-speed run, it is not out of place to dose with castor oil, removing all traces of other lubricating oils before resorting to the castor oil treatment. Castor oil is efficacious when it is desired to operate at high piston speeds, say, 2,000 feet per minute. It will be remembered that 1,000 feet per minute of piston travel is regarded as the normal rate of piston speed.

It would be imprudent to use castor oil in a motor without making sure that it is pure. A simple test is to place a sample of the oil, with five times its volume of 90 per cent. alcohol, in a graduate, and at a temperature of 62 degrees Fahrenheit, corresponding to about 17 degrees centigrade, observe the result; if the solution remains clear and brilliant, no substantial adulterant is present. If the solution riles up, it is not pure. This is the Finkener test for the quality of castor oil. If the oil is not colorless to begin with, it is not worth while to test it at all.

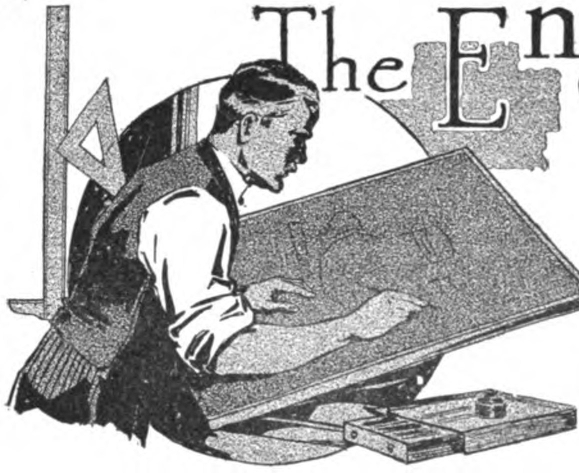
The best grades of castor oil are cold pressed from the castor bean. Chemical processes of extracting the oil are prone to leave substantial traces of free acids of refining. In the process of extracting the oil from the bean, in addition to getting all of the oil out of the same, removing the albuminoids, is needed.

Oil Tests—In the movement which is now under way to remove from the automobile the last vestiges of offensiveness in the street traffic, systematic investigation of lubricating oils has been taken up with so much more vim as the same line of research promises to remove also the last uncertainty in the control of the thermic functions of the internal combustion motor. The most important work looking to the avoidance of nauseous odors in the exhaust gases of the automobile has been done by the Royal Prussian Bureau for the Testing of Materials and showed that, by first removing those components of the oil which are soluble in acetone, odorous exhaust was obviated. Another important step was the construction of the Ossag oil-testing machine by means of which the physical properties may be determined. It has been introduced in England under the name of the Sternol machine and has already been used in an extensive series of tests.

TABLE A—ANALYSES OF AUTOMOBILE CYLINDER OILS—BY W. JONES

No.	Specific Gravity	Specific Viscosity at 80°F.	Specific Viscosity at 212°F.	Carbon	Flash Point, °F.	Fire Point, °F.
1867	0.8684	1.7647	1.1428	0.30%	325	358
1868	0.8981	3.2353	1.3214	0.70	384	432
1869	0.8992	4.1764	1.3571	0.75	404	460
1870	0.8948	6.1764	1.4285	1.03	422	474
1890-a	0.8755	5.7657	1.4285	0.80	458	504
1890-b	0.8651	3.8571	1.3035	0.72	448	510
1894-a	0.8985	3.5714	1.2857	0.95	408	454
1894-b	0.9103	4.4643	1.2500	1.70	428	474
1896-a	0.8860	2.2500	1.3214	0.65	420	476
1896-b	0.8866	3.6428	1.2500	1.00	424	476
1896-c	0.8868	4.4071	1.4285	1.10	428	478
1896-d	0.8874	6.3214	1.4285	1.10	428	490
1896-e	0.8976	18.6071	2.0000	2.35	454	526
1897	0.8747	3.8571	1.4285	0.44	438	494
1914-a	0.8953	5.1428	1.2857	0.520	412	464
1914-b	0.8756	4.1085	1.3571	0.70	434	490
1914-c	0.8801	7.5353	1.5357	0.93	450	506
1934	0.8705	3.3928	1.2143	0.55	440	494
1935	0.8777	3.5714	1.2500	0.78	438	486
1936	0.8738	3.5714	1.2500	0.53	442	494

In articles to appear later we will analyze and enlarge upon these analyses.



The Engineers' Forum

Discusses Contet's Formula for Counter-Springs—Analysis of Problem

Forrest R. Jones, Knoxville, Tenn., Sets Forth His Views on Them

KNOXVILLE, TENN.—Editor THE AUTOMOBILE:—Relative to the abstract and discussion in THE AUTOMOBILE of September 26, of Mr. Contet's article on Countersprings:

While teaching in different universities several years ago, the formula of which Mr. Contet has given a development was used whenever occasion called for it. My development is thought to be somewhat simpler and possibly more readily understood.

A specific numerical example of a compound spring made up of two simple springs which are exactly alike may serve to primarily give a clear conception of the action of such compound springs.

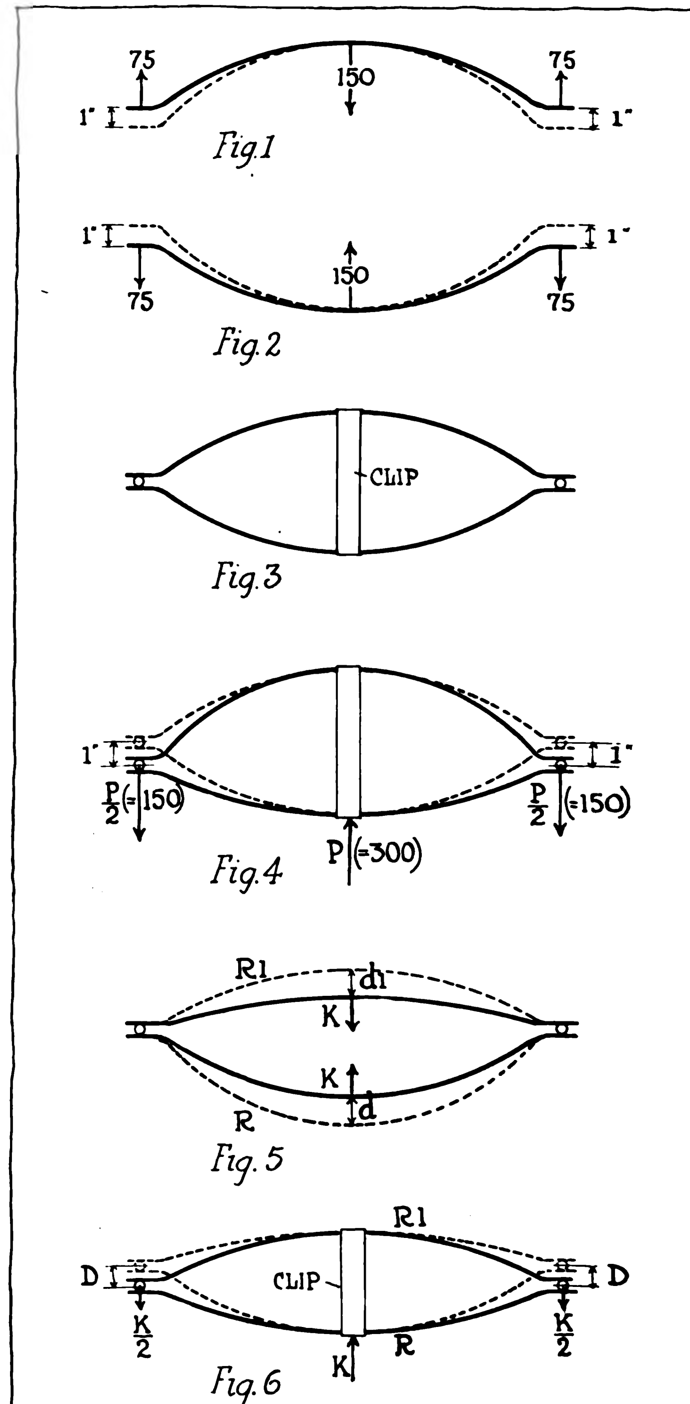
In Fig. 1 a simple spring is shown acted upon by a force of 150 pounds at its middle, and by the corresponding forces of 75 pounds each at the ends of the spring. The solid curved line shows the form of the spring while stressed by these forces, and the broken line shows the form which the spring takes when unstressed. The ends of the spring are deflected 1 inch from the unstressed position by the applied forces.

In Fig. 2 another simple spring exactly like the first one when turned upside down is shown similarly with forces of the same magnitude as before, but applied in opposite direction.

In Fig. 3 the two springs of the preceding figures are shown placed together while still deflected by the forces and with a clip over them to hold them in their deflected, or stressed positions. A small roller is shown between the springs at each end. These rollers are added merely as a convenient aid in the description of the action of the compound spring formed by placing the two simple ones together. The tension in the clip is 150 pounds, and each half of the spring is deflected 1 inch from its unstressed position. The pressure between each roller and the corresponding end of each spring is 75 pounds.

In Fig. 4 the compound spring of Fig. 3 is shown by solid lines in the form it takes when a force P, which may be considered as the pressure of a car axle against the spring, acts upward against the middle of the lower half of the compound spring, and the corresponding forces, each having the value P/2, act downward on the rollers between the ends of the component simple springs. The two forces, each equal to P/2 and together equal to P, may be considered as the load that is applied to the compound spring. The broken lines represent the form of the compound spring before the load is applied, which form is the same as in Fig. 3.

The deflection of the loaded compound spring in Fig. 4 is 1 inch from its unloaded position. The movement of the compound spring while being thus deflected increases the deflection of the lower half, but allows the upper half to recoil to its unstressed form corresponding to that of the broken line in Fig. 1. In order to deflect the lower spring 1 inch, the pressure of each roller against the corresponding end of the lower simple spring must be increased by the amount of 75 pounds (since the flexibility of the simple springs is such that 75 pounds at each end cause a deflection of 1 inch). Before applying the load to the



Figs. 1, 2, 3, 4, 5 and 6

compound spring the downward pressure of the upper simple spring against each of the two rollers was 75 pounds, but after the deflection of 1 inch there is no pressure of the upper simple spring against the rollers. Therefore 75 pounds of each force

P/2 are required to keep the pressure of each roller against the corresponding end of the lower simple spring the same in amount after deflection of the compound spring as it was before applying the load.

In order to obtain the required increase of 75 pounds pressure of each roller against the corresponding end of the lower simple spring, the force P/2 must be 75 + 75 = 150 pounds. The corresponding value of the upward force P, at the middle of the compound spring, is of course 300 pounds, which is the amount of the load applied to the compound spring to deflect it 1 inch. The deflection of the compound spring for a load of 150 pounds is 1-2 inch, since the deflection is proportional to the load, for a load not greater than 300 pounds.

The flexibility of the compound spring composed of the two like simple springs is therefore only one-half as great as that of one of the simple springs when the load is applied as shown.

If the two simple springs were used as an elliptic spring, the clip then not being used, the deflection for a load of 150 pounds applied at the middle of the upper simple spring would be 2 inches, in which case the flexibility is four times as great as when one of the simple springs is used as a counterspring and the load applied as in Fig. 4.

If two simple springs like that of Fig. 1 or Fig. 2 are placed side by side so that the load is divided equally between them, then a load of 300 pounds will deflect them 1 inch from their unstressed position, and a load of 150 pounds will deflect then 1-2 inch. When used in this manner the two simple springs together have a flexibility equal to that of, and are twice as strong as the compound spring with the load applied, Fig. 4.

Now taking up the more general case as discussed in THE AUTOMOBILE:

In Fig. 5 two simple springs, R and R_1, are shown as elliptics, with rollers between their ends for convenience of discussion, as before. The solid lines show the positions of the two simple springs when each is subjected to a force K as shown, and the broken lines represent the positions which the springs take when no bending forces are applied to them.

In Fig. 6 the broken lines have the same form as the full lines in Fig. 5. These two broken lines, Fig. 6, represent the positions of the two simple springs, R and R_1, when bound together by a clip which holds the simple springs bent to the respective amounts, d and d_1, and when no load is applied to the compound spring. The solid lines in Fig. 6 represent the position of the compound spring when deflected by a load K, half of which is applied to each of the rollers.

In order to deflect the lower simple spring R to the amount D from the broken-line position of Fig. 6, the sum K/2 + K/2 = K of the pressures of both rollers against the lower spring must be increased by the amount $\frac{D}{d} \times K$. The accompanying recoil of the upper simple spring R_1 to the same amount D corresponds to a decrease of the sum K of the pressures of the ends of the upper spring against the rollers to the amount $\frac{D}{d_1} \times K$.

The required increase, $\frac{D}{d} \times K$, of the total pressure against the ends of the lower spring R is equal to the difference between the applied load K and the decrease $\frac{D}{d_1} \times K$ of the sum of the pressures of the upper spring R_1 against the rollers.

Accordingly,

$$\frac{D}{d} \times K = K - \frac{D}{d_1} \times K$$

whence,

$$\frac{D}{d} = 1 - \frac{D}{d_1}$$

$$\frac{D}{d} + \frac{D}{d_1} = 1$$

$$\frac{Dd + Dd_1}{dd_1} = 1$$

$$D\frac{d + d_1}{dd_1} = 1$$

$$D = \frac{dd_1}{d + d_1}$$

or,

$$D = d\frac{d_1}{d + d_1}$$

The value of the last fraction is less than unity, since the numerator d_1 is smaller than the denominator $d + d_1$. Therefore, the value of D is always less than that of d.

If the applied load is taken as 100 kilograms, and the corresponding respective deflections as Y, y and y_1, as is done by Mr. Contet, then the equation corresponding to the first one of the last group is:

$$\frac{Y}{y} \times 100 = 100 - \frac{Y}{y_1} \times 100$$

which reduces to the form

$$Y = y\frac{y_1}{y + y_1}$$

The last equation is the same as that obtained by Mr. Contet. —FORREST R. JONES.

Note—Mr. Jones assumes that the load K produces the deflection D in the compound spring RR_1; next he reasons that to produce this deflection in the lower spring R alone the load must be $\frac{D}{d} \times K$; next, that the pressure or load required for producing the deflection D in the compound spring is smaller than that required for producing it in the lower spring alone; less by $\frac{D}{d_1} \times K$; and so far he is in full accordance with the data. This last and correct assumption, however, means just exactly the opposite of his final result; for, if the load required for producing a given deflection (D) is smaller for the compound spring RR_1 than for the simple spring R, then the former is the more flexible of the two. And the final result of both Mr. Contet and of Mr. Jones is that the compound spring is less flexible, that D is smaller than d.

The error lies in the application of the mathematics. Up to the point of formulating the equation

$$\frac{D}{d} \times K = K_1 - (\frac{D}{d_1} \times K)$$

there is question of numerical values for the deflections only, but the moment Mr. Jones says: "Accordingly" followed by the above equation, this condition of the inquiry is changed. The object is now to determine a deflection operating in a certain direction, namely, from the load toward the ground. In this deflection of the compound spring, toward the ground, the tension of spring R and that of spring R_1 are both involved, but these forces work in oposite directions. If the load applied to overcome the tension of spring R is considered positive then the load required to overcome the tension of spring R_1 must be considered negative. As the equation is formally correct, however, one can work with it so long as one remembers that d_1 is in reality a negative quantity in so far as it is used for determining the deflection D of the whole compound spring. The final equation

$$D = d\frac{d_1}{d + d_1}$$

can therefore be accepted if it is understood that the value of d_1 is negative. Now, with d_1 negative, the final conclusion of Mr. Jones as well as of Mr. Contet falls to the ground. The value of the last fraction is NOT less than unity, and D is NOT smaller than d. In other words, the flexibility of the compound spring is greater than that of the simple spring R, which was also the first assumption of Mr. Jones, although by putting it into equations he afterwards made it contradict itself.

The error in Mr. Jones's reasoning is exactly of the same nature as that which was pointed out in Mr. Contet's develop-

(Continued on page 907)

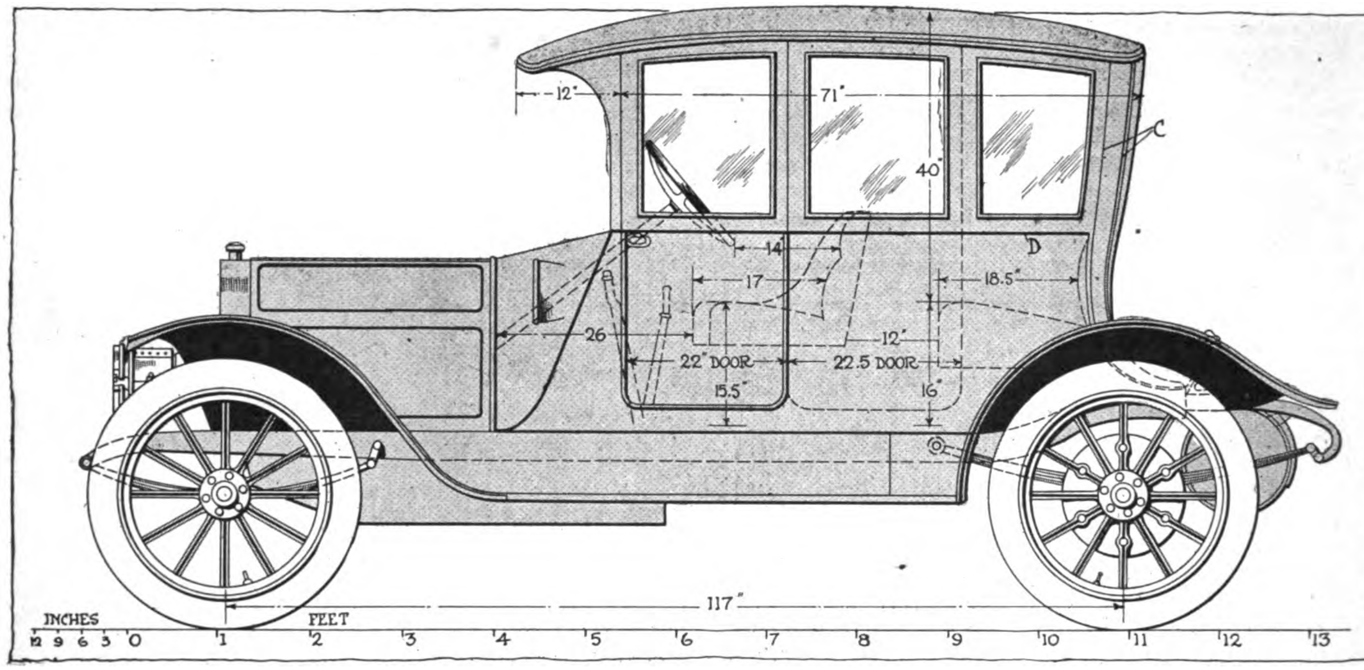


Fig. 1—Side view to scale of coupé design adapted to Hudson 37 chassis

Four-Passenger Hudson Coupé Design

Body Designer Utilizes Hudson 37 Chassis and Makes Few Changes—Drawings and Plans Drawn To Scale

By George J. Mercer

IN continuation of the plan mentioned in the last issue of THE AUTOMOBILE, the accompanying illustrations show another design of a closed body suitable for use on a medium-powered car. This design is totally different from the one preceding; it is made to carry four passengers, including the driver. There are two seats, and each seat is comfortable for two people, and the doors for entrance are offset, that is, not in line across the body; the one on the left side is forward and is used for entrance to the front seats and that on the right side is toward the rear and is used for entrance to the rear seats, the width of the door openings is, respectively, 22 and 22 1-2 inches and is so indicated on Fig. 1.

Allowance for the individual tastes and requirements of the customer is becoming every day a more important part of the duties of the automobile salesman. Close competition in the trade caused by the advance upward of the standard of the popular-priced car has made it possible for the public to become more dictatorial and the desires of the customers are acceded to as far as the selling profits of the business will permit.

The buyer who is able to purchase an article costing from about $2,000 and up is not willing to be treated collectively and this trait in human nature is well understood and provided for by the successful salesman. As a rule, the changes suggested by a customer are made in good faith; it is the critical buyer who forces up the standard and the reform work of the particular person benefits all that come after. Style and appearance count largely in determining a purchase.

This body design is unique in that a straight-line effect is obtained in combination with the arched roof and the ogee sweep of the back line, Fig. 1, the exterior or border lines of this body all show a curve that combines with the curves of the mudguards, yet the straight lines of the belt, the window lines and the cowl hood give the body a severe tone and the rear view, Fig. 4, is made to carry out this same design.

The body is illustrated mounted on a Hudson-37-1912 chassis, 118-inch wheelbase, 36-inch by 4-inch tires, and as the body will weigh when finished ready to mount approximately 650 to 700 pounds, it will come well within a reasonable limit to mount on a standard chassis. The design is made to harmonize with and utilize the standard mud-guards, lamps, tire holders, etc.; the electric lighting system as regularly provided will furnish current for the dome light in the roof and the standard dash lamps can be inserted in the recessed pockets of the cowl hood, Figs. 1 and 2. The extra tires are carried on the right side on the running-board; this is the position provided for on the standard car and by retaining this place the regular equipment for holding the tires can be utilized and the offset body doors permit of this selection. This utilization of the standard parts of the car as far as the harmony of design will permit will help out in the final cost more than the actual saving in money, because a commercially-purchased article will be cheaper than one specially designed.

The change-speed and brake levers on the standard chassis are located, for convenience of operating, inside the standard foredoor body and the body design illustrated is wide enough to allow ample room for these levers and also hand clearance around the steering wheel. The plan view, Fig. 3, will give the thickness of the framing, which will equal the inside of the framing at a point opposite the steering wheel. Measured in this way, the hand clearance is approximately 2 1-2 inches, and, as the wheel is above the framework and opposite the glass, the hand clearance will be even greater, or approximately 3.5 inches.

The body is made to cover the entire length of the frame back of the hood and without having to add the customary box at the rear. The actual body length inside is short for a four-passenger job, yet plenty of room is allowed for all seatings; this is accomplished because the 22-gallon gasoline tank is at the rear of the chassis and outside the body lines and the space under the front seat is utilized for foot room for those seated at the rear. The space allowed between the back of the front seat and the front of the back seat is only 12 inches, Fig. 1, but the maximum entrance from the doorway to the rear seat is obtained by tilting the back of the front seat forward as indicated in Fig. 1, and the full complement for the seating of those occupying the rear seat is the utilization of the space under the front seat for foot space.

It might be added that the location of the doors in the design is not arbitrary, the door on the left side can be placed opposite the right side one, but as it will necessitate lifting up one side of the front seat to pass forward and as there will be two doors, the design will certainly appeal to many customers.

The principal dimensions of the body sizes, doors and seating arrangements are indicated by figures on the drawings, and these proportions are ample for the average person.

Ventilation is by a shutter at the offset part of the body at the front, indicated in Fig. 1, a long, narrow shutter with provision for operating from the inside is placed at each side at the point above mentioned, and the cowl, which is graduated from the hood to the body, is provided with recessed pockets for the electric lamps, and at the top is a glass panel E, Fig. 3; this panel is serviceable to light up under the cowl and permit the reading of indicators on the dash, etc.

Locker space is under the rear seat and at the each side under the cowl at the front. The side windows are made to drop full length and are of 1-4-inch plate glass without wood frames. They shut out the rain when raised by setting over the guard rail on the middle bar. The rear window is stationary. The front glass is made with rain vision and swings outward like the conventional windshield for this style of body.

The construction of the body is reasonably simple, the lower sides, back and door panels, also cowl, are made from 16-gauge aluminum; the panels are shaped and fastened at the rear to the wood corner pillar, and the edges covered with metal molding, as illustrated in Figs. 1 and 4; at the front the side panels terminate as shown in Fig. 1, at this line they turn at right angles to the side surface, with the angle of turn slightly rounded and at the intersection with the cowl the panel is stopped and fastened.

The rear corner pillar is made to form the slight rounded corner, Fig. 3, and no metal is used to cover the wood forming the round. The upper panels are .375-inch whitewood and are glued to the rear pillar and the framework, the lower edges of these wood panels are lapped over the top edges of the aluminum lower panels 1-4 inch and rounded over to give a molding finish. The line of demarkation on the lower finish line of the wood panels on the sides and back is marked D, Figs. 1 and 4. C, which is indicated in like manner on the same two figures, shows the terminating line of the wood panels, back and sides, where they lap over on the corner pillar; these panel edges are made to continue the line of the metal molding up the corner pillar, and the lines C show a molding finish up the whole length of the pillar and the rounded part of the pillar in between these lines show a recessed effect.

The body framing is of good ash and the roof of the regulation laminated whitewood or pine sheathing. The method of framing will be such as general practice dictates. Wood panels have been specified wherever possible, because the design is special and consequently a quicker delivery can be secured if the older-fashioned methods are resorted to. Metal panels undoubtedly give better service as the outer covering on bodies to be used as automobile bodies, but occasionally there are cases where the design and construction are such that equally as good results can be obtained where part of the panels are of wood and part of metal, and it is perfectly safe to guarantee that wood panels as specified will give a good account of themselves.

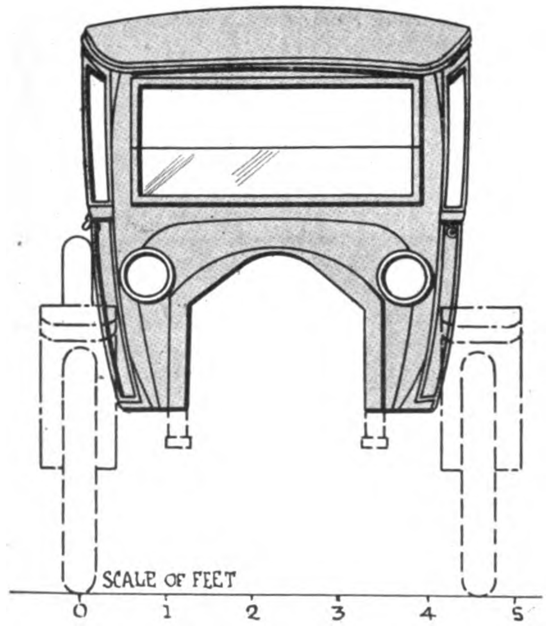


Fig. 2—Front view of Hudson 37 coupé design

The cost of a body made according to the design submitted and with a trimming, interior appointment and color specification in accord with the standard of that furnished by the car makers on their stock bodies, will be approximately $1,300 to the customer, and this should include mounting the body on the chassis. This price is a fair average and will permit the customer to select from samples furnished by the best wholesale houses of broadcloths or other suitable cloths for trimming the interior, laces for binding, carpet for the floor, silk for the curtains, toilet and card cases and a choice of the style of trimming. In regard to this latter it is generally left to the workman to use a style of trimming that will accord with the material selected.

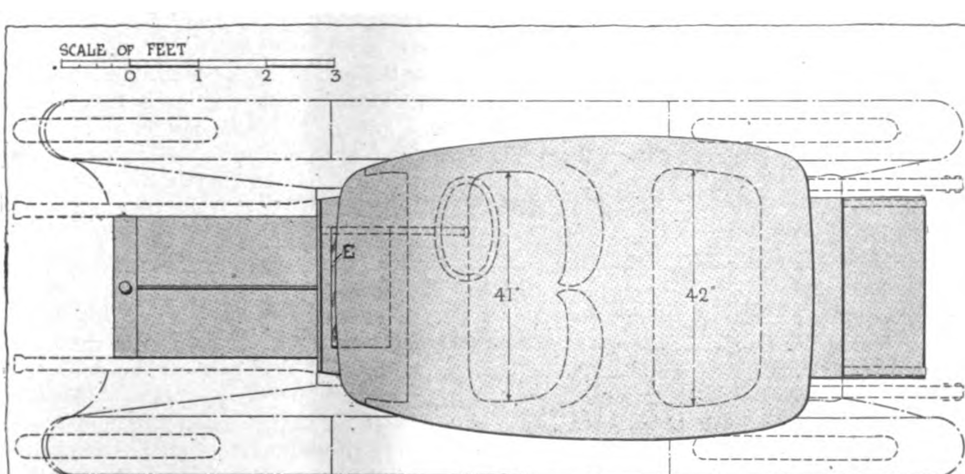


Fig. 3—Plan of suggested Hudson coupé

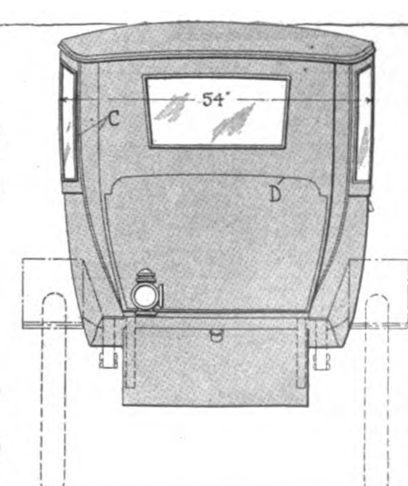


Fig. 4—Rear view of coupé

Foreign Constructions Designs and Practices

Shopman Made Practical Steel Tester—Suggested Machine for Quick Work and Reliable Results

German Factory Tests 4,000 Pieces of Steel Every Working Day in Year

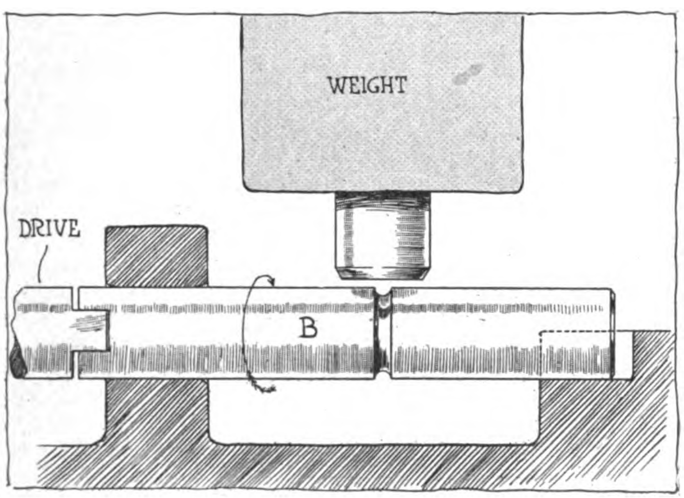


Fig. 1—Method of subjecting automobile steels to shocks to determine ultimate ability of parts in the actual car service

TESTING over 4,000 pieces of steel every working day in the year, and using the shopmen instead of the laboratory to do this testing, may seem a herculean task, but it is what is being done in one of the best European plants and it is being done well, done cheaply and is leading to excellent results.

In the majority of factories the laboratory does all of the testing of steels for use in the company's product. It determines the necessary analysis of the steel, but it has not sufficient capacity to adequately test all of these materials when delivered to the factory; this is the great present weakness of the factory laboratory and the point where there is not sufficient overlapping between laboratory and shop.

Then too many of these materials delivered as per specification at the factory have to be heat-treated after received and it is here that the real difficulties of the shopman begin: More than likely some of the material is unsuited to the actual work to be done. The laboratory merely hopes that heat-treatment will whip the material into shape. Frequently good results come through this process. But there are times when anything but a happy conclusion is reached.

Knowing perfectly well that the laboratory is not to be blamed for the practical happenings of the every-day work, the shopman struggles along under his heavy and swelling burden, or can it be said of him that he has over much time to spend on betterment plans? It may be that the shopman's failing lies in his very ability to struggle along. It might be better for him were he to take a day off occasionally and think it over; to devise means for subduing the situations which are obviously too penny-wise and pound-foolish to be tolerated any longer.

In nine cases out of ten, however, it is more a question of facilities than it is a want of appreciation of the necessity for making tests of materials to use. The shopman can scarcely be expected to have the nimbleness of the laboratory man in the laboratory. What he needs is represented by such facilities as will warn him in time of any danger to the good of his processes that may be lurking in the offing. If the danger is offset by due warning, to ask the laboratory to conduct an investigation is a simple thing to do. The real difficulties of the shop are not completely met by the laboratory. The only pleasant aspect lies in the fact that a good working laboratory reduces the actual number of the shop difficulties which come to the surface from day to day.

Remembering that all great difficulties are mastered by handling their details one at a time, what possible harm would befall the shopman who would conclude definitely to test all of the steel he might use, making a separate test for each condition of heat treatment on each grade of steel used? It might be said, what an enormous undertaking! That is exactly what shopmen did say. All of their failures are readily traced back to this simple statement. **After all it is not such a large undertaking as it looks.** There is one plant wherein an average of over 4,000 determinations are made on steel every working day in the year. The men who make these determinations enjoy every minute of the work. That it pays to make them is a proven fact, indeed, it would not be possible to get on without doing this work. The quality of the product has grown to the point of demanding just this painstaking care in the process.

It has been found that a simple shock-bending test on a test bar of steel, if the process of test is systematically made, develops faults, if they exist in the steel, very promptly. Fig. 1 indicates to a shopman how he can rig up a test of this sort. The test-bar B of the steel to be investigated, is turned down to some convenient size as: Diameter of round section, .47 inch; length between supports (5 diameters) 2.36 inches, and length over all to suit testing machine.

The bar is notched at the middle by a round nose tool to a depth of say 1-8 inch. The important point is to make all test-bars the same size and to have the notch uniform between them. The next step is to provide a falling weight and a means for rotating the test bar so that it will always be rotated an exact number of degrees for each blow struck by the falling weight. In this class of tests it is the custom to rotate the test bar either 90 per cent. or 180 per cent. for each blow struck. The force of the blow must be regulated depending upon the time that can be allowed in making the test. The great question in practice is to adopt a uniform system and to subject all test bars to the same uniform practice. It is not actually necessary to know just what the force of the blow is so long as the same force, under identical conditions, is suffered to play against all test bars used. In the plans of testing it is purposed to so weight the hammer and regulate the diameter and notching of the test bar as to bring about destruction of the test bar within a short time. It would be a small item in point of first cost to rig up a battery of these hammers and provide means for changing speed of blows, and rotation of the test bar would suggest itself to the operator. In the Krupp motors at Essen, where these tests were examined, it was found that the persistance of the steel depended upon its quality. Time and experience with the trip hammer method has enabled the operators there to judge very quickly whether or not a given heat of steel is worth duplicating.

These little testing machines are very noisy. To put up with them it is necessary to place them in a separate room to locate the room as far away from other activities as possible is good practice.

In plants which are fitted out with compressed air equipment, remembering that compressed air hammers are capable of striking blows of some force at a very rapid rate, it is more than likely that preliminary testing work might be done by this equipment. Fig. 2 suggests the idea. The details would depend upon the design and construction of the compressed air tools available in a given case. It is very possible that anyone of a dozen riveting machines now available on the market would readily serve for this class of work. These machines strike a rapid series of sharp blows. It would be a simple matter to give the test bar rotation so that the average travel would be 90 degrees of rotation of bar per blow of the hammer. A properly sized notched test bar would show fatigue very quickly under this treatment.

It is speed of test that the shopman must have. He cannot wait for a week to get results. There would be a certain indefiniteness about the results in an attempt to make a statement, but this point would be submerged in the general accuracy of comparison which is all that practice demands. If a steel comes up to the sample furnished by the laboratory for a given grade of steel, nothing more is required. If it is desired to get finer readings for purposes outside of shop practice, it is time to call upon the laboratory for work to be done. With means for testing, to turn out bars of the several classes of work passing through the plant would necessarily have to be made a routine matter.

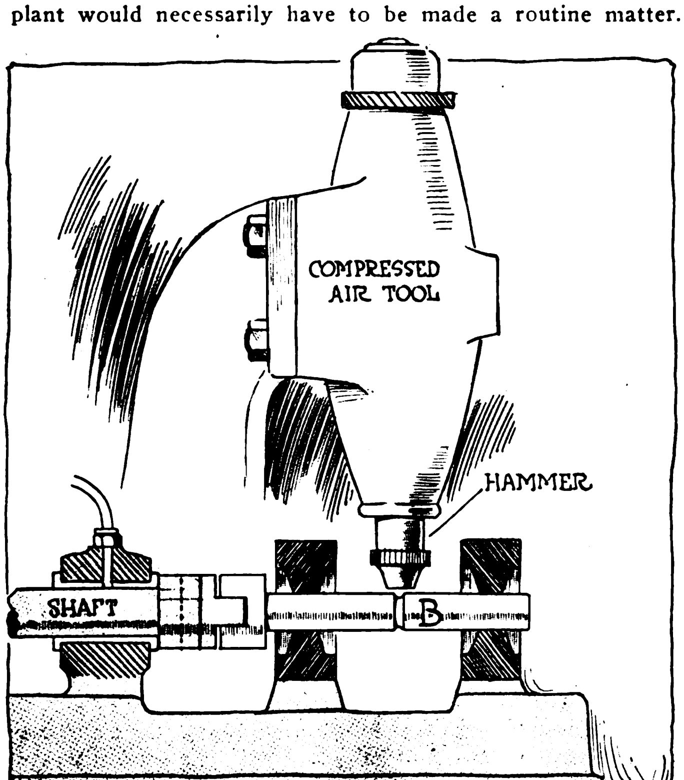


Fig. 2—Compressed air tool for use by workman in shop testing of steel to get reliable and quick results

Harking Back a Decade

What the Motoring Publications of 10 Years Ago Had To Say on Live Matters of the Day

FROM *The Automobile and Motor Review*, October 25, 1902:

The progress made by the automobile since 1895, when the first of the American endurance runs was held, is shown by the percentage of starters that finished in each event of the kind. In 1895 there were two runs; in 1901 there was one and the recent tour of the Automobile Club of America to Boston and return was the fourth. The results are indicated in the following tabulation:

Date	Distance	Starters	Finishers	Per cent.
1895	38	5	1	20
1895	39	7	3	43
1901	394	78	41	53
1902	488	75	68	90

The Chicago Automobile Club gave its twice-postponed race meet at the Harlem race track last week. The attendance was small and the contesting fields very thin. Nevertheless the Peerless Yellow Kid and the Winton Pup in addition to about a dozen locally owned cars performed creditably. The track was so slow that the best time made was just under 1:30 for the mile.

Automobile exports in August reached a total of $71,907, against $56,300 during the same month of 1901. During the first 8 months of the fiscal year the exports were $786,137 against $128,702.

Albert C. Bostwick is demonstrating the first model of the new Pan-American car which is made at Mamaroneck. The motor, body and many if not all of the mechanical parts are imported and the justification for the name lies in the fact that they will be owned by Americans. The car has a motor with four cylinders and is rated at 40-horsepower. The mechanism resembles that of the Mercedes but in appearance the car is more like a Mors.

The effect of the long, novel, orderly and interesting procession during the Automobile Club of America run to Boston upon the average citizen could not fail to be of the best. It is likely that the run has done much for the interests of motoring throughout New England. To the country at large, as informed by the press, the run has given good evidence of the practicability of the automobile in actual road use.—*Editorial.*

The Cleveland Automatic Machine Company, a New Jersey corporation capitalized at $850,000, is preparing for business. A. L. Garford is president and it has been announced that $150,000 of the capital will be used in Ohio. The company was formerly known as the Cleveland Machine Screw Company. Mr. Garford is also president of the Federal Manufacturing Company, of Elyria, O.

The National Association of Automobile Manufacturers has has made preliminary plans for the automobile show will be held in connection with the Louisiana Purchase Exposition at St. Louis in 1904. Manufacturers are invited to send in applications for space as soon as possible. No space charge will be made against exhibitors and a reasonable amount of electric power for lighting the displays of the exhibitors will be furnished free.

The annual automobile show which will be held in Paris next season promises to set a new mark in the growing industry. The show will be much larger than ever before and a number of American manufacturers will be represented. Special efforts are being made by the management in connection with the National Association of Automobile Manufacturers to secure a large American representation. The foreigners, on their part, are planning to show at the St. Louis fair.

What to Do With Your Tires in Winter; Trouble With the Oiling System; Principles of the Claudel Carbureter; Advantages of Air Substitutes; Quick Blowout Explained; Alignment of Drive Mechanism

Winter Care of Tires

EDITOR THE AUTOMOBILE:—I want to jack up my car for the winter; is it necessary to remove the tires?

I would like to offer a suggestion in the way of carrying tire chains. Several times I have noticed that it took me a considerable time to put these chains on because I had not taken sufficient care in putting them away and the links stood up on end at the time and had to be pushed in place before stretching the chain over the tire. If the chains are laid carefully on the ground first and then doubled over, Fig. 7, and placed in a bag it will save a lot of time in trying to put these on in the wet.

Germantown, Pa. FRED MARSHALL.

—It would be better to remove the tires because they can be taken care of more thoroughly. The United States Tire Company gives the following advice for the winter care of tires: In laying up a car the tires should be removed from the rims and washed thoroughly with soap and water. They should then be carefully wrapped in strips of paper or cloth and stored in a dark place which is kept as nearly as possible at a temperature of 50 degrees.

If the tires are to remain on the wheels for a considerable length of time while the car is out of service the wheels should be jacked up and only about 5 pounds of air left in each tire. This keeps the tubes in shape and also preserves their softness and pliability. When the wheels are not jacked up and the car is allowed to stand for any length of time the tires should be kept well inflated and the car moved occasionally so that the tires will not flatten from standing too long on one spot.

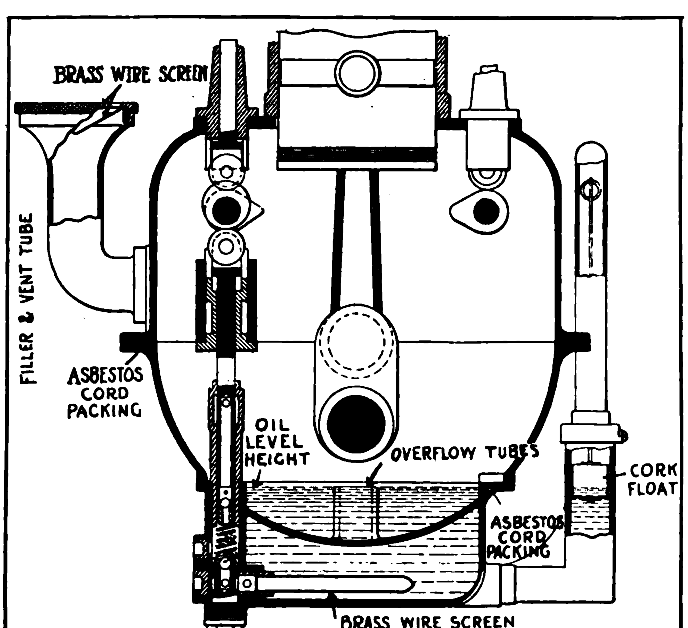


Fig. 1—Section through the Ohio crankcase, showing oiling system

Oiling System on Ohio 1911

Editor THE AUTOMOBILE:—I am running a 1911 Ohio touring car and I am troubled lately by smoke. Would you please tell me if this is due to a defect in the oiling system or what the cause can be. Of late I am also troubled by a large carbon deposit in the two front cylinders. Is this due to the same cause, do you think, or some other?

Saginaw, Mich. OHIO.

—The Ohio motors are lubricated by a system which is contained almost entirely in the crankcase. The oil reservoir, Fig. 1, holds about a gallon of oil, is located in the lower half of the crankcase. The oil may be put into the reservoir in two ways: by pouring it through the breather tube or into the filler pipe which is located on the side of the motor. Within the base of the crankcase and extending vertically there is a plunger pump, driven by means of an eccentric off the camshaft. This pump takes the oil from the base of the reservoir through a strainer tube projecting laterally into the reservoir and forces it up into the upper part of the lower half of the crankcase. This part of the crankcase contains a number of troughs into which the oil is fed by the pump in sufficient quantities to keep them constantly filled to such a height that a proper dip of the connecting-rod into the oil will take place.

There is one of these troughs to each cylinder. As the rapidly revolving connecting-rods are whirled into the oil pools contained in the splash troughs they churn the oil into a vapor which fully envelops the crankcase and lubricates every moving part contained therein. This includes the cylinder walls, connecting-rod bearings, main bearings, camshaft bearings and cams.

After lubricating all the bearings the oil will drain back into the bottom of the crankcase and will pass through the system again, after being strained. A constant level throughout the crankcase is maintained by means of partition walls placed laterally across the crankcase between each pair of cylinders.

Worn piston rings in the two front cylinders is no doubt the cause of your trouble. If you will renew the rings there is no doubt that both the smoking trouble and the carbon will disappear as the oiling system is automatically taken care of and will not change if once adjusted correctly.

Information Wanted on Claudel

Editor THE AUTOMOBILE:—Would you kindly tell me where I can get information and prices of the Claudel carbureter in this country.

Newport, R. I. H. W. BENTLEY.

—The Claudel carbureter is shown in section in Fig. 5. It is of the eccentric float-feed type, so called because the float has not the same axis as the jet. The carbureter is hot water jacketed about the mixing chamber and so arranged that the air is taken both through and around the jet. A tube surrounds the gasoline lead to the spray nozzle and is pierced by holes at the bottom and top. The air passes into the lower holes in the tube and comes out through the upper ones which surround the spray nozzle. Easy starting is obtained with this starter by fitting a shutter into the air channel which permits the suction of the motor to fall upon the jet, thereby securing a very rich mixture for starting purposes.

This carbureter is not handled in this country at the present time, but full information may be had concerning it by addressing the Claudel Carbureter Company, 41 Rue des Arts, Seine, France.

Advantages of Air Substitutes

Editor THE AUTOMOBILE:—Can you furnish me with, or inform me where I can obtain a list of the different varieties of pneumatic tires that have been patented?

2. What are the disadvantages of fillers for tires as a substitute for air, and do you think fillers will ever supersede air?

Chattanooga, Tenn. J. I. LEVENTHAL.

—Any patent attorney will secure this list for you at a very reasonable price. It is a matter of looking up records at the patent office and cannot be secured from them directly. THE AUTOMOBILE has no lists of these patents.

2. The most serious disadvantage under which some of these tires have labored is that the inner filler crumbled to pieces and disintegrated in a very short time. Others could not be left standing for even a short time without the tire having a flat place where it had been left standing. Still others were all very good on asphalt roads, but on other roads developed the same fault as solid rubber tires, that is, too much vibration and bad riding qualities. There are some of these fillers on the market now, however, which are said to overcome all these difficulties. They knead back together if torn apart, will not tend to flatten and are very nearly as resilient as air. THE AUTOMOBILE cannot predict that fillers will ever take the place of pneumatic tires.

Where the Power Goes

Editor THE AUTOMOBILE:—I understand that in an automobile motor that very little power is actually exerted by the road wheels in propelling the vehicle after it once attains a uniform speed on level ground. Take a motor which develops a certain horsepower when turning at the number of revolutions required to propel the vehicle at a given speed. This motor uses up so much fuel; now where does it go? There are a certain number of heat units in each gallon of gasoline. This is converted into useful work to some extent, while most of it is lost because of the inefficiency of the machine. Can THE AUTOMOBILE tell me where the power that is in a gallon of gasoline goes?

Saratoga, N. Y. CHARLES DIXON.

—Your question, which is an interesting one, can be answered graphically to good advantage. In Fig. 2 is represented a gallon jug of gasoline which is fed to the motor. Of this the heat units contained in 35.9 per cent., according to tests which have been made on several different motors, is thrown away in cooling the motor; 35.2 per cent. passes out through the exhaust; 8.1 per cent. is lost through friction in the motor and in heating the incoming charge, etc. The other losses are also indicated in the illustration, which shows that on the average there is only about 6 per cent. of reserve power for the hills and for accelerating.

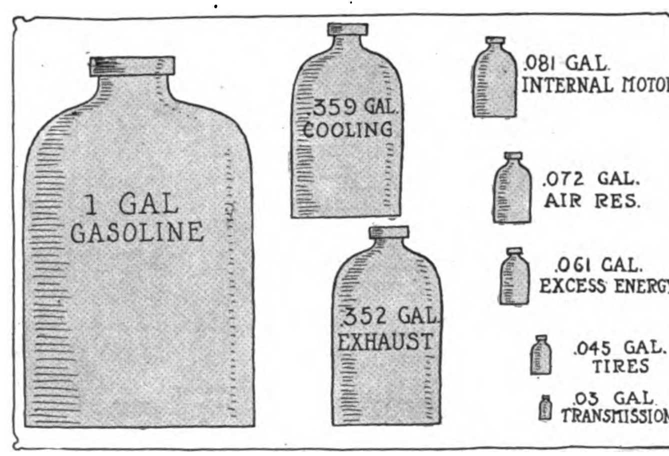


Fig. 2—Graphic representation of the various sources of power loss

Questions Regarding Comfort

Editor THE AUTOMOBILE:—1. Is it not best to run with advanced spark when car is on level road and gas throttle very nearly closed?

2. Is it not best to retard spark when pulling grade if engine begins to pound? Then will you please explain how automatic spark advance can take care of the above opposite conditions, namely, when car does not require much power, spark is advanced, throttle almost closed; next, when car calls for all the power engine has, spark is retarded, throttle is wide open.

3. I am buying new car and want to equip it with anything that will make it more efficient and more economical. The question of shock-absorbers I can't decide. I do not believe in friction absorbers, because when springs are depressed they cannot again come to normal position with friction absorbers. Hydraulic absorbers are not only very expensive, but give considerable trouble in keeping them properly adjusted to give desired results. Is there any known, actual tests that prove beyond doubt that absorbers give a tire more mileage? Which is the

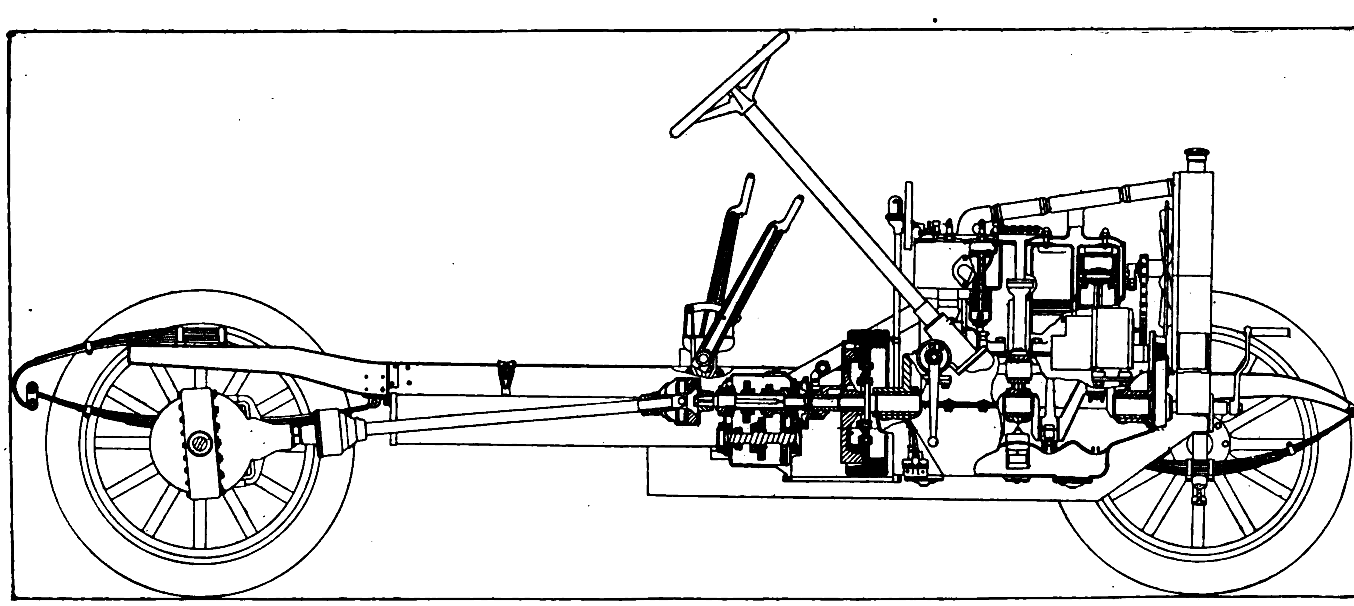


Fig. 3—Section through the driving mechanism of a modern automobile to illustrate features which take care of load changes

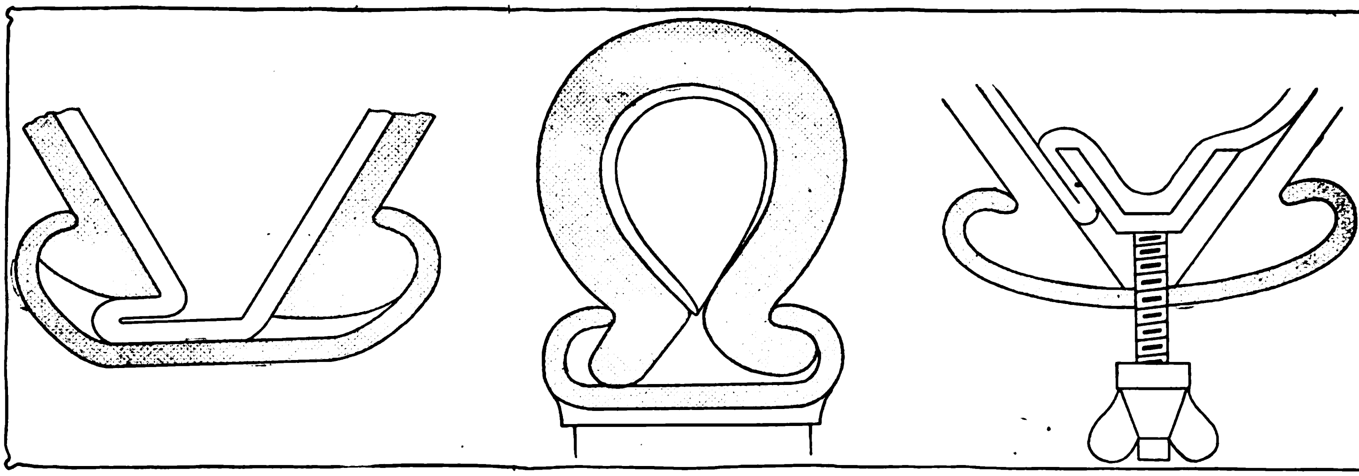


Fig. 4—Showing how the inner tube may be pinched between the bead and the casing, the bead and the security bolt or the two beads

best principle of construction for absorbers, friction or hydraulic?

4. Will you name an equipment for Overland 69 T, equipped with electric starter and lights, that you think covers everything needed for light touring that will aid comfort and pleasure, and for the best possible good of the car and tires, regardless of equipment first cost.

5. Can an electric foot-warmer be operated on a car of the above make, without injury to battery or generator?

6. If foot-warmer can be used, I take it for granted, electric stove, such as toaster, could also be operated from battery when car is standing.

7. I have used an oil heater in car with curtains all down in very cold weather much to the comfort of the passengers. Is this dangerous or not? Danger of oil exploding, I mean.

8. How can you explain that Ford cars generally give more mileage per tire, with their small tires, than most other cars do with much larger tires and in the face of the cry of tire manufacturers to use larger tires. You can put two sets of tires on Ford car for practically the same money you can put one set of 34 by 4 on a car, and if you will get up statistics you will find the two sets of small tires will give one-third to one-half more mileage. You answer, the light car, of course. Then why should not manufacturers strive to lighten up on their cars?

Inman, S. C. G. C. F.

—1. Yes, always run with the spark as far advanced as you can possibly keep it without allowing a knock to occur in the motor.

2. It is necessary to retard the spark or the motor will knock. It must be remembered that the position of the spark is governed by the speed of the motor. When the throttle is wide open and the motor is on a hill under heavy load it will be turned over slowly. The spark will therefore be automatically retarded; a feature which is just what is required or the motor will knock. When the motor is speeded up the spark is automatically advanced, generally by some centrifugal device, and the correct condition for high speed is obtained. A skilled operator can get better results with a hand advance than he can with a fixed spark or one with automatic advance, but the average operator will obtain better results with the automatic.

3. In spite of the many skeptical people the general opinion is that shock-absorbers contribute materially to the easy riding qualities of the car. That this is generally accepted is shown by the fact that the higher priced cars put them on as standard equipment. There have been no actual figures as to tire saving, but the Truffault-Hartford concern estimates it at 10 per cent.

4. The equipment furnished you with your new car besides the addition of tire chains, lap robes, three extra shoes, six extra tubes, blowout patches, warm clothing and a trunk rack will be sufficient. There are endless luxuries which could be added to this and which would no doubt add to your comfort. With this equipment, however, you would not have to struggle.

5. There are no electric heaters of which THE AUTOMOBILE has any record that could be used in connection with the generator or accumulator.

6. Perhaps a heater of this type could be used for this purpose, but the cooking would be very slow work. For a camping trip a small alcohol or oil stove in addition to the regular campfire would be much quicker.

7. An oil heater in good condition will not explode, but there is always a chance.

8. As you have stated, the matter is one of weight. The added comfort of a big, heavy car with its great roominess and luxurious upholstery and heavy motor must be paid for by the greater cost of tire upkeep and first cost. The man who cannot afford all these should be content with a small car.

Tire Blew Out Very Quickly

Editor THE AUTOMOBILE:—I had just made a tire change the other day when the very tire upon which I had been working blew out within 3 minutes after I had fixed it. What could have caused this? I am running an old-fashioned car and am using regular clincher tires.

New Haven, Conn. GEORGE WESTON.

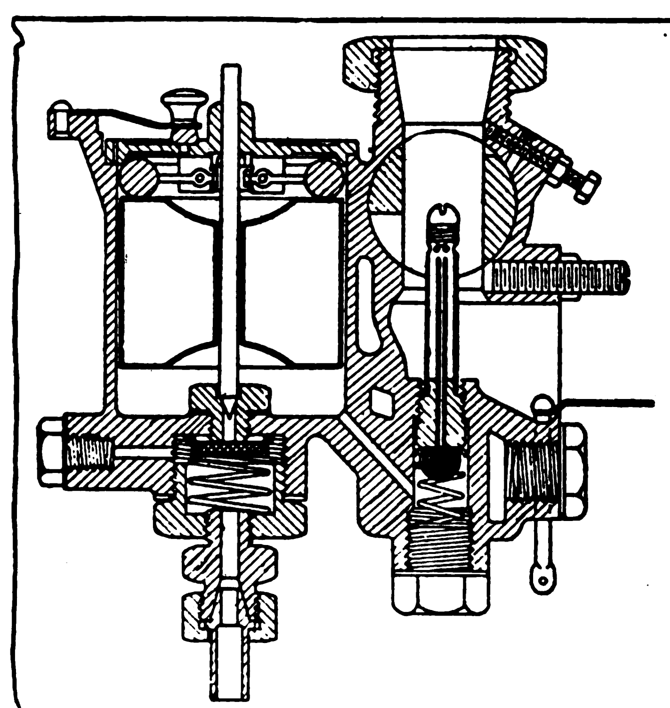


Fig. 5—Sectional view of the Claudel carbureter made in France

—This is no doubt a case of bad assembly. The inner tube became pinched between the tire iron and the rim or perhaps in one of the three ways depicted in Fig. 4. If you will take care in putting the inner tube into the casing the chances are that an accident of this nature will not occur. It is very easy, however, to have a tube blow out through not assembling it properly. When security bolts are used as they were in many of the old-fashioned tires it is easy to see the dangers which surround the inner tube. As shown in the illustration the tube may be pinched between the casing and the rim, the bolt and the casing or occasionally when the tire is underinflated between the two beads of the casing at the top of the tire owing to the tendency of the casing to spring together at the top. In springing the second bead in place after the casing and the tube are on the tire care must be used in not pinching the tube with the tire iron. Many cuts are caused this way and great care is needed in avoiding them, especially if the casing be new and stiff.

Details of Marmon Control

Editor THE AUTOMOBILE:—The spark and throttle of my Marmon car will not stay in place. The factory sent me new gears and advised me to change the springs back of the friction plunger, but after using the car for a short time they became loose. What is the cause?

New London, Conn. PHILIP MORRIS.

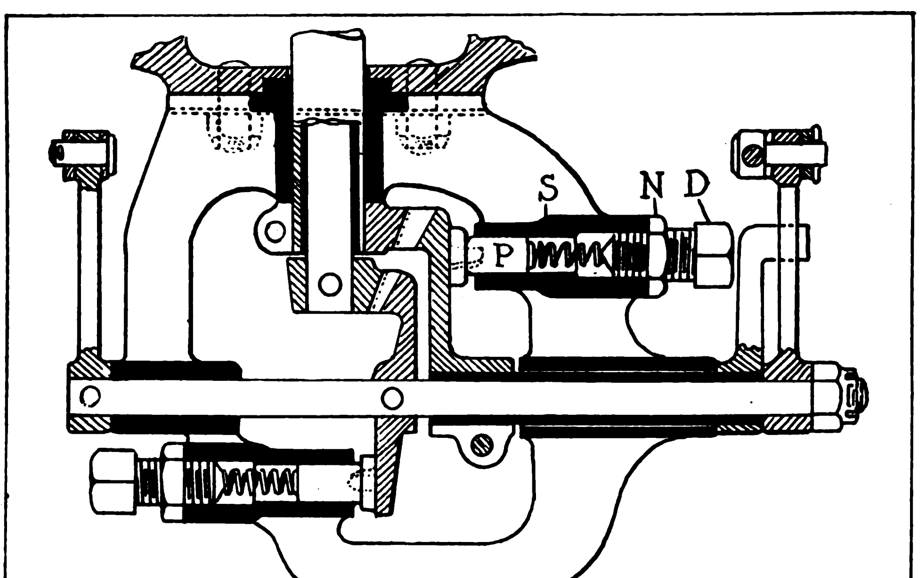


Fig. 6—Control mechanism on the Marmon with a view of the adjustments

—If you have changed the springs back of the friction plungers at the lower end of your steering columns as advised by the factory, perhaps you have not screwed in the studs D, in Fig. 6, to give the springs S the required compression. If you will adjust the springs so that the plungers T press sufficiently hard upon the backs of the gear sectors the friction should be great enough to hold your engine control levers as tightly as desired. It is possible that you have not tightened the locknuts N on the spring adjusting studs. These nuts must be tight in order that the adjustment may be maintained.

Taking Care of Alignment

Editor THE AUTOMOBILE:—What provision is made in the Haynes car for taking care of the change of alignment due to the additional weight of five passengers over the weight of the empty car. That is, if the drive is aligned for an empty car will it make a difference in the arrangement of the parts below the floor of the car if five passengers are carried? I am mentioning the Haynes cars for example as I drive one of these cars now and have owned one of the earlier models for some time. I have heard it stated that a car will have a practically straight-line drive when loaded, while the drive will not be straight when the car is empty. I should like to know what compensating device takes care of this and how it is taken care of automatically.

New York City. CHARLES ATWOOD.

—This cannot be better explained than by a section through the whole car which will show how the drive is transmitted from the motor to the wheels. In Fig. 3 this section is given. It will be noted that the motor sends the power through a clutch into the gearset. From the gearset it is transmitted through a universal joint and then back to the propeller shaft. At the rear end of the propeller shaft there is another universal joint through which the power passes into the rear axle. The rear axle shafts transmit the power to the drive wheels and it is thus that the car is driven. Now when a heavier load is placed in the car it will tend to flatten out the springs at the front and rear. This is especially so in the rear, as most of the passengers will be carried in the tonneau of the car, which is mounted practically over the rear axle. The rear of the car sinks down about the front suspension points as a pivot, although the front suspension itself will be lowered slightly. The frame carrying the motor and the gearset is a part of the main frame which carries the body. Therefore the motor and gearset will be lowered slightly in relation to the rear axle tending to bring the propeller shaft to a more horizontal position. The propeller shaft is permitted to move on account of the universal joint connection it has with the main gearset and rear axle and therefore there is a perfect accommodation for the changes of alignment. It is perfectly true that a motor car will have a more efficient drive when loaded. In fact, many of the four and five-passenger cars are designed to have a straight-line drive when loaded. This form of suspension is common in the modern motor car. It will accommodate not only for changes in the total load, but also for changes in alignment which are caused by the rocking motion of the car when striking spots on the road that cause the springs to come into sudden action.

Carbureter Chokes

Editor THE AUTOMOBILE:—When I am first starting out with my car I notice that it will start to skip if I press down quickly on the accelerator pedal. What is the cause?

C. PETERS.
N. Y. City.

—This does not show that there is anything wrong with the carbureter or the motor. The accelerator pedal should be pressed down gradually, at least until the motor has become warmed up or else the mixture will be too rich and will not be thoroughly vaporized. This, of course, causes the motor to misfire. After the motor has become warmed up, however, this should not occur and you should be able to open the throttle quickly without the motor choking or missing fire.

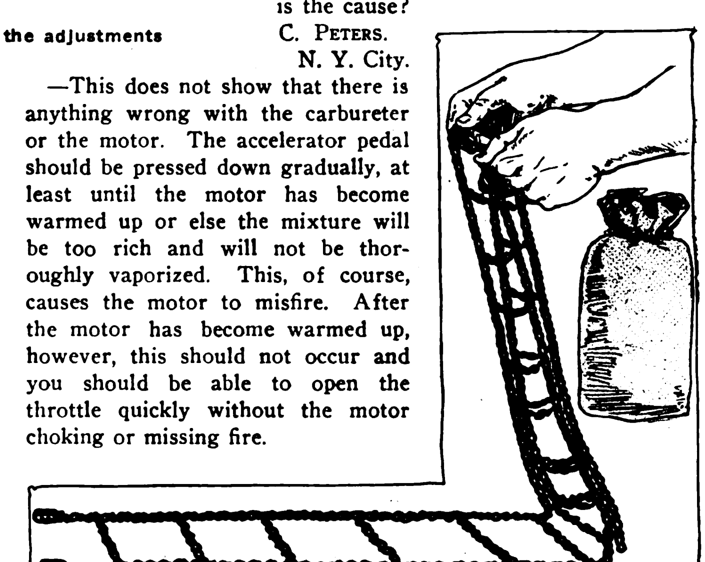


Fig. 7—How to carry tire chains so that they are always in condition

Stearns-Knight Motor Continues Unchanged

Retaining Motor Construction, Stearns Adds Six-Cylinder Model —Bodies Are of Original Design

Fours Are Fitted to Three Different Wheelbases and Sixes to Two—Complete Equipment a Feature

THE Stearns Company, which 1 year ago introduced the Knight type of sleeve-valve motor and entirely discontinued the marketing of poppet-valve types, announces for 1913 that it will build this motor in four and six-cylinder designs, and is continuing its four-cylinder motor without practically any mechanical changes. The six-cylinder model will not be announced for some weeks, but will be characterized by a long-stroke Knight engine and will be built with 134 and 140-inch wheelbases depending on the body type.

The four-cylinder model for next season is very similar in chassis design to this year's model, but fitted with a line of entirely new bodies. The chassis is made in three wheelbase lengths: 116 inches, roadster; 121 inches, five-passenger, and 127 inches, seven-passenger body. Limousine and landaulet are mounted on either 121 or 127-inch size. It is fitted with a motor of twin castings 4.25-inch bore and 5.5-inch stroke, a bore-stroke ratio of 1.29 and a horsepower rating of 28.9. This horsepower figure is claimed to be quite below the actual power generated at running speed.

The characteristic curves for this motor shown by Fig. 4 will bring out this low rating. The motor will develop this horsepower at a speed of 800 revolutions per minute, while its maximum output is seen to be about 64 horsepower at 2,400 revolutions. Naturally its torque, or turning effort, is least at this speed, being 124 pounds. The maximum torque of 181 pounds is at a crankshaft speed of about 1,100 revolutions per minute. In test, the car has required about 160 pounds torque from the motor to start, which means a horsepower somewhere in the neighborhood of 10.

Fig. 4 brings out the interesting fact that the top of the torque curve is at a higher motor speed than is common in most automobile motors. The almost straight horsepower curve is remarkable as the result of consistent valve timing at all running speeds of the motor.

Below is given a table showing the performance of the motor at different crankshaft speeds. These data were obtained on a prony brake test of the four-cylinder Stearns-Knight.

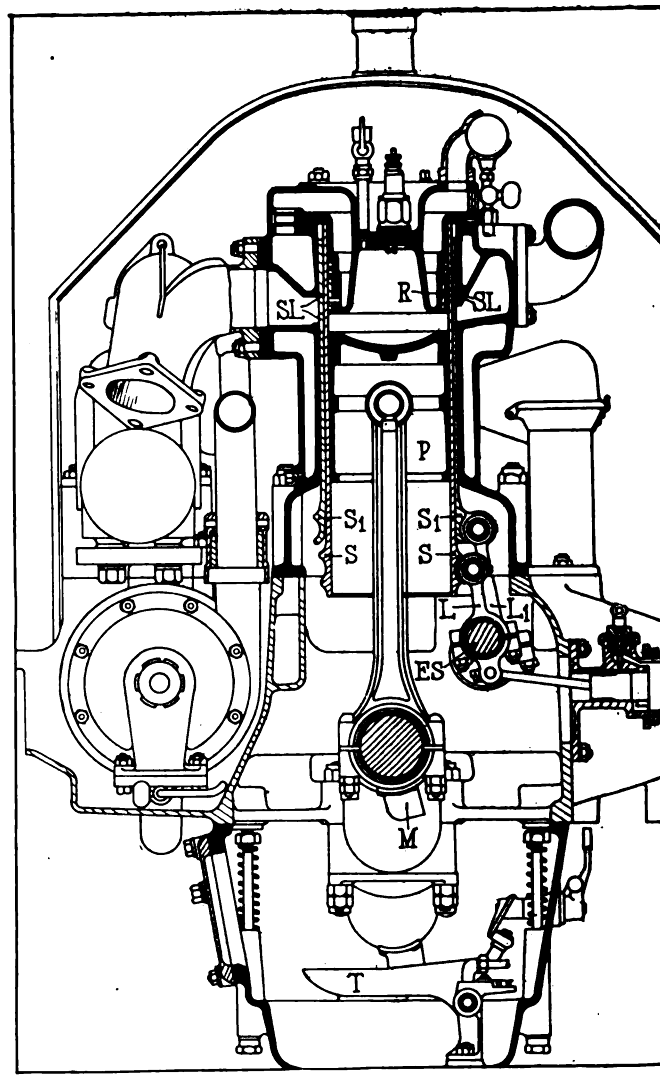


Fig. 2—Cross-sectional view of Stearns-Knight motor, illustrating sleeve construction and design of oiling system

Crank-shaft speed, r.p.m.	Horse-power	Torque pounds	Crank-shaft speed, r.p.m.	Horse-power	Torque pounds
400	14	168	1500	51.2	175.5
500	18	171	1600	53.8	172.5
600	22	174	1700	55.3	168.5
700	26.2	176.5	1800	57.2	164.0
800	30	178	1900	59.0	160.0
900	33.7	179.5	2000	60.3	154.0
1000	37.5	180.5	2100	61.5	147.0
1100	40.5	181.0	2200	62.7	140.0
1200	43.5	180.5	2300	63.7	132.0
1300	47.2	179.0	2400	64.5	124.0
1400	48.8	178.0			

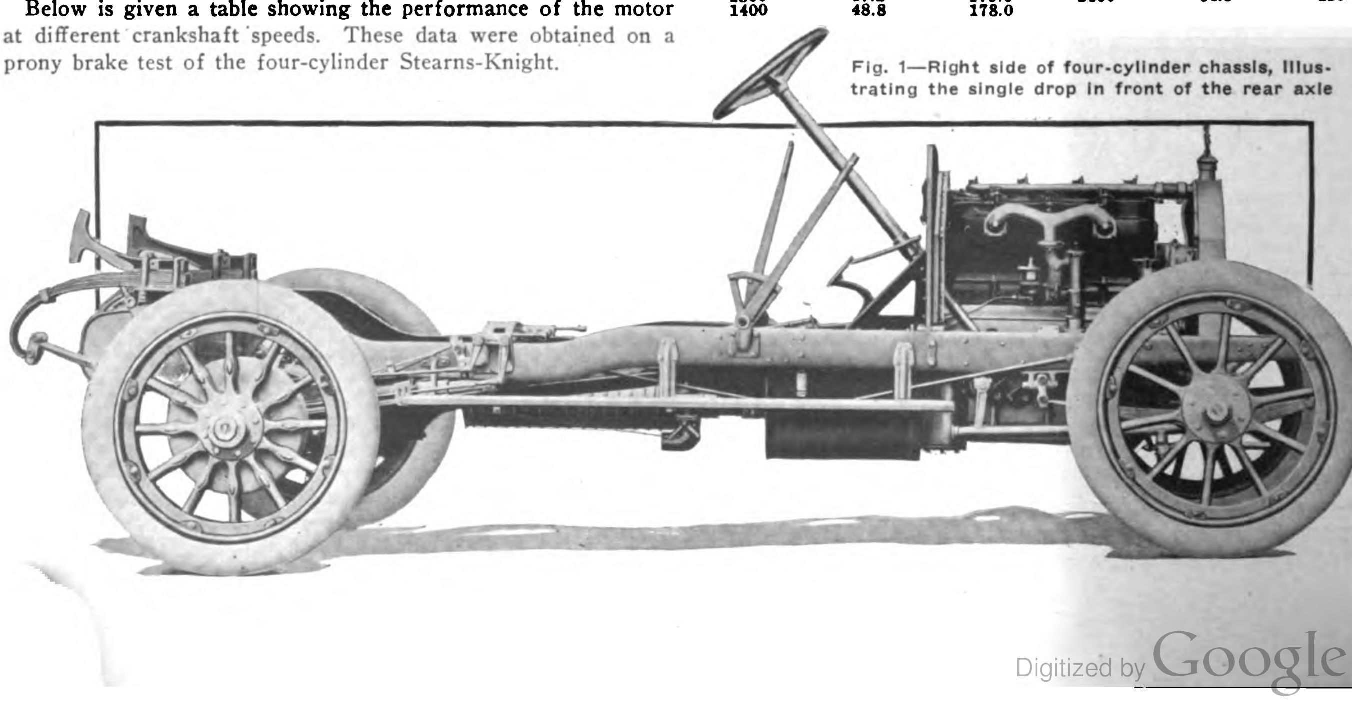


Fig. 1—Right side of four-cylinder chassis, illustrating the single drop in front of the rear axle

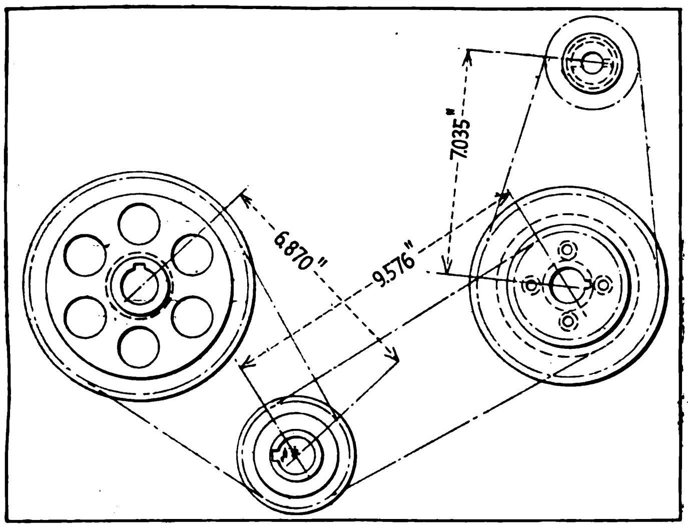


Fig. 3—Schematic view of chain drive used for actuating the sleeve-eccentric and magneto shafts

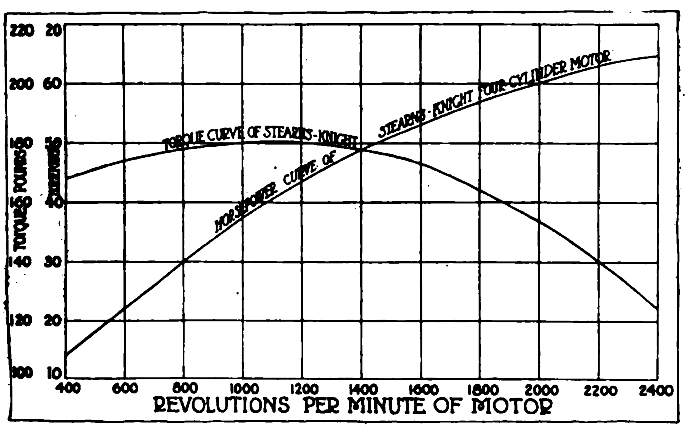


Fig. 4—Horsepower and torque curves of four-cylinder Stearns-Knight motor used in 1913 cars

In making practically no change whatever in this year's power plant, the Stearns people point out that before adopting this type of motor exclusively, their engineers made a number of improvement in it, and the performance since its adoption has been such that no material changes have been found desirable.

In fact, before finally pinning their faith to the sleeve-valve creation of Charles Y. Knight, the Stearns designers worked out extensive improvements in the inventor's conventional type of engine. These improvements were sanctioned by Mr. Knight and later adopted, at least in principle, by the Daimler, Mercedes, Panhard and Minerva concerns abroad. One difficulty which was formerly experienced with the Knight motor was to get it to idle successfully, that is, to pull evenly when running at low speed under no load. After making many tests, the Stearns engineers became convinced that the difficulty lay in the entrance of a slight amount of air through the exhaust port. This port, when not open, was thought to be hermetically sealed, but by means of several delicate tests, it was found that there was a slight amount of leakage between the concentric sleeves, the cylinder wall and the piston. Having thus located the trouble, it was a simple matter to remedy it, although just what method was adopted, the Stearns company refuses to divulge. It is easy to surmise how such leakage could be prevented, however. Clearances might be altered, compression rings changed, or any one of several other means for preventing leakage might be resorted to.

The Stearns concern, before adopting the motor, also worked out a change in the oiling system. The movable troughs into which the ends of the connecting-rods dip were retained as Mr. Knight had designed them, but in addition an auxiliary oiling device connected to the throttle adopted. This device consists of a small oil tank located on the back of the dash, under the hood. When the motor has reached an excessively high speed or the load has become very heavy, this auxiliary lubricator comes into play, feeding through the intake ports. In the early sleeve valve motor, a sort of auxiliary oiler, feeding through the cylinder heads, was used. This, however, gave more or less trouble and had a tendency to smoke. It is claimed for the Stearns system that it entirely eliminates this trouble.

Other changes were made by the Stearns concern, of which only the most meager sort of information is obtainable. The so-called junk-ring or cylinder head ring R, Fig. 2, was redesigned, making it heavier and wider, the system of forcing oil to the crankshaft bearings was changed, the construction of the oil gauge, shown in Fig. 3, was altered, the water manifolding was changed, and so on.

With the construction of the Stearns-Knight motor readers of THE AUTOMOBILE are no doubt familiar, the principle of operation and details of this motor having been exhaustively treated in the technical press within the past year. However, for the benefit of those who are not familiar with the motor, the general features of the Knight construction will be reviewed. The sectional cuts and illustrations herewith will serve to bring out the constructional details clearly. Fig. 2 shows the end section of the motor. There are two concentric sleeves, S and S1, which fit within the cylinder, between it and the piston, P. These sleeves move up and down, being actuated by the small connecting links L and L1, which are connected to the eccentric shaft, ES. In the upper ends of these sleeves S and S1 there are slots cut, which serve as port openings, admitting or exhausting the gas at the proper time. When the exhaust or inlet openings in the two concentric sleeves register with one another

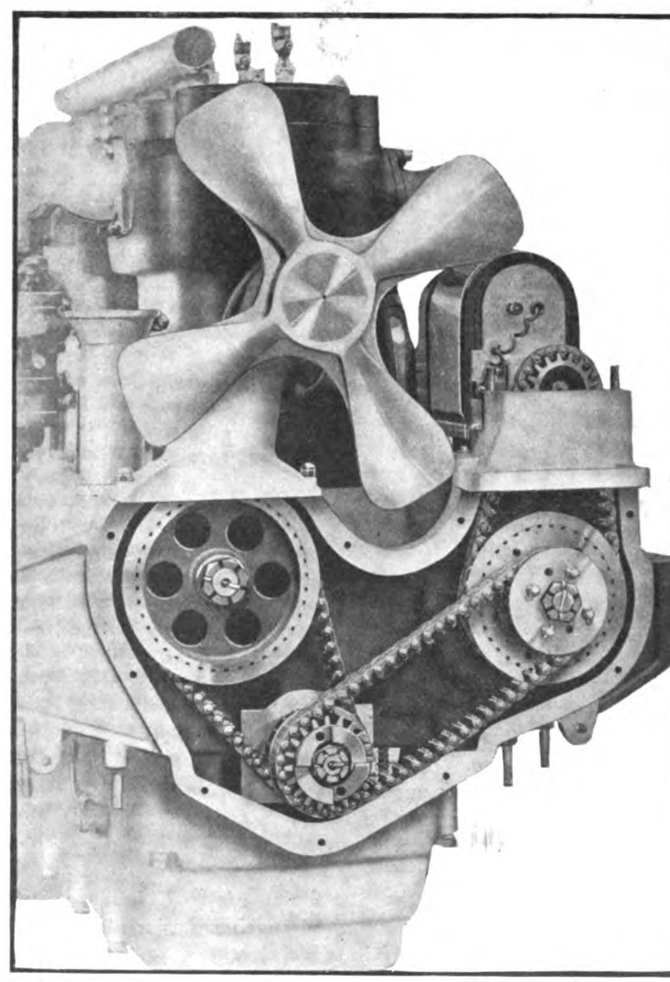


Fig. 5—Front view of Stearns-Knight motor with front plate of timing gear case removed, showing silent chain drive

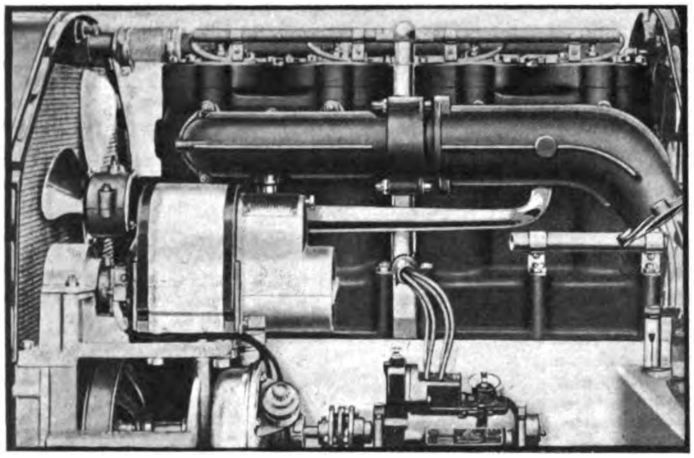


Fig. 6—Left side of the motor, showing the arrangement of Mea magneto and Deaco lighting generator

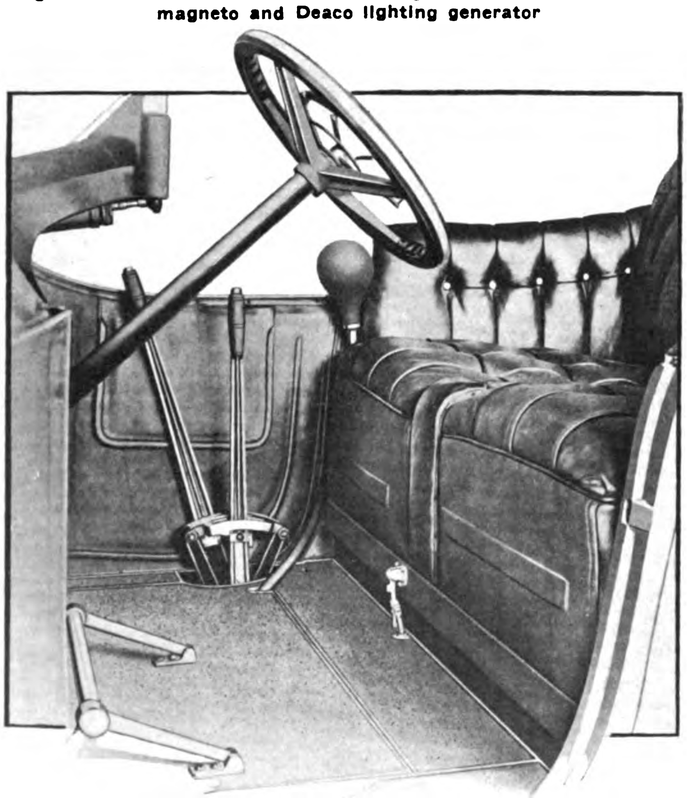


Fig. 7—Driver's seat and control mechanism of 1913 Stearns-Knight, showing provision for operator's comfort

and with the opening in the cylinder wall, there is a path from within the cylinder into the exhaust or inlet manifold, as the case may be. Of course, as soon as the three openings begin to register, there is a partial passage between manifold and cylinder, but the port is not fully open to the gases until all three openings—the two sleeve slots and the cylinder passage—are in exact register. In its motion up or down, the opening or slot in one of the sleeves may be opposite the cylinder opening, but no gas can escape or enter because the passage is barred by the other sleeves. The movement of the sleeves is so timed that only during the exhaust stroke or the suction stroke do the two sleeve ports come together, at the same time being opposite the opening in the cylinder wall.

It will readily be seen that the timing of the Knight motor is a difficult proposition, and required much experimentation and testing during the period of its development.

The movement of the sleeves up and down is very much less than that of the piston, hence the problem of oiling is not a troublesome one. In fact, the stroke of the sleeves is only about

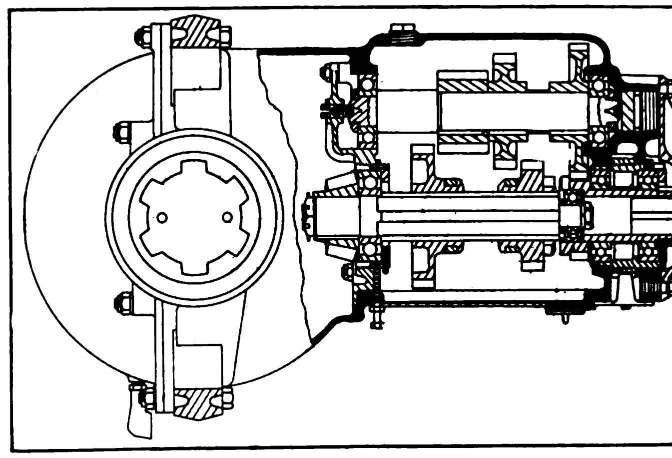


Fig. 8—Sectional view of rear unit of Stearns car, in which the drive is taken directly from the gearbox to the differential

one-tenth that of the piston. That is, while the piston stroke is 5.5 inches, the stroke of either sleeve is only 1.125 inch. For a crankshaft speed of 1,500 revolutions, which means a piston speed of 1,375 feet per minute for a 5.5-inch stroke, the sleeve speed is approximately 140.5 feet per minute, nearly a tenth, as already stated.

The slots in the upper ends of the sleeves are not the same width for both intake and exhaust sides. The lengths are the same, but the width of the exhaust opening is slightly wider, as seen from the following:

	Port length	Port width
Inlet	124 degrees (4.5 inches)	.5 inch
Exhaust	124 degrees (4.5 inches)	.625 inch

The exhaust is made slightly larger than the intake to allow for the complete escape of the exhaust gases and the thorough scavenging of the cylinders.

Silent Chain Drive Throughout

The conventional type of poppet valve motor has its camshafts driven by helical or spur gears, connected with the crankshaft. The Knight motor does not use gears to drive its eccentric shaft, which imparts the sliding motion to the sleeves through the small connecting-rods. This shaft is driven by silent chains, as shown in the illustration. A silent chain also connects the crankshaft with the magneto shaft. The latter in turn drives the electric generator shaft through another silent chain. A diagram of the chain drive and sprockets is given in Fig. 3. The distances between centers of the various sprockets are also noted. They are as follows:

Eccentric to crankshaft	6.87 inches.
Crankshaft to magneto shaft	9.576 inches.
Magneto shaft to generator shaft	7.035 inches.

Each of the three chains has a different width. The chain dimensions are given:

	Width	Thickness	Length
To eccentric shaft	1 inch	.5 inch	29 inches
To magneto shaft	.75 inch	.5 inch	29 inches
To generator shaft	.5 inch	.5 inch	27 inches

The sprockets have diameters as below:

Eccentric shaft	6.424 inches, pitch diameter.
Crankshaft sprocket for eccentric shaft drive	3.222 inches, pitch diameter.
Crankshaft sprocket for magneto shaft drive	3.222 inches, pitch diameter.
Magneto shaft sprocket	3.222 inches, pitch diameter.
Generator drive sprocket on magneto shaft	5.462 inches, pitch diameter.
Generator shaft sprocket	1.406 inches, pitch diameter.

The oiling system of the Stearns-Knight has been briefly touched upon, but special attention should be drawn to the varying-lever oil troughs, T, Fig. 2, one of which is under each of the connecting-rod ends. The scoops M on these rod ends dip into the oil contained in the troughs T and splash it onto the sleeves, bearings, etc. The troughs are connected to the throttle. Opening the throttle raises them so that they will hold more oil, thus feeding more to the bearings, while closing the throttle lowers the troughs so that less oil is available for the connecting-rod ends. A gear pump furnishes oil to the troughs by means of oil leads. Another oil lead goes to the fan, while a fifth passes to the dash sight-feed. The additional lubrication of the sleeves has already been taken up. It will be noticed that they are grooved to aid in the even distribution of the oil over their entire bearing surfaces. The Stearns-Knight utilizes essentially the same oiling system as that of the Daimler-Knight motor of England.

Fig. 6 shows the left side of the motor. The Mea magneto is mounted below the generator, as seen. The generator furnishes current for all lamps, but not for starting. The American Ever-Ready spring starter is used, and is placed at the front of the motor. It consists of a coiled spring of sufficient strength to turn the crankshaft a number of times when released. After the engine is running, the spring is re-wound automatically. The generator is a Vesta and a Stromberg type of carbureter is used. The gasoline tank is carried at the rear and fuel is fed to the carbureter at 2 pounds pressure.

The eccentric shaft and the crankshaft have five main bearings, each as follows:

Eccentric shaft bearings	Diameter, inches	Length, inches
Rear	1.001	2.625
Center	1.250	3
Two intermediate	1.250	2
Front	1.250	2.5625
Overall length of eccentric shaft		32.125

Crankshaft bearings	Diameter, inches	Length, inches
Rear	2.5	5.25
Center	2.5	3
Two intermediate	2.5	2
Front	2.5	2.5625
Overall length of crankshaft		40.2375

The connecting-rod bearings on the eccentric shaft have a length of 1.6875 inch and a diameter of 1 inch. The piston connecting-rod bearings have dimensions of 2.25 by 2.5 inches diameter and length, respectively. The sleeves, cylinder walls and jacket walls all have a thickness of 5-32 inch.

Details of Transmission Set

Passing from the motor to the transmission and rear construction: The gearbox is at the rear axle, bolting to the differential housing, Fig. 9. The clutch is of multiple-disk type, having fabric facings on the plates where they engage with one another. The clutch is located within the flywheel. From this point the power is transmitted through a universal joint, and thence to the propeller shaft, which is inclosed within a substantial torque tube. This latter is hinged in the conventional way at either side of the shaft to a cross-member of the frame by means of two arms, which form a U-shaped construction. At its rear end the torsion tube bolts directly to the gearset housing.

Radius rods run diagonally from the center of the intermediate cross-frame member to either end of the live rear axle, maintaining the correct alignment of the latter. The gearset provides three speeds forward and reverse. It is of the selective type, gear-shifting being effected through the use of an H-gate. Three-quarter elliptic springs are used in the rear, being shackled outside the frame. The front springs are of the half-elliptic class, and sufficient for the requirements, due to the weight distribution of the car over the front and rear axles respectively. The construction of the suspension on this year's Knight cars is such that easy riding is one of the special claims for the product.

The frame is dropped at about the middle, and raised at the rear so as to clear the rear axle. Brakes are internal expanding, two for each drum. One drum is placed within the other concentrically, the same type of cam-operated expanding shoes being used for both.

The standard form of right drive and right control have been retained, despite the rumors to the effect that the Stearns concern had shifted to the left drive on its new fours. It is not known as yet as to whether the drive and control of the new six will be right or left.

A slight change has been made in the steering mechanism, the steering gearcase now extending from below the frame to the floor boards, giving greater rigidity of the entire steering column. Another minor change which is worthy of note is the placing of all wiring for the electric lighting system on the body. This wiring was formerly run along the frame, but it has been removed from the chassis so as to eliminate any danger of short-circuiting, regardless of how slight that possibility is when the wires are properly inclosed in substantial conduits.

It is in the bodies that the greatest Stearns changes have been made. The appearance of the car, even though it is mechanically nearly a counterpart of its predecessor, is different. The straight-line, flush-side body is now used, the door hinges being concealed. The running-boards have been cleared of tool boxes, battery boxes, tires, etc. Upholstery has been made deeper than last year, and the equipment is more complete. The most important items which come under the latter head are the self-starter, silk mohair top, windshield, Warner speedometer, Klaxon horn, electric generator for lighting all lamps, demountable rims, etc. In fact, it is the intention of the company to adhere to the policy which the leading manufacturers have decided upon for the coming year, and make 1913 its equipment year. The metal fittings, lamps, etc., on all cars are finished in nickel plate and black enamel.

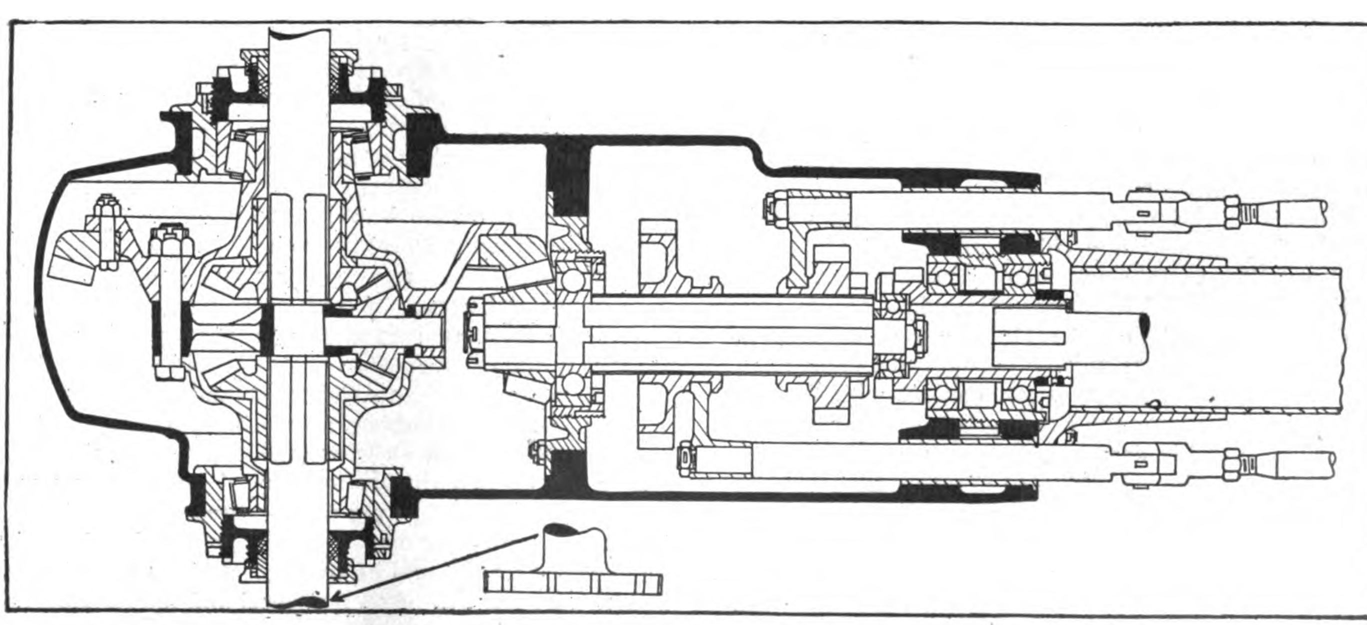


Fig. 9—Section of transmission and differential unit, illustrating the use of torsion tubes and the application of ball bearings throughout the construction

The AUTOMOBILE

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Reducing the Weight

AMERICAN makers are retrograding somewhat in the present increase in weight in many of the newer models as compared with older models with practically the same motor sizes. Two years ago the weight-reduction argument was more general than it is to-day. At that time several makers went too far in the reduction rôle, producing cars not adequately robust for heavy road surface, but to-day they are steering in the opposite direction.

There have been many reasons for weight additions within the last year and chiefly on several of the 1913 models. The extra equipment is responsible for many additional pounds. The matter of demountable rims alone in this connection is considerable. On some large cars, by actual weight, the tire inflated on the rim weighs exactly 110 pounds. The owner is not content with five rims, that is one spare for the running board, but carries two extras so that his demountable rim and tire weight is alone 660 pounds. Of this 440 is unsprung weight, the two extras carried on the running board being supported through the springs.

But the causes of extra weight go still further: The starter battery and starter mechanism have added weight, yet it is commendable to see that concerns marketing electric starting apparatus are aiming at reducing the weight as much as possible, some claiming to build a satisfactory device not weighing more than 24 pounds and others announcing that their aim is to still reduce this figure. It is certain that at present the weight question is going to be a factor in determining the exact nature of the electric starting and lighting equipment on certain makes of cars. While weight reduction is commendable when adequate strength is maintained it is to be hoped that efficiency will not be sacrificed for weight reduction.

Foreign makers are devoting much attention on their 1913 models on the reduction of unsprung weight, that is weight carried direct on the road wheels and not supported through the springs. They recognize that unsprung weight is not desirable in any way, shape or form. They recognize that unsprung weight reduces the flexibility of the car on the road; they recognize that unsprung weight means greater tire wear; and they recognize that unsprung weight is harder on those unsprung parts, which, because of the duty they play in the car, cannot be mounted otherwise.

Many means are being used in both pleasure and commercial cars to cut down this unsprung weight: A favorite one is the development of forgings in axle construction and the elimination of steel and malleable iron castings. Engineers are expending much energy on this work. The forging art is being developed to utilize the requisite amount of material, placing it in that part where greatest strength is essential and cutting out those parts where heretofore it has not been necessary. There still remains much room for improvement. Not only has bulk been cut away where not necessary but there has been a perceptible improvement in the quality of material used in the forging and more means made use of for testing more generally these parts before placing them in the machine. Then, too, the laboratory has been busy in going further into the details of heating processes, so that in a word the forging art has been carried to the fifth decimal place.

There is a tendency abroad to follow the DeDion plan of getting away from unsprung weight by the forged stationary rear axle and supporting the differential on the chassis frame, thereby carrying it through the springs. In this way the rear axle weight is cut to the minimum, without any reduction in efficiency. Still further in rear axle design is the use of the higher-grade stampings or pressings for axle housings. These stampings are now being made from alloy steels and the processes are so refined that robust housings for high-powered are being produced which weigh less than 70 pounds.

The use of wire wheels, which is in the eye of the American builder to-day, is growing by leaps and bounds in Continental Europe. A few years ago England was the only exploitation ground and because John Bull brought it out France and Germany would have none of it. Two years ago France took it up and now one of the best engineering houses in France has announced that for 1913 detachable wire wheels will be stock equipment. This company has further announced an average temperature reduction of 33 per cent. in tires on wire wheels, due to the rapid radiation of heat from the tire through the metal wheel rim and its spokes. Added to this is the reduction in rim weight on the wheel and the consequent adding of flexibility to the car when on the road. Here also comes longer wear on tires and brake linings.

Full Equipment Now a Necessity With Car Makers

Nowadays An Automobile Is Judged by Its Equipment Which Also Aids or Hinders The Salesman, C. S. Jameson, of the Willys-Overland Company, Tells Sales Managers' Convention of the Automobile Board of Trade

THE subject of automobile equipment would have admitted of more argument several years ago than it can possibly do today. Custom and demand have settled any question, and beyond any doubt. **Full equipment must be furnished by the manufacturer.**

When the automobile was in its infancy, naturally cars were not equal to those of today in any respect, and the prospective customer had not become motor-wise as he has at this time. Now full equipment is expected and demanded, and why not? Certainly, the prospective purchaser has learned, either by experience or through a friend, that equipment is a necessity, and that he pays whether it be on the car when he buys it or at an additional cost. He further appreciates that if equipment is supplied at the factory, and by the manufacturer, it will mean better material, better workmanship, more effective devices and a more harmonious whole.

He knows that the maker of a car cannot afford to jeopardize his reputation by supplying ineffective devices or material of questionable quality; hence, the fully equipped product has the advantage to start with.

The purchaser of a car at $1,000 should not look for the more expensive equipment, and that which would be out of proportion in comparison with cost or selling price. Still, the evidence is strong that, regardless of what the prospective purchaser may be able to pay, he looks not only for such equipment—which might be termed a necessity—but also for that which represents labor-saving devices and comfort.

Manufacturers of medium—and in many cases lower—priced automobiles have shown a willingness to furnish full equipment, and the builders of the higher-priced cars have, from necessity, been obliged to follow suit.

The greater margin of profit on the latter has permitted of more complete equipment, and occasionally extravagance is shown. The future will see even more attention given to the subject of equipment, which will represent a logical and common-sense reason for the difference in price.

A certain percentage of buyers, at least, will pay high prices for equipment de luxe, as they will pay high prices for luxurious hotel, steamboat, train and other accommodations. However, most buyers are looking for their money's worth, and a wide-awake builder of automobiles will, by ingenuity or through the result of volume production, obtain the desired result, and at the same time keep within his class as to cost and selling price.

It must be conceded that the cost of equipment will be reduced as the demand increases, product becomes larger, and use more general. As the selling price of the automobile advances, the demand is more limited and the purchaser more exacting.

The medium-priced product has reached the stage where full equipment today is required, and the car selling at present for $2,500, or above, must be fully equipped. The manufacturer who fails to realize this should not wonder why his dealers lack enthusiasm, and sales drop off.

The purchaser of an automobile is a progressive, and demands up-to-the-minute ideas that add to his protection and comfort. He must be shielded from the inclemency of the weather. He must be permitted to ride on and on without worry and inconvenience.

The automobile without a top may be compared to a house without a roof. The individual who travels in his residence from one floor to another by simply stepping into an elevator and pressing a button will not accept an old style of equipment, nor the lack of it which requires the cranking of an automobile engine on a hot morning in summer, or a cold one in winter.

The man who has electric lights in his home from cellar to attic will not be subjected to the use of kerosene lamps, with their dirt, oil and smut, and this same party will insist on knowing how far and how fast he is traveling, whether it be by automobile or train.

The demountable rim helps to remove one of the great drawbacks to motoring. It is becoming more and more in demand each minute; **but it remains for some fertile brain to give us an acceptable substitute for the pneumatic tire, something with which the words puncture and blow-out have no connection.** He who can do this will surpass Edison in fame and Rockefeller in wealth.

One of the strongest arguments in favor of full equipment by the manufacturer is presented in the cheaply constructed top, top boot, and similar accessories made to sell to the dealer, or purchaser, of the unequipped car at a price. The question of quality never enters into equipment of this nature; neither does the matter of finish, design nor conformation to the lines of the car receive any consideration. **A car of quality may become a subject of criticism and a discredit to its maker through the ill-fitting, poorly proportioned and cheaply made top and top boot.**

In some instances dealers have purchased tops other than that of the car manufacturers' make, and of inferior design and material, and these have been sold to the customer as the factory article, unquestionably injuring the manufacturer's reputation.

The lack of full equipment has been said to encourage price-cutting. The customer realizes the necessity of equipment, and the lack of it appeals to him as an arbitrary and unreasonable position on the part of the manufacturer. A haggling over cost follows, and oftentimes results in the dealer throwing in the equipment at a loss to himself, and such action represents a cut in price.

The fully equipped car unquestionably gives the salesman advantage over competition in many respects, and without considering extremes or fads, the more equipment the greater the advantage.

Place the salesman in a position where he can utilize his time, his knowledge and his enthusiasm in extolling the merits and construction of the car he sells, and not in making excuses because the manufacturer fails to include a boot with a top, or his fossilized ideas led him to think a self-starter was unnecessary and only a fad, or that the demountable rim rusted, or was no better than the old clincher.

It is said that a man is judged by the company he keeps, the company by the men it employs, and I say an automobile is judged by its equipment.

U. S. Motor Assets and Liabilities

(*Continued from page 877.*)

Aggregate Assets of Companies in Receivership

REAL ESTATE, BUILDINGS AND EQUIPMENT—as per the Books	$7,858,266.23		
Deduction—Depreciation as per the Books	1,473,493.24		
	$6,384,772.99		
Value as a going concern—Appraised by Gunn, Richards & Company		$4,999,836.31	
(Auction Value—Appraised by Gunn, Richards & Company, $2,602,000.00.)			
REAL ESTATE INVESTMENTS:—			
Columbus Circle Realty Company—Capital Stock at par—as per the Books	$112,000.00		
Improvements made on premises owned by Columbus Circle Realty Company—per Books	116,311.67		
	$228,311.67		
Building and Improvements appraised by Gunn, Richards & Company at $587,737.00; Estimated Value in the equity based on appraisal	$83,520.00		
New Castle Construction Company—Bonds at par—as per the Books; and Estimated Value, based on appraisal of property by Gunn, Richards & Company	36,000.00		
		119,520.00	
Total Real Estate, Buildings, Machinery and Equipment			$5,119,356.31
FURNITURE AND FIXTURES:—			
Estimated Values, as per Office Employees; Appraiser's Figures not yet received:			
New York Office		$36,000.00	
Factories		40,000.00	
			76,000.00
INVENTORIES—ESTIMATED:—			
At Factories, and on Consignment from Factories, as per actual Inventory July 31, 1912, brought to September 11, 1912, by adding purchases and labor and deducting Sales—as per Books	$5,772,870.52		
Deduction—Reserve for Obsolete Material, etc., estimated by Comptroller of the Company	1,024,831.72		
	$4,748,038.80		
(Of this sum less than $275,000.00 is represented by completed new cars)			
Estimated Value: by Messrs. Anthony, Maxwell, and Jameson (for the Company) on the basis of a going concern for all Factories, all operating, except the "Brush"			4,500,000.00
On the basis of closing down the Brush and Alden-Sampson Factories, $4,100,000.00.			
On the basis of closing down the Brush, Alden-Sampson, Columbia and Dayton Factories, $3,000,000.00.			
ACCOUNTS RECEIVABLE—Not including Inter-Company Accounts—as per Books		$661,257.22	
Deduction—Reserve for Doubtful Accounts—as per Books		73,010.70	
		$588,246.52	
Estimated Value			550,000.00
NOTES RECEIVABLE—In hands of Treasurer—as per the Books		55,406.44	
Estimated Value			34,830.20
CASH IN HAND AND ON DEPOSIT			412,027.80
CASH—Special to provide for Dealers' Deposits (This fund stands to Credit of U. S. Motor Company in Banks as "Special Fund")			62,513.24
PREPAID EXPENSES: Insurance Premiums—Unexpired Proportion—Estimated Value			45,440.21
Total Assets other than Inter-Company Accounts			$10,800,167.76
INTER-COMPANY ACCOUNTS:			
Accounts Receivable—Due from Factories to U. S. Motor Co. and other Inter-Company Accounts—all in Receivership		$4,789,713.56	
Offset by Liabilities in Companies in Receivership—of Equal Amount		4,789,713.56	—0—
Accounts Receivable—Due by Branch Selling Companies on Notes Assigned to Banks with Endorsement		$1,303,838.25	
Unassigned Notes and open account		2,066,844.03	
		$3,370,682.28	
Estimated Value of the Entire Debt, Assigned and Unassigned, $1,954,995.72.			
Estimated Value of the Entire Debt so far as Unassigned			1,198,769.54
Notes Receivable—E. R. Thomas Motor Car Company		$5,000.00	
Estimated Value, problematical			2,000.00
Accounts Receivable—National Motors Company—Estimated Value Par			4,042.23
Accounts Receivable—Providence Engineering Works—as per the Books—Disputed		$180,923.53	
Estimated Value			—0—
Total Assets, other than Securities Owned: Going Concern Value			$12,004,979.53
SECURITIES OWNED IN OTHER CONTROLLED COMPANIES:			
Briscoe Manufacturing Company—Par Value of Capital Stock Owned		$310,000.00	
Estimated Value, over and above amounts due from U. S. Motor Co			367,995.00
Appraisal of Real Estate, Buildings, Machinery, etc., by Gunn, Richards & Co., as a going concern $166,995.00, and Auction Value $121,000.00.			
Providence Engineering Works—Par Value of Capital Stock Owned		$500,000.00	
Estimated Value, problematical			1.00
Appraisal of Real Estate and Buildings by S. A. Nightingale & Company, not including Machinery, to the amount of $91,021.00.			
E. R. Thomas Motor Car Company—Par Value of Capital Stock Owned		$2,400,000.00	
Estimated Value			—0—
Courier Car Company—Par Value of Capital Stock Owned		$500.00	
This Company has no Assets—Estimated Value			—0—
National Motors Company—Par Value of Capital Stock Owned		$849,600.00	
Estimated Value—Based on Equity in Real Estate at Boston (Mass.); New Castle (Ind.); Equity in certain Branch Selling Companies; Cash; Receivables, etc			355,190.07
TOTAL ASSETS, ESTIMATED VALUE			$12,728,165.60

Aggregate Liabilities

REAL ESTATE MORTGAGES		$164,540.90
DEBENTURE BONDS, BOND SCRIP AND INTEREST		6,161,509.87
NOTES OF ONE OR MORE OF THE SUBSIDIARY COMPANIES:—		
Endorsed by the United States Motor Company, and Notes of one or more of the Branch Selling Companies endorsed by the United States Motor Company, with interest		*2,194,258.12
NOTES OF UNITED STATES MOTOR COMPANY:—		
Endorsed by one or more of the Subsidiary Companies		650,820.99
CLAIMS AGAINST UNITED STATES MOTOR COMPANY ONLY:—		
Of this sum, approximately $100,000 is due for goods delivered immediately prior to Receivership		1,961,875.99
CLAIM AGAINST COLUMBIA MOTOR CAR COMPANY, OR UNITED STATES MOTOR COMPANY OR BOTH		91,789.60
NOTES SECURED BY SIGHT DRAFT ON CAR SHIPMENTS		63,691.26
WAGES OF EMPLOYEES AND ACCRUED EXPENSES		74,256.30
DEALERS' DEPOSITS (PARTLY OFFSET BY ACCOUNTS RECEIVABLE)		55,113.24
CONTINGENT LIABILITY ON ENDORSEMENT OF NOTES OF E. R. THOMAS MOTOR CAR COMPANY		†400,000.00
PROVIDENCE ENGINEERING WORKS:—		
Claim made for work performed—Disputed	$138,532.26	—0—
TOTAL LIABILITIES OTHER THAN INTER-COMPANY		$11,817,856.27
INTER-COMPANY ACCOUNTS:—		
Briscoe Manufacturing Company	$313,970.91	
The Capital Stock of this Company is owned entirely by the United States Motor Company, and, as the Briscoe Manufacturing Company is regarded as a solvent Company, this liability is taken at		—0—
EXCESS ASSETS—Estimated Value as shown—Over Liabilities as Shown		910,309.33

*It is estimated that the Branch Selling Houses can pay $756,226.18 on their Notes, after providing for their local indebtedness.

†The Receivers of the E. R. Thomas Motor Car Company estimate that that Company will pay from 25% to 40% to its Creditors.

CAPITAL STOCK (NOT INCLUDED IN THIS STATEMENT) OUTSTANDING—OUTSIDE OWNERSHIP:—		
United States Motor Company, Preferred	$11,499,733.33	
United States Motor Company, Common	12,206,350.00	
Columbia Motor Car Company, Preferred	13,400.00	
Columbia Motor Car Company, Common	118,000.00	
	$23,837,483.33	
TOTAL		$12,728,165.60

Russell Profits Show Increase

TORONTO, Oct. 28—Profits of $180,127 for the year ending July 31 are shown in the annual statement of the Russell Motor Car Company which will be presented at the annual meeting of shareholders October 31. This is an increase of $2,598 over the previous year and is not so large an increase as was expected. After paying dividends on common and preferred stock and deducting underwriting and other expenses connected with the issue of additional preferred stock, a profit and loss balance of $303,133 is carried forward. This compares with $246,068 carried forward last year.

Dixon Company Promotes Long

JERSEY CITY, Oct. 28—At the regular monthly meeting of the board of directors of the Joseph Dixon Crucible Company the following changes in the officers and board of directors were made on account of the death of Vice-president William H. Corbin:

George E. Long, former treasurer, was elected vice-president to succeed Mr. Corbin; J. H. Schermerhorn, former assistant secretary and assistant treasurer, was elected to membership in the board of directors and treasurer of the company; Albert Norris was elected to the office of assistant secretary.

England and Low-Priced American Cars

THE British market only began to feel the importation of the American cheap car about the time of the annual Olympia show, November, 1911, when there was an extraordinary scramble of dealers desirous of taking up agencies for the cheap American car. It was then felt that the British public was at last beginning to feel confidence in low-priced American goods, as previously there had been a good deal of scepticism among the general public with regard to American-made articles, principally caused by the impression left of American bicycles and boots.

Engineers, of course, have long been aware of the excellence of the American machine tools, but the automobile at $1,000 or less was an entirely new proposition,

The Britisher is naturally slow to take up a new thing, particularly such as this, where solidity of construction does not exist, and appearance is so diverse from that which has been his custom.

We will now consider a few figures showing the development of the business in the importation to Great Britain of American automobiles.

AUTOMOBILES AND PARTS IMPORTED FROM AMERICA INTO ENGLAND

Year	Cars	Value	Value of Parts
1907	555	$879,135	$135,410
1908	348	481,455	91,665
1909	427	607,100	124,000
1910	1,101	1,076,485	427,035
1911	3,734	2,961,320	1,332,890
1912 (6 months)	3,327	2,792,935	....

It will thus be seen that the total number of cars imported during the first 6 months of 1912 was nearly as many as the total importation during the whole of 1911, and the average value of these cars is about $1,000.

It is about 10 years since the small American cars first made their appearance in England, and at that time the American industry was quite in its infancy, and the cars produced compared in design and construction very unfavorably with the European article. Even then, however, the type and price of the goods were unique in their way, and were not in competition with anything European.

These two marks have ceased to exist as far as Britain is concerned. The cheap American car has entered a field hitherto untouched and unapproachable on account of the price question, and has shown that the large British middle class exemplified in the man of moderate means is the buyer of an automobile at a price. However, this does not exist to so great an extent in Britain as in America, as the cost of running a car in the former country is much greater than in the latter, and the facilities for storing are very inferior and generally expensive.

The tendency has been in England particularly toward the development of a small bore and very efficient engine, and this is due to the high rates of taxation. Such an engine is expensive to construct and it cannot compete in price with the less efficient American engine. Furthermore, the high finish which is usually demanded in Europe cannot be given at a low price.

The American car has taught the buyer to be satisfied with an automobile that will run with very little attention and at the same time will be reliable, and if he does not pay the price of a highly finished car he must be satisfied with utility, which, by the way, is the first consideration.

It has been rumored from time to time, that renewed efforts are being made by those American concerns having a very large output, to land their surplus production on the open British market at prices showing the minimum margin of profit. Such a dumping of goods is apparently a satisfactory state of affairs to the so-called free-trader, but the far-thinking Britisher sees English capital going abroad which could well be spent at home, giving increasel employment to the work people of his country.

The keen American business man is fully alive to the political state of Britain, and is raking in the dollars while he has this glorious opportunity of so doing. The foothold he is now gaining he will not be prepared to lose without a struggle, and whatever may be done by the Britisher in the way of a large local production of cheap cars will undoubtedly be met by retaliation from the other side.

Unfortunately, there is a class of British manufacturer aptly termed the Dog-in-the-Garage, who does not see further than the length of his nose, and he takes up the attitude that as his factory is full of work, and that he and his stockholders are making a comfortable income, everything is well.

He fails to realize that the progressive business man is never satisfied with things as they are at present, and that if his factory is full and prospects are good, it is policy to increase the size of that factory, and his output at the same time. By so doing each article he makes can be more cheaply produced on account of quantity production, his employment of labor increases, and his actions tend toward the prosperity of his country as a whole.

While considering this question of production there is one important point which must be borne in mind; namely, the labor question. In America, a machinist can earn practically what he likes unhampered by the unions, and a man is paid more or less on results.

In Britain, however, very strong trades unions exist whose policy is to limit output, and to keep up the wages of the inefficient. Under such circumstances large productions can only be carried out by means of a very strong policy, and in order to avoid any serious difficulty arising on this score, the writer has obtained quotations from large American manufacturers of standardized parts, to supply their goods to a British concern assembling the same on British soil.

The $2,000 car and upwards of American make cannot, at the present time, obtain any substantial footing in the British market, as that is a type of car upon which British manufacturers have specialized and can produce at very good value for the money. It may be, however, that the importation of the cheap car is merely the thin end of the wedge, and among some British authorities this is considered to be the case. The effect, however, on the British market is that the manufacturers of the $2,000 type of car are being hampered in their sales by reason of the decreasing demand for used cars. This is how the situation has arisen: Many owners of automobiles are in the habit of arranging with dealers to take over their used cars in part payment for new ones. The dealers now find that the market for used cars is rapidly falling off, buyers of cars at the old figure of a $2,000 used car have now the alternative of purchasing a completely equipped new American car at the same figure.

There is, therefore, considerable reluctance on the part of the dealers to take these cars into stock generally resulting in the loss of sale of a new car every time. The Dog-in-the-Garage type of manufacturer fails to see this, but the effect is growing rapidly to his and other people's detriment.

The other side of the question is that the low-priced American car has made motoring possible for a large population who would otherwise be unable to afford it, and has incidentally developed a motor feeling and way of thinking that brings into line a large number of people whose interests are allied. These beginners circulate money in the automobile industry and the majority will eventually become purchasers of more expensive cars.—*R. W. A. Brewer*, London, Eng.

It has been discovered that in the city of Philadelphia there are at present on the statute books thirteen separate ordinances governing and defining the rights of various classes of vehicles. The new ordinance now being considered is a composite of all the thirteen. Maximum speed of 10 miles an hour is provided within the city limits under penalty of a $25 fine.

Bronze Flame Welding

Experiments Show That Rapid Heating of the Metal Modifies Its Physical and Mechanical Properties

Conclusion of Tests Is That Autogenous Welding of Copper and Its Principal Alloys Is Practicable

A SERIES of welding tests was carried out recently with bronze, three ordinary types being used and for convenience here designated A, B and C. Their chemical composition was:

	Per Cent. A	B	C
Copper	94.2	87.9	87.1
Tin	5.7	11.01	9.3
Zinc	....	1.53	....
Lead	....	....	3.48

The metal used was in rods 25 millimeters, 1 inch diameter, cast in molds of well-dried earth to insure homogeneity of the alloy. As welding material very thin rods of bronze of exactly same composition were used. When the welding was done, in spite of all precautions innumerable vesicular cavities were formed in the zone of the weld over the entire surface of the weld.

The great heat to which the metal is subjected, and the sudden variations of temperature which occur within it during the process of welding and in the course of the subsequent cooling, each play their part in modifying profoundly the structure of the metal in the zone of welding. High temperatures, facilitating the oxidation of the fused metal by means of the action of the oxygen of the atmosphere, determine, in the first place, the oxidation of those constitutive elements of the alloy which have most affinity for oxygen—as, for instance, tin, zinc, and lead. This oxidation reveals itself in the decreased proportion of those elements which in part are volatilized, and in part pass into the slag in the form of oxides; also in the formation of bubbles or vesicles, arising from the partial reduction of these very oxides by the excess of metal (the metallic mass) present; also in the lowering of the mechanical properties of the zone of welding, caused by the innumerable vacuoles set up within it, and accentuated by the diffusion of tin dioxide (SnO_2) in the mass of the alloy, partly in the shape of acicular inclusions.

Moreover, the high temperature attained in the course of the process of welding, with alloys of low tin content (alloy A), in which really a single constituent is present—α mixed crystals of copper and tin—determines, as we have seen in the case of pure copper, a commencement of ignition of the metal, with the consequent formation of big granules.

Finally, the rapid variations of temperature during the process of welding, determine—in the case of bronzes of higher tin content, wherein two constituents are present, namely, the α and β mixed crystals of copper and tin—an irregular and very conspicuous subdivision of these constituents, imparting to the metal a heterogeneous structure.

The localization of the surface of fracture in the samples of welded copper to the margin of the chamfer is again observed in the case of the zone of welding of bronzes.

Admitting all that precedes, we may reasonably expect that an appropriate reheating of the welded portion will prove even more efficacious than in the case of copper, because, in addition to relieving the internal strains of the metal set up by the process of welding, it tends to restore to it an improved homogeneity of structure.

Brass—A third series of experiments was conducted, by the same methods with the types of brass fusible at high temperatures, here designated respectively as M and N. Their composition is as follows:

	M Per Cent.	N Per Cent.
Copper	60.2	55.18
Zinc	40.08	41.50
Manganese	....	3.2

The first mentioned was cast in rods, measuring 30 millimeters (1.2 inch) in diameter, in dry earth-molds; the other was wire-drawn into rods, 2.5 millimeters (1 inch) in diameter. The welding material consisted of very thin rods, in each case of exactly the same composition as the original alloy.

The phenomenon of the unwelcome vesicles, set up in large numbers within the welding zone, despite all the preventive precautions that could be taken, was intensified in the case of these alloys by the extreme facility with which the zinc contained in the metal oxidizes. In Table 3 are set forth the results obtained from shock tests and from chemical analysis of the various samples.

Microscopic examination, confirming the results here tabulated, leads to the same conclusions as those postulated in regard to the bronzes. In order, therefore, to avoid needless repetition, I will content myself with referring the reader to what has already been said on that point. We may note, however, in these alloys a diminution in the capacity, when heated, of absorbing the products of combustion of the welding flame; coincidently with this

TABLE III.—SHOCK TESTS WITH THE CHARPY APPARATUS*

No. of Sample	Thermal Treatment	Indicated Angle	Breaking Test Kgs. Mm.	Mean Chemical Analysis: Of the Metal. Per cent.	Mean Chemical Analysis: Of the Weld Zone. Per cent.	Remarks
M1	Reheated	128°	4.646	Cu = 60.2 Zn = 40.08	......	Not welded.
M2	Cooled in air after welding.	141°	2.112	......	Cu = 69.3	Welded; finely granular fracture; numerous vacuoles.
M3	Reheated after welding.	138°	2.646	......	......	Welded; finely granular fracture; numerous vacuoles.
N4	Reheated	128°	4.646	Cu = 55.18 Mn = 3.2	......	Not welded.
N5	Reheated after welding.	140°	2.286	......	Cu = 68.75 Mn = 1.2	Welded; medium-grained fracture; numerous vacuoles.

*See Table 1, page 885.

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(*Continued from page 884.*)

usual construction is shown in Fig. 9. The loss comes from using the walls of the crucible or the walls of the housing around it as conductor for transmitting heat to the crucible and its contents. The innovation consists in producing the heat in the crucible 4 by bringing only the bottom 5 of the crucible in contact with the die 6 which is made of tungsten-copper, preferably and is highly conductive. The pressure of the die is regulated by the weight of the crucible and the melt and can be increased if necessary by adding the weight of the current-carrier 7. After the smelting the die and the carrier 7 may be raised by means of crank-arm 13 so as to permit the tipping or removal of the crucible. The invention is patented in Germany by Pfretschner & Company.

Filip Tharaldsen, of Norway, has also an improvement looking to economy in electric smelting. Owing to the continued high heat which is sometimes necessary in the reduction of ore, considerable quantities of valuable materials escape in gaseous form. To avoid this loss Tharaldsen builds a system of flues in which the gases are brought in contact with chemical reducing agents, with provisions for cooling, and are returned to liquid or solid state, in which form they fall back into the melt.—From *Metallurgie*, August 8.

diminution, the liability of the welded parts to fracture along the margins of the chamfer decreases.

CONCLUSION—The results obtained and the observations recorded in this triple series of investigations concerning the oxy-acetylene autogenous welding of copper and its chief alloys demonstrate:

1—That rapid heating and sudden fusion of the metal subjected to welding profoundly modify its physical and mechanical properties, developing within it internal strains and structural alterations which are of detrimental effect.

2—That the structural modifications which take place in the process of welding, apart from the alterations in composition of the metal, may be classified under two principal headings: *a* coarse crystallization of a single-constituent metal, and *b* minutely heterogeneous structure of an alloy consisting of two or more elements. We must also take into account the discontinuity of structure attaching to metals in which there are oxide inclusions or vacuoles.

3—That the deficiency in mechanical properties, most conspicuous in all that regards the tenacity and elasticity of a metal, is expressed in the case of copper by an average reduction of 50 per cent. in the capacity to resist fracture, and an increase of about 30 per cent. in brittleness, while the percentage ductility is reduced to about a tenth of the original. In the case of bronzes and brasses, the deficiency in mechanical properties is not susceptible of rigorous mensuration, but it is greatly intensified and proportionately detrimental as the number and variety of the constituents of the alloy subjected to welding are increased.

4—That, while mechanical treatment, such as hammering along the zone of welding, has practically no useful effect on the properties of the welded metal, thermal treatment, such as reheating, prolonged for a suitable interval at a fixed temperature, exerts an undoubted ameliorative influence, since in the first place it relieves the latent internal strain set up by the sudden temperature changes involved in the process of welding, and in the second place it restores homogeneity to the structure of the metal itself. Consequently, and more particularly in the case of alloys made up of several constituents, the conditions of cooling of the welded metal are of special importance, the slower the cooling the greater being the ameliorative effect.

5—That considerable variations—diverse according to the manner in which the process of welding is applied—occur in the composition of bronzes and brasses; these variations are the more extensive the greater is the number of constituents of which the alloy is made up, and also in proportion to the affinity of these constituents for oxygen and to the volatility of the oxides formed therefrom. Thus, for example, in the bronzes of type B (Table 4), in the welded zone, there is an average diminution of 19.0 per cent. in the proportion of tin; while the loss of zinc, a more easily oxidized metal than tin, amounts to 22.3 per cent. (the original proportion present being smaller than that of tin). In brasses, wherein the percentage of zinc is much higher, its decrease in the welded zone amounts to 28.7 per cent. We must also bear in mind that the oxides thus formed have a tendency to diffuse easily into the metal, modifying profoundly its properties. In pure copper subjected to the welding process changes in chemical composition cannot be traced, as the metal is made up of a single constituent; and it is only affected deeply by oxidation when the necessary precautions have been omitted in the process of welding, the suboxide then formed diffusing with great facility into the copper.

6—That taking into account the results obtained and the conclusions here postulated, we may assert that the oxy-acetylene autogenous welding of copper and its principal alloys has a practical application, limited to those parts of machinery which are not of large dimensions and are not subjected to severe mechanical stresses.

Contet's Formula for Countersprings

(*Continued from page 889.*)

ment of the subject, and it is therefore not so remarkable that both arrived at the same astonishing theory with regard to the action of countersprings.

The final formula presents some additional points of interest. Unless the numerical value of d_1 is larger than that of d the total value of D becomes negative, which is absurd and means that the counterspring must be more flexible than the main spring. If these values are equal, then D becomes infinitely greater than d, and the compound spring bends without resistance. These absurdities are obviated in practice by making the counterspring much shorter than the main spring. In this practical form its principal action is to brake the recoil of the main spring, an action which is not considered in the mathematical development of the subject at all.

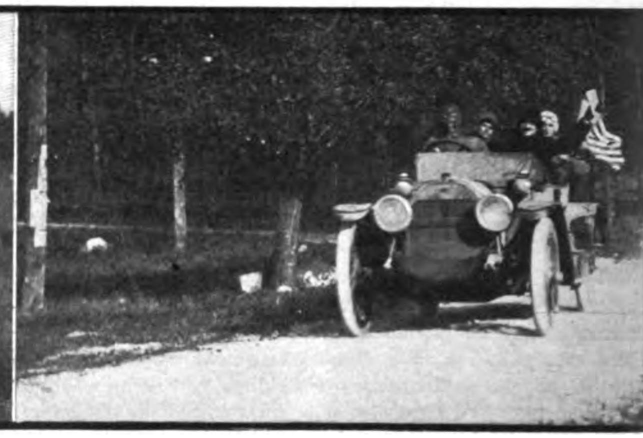
In our opinion, Mr. Jones clouds the subject by presenting, in his Fig. 6, a type of compound spring which is used nowhere and with regard to which it is difficult to conceive that the counterspring can follow with its oposite tension the main spring throughout its range of deflection.—ED.

TABLE II.—TESTS WITH CHARPY APPARATUS.*

Number of Sample*	Measurements of Sample in Millimetres	Thermal and Mechanical Treatment	Average Ultimate Stress. Kgs. per Square Mm.	Average Elongation. Per Cent.	Average Contracted Diameter in Mm.	Average Hardness. Brinell,† 500 Kgs. Ball 10 Mm. Diameter	Remarks
1	Diameter=15 Useful length=150	Reheated	23.0	43.4	....	0.38	Not welded.
2	Diameter=15 Useful length=150	Cooled in air after welding.	10.5	2.6	....	44.5 in the weld	Welded with pure copper; rupture in the weld; fracture coarsely and irregularly granular; vacuoles (small) present
3	Diameter=15 Useful length=150	Cooled in air after welding.	12.3	3.1	....	43.0 in the weld	Welded with phosphorized copper; rupture in the weld; medium-grained fracture.
4	Diameter=15 Useful length=150	Reheated	11.3	4.8	....	36.0 in the weld	Welded with phosphorized copper; rupture in the weld; medium-grained fracture.
5	Diameter=12 Useful length=100	Not reheated	24.0	40.0	7.3	54.0	Not welded.
6	Diameter=12 Useful length=100	As Sample 2	12.9	2.0	11.8	35.0 in the weld	Welded with pure copper; rupture in the weld; coarsely granular fracture.
7	Diameter=12 Useful length=100	As Sample 4	13.5	4.5	10.3	34.5 in the weld	Welded with pure copper; rupture in the weld; coarsely granular fracture.
8	Diameter=12 Useful length=100	Hammered and reheated after welding.	14.2	3.4	11.2	36.0 in the weld	Welded with pure copper; rupture in the weld; medium-grained fracture.
9	Diameter=12 Useful length=100	Hammered and reheated after welding.	13.1	2.8	11.6	40.0 in the weld	Welded with phosphorized copper; rupture in the weld; medium-grained fracture.

*Two samples, prepared and treated in the same way, correspond to each number.
†The Brinell tests were carried out on samples other than those subjected to the torsional tests.

—*Table IV. will appear next week.*



Two Moline cars driven by Joe Wicke and Frank Salisbury which finished the Chicago Motor Club's reliability run with perfect scores

Molines and Staver Win Tour Around Lake Michigan

Three Perfect Scores in Reliability Run of the Chicago Motor Club—Ten Cars Finish Out of the Field of Fifteen Starters—Velie Second in Touring Class and Bergdoll Follows Molines

CHICAGO, ILL., Oct. 28—Completing the 1,200-mile trip around Lake Michigan over roads that had been called impassable to automobiles in certain sections, the Moline pair in the roadster division and Staver No. 4, in the touring car class, finished with perfect scores and all three looked as if they could have stood a stringent technical examination, if such had been required by the rules. The Moline pair win the team trophy offered, and the individual prize in their class. The former was offered by the Chicago Motor Club. The class prize is the Morton J. Luce cup and if it is conferred upon one of the cars, a drawing will be necessary.

Ten out of the fifteen cars that started from Chicago, October 21, checked in after the trip as contestants.

The Staver entry captured the W. E. Stahlnaker cup for the best score in the touring division.

Of the touring cars, the Velie No. 1, driven by John Brolley, took second honors. This was the same car and the same driver that carried the pathfinding crew when the route was laid out 6 weeks ago. Staver No. 3, with G. Knudson as driver, finished third, the Case fourth, the Bergdoll No. 5 was fifth and A. M. Robbins' Abbott-Detroit No. 6 was sixth.

In the small car division, the Bergdoll No. 104, with Tom Rooney driving, was second to the two Molines, while Anderson in the Stutz No. 109, was the only other driver in this division to finish. Anderson, although heavily penalized on account of broken springs, wins the amateur driver's trophy, as he was the only driver entered who was not affiliated with the trade.

Overshadowing all the other features of the run was the consistent performance of the Moline team, the staunchness of the two cars and the masterly way in which they were handled by their drivers. It was to the credit of Salisbury and Wicke as much as to the quality of their mounts that the Molines finished without penalty. Few drivers could have put any car in 7 days over the roads which encircle Lake Michigan, without experiencing difficulties of some kind on the road. Other cars in the contest might have done as well had they been handled with the care shown by Salisbury and Wicke but not even the best driver could have put a mechanically weak vehicle over those roads, and at that speed without more or less penalty.

Monckmeier and his Staver are deserving of at least as much credit as the Moline drivers and their mounts, for not only did the little Swede finish his car with a perfect score but, like the Molines, could have withstood a final technical examination, had there been one, with very little loss of credit. Monckmeier's driving can be credited for his win over his team-mate Knudson, for had the latter used the care that Monckmeier did in driving through the heavy mud of northern Wisconsin he would not have been forced to clean out his carbureter, and also would have annexed a perfect score.

The driving rain and heavy mud of the first 3 days of the run were responsible for most of the difficulties encountered by the cars. It rained almost incessantly for 2 days and the clay roads of northern Wisconsin and the northern Peninsula of Michigan became perfect quagmires, necessitating a great deal of low gear work, particularly on the hills, and causing carbureters to become choked up with the mud and water that splashed against them. The rains which had made the first two days run from Chicago to Escanaba a most disagreeable and hazardous trip, probably saved the day for the tourists when they entered the heavy sand in the north woods and pine barrens of the northern peninsula and all around the head of the lake. Sand hills which had been reported as almost impassable by the pathfinder were negotiated with little difficulty because the rain had packed them so that traction was afforded the rear wheels.

The third day's run from Escanaba to Newberry, the northernmost point of the trip, is only 122 miles in length but was expected to be nearly the worst part of the route. The schedule

Velie, driven by John Brolley, second in touring class was reduced to 13 miles an hour for the touring cars and 11 miles an hour for the roadster division. This speed seemed to be none too low as it took the pathfinder 6 days to cover the distance. The road for the greater part of the way winds through the forests of mixed pine and hardwood and over great stretches of pine barrens and burnt over woods, with stretches of corduroy roads, merely logs laid side by side through the swamp.

For about 10 miles north from Escanaba the road built by the state from Marrinette to Escanaba is extended around the shore of Little Bay de Noc. The fine road came to an end suddenly between the towns of Gladstone and Kipling. After reaching Rapid River the real wilderness was encountered. From here on the road consists of wagon trails winding in and out through the woods with branches extending in all directions and the forest encroaching on the roadway as though begrudging the space it took. These branching trails, however, merely take a labyrinth course among the trees and finally come back into one road further on. The roadbed was alternating patches of sand and muck in which the cars dragged their mud pans. In places there was the corduroy through the morass and in other places the road is made out of bark which provided good going.

Right in the middle of the forest when the tourists had begun to lose hope of there ever being better going, a stretch of fine hard macadam was found, 5 miles in length, which began nowhere, passed through nothing but woods and ended nowhere. At a little trading post called Thompson's, the first sight of Lake Michigan since leaving Milwaukee was obtained. From there on the road is good, and within about 4 miles of Manistique another stretch of the state-built macadam was picked up.

At Manistique the tourist had the first taste of Michigan hospitality and began to realize the interest aroused in road building and motor cars in the north woods. The whole city turned out to welcome the tourists and they were tendered a luncheon at the Elks' Club. The macadam led the tourists northward from Manistique for a few miles and then abandoned them to the same sort of going as they encountered in the morning. Newberry, the night control, was reached shortly after dark. The road traversed for the day, though quite bad in spots, showed that work was being done upon it toward improvement and in fact men and teams were working on the road when the tourists came through. The county engineer of Delta county had gotten busy when the pathfinder went through, and in the 6 weeks intervening had done a great deal to improve the conditions. He had gotten out a route map and had it printed so that each of the drivers could be sure of striking the improved road which deviated somewhat from the route laid out by the pathfinder.

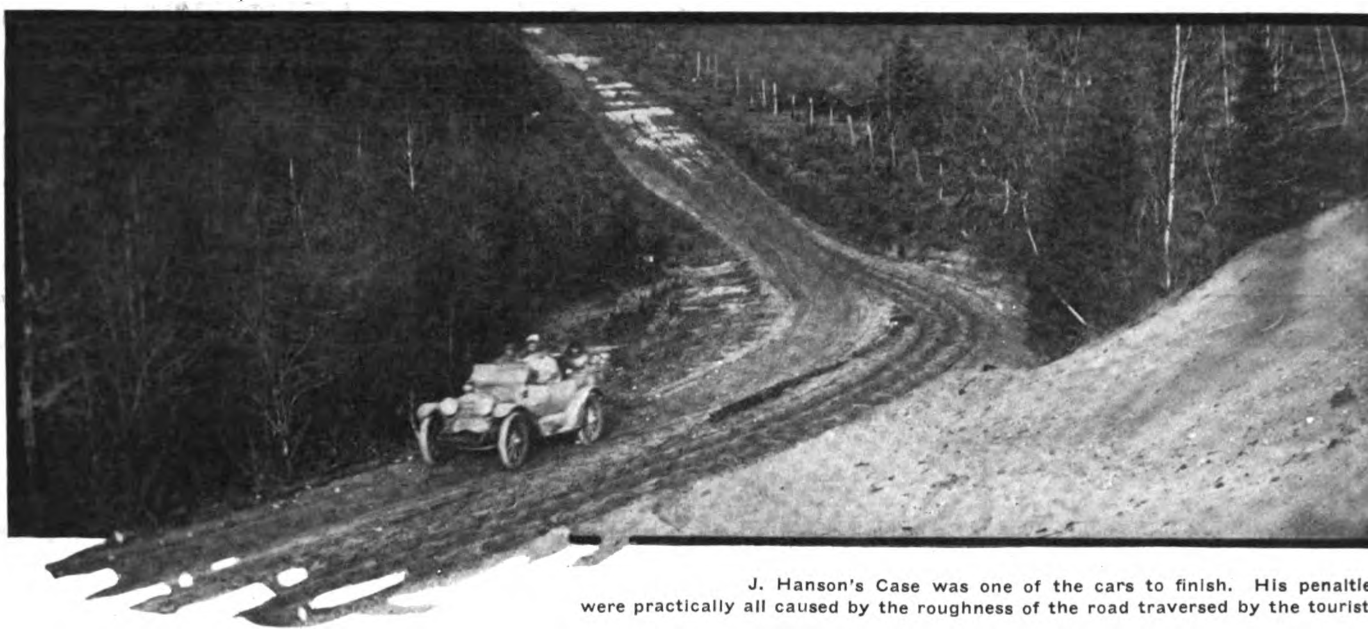
In spite of the condition of the roads only three cars were penalized during the day. Monsen had to refill his radiator three times because the jolting had started it to leaking, on account of the necessity of so much low gear work. Park's R. C. H., No. 7, stripped the gear in the gearset, in the heavy pulling, and did not get into Newberry until long after the tourists had checked out the next day. He was 12 hours late and consequently was automatically withdrawn. Park and his passengers were forced to spend the night in the woods but, although out of the contest, pluckily stayed in the game and by driving night and day caught up with the tour at Petoskey, and finished with the rest. In fact, the R. C. H. had the honor of acting as pacemaker as far as South Bend on the last day of the tour when the referee's car was temporarily out with a broken spring. Anderson's Stutz was forced to take on water twice the third day. At Newberry the tourists were treated to a chicken dinner, followed by a dance, at which the town fathers and county authorities told of their plans for making a motor boulevard through the woods and promised roads that would be good all the year round within 3 years.

Tom Rooney's Bergdoll, which was second to the Molines

From Newberry to St. Ignace, the fourth day's run, is but 65.2 miles in length but promised to be the hardest of all, as there is deep sand along the shores of the lake most of the way. However, less than 5 hours was consumed in making the trip. The only difficulty which was encountered by the cars as a whole was the trouble in following the trails through the sand plains. The whole party was lost completely for three-quarters of an hour and went about 12 miles off the course.

This was the day that spoiled two perfect scores. The Case got 3 points for replacing a magneto wire which had jolted off over the corduroy roads; the Abbott-Detroit dropped out of the perfect score class when it became necessary to refill the radiator. All the radiators had been drained the night before to prevent danger of freezing and the pet cock in the Abbott had been left partially open. In the midst of a vast expanse of brush and

The Staver team, G. Knudson and A. Monckmeier. The latter was the only driver to finish with a perfect score in the touring car division



J. Hanson's Case was one of the cars to finish. His penalties were practically all caused by the roughness of the road traversed by the tourists

second-growth timber the radiator went dry and Robbins' mechanic, Berry, scrambled 2 1-2 miles through the dense underbrush and sand to the lake. After the radiator was filled the party proceeded 100 yards when a turn in the road brought them onto a bridge under which flowed a stream of clear water. This day was Rooney's hoodoo, too, for in making a quick spurt through deep mud around one of the cars which was wallowing painfully through, Rooney ran into a tree and broke his steering knuckle. He walked back 10 miles and secured a repair part, which was put in, and by a wild night drive caught the tourists the next day.

Anderson, as well, had bad luck on the fourth day, as he stripped both low and intermediate gears and had to negotiate all the sand and mud and steep hills on high gear, with a gear ratio of about 2 1-2 to 1. The wild driving necessitated by this caused him a succession of broken springs which cost him over 1,100 points in penalty, and required that he drive all night to get into control before his time limit of 12 hours had elapsed.

Upon arrival of the cars at St. Ignace at about noon they were loaded upon flat cars and these run upon the ferry, which took them across the Straits of Mackinac to Mackinaw City. The trip on the ferry takes about an hour and another hour is consumed in loading and unloading a car. With the sixteen cars entered in the tour the entire afternoon was spent in getting the cars loaded and unloaded at Mackinaw City. It cost $6.50 to ferry a car across the Straits and 50 cents additional for each passenger. The railway authorities on the west side of the Straits are very accommodating and load the cars themselves, but the local officers at Mackinaw City, of the Michigan Central, seemed unwilling to render any assistance whatever and the tourists had to unload the cars without assistance. All the gasoline had to be drained from the fuel tanks before they were shipped across.

The night was spent at Mackinaw City and the start for Traverse City was made next morning at 9 o'clock. Once on the east side of the lake the tourists felt the worst of the trip was over and were inclined to take things easy. The late start enabled several of the cars which had been delayed to rejoin the tour and Rooney, Anderson and Park's R. C. H. took advantage of the opportunity. It was at Mackinaw that the tourists were overtaken by the Staver Dictator, a new 1913 Staver model, that had not been completed in time for the start from Chicago. With three men it left Chicago Tuesday night and caught up with the tourists at Mackinaw, making the 4 days' drive in 2 days. The car was pushed through night and day with one driver sleeping while the other piloted the machine and the third man read the route directions to the driver. The car was stopped only long enough for the men to get supplies of fuel and oil and food, except for 3 hours, during which the men slept on top of the warm boilers of a lumber mill in the north woods. From Mackinaw City to Traverse City was scheduled for the fifth day's trip. The distance was only 109 miles and was the easiest jaunt of the entire trip. The route lies through a beautiful rolling country, over fair roads all the way and fine macadam around Petoskey, the noon control. In the afternoon the route followed the lake closely and ran through a string of summer resorts almost the entire distance to Traverse City. The roads are very good and motor cars abundant. In spite of the easy trip, however, three cars accumulated demerits. The passengers in Hanson's Case had a very narrow escape from serious injury when a rear wheel loosened up and started to come off. By dexterous driving Hanson succeeded in keeping the car right side up and getting it stopped. The repair cost the Case 38 points. Monsen accumulated 52 points more for the Bergdoll who found a leaky radiator and had to clean the mud out of it and solder it up. He was having slight engine trouble as well, and the adjustment of the push rods also helped in his total. Stutz got 57 points more penalty on account of another broken spring.

From Traverse City to Grand Rapids, a distance of 207.3 miles, was the sixth trick, with lunch at Ludington. The route was through Manistee, Ludington, Pentwater, Hart and Muskegon. The roads were worse on this day's run than was expected, as there was a good deal of work being done on the roads and they were closed for miles in several places which necessitated detours through heavy sand, and in other places the newly worked roads made heavy going. The contesting cars had begun to show the wear and tear they had gone through and heavy penalties were acquired by several of them. Brolley's Velie stripped its first speed gear on a hill when stalled by a farm wagon in front of it and the strain of starting on second started the clutch to slipping so that it had to be adjusted. The Bergdoll No. 5 had a leaky radiator and was continually taking on water. One rear wheel loosened up as well and Monsen was assessed 54 points for the day. Robbins' Abbott-Detroit received the record penalty for any one day, when the car ran into a protruding branch which went through the radiator. Two attempts were made to solder it and the car came in very late at Grand Rapids, where is was decided to replace the radiator. Anderson got an additional 1,000 points for his regular trouble of broken springs.

The last lap of the tour around the lake was from Grand Rapids to Chicago. Good gravel and fine macadam was the rule and all cars were running far ahead of the schedule speed of 20 miles an hour. This was the longest distance of any day's run on the tour, 217.8 miles. The route lay through Kalamazoo, Niles and South Bend. At Michigan City the home-coming tourists were met by a delegation from the Chicago Motor Club which escorted them into the city. With two exceptions, all the contesting cars made the last day's run without penalty. Monson had to do a little work on the engine of the Bergdoll, and found it necessary to refill the radiator 3 times, which cost him 12 points. Anderson was delayed by the same old trouble of broken springs and did not get in until very late.

When Ludington was reached on the Saturday run, the tourists were caught by the National car which had started as No. 8. This car was the entry of the Chicago Spring Wheel Company and is equipped with solid tires and the spring wheels made by that concern. Also although most of the contestants had no stop at all this car carried a fully enclosed limousine body. There were three drivers, including R. B. Gray, and the car had been on the road night and day until it caught the tour. The original cause of its delay the first day which put it more than 12 hours behind the tour and so caused its withdrawal automatically, was the loosening of a wheel.

Not only did the contesting cars have their troubles, but the official cars as well were laid up at times. The official cars are subjected to harder service than are the contesting cars, but all succeeded in coming through in fairly good order. The pilot car probably receives the hardest service of any one of the cars connected with a tour of this kind. The pilot must carry the bags of confetti which is strewn along the way so the tourists will know the right road to take, and must nose out detours in case the road is closed, must stop whenever a dangerous or exceptionally rough spot is encountered and mark it so that those who come behind will have an opportunity to slow down or avoid it. At the same time, the pilot car must go fast enough so that with all of these stops it does not delay the tour. The six-cylinder Kissel-Kar, driven by Harry Branstetter, carried the pilot practically all the way, although the rough service resulted in several broken springs. The Staver roadster which carried the tour officials and acted as pacemaker was on the job nearly all the time with Vaught at the wheel. Broken springs made trouble once or twice. The Midland, driven by Kavanaugh, was the starter's car and carried starter L. A. Watts. Its chief duties seemed to be pulling stranded cars out of mudholes along the way. It was on the job all the time and gave no trouble. The press car was an R. C. H., and made a fine showing, comparing favorably with some of the more expensive machines so far as getting through is concerned.

The troubles that caused penalties were:

Velie No. 1—Carbureter air intake screen stopped up with mud; second day, driver cut hole in screen and finally removed it; sixth day, slipping clutch, adjusted it twice.

Case No. 2—Fourth day, putting wire on magneto; fifth day, rear wheel off; sixth day, broken spring.

Staver No. 3—Second day, carbureter stopped up with mud and water.

Bergdoll No. 5—Steering knuckle broken in deep mud on second day; third day, took on water three times; fifth day, cleaning the mud out of and soldering radiator, adjusting push rod, late at control; sixth day, filling radiator with water five times, loose rear wheel, late at control; seventh day, taking on water three times, work on engine.

Abbott No. 6—Fourth day, replacing water lost through open drain pipe; sixth day, radiator ripped open by stick; worked on radiator; refilled radiator several times and finally put in a new one.

R. C. H. No. 7—Third day, took on water outside control; fourth day, withdrawn account of stripped gears and transmission.

National No. 8—First day, loose rear wheel, over 12 hours late at control, automatically withdrawn.

Velie No. 101—Withdrawn second day, no penalties. Driver forced to return on account of business.

Stutz No. 102—Second day, stripped gears, withdrawn.

Bergdoll No. 104—Second day, stuck in mud hole, pulled out with engine driven winch carried on car, 30 minutes late at control; fourth day, broken steering knuckle caused by running into tree.

Stutz No. 109—Second day, slight battery trouble, work on fender bent by broken tire chain, and lateness on account of helping other contestants out of the mud; third day, taking on water and fixing fender; fourth day, two springs broken on account of having to run on high gear alone, other gears being stripped; fifth day, broken spring; sixth day, broken spring.

R. C. H. No. 110—Frozen motor, withdrawn.

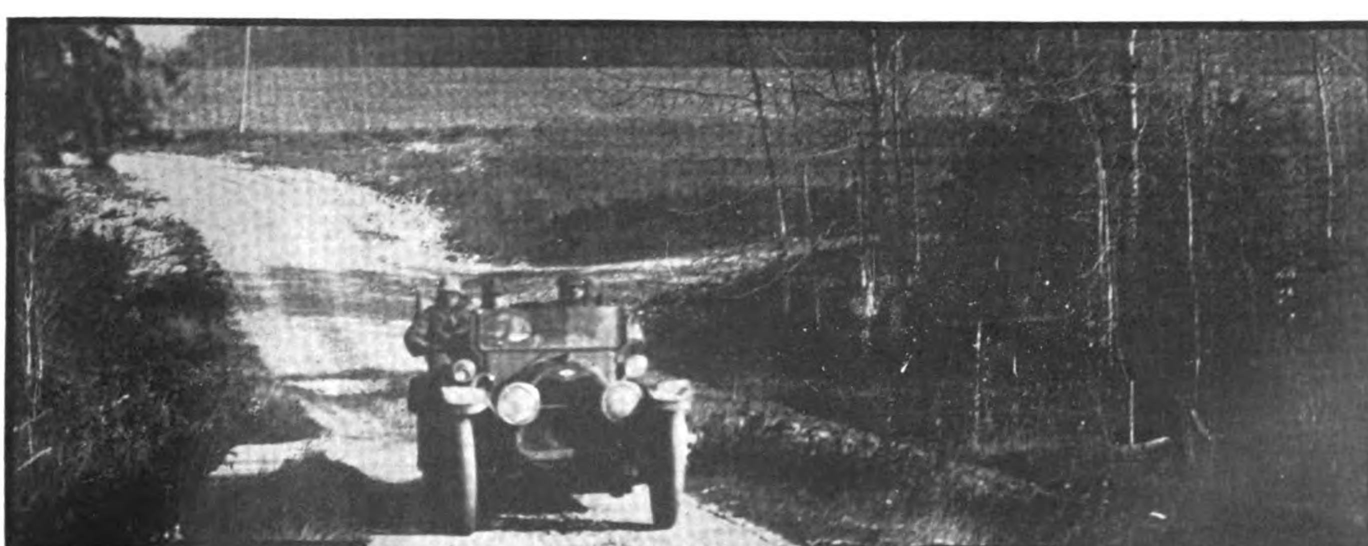
SCORES IN AROUND-THE-LAKE MOTOR RUN

TOURING CAR DIVISION

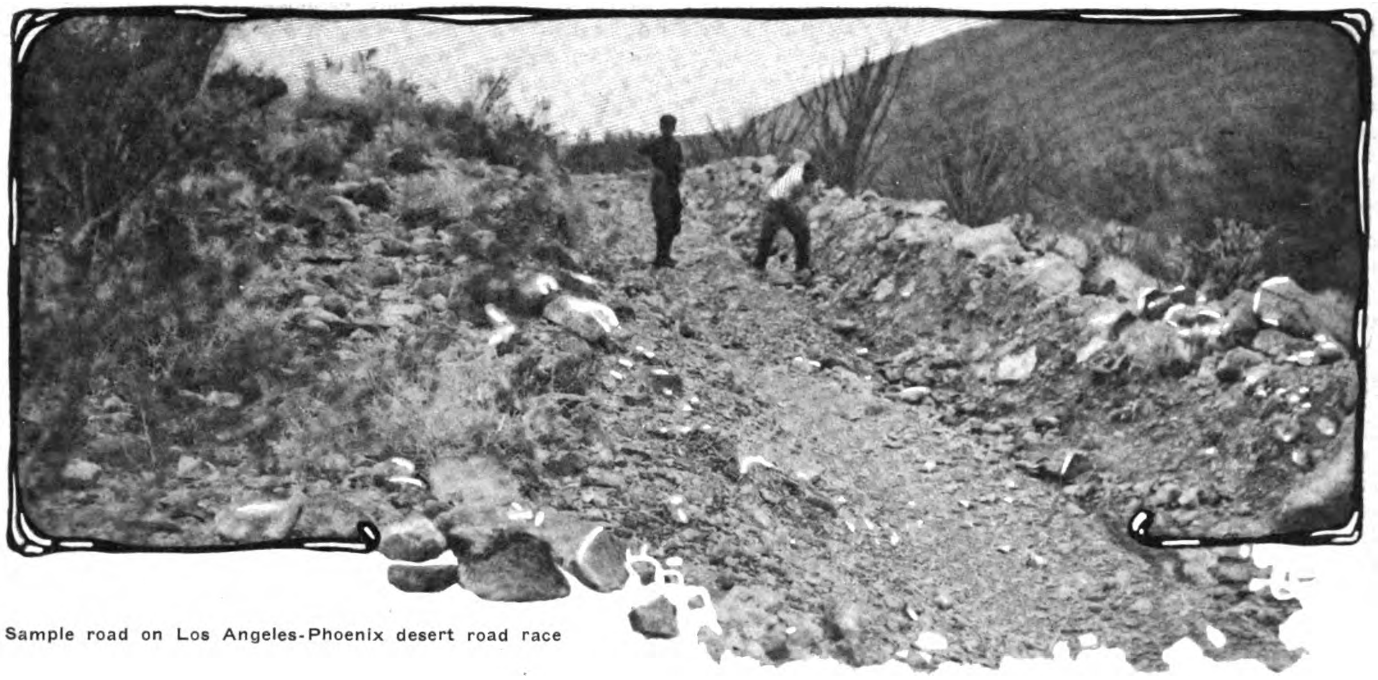
No.	Car and Driver	First Day	Second Day	Third Day	Fourth Day	Fifth Day	Sixth Day	Seventh Day	Total
1.	Velie—J. Brolley	0	2	0	0	0	3	0	5
2.	Case—J. Hanson	0	0	0	3	38	9	0	50
3.	Staver—G. Knudson	0	8	0	0	0	0	0	8
4.	Staver—A. Monckmeier	0	0	0	0	0	0	0	0
5.	Bergdoll—A. Monsen	0	161	9	0	52	64	12	298
6.	Abbott-Detroit—A. M. Robbins	0	0	0	3	0	1397	0	1400
7.	R. C. H.—H. Park	0	0	3	Withdrawn				
8.	National—Gray	Withdrawn							

ROADSTER AND TOY TONNEAU DIVISION

No.	Car and Driver	First Day	Second Day	Third Day	Fourth Day	Fifth Day	Sixth Day	Seventh Day	Total
101.	Velie—Mort Luce	0	Withdrawn						
102.	Stutz—Bob Maypole	0	Withdrawn						
104.	Bergdoll—Tom Rooney	0	30	0	295	0	0	0	325
105.	Moline—Joe Wicke	0	0	0	0	0	0	0	0
106.	Moline—Frank Salisbury	0	0	0	0	0	0	0	0
109.	Stutz—C. Anderson	0	182	7	1186	57	1000	107	2539
110.	R. C. H	0	Withdrawn						



A. M. Robbins had the radiator of his Abbott-Detroit ripped open by a protruding branch on the sixth day of the run



Sample road on Los Angeles-Phoenix desert road race

Franklin Phoenix Winner

Six-Cylinder, Air-Cooled Car Wins 511-Mile Desert Grind—Five Machines Finish Hard-Fought Race

Stevens-Duryea Wins Race From San Diego to Phoenix Covering a Distance of 400 Miles

Los Angeles—Phoenix, 511 Miles

No.	Car	Driver	Time
9	Franklin	Ralph Hamlin	18:10:22
3	Cadillac	Charles Soules	18:54:05
10	National	Fred Fuller	19:45:06
7	Cadillac	W. W. Bramlette	23:18:27
1	Cadillac	S. A. McKee	23:46:31

San Diego—Phoenix, 400 Miles

No.	Car	Driver	Time
26	Stevens-Duryea	D. C. Campbell	16:49:20
25	National	J. B. Houston	18:55:00
28	Apperson	W. E. Fergusson	19:07:29
15	Mitchell	R. L. Greer	21:16:00
36	Simplex	J. C. Rice	58:53:00
16	Stutz	C. E. Washburn	38:50:00
22	Kissel	W. T. Coop	22:17:52

PHOENIX, ARIZ., Oct. 29—*Special Telegram*—Ralph Hamlin, in the now famous Los Angeles-Phoenix road race yesterday, realized the ambition of his life by winning this with a six-cylinder Franklin in 18 hours, 10 minutes 22 seconds for 511 miles across mountain and desert between these two cities. His speed averaged 28.1 miles per hour and he was nearly three-quarters of an hour ahead of his nearest competitor. In addition to the honor which goes with the winning of this the fifth desert race ending in this city Hamlin had to combat oceans of sand and mud and drive through torrents and over mesa where roads were washed away by one of the most severe storms in the history of the Southwest.

Second honors were taken by Charles Soules, in a Cadillac, whose time was 18 hours, 54 minutes and 5 seconds; a National, driven by Fred Fuller, was third, his time being 19 hours, 45 minutes and 6 seconds. Only two others of the original twelve cars entered in the contest finished. Both were Cadillacs, one was driven by W. W. Bramlette in 23 hours, 18 minutes and 27 seconds; and the other by S. A. McKee in 23 hours, 46 minutes and 31 seconds. It is a remarkable fact that all Cadillacs finished.

At Yuma, the halfway point where the cars were ferried across the Colorado River the position of the five winners was practically the same as at the end of the race. Hamlin put his Franklin in the lead just beyond Brawley and held his lead to the finish. His time at Yuma was 10 hours and 32 minutes. For 5 years Hamlin has been trying to win this race and each time after defeat he declared he would continue until victory rested with him. Today after his triumph he has announced that he is entirely through with the racing sport.

Conditions in this desert race were severe in the extreme. In many cases the roads were trails. Hamlin changed but two tires on his Franklin, both changes being made east of Yuma. Soules had little trouble with his Cadillac; Fuller's National had a few delays due to minor difficulties, and largely to the condition of the course; McKee lost his way and drove his Cadillac 8 miles off the course; he changed several tires.

Only one accident occurred in the race; at Vineyard Curve near Ontario, Cal., the Buick entry overturned and Louis Nikrent, the driver, had three ribs broken and Fred Nikrent, mechanician, was badly injured; both will recover. The Mercedes entry driven by Charles Bigelow, in avoiding a collision with the Buick on the curve, broke a radius rod which was temporarily repaired but which broke several times after, so that Bigelow lost 14 hours from this cause.

Several of the other entrants had various mishaps. The Schacht, driven by G. A. Ball, broke a rear axle near Glamis and lost 14 hours, and arrived in Yuma only 1 hour before the other cars left this control. Ball continued though he knew he was out of the money, and acted as a good Samaritan to other cars and had it not been for him some of them would never have reached Phoenix. The Schacht and Mercedes arrived late Monday night.

The Simplex, driven by A. G. Faulkner, had trouble with the drive chains and stuck several times in the mud. It spent Monday night on the desert 100 miles west of Phoenix.

One of the American entries, driven by Marc Bunnell, skidded into a viaduct before out of the city limits of Los Angeles and dished a wheel, causing the machine to pull out of the race east of Brawley. The other American entry, driven by W. B. Pipher, dropped out of the race about the same place supposedly due to axle trouble.

The Hupmobile entry, driven by Lonard Jones, withdrew near Brawley because of a broken axle.

While the race from Los Angeles to Phoenix was in progress there was also a race from San Diego to Phoenix, the two routes uniting a few miles west of Yuma, where the night control was established. This part of the contest, namely, San Diego to Phoenix, was won by D. C. Campbell, driving a Stevens-Duryea, his time being 16 hours, 49 minutes and 20 seconds for the distance which is a little over 400 miles. Six other cars finished in the race between the cities of San Diego and Phoenix, these being:

Car	Driver	Time	Car	Driver	Time
National	J. D. Houston	18:55:00	Simplex	J. C. Rice	58:53:00
Apperson	W. E. Ferguson	19:07:29	Stutz	C. E. Washburn	38:50:00
Mitchell	R. L. Greer	21:16.00	Kissel	W. E. Coop	22:47:52

Nearly all of the San Diego cars had trouble of one nature or another, many of the cars from San Diego never reaching Yuma where they joined with the racers from Los Angeles to Phoenix. The Columbia, driven by W. H. Smith, cracked a cylinder jacket before reaching Yuma. The Winton entry, driven by W. H. Carlson, got stuck in an arroyo near Arlington and has not yet arrived at Phoenix. The Pope-Hartford, driven by L. W. Griffith, broke its frame near Dome. The crew repaired the damage with fence posts and bailing wire borrowed from a farmer. A fence post was placed parallel with each side member and bound to the frame by wire. In this condition the car reached Phoenix today.

The start was made in the Los Angeles-Phoenix race Saturday night, October 26, the first car leaving at 11:05 and the others at 5-minute intervals, the last car getting away at midnight. The night was bitter cold, and drivers and mechanicians were wrapped in blankets. While cold leaving California the desert held its mysteries in store for them as a storm had been raging for hours on it. Much of the course was muddy, the California portion not being bad, as the storm centered chiefly in Arizona. Between Yuma, the crossing point of the Colorado River, and Phoenix, deep gullies had been washed across the roads, and in places the roads had been entirely wiped out. At the Hassayampa river, 50 miles west of Phoenix, and also at Agua Fria, 16 miles west of Phoenix, both rivers were running bank full Sunday morning. At one time it was thought an extra control would have to be established at Hassayampa, which would mean that the cars would have reached Phoenix Tuesday morning. Fortunately, the Hassayampa subsided and mules were used to tow the racing machines across. No changes in position were caused by this inconvenience as the cars all reached Phoenix in the same order they checked out of Yuma.

The troubles of the course were not all confined to the losing cars: The National, in the San Diego race, caught fire near Polamas on the Arizona side of Yuma, due to carbureter troubles and burned out all connections. A 2-hour delay resulted. Later it changed three tires near Dome. The Apperson had two punctures due to nails in the same place. The Apperson in avoiding a rear-end collision with the Stevens-Duryea, which won this race, did so at the expense of a broken radiator. The Stevens-Duryea was halted and the Apperson driver following closely had to go into a deep arroyo or over a bank to avoid a collision. He chose the former course and broke his radiator which, however, was soon repaired and he finished fourth. The Stutz had motor trouble.

For 3 years the race from Los Angeles was across the desert by Mecca, across the Colorado at Ehrenberg and thence on over the Arizona mesas to Phoenix. Last year it was changed to pass through San Diego and Yuma. This year still another change was made and San Diego was left off the course. On the California side the principal towns through which the route passes are Alhambra, El Monte, Puente, Lemon, Walnut, Spadra, Pomona, Ontario, Bloomington, Colton, Beaumont, Banning, Palm Springs, Mecca, Brawley, Mammoth, Glamis and Ogleby. The Yuma control is the first stop on the Arizona side of the Colorado. It was from this place that the cars in both races started Monday, passing through Dome City, Middle Wells, Palomas, Agua Caliente, Arlington, Buckey and on to the fair grounds, which are situated on the outskirts of Phoenix.

The crossing of the Colorado river at Yuma was accomplished without special incident. This crossing is a clumsy affair, the ferry service being antique. It progressed slowly on account of the high water but no accident was reported.

It is at Yuma that the two race routes converge. The San Diegans raced across the Southern California desert by way of El Centro and Holtville.

There is little to choose between the two courses. Up to 2 weeks ago 45 miles of the desert between Holtville and Yuma had never been crossed by an automobile. The first car to cross that waste was a Premier, driven by J. L. Fernando with M. J. Farlow as mechanician. Fernando and Farlow were lost a night and a day on the desert and had a terrible experience. They encountered sand so deep that even after they had deflated their tires the only way they could progress was to leap out and push from behind, letting the car steer itself.

Before the day of the race the routes were placarded thoroughly. Between Holtville and Yuma there was a flag every 2 1-2 miles and five gallons of water.

Only those who have participated in the long desert grind can know the fatigue and hardship which the drivers and mechanicians endure. To ride at a speed of 40 or 50 miles an hour over desert roads is to take one's life in his hands. During his trial trip Fernando threw out one mechanician in rounding a sharp curve and took him back to San Diego with several broken ribs.

The prize money offered for the Los Angeles event totals $5,-200, while the winners of the San Diego race will divide $6,275.

ENTRIES IN THE LOS ANGELES-PHOENIX DIVISION IN THEIR ORDER OF STARTING

Car	Driver	Time	Car	Driver	Time
1 Cadillac	S. A. McKee	11:05	7 Cadillac	W.W.Bramlette	11:35
2 American	W. B. Pipher	11:10	8 Buick	Louis Nikrent	11:40
3 Cadillac	Chas. Soules	11:15	9 Franklin	Ralph Hamlin	11:45
4 American	Marc Bunnell	11:20	10 National	Fred Fuller	11:50
5 Simplex	Al G. Faulkner	11:25	11 Mercedes	Chas. Bigelow	11:55
6 Hupmobile	Lonard Jones	11:30	12 Schacht	G. A. Ball	12:00

ENTRIES IN THE SAN DIEGO-PHOENIX DIVISION IN THEIR ORDER OF STARTING

Car	Driver	Time	Car	Driver	Time
15 Mitchell	R. L. Greer	10:15	29 Tincher	H. A. Lees	11:25
17 Buick	S. Campbell	10.25	30 Knox	Not named	11:30
18 Mercedes	C. T. Johnson	10:30	32 Premier	J. L. Fernando	11:40
20 Franklin	Frank Carlson	10:40	33 Michigan	Chas. Gilstrap	11:45
21 Studebaker	F. C. Wood	10:45	34 Buick	C. W. Biggs	11:50
24 Knox	E. De Lovelace	11:00	35 Kisselkar	Alf. Chenowith	12:00
27 Pope-Toledo	E. W. Ballert	11:15			

WINNERS OF THE PAST THREE PHOENIX DESERT RACES

Year	Car	Distance	Time	Average miles per hour
1912	Franklin	511 miles	18:10.22	28.1
1911	National	542 miles	20:22.00	26.6
1910	Kissel	418 miles	15:49.00	26.5

Hoosiers Improving Speedway Stands

INDIANAPOLIS, IND., Oct. 28—The Indianapolis Motor Speedway is to tear down the present press stand, judges' stand, refreshment and executive buildings and all other stands grouped near the start and finish line and behind the pits.

One large, modern pagoda building is to supplant the entire lot. This building will accommodate those in charge of the race in the following way:

On the lower, or ground floor, will be located the telegraph and electrical appliances. On the second floor will be the timing and scoring devices. The press will be taken care of on the third floor, and on the fourth floor the judges and officials will have high, roomy accommodations. The fifth floor is for the management and executives.

These plans have been ratified by Carl G. Fisher, president of the Indianapolis Motor Speedway Company, and the building is now in progress.

Other changes being incorporated by the manager of events, Charles W. Sedwick, are the installation of more efficient scoring service and a general improvement in the utilization of parkage and paddock space.

Mr. Sedwick sails about November 1 for Europe, where he will discuss the May race meet with the most prominent European manufacturers. Entries are open January 1, and in the meantime Mr. Sedwick expects to have the greatest field of entries lined up that ever faced a starter.

Minor Contest News of the Past Week

Charles J. Glidden and party arriving at New Orleans

SEVERAL rulings were made at the meeting of the Contest Board of the American Automobile Association last week covering appeals, disqualifications, etc. The gist of the rulings follows: Studebaker Corporation appeal in Minneapolis-Winnipeg run against disqualification for cutting course was dismissed and class trophy awarded to Hupmobile.

The Pittsburgh-Mercer Auto Company was suspended until January 1 for mis-advertising contestants in a non-stock meeting as stock cars.

The George C. Brinkman Motor Car Company of St. Louis was suspended until January 1 for failure to start a Nyberg car entered at a recent race meeting.

Charles W. Canner, registered driver, was suspended until January 1, 1915, and E. V. Rickenbacher, January 1, 1914, for participation in various unsanctioned race meetings in Iowa and Nebraska, where Canner campaigned the Marshall Flying Squadron and met with some serious mishaps owing to the carelessness and disregard of the precautionary rules of A. A. A.

Three Clean Scores in Michigan Run

GRAND RAPIDS, MICH., Oct. 28—After a 400-mile trip through Western Michigan the reliability run given under the auspices of the Grand Rapids *Herald* and the Grand Rapids Automobile Club, pulled into Grand Rapids, bedraggled and mud-stained, but with three of the drivers happy in the fact that they had attained perfect scores. The final results showed points penalized as follows:

Car	Driver	Observer	Total penalties
Cutting	Riekse	Roth	234
Reo Fifth	Vandecar	Fiske	0
Ford	Vallade	Leonard	88
Cadillac	Eckburg	Wilcox	0
Overland	Oswald	DeWindt	868
Marmon	Kramer	Shank	1
Oakland	Austin	Bancroft	0

The first day's run was 114 miles to Ludington. The second day 98 1-2 miles were covered to Traverse City. The third day was from Traverse City to Cadillac and the fourth day brought the tourists home. Many courtesies were extended to the travelers by residents of towns along the route. The tour proved such a success that it probably will be repeated next year.

1,500 at York's Track Races

YORK, PA., Oct. 28—The race meeting held here on Saturday consisted of four events, the fifth race a free-for-all at 10 miles being declared off when Gillard's Pullman turned turtle after going 3 miles. The driver and his mechanic were seriously hurt. The fields were very small and the only close contest resulted from the running of the handicap wherein the Buick won on its time allowance.

The Lancaster Motor Club ran a sociability tour to the t and the participants were the guests of the York Motor Club the afternoon. About 1,500 attended the races.

The summary follows:

Car	Driver	Time	Car	Driver	Time
5-MILE, NON-STOCK, 201 CU. IN.					
Mercer	W. Freitag	6:29.25	Ford	C. Lambright	7:05.45
5-MILE, NON-STOCK, 451 CU. IN.					
Kline	John Menker	6:03.15	Pullman	Gillard	6:24
5-MILE, NON-STOCK, 601 CU. IN.					
Kline	John Menker	6:08.25	Pullman	Gillard	6:22.25
5-MILE, FREE-FOR-ALL HANDICAP					
Buick	J. W. Richley	7:09.45	Ford	C. Lambright	7:11.25
Kline	John Menker	7:12			

In this event Menker's actual running time was 6:02 or an average of one mile in 1:12. Menker broke the track record, which was held at 1:14.

Disbrow Stars on Louisville Track

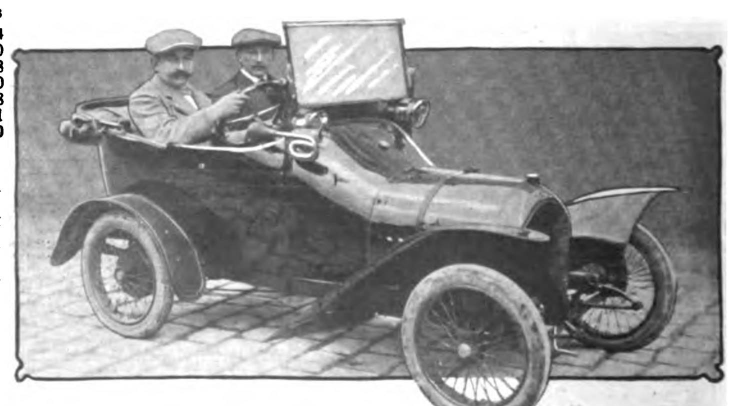
LOUISVILLE, KY., Oct. 27—Over the historic 1-mile dirt racing track at Churchill Downs, nine well-contested automobile races were run this afternoon. About 3,000 persons witnessed the events. The exhibition of Louis Disbrow, driving his Simplex Zip and his 290-horsepower Jay-Eye-See, was the feature. No records were lowered. The summary follows:

Car	Driver	Time	Car	Driver	Time
Exhibition Trials—1 Mile					
Simplex	Disbrow	:53.40	Case	Endicott	:57.20
Case	Nikrent	:57	Lozier	Martin	1:05
Hotchkiss	Kilpatrick	:57			
5-Mile Race					
Case	Nikrent	5:21.40	Case	Endicott	
1-Mile Exhibition					
Jay-Eye-See	Disbrow	:58			
Pursuit Race—5 Miles					
Simplex	Disbrow	5:45	Case	Nikrent	
Hotchkiss	Kilpatrick		Case	Endicott	
2 Miles					
Jay-Eye-See	Disbrow	2:08			

Disbrow also won a 5-mile race in his Simplex in 5:22 and Nikrent took the 3-mile handicap in a Case in 3:05.

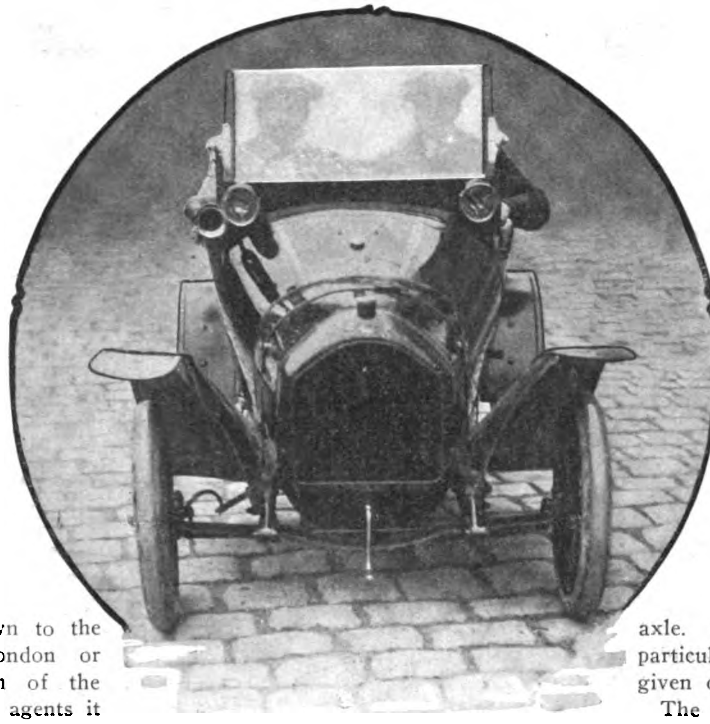
Glidden Arrives at New Orleans

NEW ORLEANS, Oct. 28—Charles J. Glidden, donor of the Glidden Trophy and one of the leading automobilists of the country, completed the route laid out for the abandoned national tour and arrived in this city on schedule time. The program that had been arranged to welcome the national tour was carried out in modified form in honor of Mr. Glidden's party.



Side view of the baby Lion-Peugeot

Lion-Peugeot Introduces Small Runabout



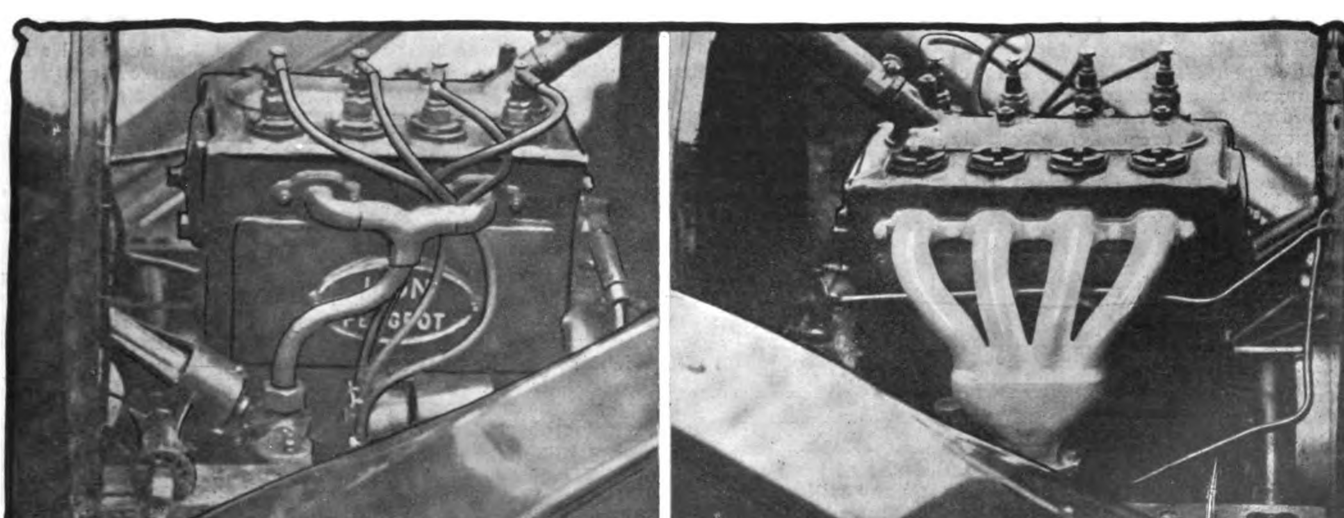
Front of Baby Lion-Peugeot

PARIS, Oct. 11—France is at present showing a decided preference for what have been termed baby cars—small, light, two-seaters, costing little more than a first-class motorcycle and having about the same upkeep cost. Up to recently these machines have been produced by firms of comparatively little importance. but rumor has had it that the Peugeot company, one of the most important in France, intended to enter the market with a big series of baby cars, the designs for which had been entrusted to Ettore Bugatti, a very successful engineer, and producer of the high-grade Bugatti car. It was not expected that the new Peugeot would be shown to the public before either the London or Paris shows, but by reason of the activity of one of the selling agents it was revealed at the agricultural motor exhibition just held at Bourges.

The baby Peugeot is built, so far as its external appearance is concerned, on big car lines; its dimensions, however, are decidedly diminutive, it being so low and light in appearance that it really has all the appearance of a baby car. The power plant comprises a four-cylinder block motor of only 2 by 3.5 inches bore and stroke. The valves are on opposite sides and are of large diameter; the timing gears are in front, with the magneto on the intake side having its shaft parallel with the motor shaft. The carbureter is a Claudel. A novel feature of the machine is the casting of the four cylinders and the whole of the crankchamber in one piece. The base plate is independent and is bolted on, and there are detachable end plates to receive the two main bearings, but on this point no definite information could be obtained from the agents in charge of the car, and an external examination did not reveal the exact nature of the construction. The motor is bolted directly on the underpan, this latter being of stiffer material than is usually employed and bolted to the channel section side-frame members. With this construction it is obviously impossible to make any internal examination of the motor without lifting it entirely out of the chassis, but owing to its small area and very low weight this is by no means a difficult task. The power is transmitted through a cone clutch, a two-speed gearset and a propeller shaft to a floating rear axle. The gearset is a special type, particulars of which have not yet been given out.

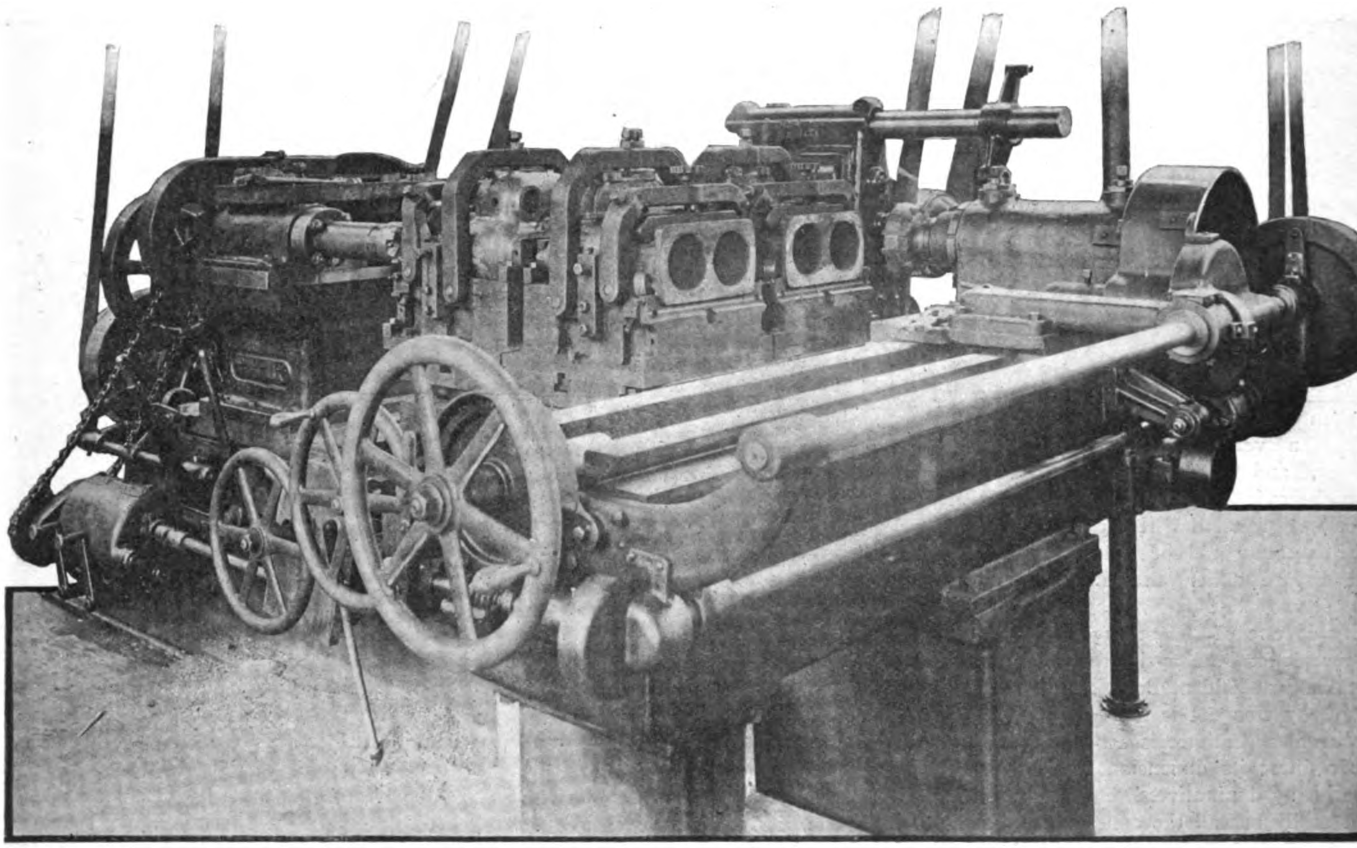
The motor is lubricated by splash, the oil tank being in the scuttle dash, with filler cap on the outside of the dash. The gasoline tank is built in the back of the rear seats, the top being polished mahogany and hidden by the hood when this latter is down. Front suspension is semi-elliptic and the rear springs are really the half of a semi-elliptic spring inverted, the thick end being attached to the frame member and the forward end of the main blade to the rear axle housing. Truffault shock-absorbers are fitted front and rear. The car is supplied with wire wheels having 22 by 2 1-2-inch tires, and is listed complete with two-seater body, three lamps, acetylene generator within the scuttle dash, horn and tools at $800 retail.

This car has been specially designed by the makers to meet the low-priced American car on the French market and in French, European and African possessions.



Intake and exhaust sides of Lion-Peugeot baby motor recently brought out for the French trade

Factory Miscellany



Machine used for boring and milling cylinders in the factory of the Lozier Motor Company, Detroit, Mich.

Boring and milling the cylinders, unless carefully handled, can become an enormous factor in the output cost of the factory. The above illustration shows the Beaman & Smith boring and milling machine as used in the Lozier factory at Detroit, Michigan. This shows the complete machine with the milling appliance in the foreground. Eight cylinders can be operated upon simultaneously. Four are bored, while the other four are in the milling part. As will be noted in the illustration, the cylinders are mounted upon a turntable, which permits them to be reversed when one of the operations is completed. After having completed the boring operation, the operator of the machine swings the turntable about and the cylinders which have just been bored are in position for milling. A fresh set of cylinders is inserted in the turntable for boring and the work proceeds. It takes but one man to handle the machine and the boring and milling of each set takes about 30 minutes. The machine can be run continuously throughout the working day, and in that time will turn out approximately twenty full sets. The size to which the cylinders are bored can be regulated on this machine by simply fitting into the boring chuck the cutter of the required diameter. The operation of the boring and milling divisions of the machine is entirely simultaneous and is to a great degree automatic in that after the job is set up it only requires the active attention of the operator when it becomes necessary to swing the set of cylinders from the boring to the milling side and to set up the new job, an operation requiring 4 minutes. It is estimated that the time saved on this job is more than 100 per cent.

Overland's Eight Additions—The Willys-Overland Company, Toledo, Ohio, is erecting eight new buildings. The largest of the group is a five-story concrete building, 102 feet by 127 feet in dimensions. Other constructions which are under way include a two-story concrete building, 50 feet by 140 feet, to be used as a repair shop; a three-story, 60 feet by 80 feet concrete building, for the varnishing and trimming departments; a three-story concrete structure 40 feet by 100 feet, for polishing, plating, pattern making and pattern storage; a two-story frame building covered with iron siding, 65 feet by 216 feet, for wheel painting and trimming; a 34 by 48-foot brick addition to boiler room for housing two 300-horsepower boilers; a one-story frame iron-covered addition to forge shop, 32 feet by 55 feet; a one-story steel and brick construction, 70 feet by 200 feet, to serve as a blacksmith shop. These buildings represent an outlay of several hundred thousand dollars and when finished will house 2,000 workmen.

Paige Company's Addition—The Paige Auto-Hoist Company, Grand Rapids, Mich., has purchased a site at that city on which a factory will be erected. The company will manufacture a device for lifting the weight of an automobile from its tires while not in use.

Jeffrey-DeWitt's Factory—The Jeffrey-DeWitt Company, Detroit, Mich., manufacturer of spark-plugs, has acquired an additional factory which it will operate in connection with its present plant. The new building will house the assembly and shipping departments.

Stewart's Plant—The W. F. Stewart Company, Flint, Mich., states that the plant which it is erecting will be used for the manufacture of metal automobile bodies for pleasure cars and is designed to produce 100 complete bodies per day. The company is interested in the purchase of metal automobile body making machinery.

Lavigne Leases Plant—The Lavigne Gear Company, of Corliss, Wis., and Detroit, Mich., which moved its plant and equipment from Detroit to Corliss about a year ago and which was reported to have been contemplating a return to the Michigan metropolis, has leased the big Racine plant of the Racine-Sattley Company, of Racine, Wis., and Springfield, Ill., and will occupy 50,000 to 75,000 feet, beginning Monday morning, October 28.

Kissel's Milwaukee Plant—The Kissel Motor Car Company, of Hartford, Wis., expects to be able to take occupancy of its new branch plant at Milwaukee, Wis., on or about November 15. The work of rearranging the new plant, formerly the Romadka trunk factory, is progressing rapidly, and some of the equipment is now being installed. Improvements to the main plant at Hartford are being completed, the new buildings having been equipped and put into condition for continuous operation.

Vinot Enlarges—The Vinot Car Company, Montreal, Que., is having plans prepared for a new factory.

St. Paul Company Builds—The Peteler Car Company, St. Paul, Minn., has acquired a site covering about 23 acres and will erect a factory.

Hudson Plans Additions—The Hudson Motor Car Company, Detroit, Mich., plans to add two more buildings to its plant, bringing the total floor space up to 363,611 square feet.

Ware Company Builds—The Ware Motor Company, Minneapolis, Minn., has under way the construction of a much larger factory than it has maintained and shipments will begin January 1.

Standard Oil Buys—Interests allied with the Standard Oil Company are said to be negotiating for the purchase of the factory and good will of the Knox Automobile Company, Springfield, Mass.

Deny Building Report—An official denial of the report that they are going to build a factory at St. Louis, Mo., is being sent broadcast by the Swinehart Tire & Rubber Company, Akron, Ohio.

Build Brick Factory—The American Automobile Trimming Company, Detroit, Mich., has made arrangements for the erection of a three-story brick building on Meldrum and Berlin avenues, that city.

Jackson Rim Adds—A contract has been awarded for the erection of an addition of a one-story factory 80 feet by 100 feet by the Jackson Rim Company, Jackson, Mich. The estimated cost is to be $40,000.

Another Body Plant—J. A. Fitzsimmons, Lindsay, Ont., will start work at once on a new two-story brick factory for the manufacture of aluminum automobile bodies. Complete new machinery will be purchased.

Chase Visits Havers Plant—A. F. Chase, Minneapolis, Minn., distributor of the Havers car, recently visited the factory of the Havers Motor Car Company, Port Huron, Mich., and after going over the line carefully placed an order for one hundred and fifty cars.

Detroit Adds Body Plant—With the addition of a body building plant to manufacture every sort of body, Detroit again gains. An organization of New York millionaires is at present forming a $200,000 corporation with John Mackay and H. D. W. Mackay as the leading directors.

Ford Leases Property—The Ford Motor Company, Philadelphia, Pa., has leased property at Sixteenth street and Washington avenue, that city, and will establish an assembly plant on the site. The acquisition of this property will also give the Ford company the benefit of its own railroad siding.

Cleanliness Garford Factor—Cleanliness is made an important factor in the Elyria, Ohio, plant of the Garford company. Every department of the plant is kept as clean and free from litter as a big force of shop white wings can make it. Parts and materials are neatly piled and the passageways are never obstructed.

Gramm-Bernstein's Truck—The first truck completed by the $500,000 Gramm-Bernstein Company, at Lima, was finished recently. It is of three and one-half tons capacity and the company will complete 250 of them by spring. The plant has been in operation for about four weeks and employs seventy-five men.

To Enlarge Plant—Additions and improvements costing $10,000 will be made by the M. E. Blasier Company, Utica, N. Y., to the building which it occupies at the present time. A four-story brick structure 21 feet by 60 feet will be built in the rear of the present plant, which will be enlarged by the addition of two stories. The company manufactures automobile tops.

To Make Automobile Tires—The Stens Manufacturing Company, Springfield, Mass., capitalized at $200,000, has bought land in the vicinity of Wood Pond on the line of the New Hampden Railroad and will build a three-story factory building 100 feet by 40 feet in size with basement, of brick and concrete. The company was organized last summer to manufacture automobile tires.

Adler-Werke's Increase—The Adler-Werke, Eagle Works, at Frankfort, Prussia, were formed by H. Kleyer, who commenced business in a small shop in 1880. His receipts in that year amounted to $2,248, whereas now the Adler Werke's annual production approximates $4,500,000 and is increasing from year to year, making enlargement of the plant frequently necessary. The works employ about 5,000 operatives and 500 clerks.

Calendar of Coming Automobile Events

Shows, Conventions, Etc.

Jan. 2-10	New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11	Cleveland, O., Annual Automobile Show.
Jan. 4-11	Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-25	New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25	Philadelphia, Pa., Annual Automobile Show.
Jan. 25-Feb. 1	Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1	Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1	Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8	Chicago, Ill., Annual Automobile Show.
Feb. 10-15	Minneapolis, Minn., Annual Automobile Show.
Feb. 11-15	Ottawa, Ont., Annual Automobile Show.
Feb. 15-22	Newark, N. J., Annual Automobile Show, First Regiment Armory, New Jersey Automobile Exhibition Company.
Feb. 17-22	Kansas City, Kan., Annual Automobile Show.
Feb. 24-Mar. 1	Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1	Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1	St. Louis, Mo., Annual Automobile Show.
March 3-8	Pittsburgh, Pa., Annual Automobile Show.
March 8-15	Boston, Mass., Annual Automobile Show.
March 17-22	Buffalo, N. Y., Annual Automobile Show.
March 19-26	Boston, Mass., Annual Truck Show.
March 24-29	Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Oct. 31	Track—Phoenix, Ariz., Maricopa Auto Club.
Nov. 9	Sociability Run, Louisville, Ky., Louisville Automobile Club.
Nov. 29-30	Richmond, Va., Track Races, State Fair Grounds, Richmond Automobile Club.
May 30	Indianapolis, Ind., 500-Mile Race, Speedway.

Proposed Contests

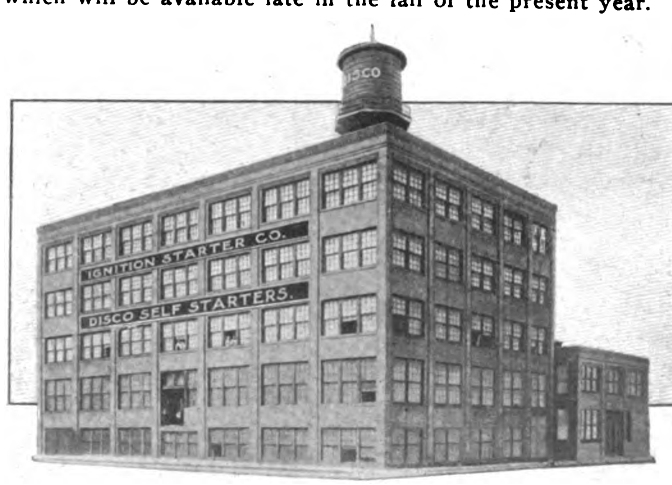
Nov. 3-5-6	Track—Shreveport, La., Shreveport Auto Club.
Nov. 15-16	Track—Richmond, Va., Richmond Automobile Club.
Nov. 28	Road Race—Visalia, Cal., W. H. Lipton.

Foreign

Nov. 2-3	Versailles, France, Splash Guard Competition.
Nov. 8-16	London, England, Olympia Automobile Show.
Dec. 7-22	Paris, France, Paris Automobile Show, Grand Palais.
Jan. 11-22	Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.
April	Barcelona, Spain, International Exhibition.

Atlas Purchases Plant—Through the purchase of the Atlas Engine Works by the Lyons-Atlas Company, Indianapolis, Ind., recently the Knight sleeve-valve engine receives another impetus from a production standpoint which bids fair to place it on a more advantageous basis than ever before in this country. The new company will take possession of the new plant, which covers sixty-seven acres, at once, and will begin the manufacture of Knight engines for the trade.

New Departure Busy—The New Departure Manufacturing Company, Bristol, Conn., manufacturers of the well known American-made New Departure ball bearings, has been working 127 hours a week in all departments and 152 hours a week in some departments with day and night shifts of skilled mechanics to meet the large demand for these goods. Factory additions are now in process of construction. These additions will give nearly 75,000 square feet of floor space which will be available late in the fall of the present year.



New plant of the Ignition Starter Company, manufacturers of Disco starters, Detroit, Mich.

BAKER'S Sales Convention—Eighty-five dealers and salesmen were present at the Dealers' and Salesmen's Convention held at the Cleveland, Ohio, factory of the Baker Motor Vehicle Company, October 16, 17 and 18. Addresses were made by G. H. Kelly, W. P. Kennedy and other officials of the company. The accompanying illustration shows about two-thirds of the total number of men present asembled before the factory.

Barrett with Stratton—S. W. Barrett is now in charge of the stock department of the E. V. Stratton Company, Albany, N. Y.

Stromberg's Detroit Branch—The Stromberg Motor Devices Company has opened a Detroit, Mich., branch with N. H. Minniter in charge.

Baxter Sales Manager—William A. Baxter of Dayton, O., has recently been appointed sales manager of the Pan-American Motors Company, San Francisco, Cal.

Day and Night Service—M. E. Grable, Boston, Mass., who has been appointed New England district manager for the Universal truck, has inaugurated a day and night service for the owners of these vehicles.

Trade Men Organize Fraternity—A number of automobile owners, drivers and others identified with the motor car trade have organized the Fraternal Order of Honk Honks, which will have its headquarters at Anderson, Ind.

Tire Branches Consolidate—Since the consolidation of the Diamond and Goodrich companies of Akron, O., the two Columbus, O., branches have been consolidated with the former Diamond branch at 186 East Gay street under the management of H. S. Smith.

Goodyear's Indianapolis Warehouse—The Goodyear Tire and Rubber Company has begun the construction of a new business and warehouse building at Walnut street and Capitol avenue, Indianapolis, Ind. It will be 50 by 200 feet, of fireproof construction and will cost $107,000.

Columbus Wants Automobile—Bids will be received by Director B. L. Bargar of Columbus, O., November 4, for two gasoline automobiles for use in the fire department.

Will Build Garage—A building permit has been issued at Lima, O., for the construction of a garage on North Main street by J. A. Ireton.

Michigan's Good Road Campaign—The Michigan Good Roads Association has begun another campaign for membership and has become especially active in Detroit in its efforts to promote a good road along the Detroit and Toledo route through Monroe for which the Boards of Commerce of Toledo and Detroit have contributed $3,000.

Extend Minnesota Road—Business men between Rockford and Glenwood on the Soo line in Minnesota have organized to extend the state road from Minneapolis to Glenwood through Rockford under the Elwell road law which distributes one-half the cost to the state, one-fourth to the county and one-fourth to the property improved.

Mail Collectors Mechanics—Several months ago the Columbus, O., postoffice permitted the mail collectors which had been operating the automobile collection wagons, to take over the cars and gave each an allowance of $1,000 for maintenance. Since that time the collectors have become mechanics and are making quite a saving by making all adjustments themselves.

Mississippi's Road Improvement—Mississippi statistics show that during the past two years $5,867,900 in bonds have been issued for road improvement. In nearly every case the bonds brought par. This does not include expenditures for this purpose made from funds on hands. In addition automobile clubs and individuals have contributed considerable sums for road improvement.

Cost of Indianapolis Roads—More than $25,000 has been added to the Indianapolis, Ind., city treasury this year by automobile licenses. On January 1, 1912, there were 188 miles of paved streets in the city. Since that date contracts for paving streets have been awarded amounting to about $500,000. Street cleaning this year will cost the city $120,000; repairing and maintaining unimproved streets, $55,000, and repairing paved streets, $85,000.

Overland Helps Y. M. C. A.—The Willys-Overland Company has made possible the proposed complete course of instruction in the care and operation of an automobile to be offered by the Y. M. C. A. of Toledo, O., in its night classes, by presenting the association with a complete demonstrating apparatus. The use of this apparatus will give students a large amount of actual repair work in the shop. The school opened recently and is in charge of W. F. Morris, mechanical expert of the Union Supply Company.

Gathering of salesmen and dealers of the Baker Motor Vehicle Company during their recent convention at the factory of the

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Asheville, N. C.	Alco	Asheville Auto Co.
Attleboro, Mass	Cole	Pawtucket Auto Co.
Baltimore, Md	Kline	Neeley & Ensor
Bath, Me	R-C-H	H. Washburn
Boston, Mass	Chevrolet	Republic M. C. Co.
Boston, Mass	Little	Republic M. C. Co.
Brooklyn, N. Y	Kline	C. & C. Auto Co.
Bryan, Tex	R-C-H	Dr. P. M. Rausor
Buffalo, N. Y	Kline	Windsor M. C. Co.
Center, Tex	R-C-H	H. C. Parker
Charlotte, N. C	Kline	E. T. James
Chattanooga, Tenn	Alco	Auto Repair Co.
Chillicothe, Mo	R-C-H	H. L. Gilbert
Columbus, O	Reo	R. F. Boda & Co.
Denver, Colo	Little	W. Thorney Auto Co.
Denver, Colo	Palmer & Singer	W. W. Barnett
Denver, Colo	Stutz	Hall Auto Co.
Dorranceton, Pa	Kline	Gilbert H. Edgar
Erie, Pa	Alco	Star Garage Co.
Flora, Ind	R-C-H	Greider & Hawkins
Franklin, Pa	Kline	King Auto Co.
Grand Rapids, Mich	Alco	E. A. Merrill
Harrisburg, Pa	Abbott-Detroit	Harrisburg Auto Co.
Harrisburg, Pa	Autocar	Andrew Redmond
Harrisburg, Pa	Cadillac	Crispen M. C. Co.
Harrisburg, Pa	E-M-F	Keystone M. C. Co.
Harrisburg, Pa	Flanders	Keystone M. C. Co.
Harrisburg, Pa	Hudson	I. W. Dill
Harrisburg, Pa	Maxwell	Andrew Redmond
Harrisburg, Pa	National	Harrisburg Auto Co.
Harrisburg, Pa	Oakland	Harrisburg Auto Co.
Harrisburg, Pa	Overland	East End Auto Co.
Harrisburg, Pa	Reo	Harrisburg Auto Co.
Harrisburg, Pa	Stanley	Paul D. Messner
Harrisburg, Pa	Studebaker	Keystone M. C. Co.
Hartford City, Ind	R-C-H	K. P. Carroll
Johnstown, Pa	Kline	Atlas M. C. & Sup. Co.
Kankakee Ill	Alco	Kankakee M. C. Co.

Place	Car	Agent
Kossuth, Pa	R-C-H	G. E. Kelly
Lancaster, Pa	Kline	S. E. Bailey & Co.
Littlestown, Pa	Kline	L. M. Alleman
Los Angeles, Cal	Selden	Leslie Co.
Lowell, Mass	Cadillac	Walter Perham
Lowell, Mass	Stutz	Arthur J. Cummiskey
Memphis, Tenn	Alco	Tri-State Chalmers Co.
Montreal, Que	Cole	Royal Auto Co.
Montreal, Que	Overland	W. J. O'Leary & Co.
Montreal, Que	Hupmobile	Victor Octave Reed
Morristown, N. J	Franklin	A. M. Guerin
Mt. Bullion, Cal	R-C-H	J. J. Youd
Mulberry, Ind	R-C-H	Burkhalter Bros.
Newark, N. J	Kline	A. N. Brunner
New Bedford, Mass	Hudson	O'Neil Auto Co.
New Bedford, Mass	Hupmobile	O'Neil Auto Co.
New Bedford, Mass	Stearns	O'Neil Auto Co.
Norfolk, Va	Kline	C. L. Young
Oakland, Cal	Henderson	W. E. Hall M. C. Co.
Pawtucket, R. I	Cole	Pawtucket Auto Co.
Philadelphia, Pa	Kline	Kline Kar Sales Co.
Philadelphia, Pa	Pope-Hartford	Wallace Auto Co.
Pittsburgh, Pa	Kline	Kline Kar Motor Co.
Portland, Ore	Flanders	Oregon M. Dis. Co.
Portland, Ore	R-C-H	Becker Auto Co.
Quebec, Ont	Speedwell	J. A. Landry
Reading, Pa	Kline	D. B. Hoffer & Sons
Richmond, Va	Kline	Foster M. C. Co.
San Francisco, Cal	Kline	F. O. Renstrom & Co.
Santa Rosa, Cal	R-C-H	E. M. Dates
Sausalito, Cal	R-C-H	E. M. Dates
Scranton, Pa	Kline	A. J. Schnell
Springfield, Mass	Studebaker	Maynard Rubber Co.
St. Louis, Mo	Little	Karkell M. C. Co.
Taunton, Mass	Cole	Pawtucket Auto Co.
Wabash, Ind	R-C-H	C. M. Story
Youngstown, O	Kline	Thomas M. C. Co.

San Antonio Dealers Move—Birdsong & Patchernick, Franklin dealers in San Antonio, Tex., have just moved into a new salesroom and service station at 104 Avenue D, near the new Alamo Plaza.

Closes Season with Tour—The Automobile club of Mankato, Minn., closed the season with a tour of fifteen cars and fifty-five tourists through St. Peter, New Ulm, Madelis, Hanska and Lake Crystal, a one-day run.

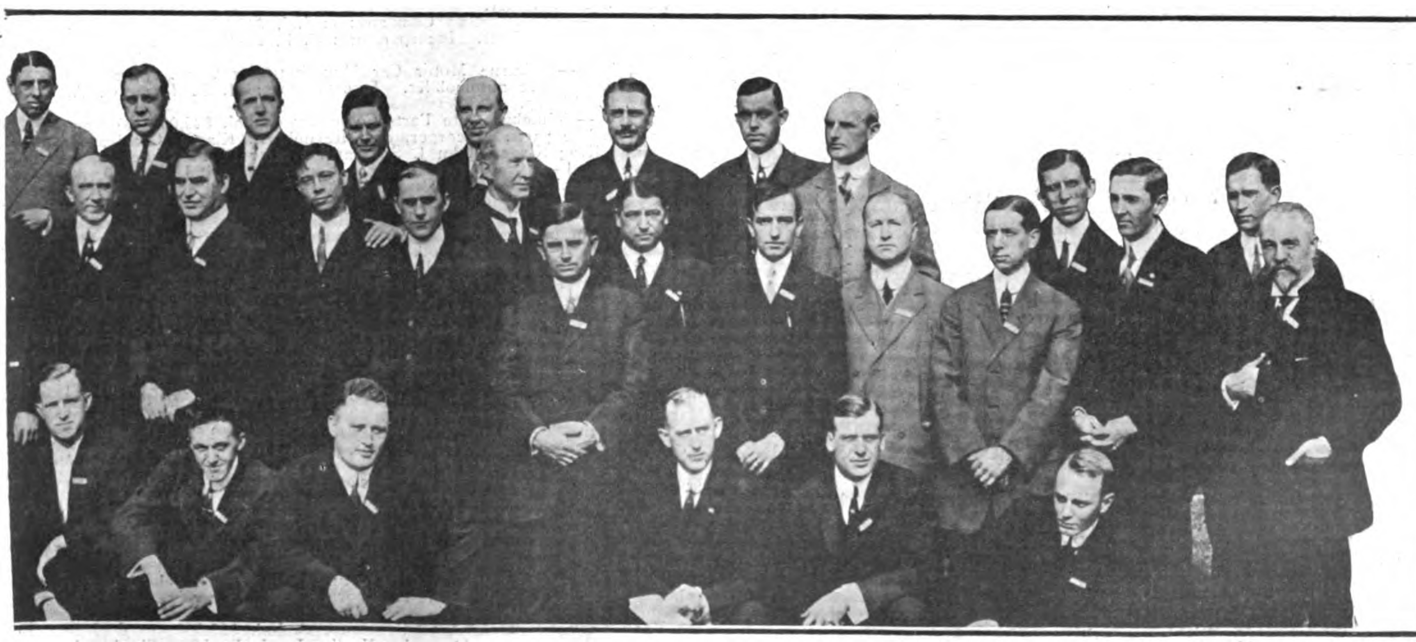
Membership Campaign Successful—That the membership campaign now being waged by the Vancouver, B. C., Automobile Club is meeting with success, was the statement made recently by O. I. Fox, secretary of the association.

Ottawa's Show Plans—Next year's automobile show in Ottawa, Ont., which will be held in Howick Hall February 11 to 15, promises to be the largest ever held in Canada. Practically all the space in the hall has been taken by local and other dealers.

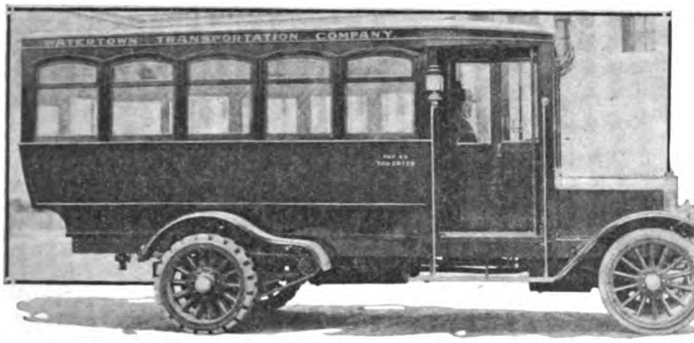
Ottowa Club Progressing—Seventy-two new members have been enrolled in the Ottawa, Ont., Motor Car Association during the past few weeks, according to the statement made at a meeting of that organization held recently. There are now about 550 automobile owners in the city.

Wireless on R-C-H—Highly interesting and exhaustive experiments involving for the first time the use of the automobile in wireless telephony have recently been made by E. C. Hanson of Los Angeles, Cal. One of the most recent experiments was a receipt on Lookout Mountain of a message sent over the ranges from Long Beach, 35 miles away. The car used was an R-C-H, current being supplied by the lighting storage with which the car is equipped.

Minneapolis Show Plans—The Minneapolis Automobile Trade Association, Minneapolis, Minn., has elected Walter R. Wilmot manager for the 1913 show in the Armory and annex and has executed a $5,000 contract with J. L. Hall company for the decorations. The space for the show has been doubled by the erection of an addition to the Armory which adds 27,000 square feet of space.



company at Cleveland for the purpose of studying the Baker electrics and of exchanging ideas on salesmanship and advertising



Atterbury truck fitted with a pay-as-you-enter car body, for use by the Watertown, N. Y., Transportation Company

Goodyear's Dayton Branch—The Goodyear Tire & Rubber Company has established a branch at Dayton, O., being located at 15 East Second street.

Alco Adds Shock Absorber—The American Locomotive Company, Providence, R. I., is to equip its cars with Truffault-Hartford shock-absorbers.

Turner with Wise—W. M. Turner has been engaged as manager of S. J. Wise & Company, Broadway and Fifty-eighth street, New York City.

Anderson Company Moves—The main office of the Anderson Engine Company, Chicago, Ill., is now located at 140 South Dearborn street, that city.

Osborn Manager Speedwell—C. E. Osborn has succeeded Harry Croninger as Pacific Coast manager of the Speedwell Motor Car Company in San Francisco, Cal.

Springfield Dealers Organize—The Motor car dealers in Springfield, Mass., got together last week and formed the Springfield Automobile Dealers Association.

Birmingham's Municipal Garage—A municipal garage may be the outcome of the Birmingham, Ala., controversy in regard to parking automobiles along the curbs.

Sweeney Kline Advertising Manager—C. E. Sweeney has been appointed advertising manager for the Kline Motor Car Corporation, York, Pa., and Richmond, Va. He succeeds W. P. Sieg.

Savannah's Mail Collector—An automobile is to be used in Savannah, Ga., for the collection of mail. The mail department has made an additional appropriation of $720 a year for the maintenance of the car.

Sturdy Adds Sta-Rite Line—The Sturdy Manufacturing Company, Chicago, Ill., has taken over the Sta-Rite line of ignition plugs, due to the failure of the R. E. Hardy Company, who has manufactured these plugs since 1900.

Daniels Moves Office—Smalley Daniels, operating as manufacturers' sales representative with main office for several years at Boston, Mass., has moved his main office to Detroit, Mich., and will make Boston a branch instead.

Franklin Company Moves—The Franklin Auto Company, Baltimore, Md., A. J. Miller, manager, will move to a larger home at 1919 North Charles street after November 1. The new location is now occupied by the D. C. Walker Auto Company.

Citizens After Speeders—To prevent speeding within the City limits a vigilance committee has been formed by citizens of Birmingham, Ala. Members of the committee will so arrange their hours that several watchers will be on duty night and day.

Replace Old Buses—Within the next few weeks the motor buses operated by the Metropolitan Coach Company on Sixteenth and other streets in Washington, D. C., will be replaced with new machines. An order will be placed for half a dozen new buses.

Road Tax Lower—In Los Angeles County, Cal., the tax for road work last year was 60 cents on every $1,000 of assessed property valuation. This year it is 50 cents, which will give the highway commission about $700,000 to expend on the roads of that county.

Baltimore Goodyear Moves—The Baltimore, Md., branch of the Goodyear Tire and Rubber Company will move into its new home at Cathedral and Preston streets within a few weeks. With the exception of a few finishing touches this new structure is practically completed.

Car's Novel Use—Elmer Sherman, San Francisco, Cal., has found a new use for his automobile. He was installing miles of heavy cable and the work was progressing slowly with two teams. Sherman used his Regal car as a wire stretcher and it took only 2 hours to finish the job.

Opens Service Station—The E. V. Stratton Company of Albany, N. Y., has opened a service building at 391 Hudson avenue for Everitt cars and Flanders sixes and electrics. A general repair shop for all makes of cars will also be conducted. Ezra Mickel will be in charge.

Unintelligent Road Improvement—Summing up the results of the Good Roads Convention, which was attended by more than 1,000 delegates representing every county in Alabama, it can be said that the keynote of the meeting was a warning against unintelligent road improvement.

Club Outlives Usefulness—A committee of five members of the Automobile Club of Washington, Washington, D. C., has been appointed by President Harrington Mills to consider the advisability of dissolving the organization, selling the club's country home and the formation of a new organization.

Holyoke Wants Motors—A committee of the Holyoke, Mass., Board of Aldermen, visited the Knox plant at Springfield, Mass., last week to inspect the motor apparatus that company makes as Holyoke intends to do away with some of its horse-drawn fire equipment and replace it with automobile engines and chemical wagons.

Drives His Own Machine—Chief Pomphret of the Chicopee, Mass., fire department recently bought a motor car in which to go to fires, and the Board of Aldermen, having refused to make an appropriation for a fireman to act as driver the chief has had the car placed in special quarters near his home and he will act as his own chauffeur.

Purchases Garage Stock—The Co-operative Auto Sales Company, a $100,000 corporation which was recently organized by Spokane, Wash., capitalists to carry on a wholesale and retail automobile and supply business on a co-operative plan, has purchased the entire issue of stock of the Regal Garage Company also of Spokane, at its par value of $10,000.

Washington's Show—The chances for a motor car show in Washington, D. C., are slight. The chief obstacle is the lack of a building of sufficient capacity to house the exhibits. Convention Hall, where the previous shows have been held, is the only available building, but there is some question about filling it with cars, many dealers believing it unsafe to use it for show purposes again.

Automobile Incorporations

AUTOMOBILES AND PARTS

Austin, Tex.—Oakland Motor Company; capital, $10,000; to sell automobiles. Incorporator: T. B. Cochran.

Benton, Ill.—Benton Motor Car Company; capital, $65,000; to manufacture automobiles and accessories. Incorporators: Harry Stotlar, W. S. Cantrell, A. H. Fraunfelder.

Boston, Mass.—Pope-Hartford Company; capital, $100,000; to manufacture and deal in automobiles. Incorporators: G. L. Dodd, C. W. Cousens, F. H. Lucas.

Cleburne, Tex.—Cleburne Motor Car Manufacturing Company; capital $10,000; to manufacture automobiles. Incorporators: H. E. Luck, G. A. McClung, O. L. Bishop.

Columbus, O.—Columbus Auto Parts Company; capital, $25,000; to manufacture automobile parts. Incorporators: Reynold E. Klages, Charles H. Krag, Corinne Krag Klages, John J. Stoddard, Walter D. McKinney.

Elizabeth, N. J.—Excelsior Automobile Company; capital, $50,000; to do a general automobile business. Incorporators: P. H. McCann, H. St. V. deRaismes, Peter Kern, Maurice Spewak.

Guelph, Ont.—C. Kloepfer, Ltd.; capital, $250,000; to manufacture automobiles. Incorporators: C. Kloepfer, Edward Halloran, George A. Scott.

Haverhill, Mass.—Rambler Motor Car Company; capital, $10,000. Incorporators: J. P. Mollay, G. A. Burnham, C. S. Goodwin.

Morgantown, W. Va.—City Automobile Company; capital, $4,800; to manufacture automobiles. Incorporators: J. Leonard Gates, S. S. Dearing, N. B. Yost, Margaret Smith, Cora B. Dearing.

Nashville, Tenn.—Jackson Motor Car Company; capital, $5,000; to deal in automobiles. Incorporators: H. C. Gillespie, D. D. Canfield, E. L. Bonne, W. H. Weakley, W. C. Sanefeur.

Newark, N. J.—American Auto Radiator Works; capital, $25,000; to manufacture automobile radiators. Incorporators: M. Steiner, S. Goldstein, A. Marcus.

Houston, Tex.—Cole Motor Car Company; capital, $12,500; to deal in automobiles. Incorporators: J. J. Settegast, Jr.; A. J. Binz, F. H. Buelow, David F. Burks.

Newark, N. J.—Lippard-Stewart Sales Company; capital, $50,000; to deal in automobiles. Incorporators: Benjamin P. Burton, Benjamin B. Burton, Robert C. Bennett.

Newark, N. J.—Continental Garage Company; capital, $10,000; to do a general automobile business. Incorporators: Littleton Kirkpatrick, Robert C. German, Stuart A. Young.

New York City.—Distributing and Importing Company; capital, $100,000; to deal in automobiles and biplanes. Incorporators: Paul Lacroix, Harvey T. Andrews, Henry A. Miller.

New York City.—Faissole Auto Company; capital, $25,000; to deal in automobiles. Incorporators: Alexander Karlin, Lewis Lapides, Charles A. Faissole.

Ford's Philadelphia Plant—The Ford Company, Detroit, Mich., has established an assembly plant at Philadelphia, Pa.

Guide Lamp's Factory—The Guide Motor Lamp Company, Cleveland, O., is erecting a new factory building on Madison avenue, between 114th and 115th streets, in that city.

Hartford Company's Addition—The Hartford Suspension Company, Jersey City, N. J., is planning an eight-story re-inforced concrete building, to be put up next to the Jersey City plant.

Portland Company Formed—The Beaver State Motor Company, Portland, Ore., was incorporated recently to manufacture motor trucks and motorcycles. A factory will be erected in the near future.

Marathon's Factory—The Marathon Tire & Rubber Company, Cuyahoga Falls, O., which is erecting a factory building, expects it to be completed and equipped to manufacture tires about November 1.

Cutting Enlarges Plant—The Cutting Motor Car Company, Jackson, Mich., has made arrangements for increasing the factory capacity. The new factory will probably be in course of erection by next spring.

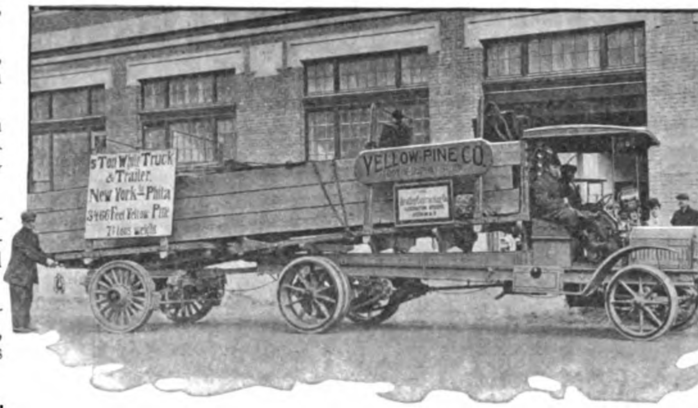
Premier's Addition—Two additions are to be made to the plant of the Premier Motor Manufacturing Company, Indianapolis, Ind. The buildings will be two stories high, one 40 feet by 140 feet and the other 48 feet by 140 feet.

Boon for Connersville—The Lexington Motor Car Company, Connersville, Ind., has agreed to furnish a tentatively-formed selling company with 1,000 six-cylinder automobiles in 1913. This order will keep the Lexington plant busy throughout the coming year.

Cincinnati Chauffeur's Club—The Ohio Chauffeur's Protective Association has been incorporated with headquarters at Cincinnati, O. Grover Bennett was elected president, Charles Eckert, vice-president, Roy Engelman, secretary, and George Puls, treasurer.

Editor Forms Company—Victor C. Parker, editor of *Modern Power*, Winnipeg, Man., has relinquished his position and removed to Detroit, Mich., where he has formed the Parker Motor Company, which will manufacture a rotary valve engine of which he is the inventor.

Ford Plant Manager—C. C. Hildebrand, formerly of the Chalmers Company, Detroit, Mich., will take charge of the Minneapolis, Minn., Ford plant, while H. C. Skinner, formerly manager of the Houston, Tex., branch of the Ford Motor Company, Detroit, Mich., will manage the assembling plant at Portland, Ore.



White truck used by large lumber firm, operated in conjunction with a trailer hauling a heavy load from New York to Philadelphia

Elmira's Fire Engine—The bid of the American LaFrance Fire Engine company, Elmira, N. Y., for the new hook and ladder motor truck for the fire department, has been accepted by the board of public safety. The machine will cost $6,000, will be equipped with a 70-horse-power engine, and will be thoroughly modern in every particular.

Leominster Chief Uses Motor—Chief Fred A. Russell of the Leominster, Mass., fire department recently bought a motor chassis on which he mounted a body supplied with a 32-gallon chemical tank, two hand fire extinguishers and a few other things needed in fire fighting and now he has a machine capable of doing good service in checking the spread of small fires.

Ford's Profits $7,000,000—To the Ford Motor Car Company, Detroit, Mich., belongs the credit of having made the largest 1912 net profits of any automobile concern in the country. Its production for the season to June 30 was at least 70,000 and probably nearer 75,000 cars which were sold at a net profit of slightly less than $100 per car, making the total profits amount to about $7,000,000.

Hadley Starts on Tour—W. K. Hadley, factory sales manager of the Lenox Motor Car Company of Boston, Mass., has started on a tour in the interests of the car and before he gets back he plans to cover about 10,000 miles and will visit New York, Philadelphia, Chicago, Indianapolis, Milwaukee, Denver, Los Angeles, Portland, San Francisco and other cities establishing agencies.

Visit Flanders Plant—In order to enable their distributors to inspect the new 1913 model of the six-cylinder, seven-passenger Flanders car the Flanders Motor Company, Detroit, Mich., will take a party of prominent dealers to Detroit in a special Pullman, so that they can inspect the new models and obtain a comprehensive idea of the magnitude of the new Flanders operations and the big scale on which the cars are now coming through the works.

Federal Supply Elects—The Federal Motor Supply Company of Cincinnati, O., has established its headquarters in the First National Bank Building. Plans have already been laid to open up branch houses in other cities throughout Ohio. The company will handle accessories and supplies for automobiles and trucks. George Platt, was elected president, Fred Beroldt, vice-president, Jesse Wozzencraft, secretary, Emil Schmidt, treasurer.

McNab Goes to Marion—The announcement is made by the Marion Motor Car Company, Indianapolis, Ind., that M. D. McNab, of Chicago, Ill., who until recently has been general manager of the United Motor Company, Chicago, has resigned that position to accept the vice-presidency of the Marion Company. In addition to filling this office Mr. McNab also will be director of sales. He will make his headquarters in Indianapolis.

From Agency to Branch—A change was made last week in the handling of the Chevrolet and Little cars in Boston, Mass., which had been taken on by the F. J. Tyler Corporation as an agency. The Republic Motor Car Company has been organized as a Massachusetts corporation with headquarters in the Motor Mart, Park square. The F. J. Tyler Corporation has moved next door where it will continue to handle the Columbus electric and later take on some other gasoline cars. W. C. Sills is in charge of the Republic company's branch.

Automobile Incorporations

North Tonawanda, N. Y.—Twin City Company; capital, $5,000; to deal in automobiles. Incorporators: W. A. Arenz, R. Leroy Herschell, F. J. Wallenberg.

Rockford, Ill.—Rockford Motor Truck Company; capital, $10,000; to manufacture automobiles. Incorporators: P. A. Peterson, Levin Faust, John Ledin.

GARAGES AND ACCESSORIES

Buffalo, N. Y.—Up-To-Date Auto Body and Specialty Company; capital, $2,500; to manufacture automobile bodies. Incorporators: Ludwig Dreyer, Emma H. Dreyer, G. P. Askin.

Columbus, O.—Independent Motor Inspection Company; capital, $10,000. Incorporator: V. A. Troxell.

Jacksonville, Fla.—Atkinson Tire & Supply Company; capital, $25,000; to carry on an accessory business. Incorporators: J. D. Cary, Lucien H. Boggs.

Newark, N. J.—Tri-Unit Electrical Company; capital, $100,000; to deal in automobile accessories. Incorporators: J. B. Stobaeus, Jr., B. W. Mathews, Wm. C. Stobaeus.

New York City.—Bryant Auto Painting Company; capital, $2,000; to paint automobiles. Incorporators: A. Berkowitz, Benjamin Davis, P. Ostruk.

New York City.—Atlas Tire Company; capital, $10,000; to manufacture automobile tires. Incorporators: R. W. Morrison, R. D. Placak, F. F. Nichols.

New York City.—Snowden Rubber Company; capital, $1,000; to manufacture tires. Incorporators: W. T. Snowden, E. J. Landgraff, A. Bidney Galitzka.

Richmond, Va.—Automobile Lighting Corporations of America; capital, $1,500,000; to manufacture a lighting device for automobiles. Incorporators: W. J. Simpson, Wailes Hank, A. D. Newcomb.

Richmond, Va.—National Automobile Top Company; capital, $15,000; to manufacture automobile tops. Incorporators: G. W. B. Crawford, R. V. Merchant, E. R. B. Crawford.

St. Matthews, S. C.—Calhoun Garage; capital, $3,000; to do a general garage business. Incorporators: C. H. Culler, N. E. Salley, J. M. Salley.

Yoakum, Tex.—Automobile & Garage Company; capital, $20,000; to do a general garage business. Incorporators: F. A. Mason, J. Lyon, D. J. Shall.

CHANGES OF NAME AND CAPITAL

Detroit, Mich.—Chalmers Motor Company; increase of capital from $3,000,000 to $5,000,000.

Indianapolis, Ind.—Motor Car Manufacturing Company; increase of capital from $75,000 to $150,000.

Middletown, O.—Crescent Motor Truck Company; increase of capital to $100,000.

Fig. 1—Loosening the locking ring

Fig. 2—Removing the ring

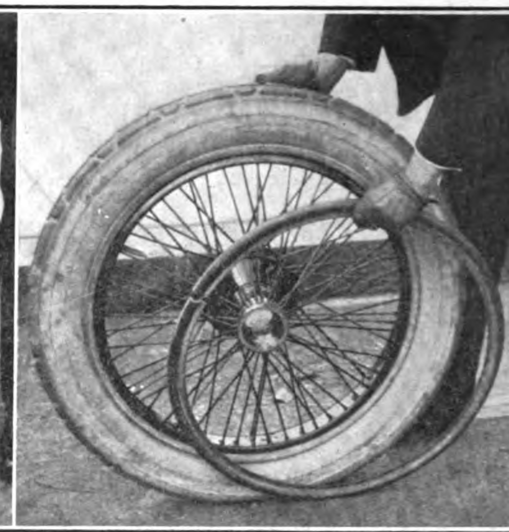


Fig. 3—The ring removed

Houk Q. D. Rim for American Wire Wheels

Rudge-Whitworth Type of Wire Wheel for Automobiles To Be Manufactured With Special Quick Detachable Rim for the American Trade in The Plant of the Standard Roller Bearing Company

THERE are strong indications that the long-predicted advent of the wire wheel into the automobile practice of America is to be fully materialized during the coming season of 1913.

The superiority of this type of wheel over the wooden artillery wheel has been amply demonstrated in both tests and actual practice on the road during the last 4 years. The most important of these tests was a series of destruction tests to determine the comparative strengths of the most commonly used kinds of wheels, carried out by the Rudge-Whitworth Company, of Coventry, England, the results of which were published a few months ago in THE AUTOMOBILE. Wire wheels have shown themselves to be stronger, lighter, more economical on tires and more flexible than wood wheels. Why, then, this tardy adoption of their merits in this country? Various reasons have been put forward, perhaps the most important being that as ordinarily made for the European market, wire wheels are provided with clincher type rims only, requiring tires with extensible beads, and this style of tire is becoming less easily procurable in the United States since the great advantages of the detachable rim were realized. In all probability the tire with inextensible edges for detachable rims will soon become the rule.

The George W. Houk Company, Philadelphia, Pa., has secured the American rights for the Rudge-Whitworth wire wheel and will combine with it the Sangster-Houk patent Q. D. rim.

The detachable portion of the Houk rim consists of a single split clinch ring, remarkable in that it is entirely free from bolts, nuts or clips of any kind. Its simplicity, in fact, renders a description other than that afforded by the illustrations almost unnecessary. As shown at A in the section, Fig. 4, the ring is stamped from the same stock as the rim proper and its attachment and detachment are as simple as its construction. The views, Figs. 1, 2 and 3, show the operations of removing the clinch ring. A special lever tool, used for this purpose, is shown with its method of application in the sketches Figs. 7 and 8. In removing, it is only necessary to start the ring from its seating at a point a few inches from the split end, as shown in Fig. 7, insert the small wedge-piece W, supplied with the tool, and after prying the raised end outwards over the top of the wedge with the handle of the tool, withdraw the ring by hand. To replace

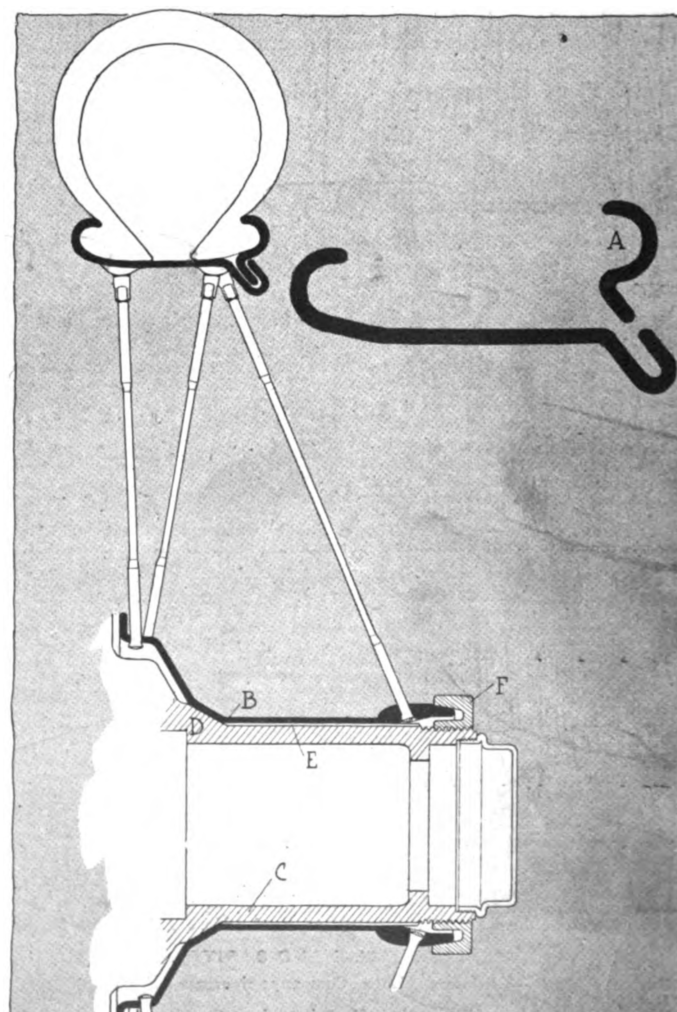


Fig. 4—Section through Rudge-Whitworth wheel and Houk rim

the clinch ring one end is first inserted in the groove, and the ring then worked in by hand around the rim as far as possible, the tool being required only to spring in a short length at the end.

The wheel itself, which will be turned out in all details exactly as the Rudge-Whitworth Company's product in England, will, in fact, be interchangeable with it, is of the triple-spoke order. A section is shown in Fig. 4.

It consists of a stamped shell hub B with a coned inner end to which the spokes are attached. This hub slides over an inner hub C mounted on ball bearings and provided with a flange D to take the coned surface of the wheel hub which is forced up against this flange by a single lock nut. The drive is transmitted through serrations E cut on the inner surface of the wheel hub and the corresponding outer surface of the inner hub. Great care is taken when cutting these longitudinal serrations to insure accurate alignment so that the wheel can be slipped on in any position with equal ease and fit.

When the R. W. detachable wheel was first introduced in 1909 it was held in place on the hub by the use of a special lock-nut with a double ratchet and pawl, one hand-operated and the other automatic. This device was absolutely fool-proof and has given perfect satisfaction so far as its action was concerned, but last year, after much experimenting, the makers replaced this device by the much simpler lock-nut shown at F, Fig. 6. This new nut has no second lock-nut, pin or other check, and yet once screwed up to the hub it remains automatically tight. Not only that, but if through carelessness or other cause the nut is not screwed home it will proceed to tighten itself as soon as the automobile is put into operation.

Reference to Fig. 6 will help to elucidate this peculiar action. Suppose the nut with its internally coned bearing surface is mounted on the hub but has not been screwed up tightly. It follows then, owing to the slight play of the wheel hub on the inner hub and the weight of the car on the axle, that the coned surfaces of wheel hub B and lock-nut F will meet only at a point, as shown at P. In other words, there will be a very slight degree of eccentricity existing between the two members, and as the situation of this contact point remains stationary, although the wheel is turning, it follows that a contact path is being mapped out on the inner circumferences of hub end and lock-nut. But, owing to the eccentricity, these circumferential paths are not of equal length and the outer, that of the nut, being the greater, there will be set up a differential creep betwen them, the nut lagging behind the wheel and so tightening itself up. It should be understood that the screw-thread for the wheels on the left side of the car is right-hand, while that for the right side wheels is left-hand. There is also a similar action, though of a lesser degree, taking place at the same time between the nut and the thread on which it is screwed. As the eccentricity of the various members decreases the action ceases so that finally the nut is right home and the wheel truly concentric on the hub.

Actual experiment has proved that the nut is sufficiently tight to resist the reversing efforts brought about by driving the automobile backwards for all ordinary distances.

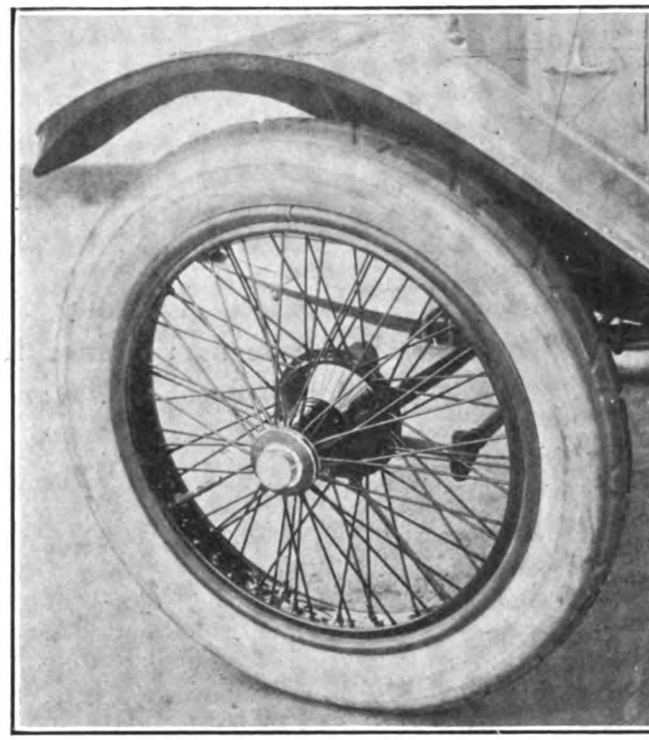


Fig. 5—American Rudge-Whitworth wire wheel with Houk rim

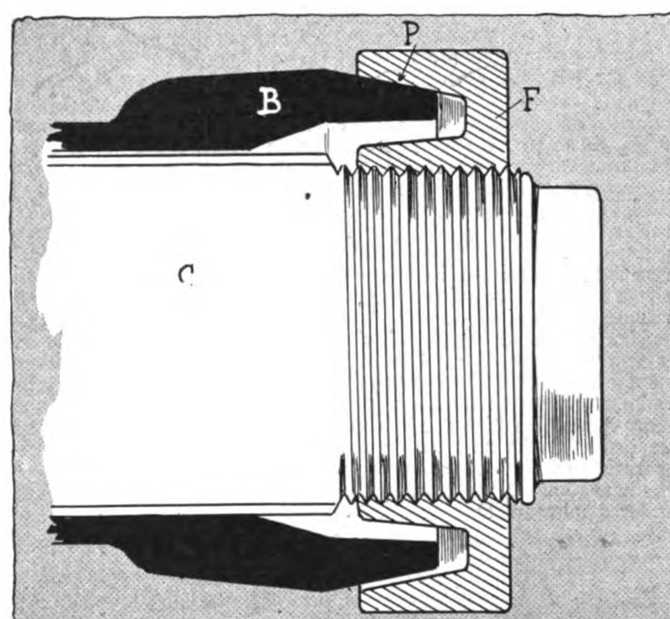
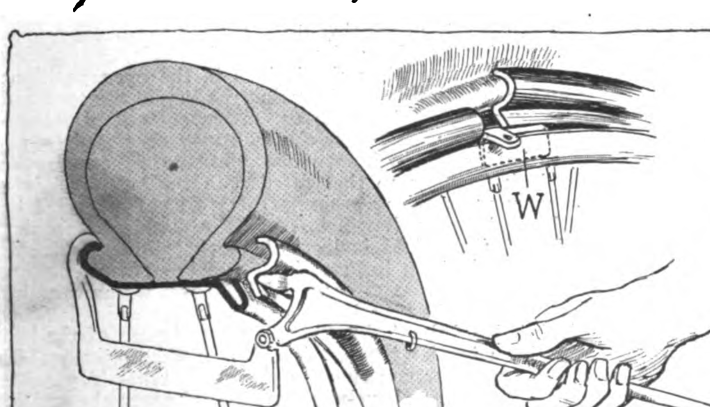


Fig. 6—Section of latest Rudge-Whitworth locking device



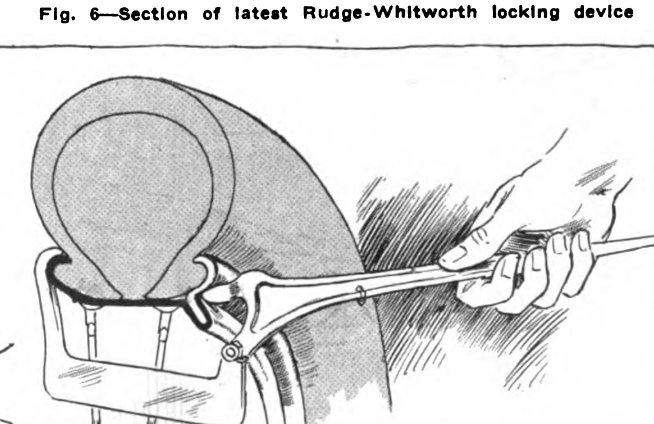


Fig. 7—Detail removing the Houk rim. Tool used for removing the locking ring. Fig. 8—Same tool inserting the ring

Reliance Ratchet Horn; Universally Adaptable Fuel Gauge; Gasolock; Kerosene Spray Engine Cleaner; Mixer for Starting; Landophone for Closed Cars; Portable Recording Clock for Watchmen

A HAND-operated horn in which the signaling sound is produced by the intermittent contact of a ratchet wheel with a steel button secured to the center of a steel diaphragm is the latest addition to this line of instruments, being manufactured by the D. S. P. Automobile Specialty Company, 327 Adams street, Brooklyn, N. Y. The horn is shown in Fig. 2 and is dimensioned as follows: length, 9 inches; diameter of diaphragm, 5 inches; diameter of screened front of the horn, 6.5 inches; width of the squared middle portion, 2.5 inches. The outside of the horn requiring no explanation, we will proceed to deal with the description of the mechanism by means of which the signaling sound is generated. This mechanism consists of a train of gears made irreversible by the use of a pawl engaging one of them. These gears, of which there are five, are mounted on three shafts S1, S2, S3 in Fig. 3. The operation of the horn is as follows: A handle H, Fig. 3, is secured to the shaft S1 which carries gears A and B, and when this handle is turned toward the right, referring to Fig. 3, the gear B and with it the gear A is turned in that direction. As soon as the handle H has reached the limit of its movement which is determined by the shape of the casing of the horn the pressure on the handle may be released whereupon it returns to its original position due to the tension of the spring S4 which draws forward the pawl Rb engaging the gear or ratchet B. The transmission of the movement of the shaft S1 over the shaft S2 to S3 which carries the ratchet W is obvious upon referring to Fig. 3. Excepting gears A and B which are loose on S1, all gears are keyed to their respective shafts and are continually in engagement so that the operation of the horn is positive and the pressure on the handle H always causes the ratchet W to strike against the bottom D1 under diaphragm D.

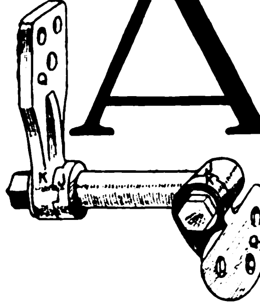


Fig. 1— Attaching piece for Reliance horn

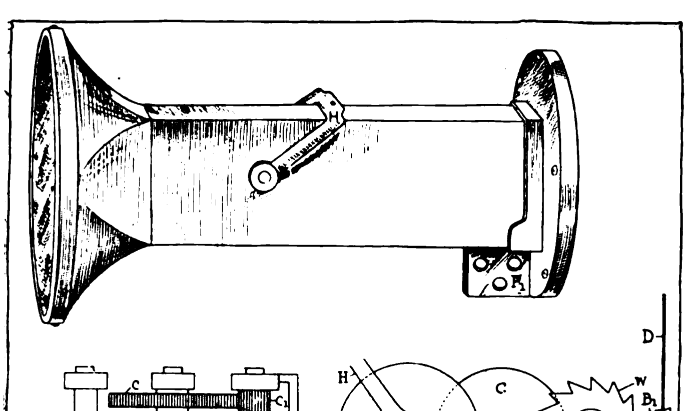


Fig. 2—Outside view of Reliance hand-operated, ratchet-and-button horn. Fig. 3—Schematic view of gears by means of which horn is operated

The horn is secured for any suitable portion of the body and in reach of the driver by means of an attachment piece shown in Fig. 1. This member is of an ingenious construction, giving the service of a ball-and-socket joint in combination with positive locking of its parts. The attachment consists of three pieces, one of which is formed as a bolt and is fitted with jaws J, while the other two are plates, each punched with three holes and engaging jaws J by means of jaws K. The jaws are held in engagement through the office of nuts. The piece Q is bolted with a part P1 of the horn casing, and the part Q1 is secured to the body of the car.

Imperial Gasoline Gauge

Automobilists are more and more coming to realize the value of a dash-attached gauge which always tells at a glance the quantity of fuel carried in the tank at the moment. An addition to the line of devices which have been designed as tell-tales is the Imperial indicator, made by the Imperial Fluid Gauge Company, Canton, O. This device may be used for gravity or pressure feed systems, and consists of a glass tube carried in high-polished brass. Fig. 6 shows the system as used for gravity feed, in which the interior of the gauge is simply brought into communication with the fuel line by means of two couplings and a piece of tubing. In case the gauge is desired to serve in connection with a pressure-feed system, the type shown in Fig. 4 is used, comprising in addition to the indicator tube, a well under the same which extends below the floor line and contains a cylindrical float carrying a wire with an indicator head. To the top of the indicator tube a compression connection is made to a return air line, and by this expedient the height of the gasoline in the gauge above the well is always the same as the height of the fuel in the tank. When ordering the outfit, it is necessary to inform the maker of dimensions of tank and feed pipe, shape of tank, class of feed used, etc., to obtain correct graduation.

Gasolock for Dash Control

To prevent the use of the car without the permission of its owner and to prevent leakage in the gasoline line at the point of the fuel cock, the Auto Lock and Specialty Company, 412 Scherer Building, Detroit, Mich., has constructed the Gasolock, Figs. 7 and 10. This device is attached to the dashboard and consists substantially of six parts, the Yale pin-tumbler lock cylinder, the ball head containing it, the socket for attaching the ball head to the dashboard, the cock which opens or interrupts the gasoline flow, the mechanical connection between cock and Yale lock and the reach or guard tubes enclosing the same.

The lock cylinder contains a double set of tumblers permitting of withdrawing the key when the lock is in the open position; the latter may be obtained upon inserting the key in the lock and turning the winged thumb-button T to the proper position, whereupon the key may be withdrawn; the lock may be closed by returning T to its former position, without using the key. In the end of the lock opposite to that fitted with the button T is a bevel gear segment engaging a similar gear which is carried by to the mechanical connection inclosed in the double telescoping tubes R. The ball head H incloses the lock cylinder which is held in place therein by a bayonet joint and kept from rotating through the use of a retaining screw. The socket which contains the ball head is formed with a boss on its back side which is fitted into a 75-inch hole of the dashboard. The attachment of the ball head is such that vibration between it and the socket is impossible. The connecting member contained in the reach tubes T consists of a tube T carrying the above-mentioned bevel gear; the end of this tube is squared and engages a rod of square section which has its other end pinned to the valve or cock plug contained in the casing C. The cock is formed with a bearing in its casing and its stem is surrounded by packing which keeps it tightly in place and guards it against leakage of the gasoline into the reach tubes. The cock plug is designed with an annular groove extending through an arc of 90 degrees, which is engaged by a stop screw, thereby limiting its angular movement to such an extent. The upper middle portion of the cock plug is formed cylindrically and seats in a suitably shaped portion of the casing C, being pressed down by a spring between it and the flanged portion of the casing.

National Primer and Mixer

A device which facilitates starting by thoroughly mixing the priming fuel with air before it is admitted to the cylinders is made by the National Manufacturing Company, Kalamazoo, Mich., The National Compound Mixer and Primer, Fig. 11, consists of two cylinders connected by a valve, one of which serves as a small fuel reservoir and the other as a mixer, being fitted with a device which mixes a certain amount of air when gasoline passes through the cylinder. In installing the mixer and primer, the inlet manifold is tapped with an .34375-inch drill and a 1-8-inch standard pipe tap, which permits of connecting the manifold to the outlet at the bottom of the mixing cylinder. The valves or cocks V and VI, regulate the passage of fuel from the priming to the mixing cylinder and from the latter to the inlet manifold, respectively. The device is attached to the dashboard of the car, which is drilled to permit of passing the tubing through it.

Romort Quick Engine Cleaner

The Romort Valve Company, 231 Worcester Building, Portland, Ore., manufactures a handy device which serves for rapidly cleaning the outside of the motor, being shown in Fig. 9. The cleaner is designed for use in garages, repair shops, etc., being operated by compressed air which is introduced by connecting the apparatus to an air line used in such establishment. The device consists of a cylinder shaped with a funnel-and-spout end and a nozzle, having an overall length of 20.5 inches and a diameter of 4 inches. The fluid which is used for cleaning and for which purpose kerosene is recommended, is filled in through a filler near the wide end of the funnel; while the compressed air enters through the tube T and its flow is regulated by a needle valve in V. An inclosed passageway for the compressed air traverses the interior of the cleaner, ending in an aperture near the end N of the nozzle where the air picks up the fluid which is sprayed against the motor to be cleaned. The knurled rod V enclosing the regulating valve is well packed to prevent leaks of air and the same holds of the packing nut P,. which is tightened on the compressed air tube to hold it securely in place.

Brown Automobile Telephone

One of the most recent novelties that have appeared in the British accessory field is the Landophone, made by Brown Brother, Limited, 22-34 Great Eastern street, London, E. C. This device is a specially designed telephone through which the passengers seated in a limousine or landaulet may give orders to the driver and which transmits messages loudly and clearly despite the noise of the street. The 'phone is constructed on

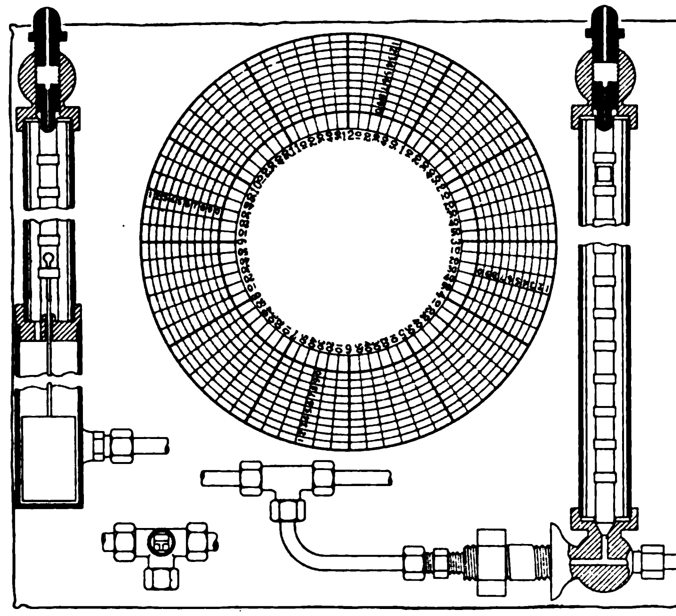


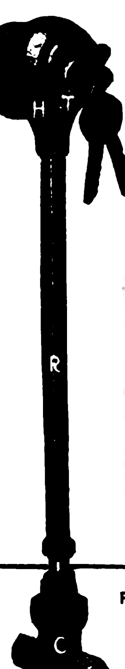
Fig. 4—Imperial gauge for pressure feed. Fig. 5—Dial of Eco portable watchman's clock. Fig. 6—Design of Imperial gauge for gravity feed

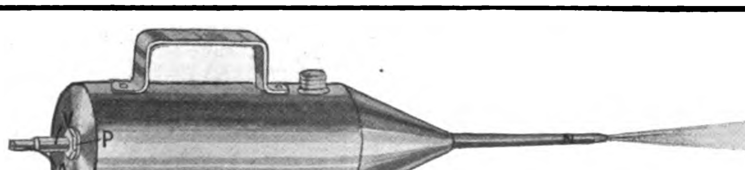
the telephone principle, but in addition to a speaking tube, coil box and 4-volt battery comprises a receiver which is fitted with a megaphone concentrating and strengthening the sound, after it has been transmitted from the interior of the car and has been reproduced by the diaphragm of the receiver.

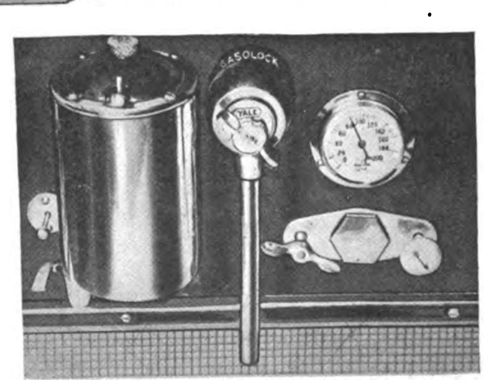
Eco Portable Watchman's Clock

The Eco Magneto Clock Company, 234 Congress street, Boston, Mass., manufactures a clock for watchmen who periodically have to inspect a number of given places in a factory or similar large establishment. This device consists of a clockwork which rotates with a paper dial as shown in Fig. 5, and from ten to thirty tumblers carrying punching pins, which are operated by Yale keys chained to the several places to be inspected. The number of the inspecting station is given by number on the circle punched, while the radius along which the dial is punched indicates the time of recording. The whole mechanism is enclosed in a leather bag fitted with straps, as seen in Fig. 8.

Correct Address of Cleaner—In the description of the Auto Vacuum Cleaner which appeared in this column, page 869, of THE AUTOMOBILE of October 24, the address of the maker was given as 253 West Twenty-third street, New York City. This address being wrong we herewith give the right address which is 253 Twenty-third street, Milwaukee, Wis.







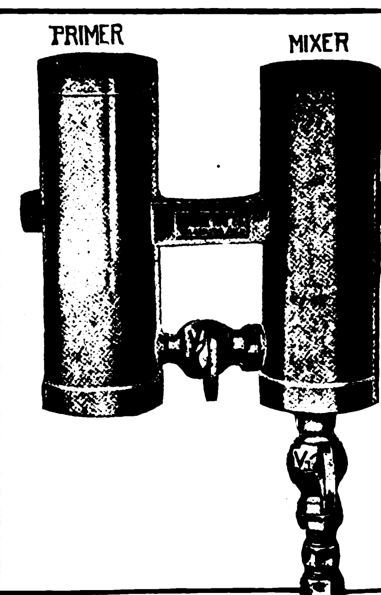


Fig. 7—Outside of Gasolock device. Fig. 8—Eco portable watchman's clock. Fig. 9—Romort engine cleaner. Fig. 10—Gasolock installed on dashboard. Fig. 11—National primer and mixer.

ROTARY Valve Design—Comprising a cylinder valve construction, with means for insuring tightness between individual passages.

This patent refers to a valve construction for internal-combustion engines, as illustrated in Fig. 1. The valve V is a rotary cylinder journaled in a cylindrical bed B, the interior of which is connected by ports P to the working cylinders of the engine. The valve itself is composed of an outer cylinder O and an inner one I, each of which is formed with a series of ports designed to register in turn with those in the valve bed, thereby providing passages between the manifolds and the cylinders. To prevent leakage of gas from one port to the other, an annular rib R is formed between each two neighboring ports; this rib extending into an annular groove in the inside surface of the valve bed.

No. 1,041,957—to George Bradford Brown, Warkworth, Ont. Granted October 22, 1912; filed May 2, 1912.

Dirigible Headlight Support—Describing a method of carrying the headlights which are operable to turn in parallel with the front wheels.

A headlight carrying design for lamps which turn when the front wheels of a car are turned to either side is shown in Fig. 2. This construction comprises a standard S for each lamp, a section S1 formed with a socket and fixed upon a post, and a second section S2 which has a complementary stem rotatable in the socket. Between stem and socket is anti-friction ball, and the stem is formed with an annular groove engaged by a screw which holds the sections S1 and S2 against separation.

No. 1,041,902—to Louis C. Thoeming, Benjamin H. Thoeming and Edwin A. Anderson, Newcastle, Wyo. Granted October 22, 1912; filed May 7, 1912.

Automobile Jack—Being of wedge design and lockable by means of a rack.

The subject-matter of this patent, shown in Fig. 3, is an automobile jack which is composed of a base frame F and a top frame T designed to be movable longitudinally in relation to the base frame. The frame T is normally arranged below the axle of a vehicle which is to be elevated through the use of the jack, and wedge blocks are secured to the top frame in such a position that they fit between it and the axles of the car when the jack is first applied. The wedge blocks W engage inclined track surfaces between top frame and car axles, and means are provided for moving T intermittently forward, for locking it in any suitable position, and means M for rendering the locking means inoperative. As the lower wedge blocks are attached to the base frame B and the upper to the top frame T, the vertical lever engaging a rack on the extension of the base frame permits of easily operating the wedges and lifting the car.

No. 1,042,154—to Herbert W. Seely, Selgman, Ariz. Granted October 22, 1912; filed March 30, 1912.

Shock Absorbing Device—Comprising an auxiliary spring fitted in a suitable manner between the inner surfaces of the elliptical spring leaves.

Fig. 4 illustrates the shock absorber construction which is described in this patent and which comprises, in combination with an elliptical automobile spring S and its bow-shaped members M provided with bracket carrying rollers R and an auxiliary, shock absorbing spring S1 which is disposed between the bow shaped members, one of its ends being fixed and the other traveling between rollers R.

No. 1,041,843—to Charles S. Moore, Danvers, Mass. Granted October 22, 1912; filed June 14, 1911.

Grip Wrench Construction—Comprising, in combination with the jaws of a wrench, means for holding the former in their relative positions when adjusted.

This patent refers to a wrench which consists of two members shaped with jaw ends and being pivotally connected to each other. Resilient means which are independent of the pivotal connection are provided for adjusting the relative position of the two members, and spring means serve for frictionally holding the wrench members in the adjusted positions.

No. 1,041,967—to William Cronk, Montour Falls, N. Y. Granted October 22, 1912; filed October 25, 1910.

Spring Wheel Tire—Comprising an inner and outer rim, between which coiled springs are located and which are braced in a suitable way.

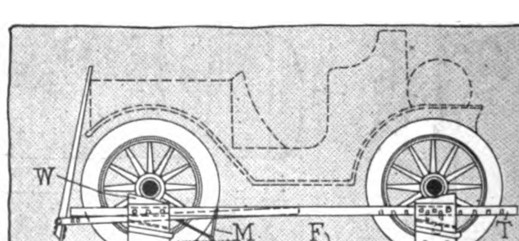
The subject matter of which patent is a spring wheel tire. The construction includes an inner and an outer rim, the latter being resilient and spaced from the former one, and coiled springs each of which has one end connected to the inner rim and the other to the outer one. A number of brace chains connect inner and outer rims respectively, and a number of resilient braces are arranged in oppositely disposed pairs. One end of each brace is rigidly held to the inner rim, while the opposite end is slidably secured to the outer rim. To the latter flexible skirt members are connected with bear over the side of the inner rim and are detachably connected to the same.

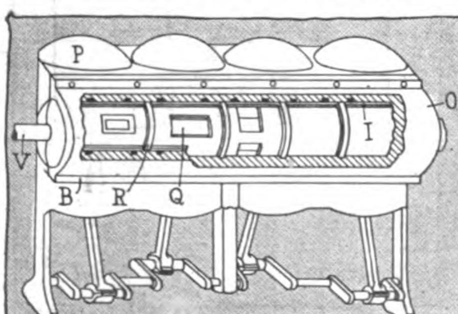
No. 1,041,829—to William B. Mallory, Hermosa, S. D. Granted October 22, 1912; filed March 12, 1910.

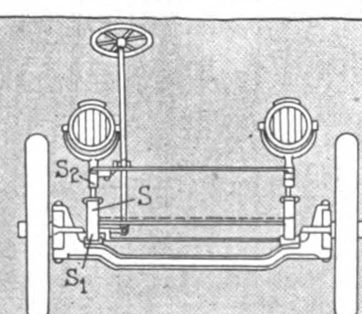
Automobile Carbureter—Comprising slidably hollow cylinders as valves for regulating the admission of mixture.

The carbureter described in this patent comprises a mixing chamber with inlet and outlet ports and two independently movable hollow valves which are arranged adjacent to each other and adapted to slide longitudinally within the mixing chamber to control inlet and outlet ports. Each valve member has an open end and contains a compression spring tending to bear against the mixing chamber through the open end of the hollow valve member.

No. 1,042,077—to Clement Brown, Birmingham, Eng. Granted October 22, 1912; filed October 4, 1909.







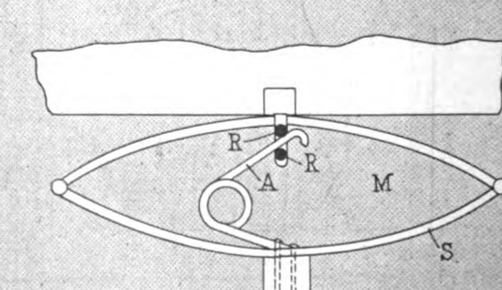


Fig. 1—Brown rotary valve. Fig. 2—Thoeming headlight support. Fig. 3—Seely jack. Fig. 4—Moore shock absorber

Vol. XXVII — New York—Thursday, November 7, 1912—Chicago — No. 19

The AUTOMOBILE

United States Has 990,738 Cars

Increase in Registration of 266,670 Automobiles During First 9 Months of Current Year—Manufacturers Increase 163, or 38.8 Per Cent. and Dealers 3,463, or 26.2 Per Cent.

New York's Registration Passes 100,000 Mark—California Leads in New Cars With 24,526 and One Machine Per 28 Souls

SURPASSING all record of an industry which produces an intricate, sensitive and high-class mechanism and equaled only by the records of the producers of raw materials such as coal and steel, the automobile industry continues to keep its position among the principal lines of effort of the United States for the year 1912. In order to learn the present status of the automobile, its manufacture and trade in a quantitative way, The Automobile has arranged a detailed census. The objects of the latter were as follows: To obtain actual figures relative to the number of automobiles in use in the whole country and its several states, to the quantitative classification of these products under the heads of gasoline and electric pleasure and commercial cars; to obtain an exact knowledge of the fees contributed to the state treasuries by the automobilists of the United States; the number of manufacturers of each type of automobile in every state of the Union; and, likewise, the number of automobile and supply dealers, as well as garages and repair shops, all of which depend indirectly upon the automobile industry. The results of the census, which was carried out in a very painstaking manner, are as follows:

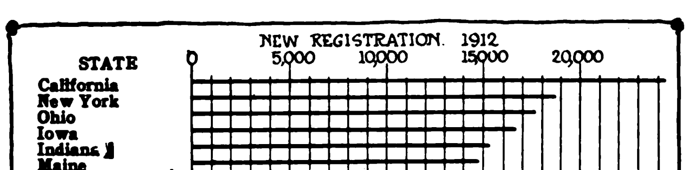


Diagram illustrating the respective gains in automobile registration up to October 1, 1912, throughout the various states of the Union over the number of cars registered during entire year of 1911

During the first 9 months of the present year, 275,293 automobiles were manufactured in the United States, and 266,670 of these were registered in the states and territories and in the District of Columbia. The total number of trucks made was 35,978, and that of electrics 33,842. The automobile owners of the Union paid to their secretaries of state or other registering officials a total of $5,229,459.65 as license fees for their vehicles, while an average price of $1,200 was paid in the purchase of the cars. The ratio of cars to the population is one car to every ninety-three residents of the country, if the results of the latest United States census is taken as the basis of such a calculation.

The total value of the cars registered in this country to October 1 is $1,188,88

Map showing the registration of automobiles up to October 1, 1912, illustrating the distribution of cars throughout the various states

or $12.98 per capita of the population. As to the distribution of automobiles in the various states, New York ranks first, being the only state in which there are more than 100,000 cars, but it is not gaining as rapidly as California, which is also making some progress as a manufacturing territory. While California leads in the actual maximum number of new registrations for 1912, West Virginia has the greatest per cent. gain, namely, 148. In regard to population per car, California is also in the lead, there being a car to every twenty-eight inhabitants.

A most careful census made to determine the present number of automobiles in the United States has led to the results which are compiled in the table on page 929 and the charts on pages 927 and 928. In order to obtain this information, THE AUTOMOBILE communicated with the secretaries of the various states and other state officials in charge of the registration of automobiles.

Tremendous Number of New Cars

There are at present 990,738 automobiles registered in the United States, including pleasure and commercial cars, of both the gasoline and electric type. Of these cars 920,918 are gasoline pleasure cars and 35,978 trucks, while 33,842 electric automobiles complete the total. Of this, 266,670 machines have been registered for the first time during the year 1912, in addition to the 724,068 automobiles in use last New Year, and this addition amounts to an increase of 36.8 per cent. on the latter basis. In other words, 26.9 per cent. of the automobiles used today throughout the Union have found purchasers since January 1 of this year. The commercial vehicles which numbered 25,451 last New Year have increased by 10,527, or 41.3 per cent., while of the 33,842 electrics now in use 5,550 have been added during the year, as a 20.4 per cent. increase. The 256,143 pleasure cars which comprise the addition to this class of vehicles during the first 9 months of this year represent an increase of 37 per cent. on the 692,494 cars in use on January 1.

Before dwelling on the distribution of cars in the various states, it might be well to illustrate these results by establishing a relation between the number of cars and the population of the United States. Taking the last census, which gives the population as 91,572,266 as a basis, there is one automobile to every ninety-two inhabitants of the country, which means, if the value of an automobile is set at $1,200 for the average, that there is $12.95 worth of automobile to every inhabitant. The ratio of automobiles registered to the population forms another interesting method of comparison and one which demonstrates even more forcibly than the percentage tables the remarkable progress already made by the automobile industry in this country.

On page 930 the several states are tabulated with the population per car registered. In this table it will be seen that California takes the lead with one automobile to every twenty-eight people, a figure which brings home to the mind very directly the extent of adoption that the self-propelled vehicle has achieved. This figure is closely followed by Maine and the District of Columbia with thirty and thirty-one respectively of the population to each car registered. New York stands midway among the states in this table, having one car to every eighty-nine people, this being largely due to the dense slum population of the cities. West Virginia shows 236 people to each car, while Kentucky ends the table with 602, a great contrast to the states at the head.

The map on this page simply illustrates the total registration in the forty-nine states and territories, including the District of Columbia, the information being duplicate to the first column of the table on page 929.

The 990,738 automobiles registered in the United States have a total value of $1,188,885,600, figuring the average price of each car as $1,200. The registration fees paid on all these cars total $5,229,459.65, or $1 on every $227.50 of car value, if the fees are looked upon in the light of taxation. Or, to express this fact in a different way an average taxation of $5.28 upon each automobile is levied by its state. The average automobile taxation per capita of the population is 5.7 cents this year.

In the distribution of the automobiles registered, the Empire State leads all others, having passed the 100,000 mark several weeks ago. There are now in that state 102,870 cars, compared with 83,969 at the end of 1911, an increase of 18,901 machines. Despite this tremendous increase, this state ranks but second in order of the magnitude of the additions, California being first with 24,526 new cars and a total of 83,728 automobiles. Great significance attaches to this fact, as it evidences the rapid economic progress of the population of the Golden State, a corroboration of which statement is found further below when the manufacture of automobiles in the various states is taken up. Then comes Ohio, being third in the number of cars registered with 63,550 machines, followed by Pennsylvania with 58,705, Indiana with 52,048, New Jersey with 50,112, Massachusetts with 48,651, Illinois with 47,904, Iowa with 44,692 and Michigan with 39,235. It is an interesting fact that the greatest automobile-producing state ranks but tenth in the number of cars owned by others than their manufacturers, although among the cars registered there are a great many used by the makers themselves.

The chart appearing on page 927 which illustrates the increase in the various states presents a vivid picture of how far California surpasses all others in this respect. New York, indeed, is second, but far behind the leader, and Ohio is third, Iowa, the ninth state in registration, is fourth in the order of gains, with 16,683 new cars registered during the past 9 months. Indiana, Maine and Pennsylvania all show increases of about 15,000 cars, while in Michigan only 11,439 automobiles have been added since the first of the year. Texas records a clean gain of 10,000 cars, being ninth and followed by Illinois, with 9,800 newly registered cars. Then follow the other states in order. New Jersey's increase of 2,762 cars is small, but may be explained by the new reciprocity law. Nevada is at the tail end of the line with only 280 new registrations, being incidentally the only state where there are less than 1,000 cars.

Perhaps the most amazing fact brought out in this investigation of automobile progress is the stupendous increase in registration of cars in West Virginia and Maine. The percentages of increase in these two states since January, 1912, are 148 and 147 respectively. These figures are almost incredible, especially that of West Virginia, which in July last registered only a 6.8 per cent. addition to the January figure. It follows, therefore, that this state has, in the short space of 3 months more than doubled its registration, a feat absolutely surpassing anything of this character in the history of the industry.

Increase Uniform in Most States

Referring to the table on page 930, it will be seen that the third place is occupied by New Mexico with an increase of 72.5 per cent. less than one-half of the preceding figures, a fact which further emphasizes the remarkable character of the increase in the two states at the head of the list. Then follows Texas with 64.2 and so on down the list with gradually decreasing figures to Colorado, which shows an addition of 20 per cent. since January to the present time. The final figure, 5.7 per cent., representing New Jersey needs special consideration, as, owing to the laws respecting registration in this state which were in force up to the end of last year, this percentage has not a parallel significance with the rest of the table. To obtain a correct impression of the increase in New Jersey it would be necessary to take the number of cars registered during 1912 and calculate the ratio with the number of native New Jersey cars previously registered. But this latter figure is unobtainable and it is therefore necessary to estimate on the total registration up to the end of 1911, a large proportion of which figure consists of the registrations of cars belonging to New York and the neighboring states. On July last the number of native New Jersey automobiles registered since the beginning of the year, although considerable, was not sufficient to render the percentage here dealt with a positive figure, showing actually a decrease of 11.7 per cent. from the 1911 registration. That this figure has been wiped out and supplanted by a positive increase of 5.7 per cent. will

Automobile Registrations in the United States up to October 1, 1912, Together with the Amount of Fees Collected

State or Territory	Total Registration	New Registration 1912	Registration up to 1912	Commercial Vehicle Registration	Electric Car Registration	Registration Fees for 1912	Remarks
Alabama	4,076	1,220	2,856	26	53	$64,502.00	New law
Arizona†	2,285	800	1,485	30	43	11,425.00	New law
Arkansas	3,616	750	2,866	33	38	18,080.00	
California	83,728	24,526	59,202	3,300	2,600	56,461.50	
Colorado†	11,383	1,900	9,483	32	175	....	Local registration
Connecticut*	17,429	3,429	14,000	600	500	244,274.38	
Delaware	2,035	784	1,251	95	85	17,567.00	
District of Columbia*	10,824	2,502	8,322	230	276	3,780.00	Perennial registration
Florida	5,295	1,406	3,889	120	75	2,812.00	Perennial registration
Georgia	16,816	4,448	12,368	216	325	8,896.00	
Idaho†	4,280	1,000	3,280	50	55	....	No state registration
Illinois†	47,904	9,800	38,104	2,200	1,850	311,120.00	
Indiana	52,048	15,222	36,826	....	....	52,048.00	
Iowa	44,692	16,683	28,009	1,300	1,148	299,691.05	
Kansas	18,623	4,623	14,000	250	300	Taxation	No state registration
Kentucky	3,718	832	2,886	135	50	....	
Louisiana†	6,467	1,400	5,067	60	50	....	Local registration
Maine	24,858	14,813	10,045	498	202	97,489.68	Perennial registration
Maryland*	10,687	2,587	8,100	700	300	92,000.00	
Massachusetts	48,651	9,744	38,907	3,320	2,900	567,733.67	
Michigan	39,235	11,439	27,796	1,500	1,500	132,330.00	
Minnesota	28,000	8,725	19,275	1,300	1,300	51,300.00	
Mississippi	4,487	3,247	1,240	50	30	37,000.00	
Missouri	24,151	7,985	16,166	676	965	116,530.00	
Montana†	3,500	771	2,729	45	55	....	No state registration
Nebraska	32,372	9,278	23,094	600	725	18,556.00	
Nevada†	800	280	520	27	16	....	No state registration
New Hampshire	5,826	1,326	4,500	95	85	102,886.00	
New Jersey	51,022	2,762	48,260	1,250	1,600	453,804.27	New law
New Mexico	2,390	1,001	1,389	....	....	4,411.00	No state registration
New York	102,870	18,901	83,969	9,118	7,000	1,019,309.25	
North Carolina	6,090	2,362	3,728	100	90	25,545.00	
North Dakota	8,941	1,721	7,220	100	110	26,823.00	
Ohio	63,550	17,762	45,788	1,500	3,186	320,946.25	
Oklahoma	5,459	2,000	3,459	80	75	27,295.00	
Oregon	8,821	2,814	6,007	200	225	42,289.00	
Pennsylvania	58,705	14,433	44,272	3,000	2,800	582,393.87	
Rhode Island	9,332	3,315	6,017	432	250	102,142.00	
South Carolina†	9,166	2,100	7,066	150	200	....	Local registration
South Dakota	14,880	3,638	11,242	200	175	5,864.00	Perennial registration
Tennessee	8,486	2,022	6,464	150	....	9,508.00	
Texas†	25,588	10,000	15,588	700	800	....	Local registration
Utah	2,690	870	1,820	50	45	....	
Vermont	4,306	1,052	3,254	100	120	79,547.37	
Virginia	5,632	1,612	4,020	200	200	46,166.85	
Washington	12,824	4,235	8,589	210	175	25,648.00	
West Virginia	5,197	3,106	2,091	105	65	30,309.51	Perennial registration
Wisconsin	24,175	8,344	15,831	800	1,000	120,975.00	New law
Wyoming	2,828	1,100	1,728	45	25	....	Local registration
	990,738	266,670	724,068	35,978	33,842	$5,229,459.65	

*Including non-residents. †Estimated on basis of population with reference to location and sectional registration.

PERCENTAGE OF INCREASE IN REGISTRATION

West Virginia	148
Maine	147
New Mexico	72.5
Texas	64.2
Wyoming	63.7
North Carolina	63.4
Delaware	62.5
Iowa	59.5
Oklahoma	58
Rhode Island	55.1
Arizona	54
Nevada	54
Wisconsin	52.6
Missouri	49.3
Washington	49
Utah	47.8
Oregon	46.5
Minnesota	45.3
Alabama	42.5
California	41.5
Indiana	41.3
Michigan	41.3
Nebraska	40
Virginia	40
Ohio	39
Florida	36.2
Georgia	35.3
Kansas	33
Pennsylvania	32.6
Vermont	32.4
South Dakota	32.3
Maryland	32
Tennessee	31.3
Idaho	30.5
District of Columbia	30
South Carolina	29.8
New Hampshire	29.5
Kentucky	28.8
Montana	28.2
Louisiana	27.6
Mississippi	26.2
Arkansas	26.2
Illinois	25.7
Massachusetts	25
Connecticut	24.5
North Dakota	23.8
New York	23.5
Colorado	20
New Jersey	5.7

PER CAPITA DISTRIBUTION OF AUTOMOBILES

California	28
Maine	30
District of Columbia	31
Nebraska	37
South Dakota	39
Iowa	50
New Jersey	50
Delaware	50
Indiana	52
Wyoming	52
Rhode Island	58
Colorado	63
Connecticut	64
North Dakota	65
Massachusetts	69
Michigan	72
New Hampshire	74
Minnesota	74
Ohio	75
Oregon	76
Idaho	76
Vermont	83
Washington	85
New York	89
Arizona	90
Kansas	91
Wisconsin	96
Nevada	102
Montana	107
Illinois	117
Maryland	121
Pennsylvania	130
Missouri	136
New Mexico	137
Utah	139
Florida	142
Georgia	155
Texas	156
South Carolina	164
West Virginia	236
Louisiana	265
Tennessee	265
Oklahoma	302
North Carolina	364
Virginia	367
Mississippi	400
Arkansas	436
Alabama	525
Kentucky	602

Distribution of Dealers, Garages, Repair Shops and Supply Houses

	Dealers	Garages	Supplies	Repairs	Total, Sept. 30, 1912	Total, Jan. 1, 1912
Alabama	62	33	....	4	79	54
Arizona	35	20	2	1	46	34
Arkansas	38	20	....	2	46	30
California	717	467	24	50	945	692
Colorado	114	94	5	5	158	141
Connecticut	293	249	8	25	409	286
Delaware	33	22	..	3	37	35
Dis. of Columbia	65	30	6	12	101	78
Florida	135	80	....	4	156	102
Georgia	184	94	5	7	228	151
Idaho	46	27	1	....	49	34
Illinois	793	664	32	55	1,230	1,001
Indiana	472	335	10	27	611	480
Indian Territory	....	....	....	....	....	....
Iowa	678	465	1	20	860	608
Kansas	360	244	5	10	343	299
Kentucky	102	63	4	5	120	102
Louisiana	74	38	1	4	83	67
Maine	148	122	1	10	98	116
Maryland	105	68	7	5	129	96
Massachusetts	551	523	38	75	932	729
Michigan	468	311	22	23	493	460
Minnesota	443	218	14	22	532	363
Mississippi	48	32	1	3	84	52
Missouri	422	213	18	56	566	437
Montana	99	57	1	1	115	73
Nebraska	347	192	6	5	388	245
Nevada	23	10	....	2	27	9
New Hampshire	102	90	1	7	141	92
New Jersey	461	532	11	31	764	493
New Mexico	24	22	....	....	29	24
New York	1,301	1,230	100	118	2,057	1,696
North Carolina	93	60	1	8	112	69
North Dakota	179	97	....	2	210	145
Ohio	721	488	25	45	932	732
Oklahoma	91	63	2	7	135	112
Oregon	114	79	9	7	151	120
Pennsylvania	772	539	32	63	1,097	903
Rhode Island	80	84	5	16	142	118
South Carolina	98	62	2	5	118	85
South Dakota	146	87	1	4	168	111
Tennessee	111	50	2	7	124	86
Texas	275	122	5	17	332	308
Utah	30	14	2	5	40	25
Vermont	82	62	....	6	103	89
Virginia	123	71	3	7	148	105
Washington	165	81	8	12	208	170
West Virginia	71	36	..	1	81	60
Wisconsin	350	277	8	26	459	364
Wyoming	21	15	....	2	25	19
W. Ind	1	1	....	....	2	2
Canada	282	225	10	7	337	167
Mexico	11	7	....	1	14	9
Hawaii	1	....	....	....	1	1
	12,066	8,901	538	731	16,708	13,245

convey some idea of the sharp upward trend of the registration of native cars in New Jersey.

A short review of the development of the automobile industry as measured by its output, since its infancy, might prove of interest. The following table shows how the manufacture of motor cars has grown from year to year, and how the production increased, at times at a moderate rate and then again with tremendous vigor:

Year	Cars built	Increase over past year	Per cent Increase
1903	9,000		
1904	12,000	3,000	33.33
1905	22,500	10,000	83.96
1906	30,000	7,500	33.33
1907	39,000	9,000	30.00
1908	50,000	11,000	28.67
1909	108,000	58,000	116.30
1910	173,000	65,000	60.25
1911	200,000	27,000	15.62
1912	340,000	140,000	41.20

The production figure for the year 1912 is estimated on the basis offered by the production figures now on hand, which would indicate that during the entire year 1912 about 320,000 new cars will be registered in the United States. A moderate estimate of the total exports for this current year would add 20,000 to the above number. This indicates that 1912 is one of the best years of the industry. Not only is the production increase of 140,000 cars absolutely unprecedented but the rate of increase is far ahead of that of every other industry.

As regards the manufacture of automobiles and motors, the census showed that there are 575 distinct manufacturing companies in the United States, quite a few of which operate more than one plant. As is shown in the table appearing herewith, fully 100 makers, or 17.4 per cent. of the total, are located in Michigan, which is still holding its own as the leading automobile-producing state. Second in magnitude ranks New York, having seventy-eight makers, while Ohio, with sixty-eight manufacturers, is third and Indiana with fifty-nine, is fourth. Pennsylvania has forty-one manufacturers, Illinois thirty-seven, Wisconsin, thirty-two and New Jersey, nineteen. The rate of increase is also greatest in Michigan and New York, there being twenty-four new makers in Michigan and thirty-three in New York, during the past year, or a gain of 31.6 per cent. in the Wolverine State and 73.25 per cent. in the Empire State.

On the other hand, the industry has fallen off in several states, prime among which is Iowa, where a 50 per cent. reduction has taken place, decreasing the number of makers from six to three. Connecticut has fallen off from nine to seven makers and the District of Columbia, Kansas, Kentucky, Tennessee and Virginia have each lost one factory. But the total difference between last November and this is still positive, there being an increase of 163 over the total number of manufacturers, which then was 420. This increase is equal to 38.8 per cent.

Of special interest is the increase in freight automobiles during the past years. The manufacture of commercial vehicles now and 1 year ago is best illustrated by the following figures:

Year	Makers of pleasure cars	Makers of commercial cars
1911	237	198
1912	286	312
Increase	49	114

Of course, this tabulation includes manufacturers who make both pleasure and commercial cars, but the effect on the number of each of these lines of products is the same.

Similar progress has been made in the number of garages and dealers, not only in the United States, but also in Canada, Mexico, the West Indies and Hawaii as shown on page 930. Such establishments have increased 26.2 per cent. in number since the beginning of the year and are doing a flourishing business, and despite the complaints which at times come from these quarters, hard facts as represented by figures show that these branches of the trade are undergoing an expansion fully as remarkable as that of the automobile industry proper. This statement is supported by the table on page 930 and the chart on the opposite page which illustrates its figures. As to the total numbers of such establishments in the various states, New York is far ahead of the next state, Illinois, the former having 2,057 against 1,230 of the latter. Pennsylvania follows with 1,097 and California with 945 is fourth, Ohio and Massachusetts with 932 each ranging closely after it. Iowa, New Jersey and Indiana follow, with 860, 764 and 611 places respectively. New York's total increase of 361 establishments again heads the list of gains, followed by New Jersey's 271 and California's 258.

Manufacturers' Distribution of Automobiles, Trucks and Motors

	Automobiles	Commercial Vehicles	Motors	Total
Alabama	1	......	......	1
Arizona	......	......	......	......
Arkansas	......	......	......	......
California	5	5	......	9
Colorado	2	2	......	3
Connecticut	4	5	......	7
Delaware	......	......	......	......
District of Columbia	1	1	......	2
Florida	......	......	......	......
Georgia	2	1	......	3
Idaho	......	......	......	......
Illinois	23	29	13	37
Indiana	38	17	11	59
Indian Territory	......	......	......	......
Iowa	4	5	1	9
Kansas	1	......	......	1
Kentucky	1	3	......	4
Louisiana	......	......	......	......
Maine	......	......	......	......
Maryland	4	3	......	4
Massachusetts	12	9	......	19
Michigan	54	48	10	100
Minnesota	5	10	1	14
Mississippi	......	......	......	......
Missouri	7	6	......	11
Montana	......	......	......	......
Nebraska	3	2	......	4
Nevada	......	......	......	......
New Hampshire	......	......	......	......
New Jersey	5	13	1	19
New Mexico	......	......	......	......
New York	26	44	13	78
North Carolina	1	......	......	1
North Dakota	......	......	......	......
Ohio	34	44	6	68
Oklahoma	1	1	......	2
Oregon	......	......	......	......
Pennsylvania	18	25	5	41
Rhode Island	2	3	1	5
South Carolina	......	......	......	......
South Dakota	1	1	....	1
Tennessee	3	1	......	3
Texas	1	2	......	2
Utah	......	......	......	......
Vermont	......	......	......	......
Virginia	1	2	......	2
Washington	......	......	......	......
West Virginia	1	3	......	4
Wisconsin	11	17	9	32
Wyoming	......	......	......	......
W. Ind	......	......	......	......
Canada	14	10	2	21
Mexico	......	......	......	......
Hawaii	......	......	......	......
	286	312	62	575

NOTE:—Where manufacturers build both pleasure cars and trucks they are listed under each head, but allowance is made in the total.

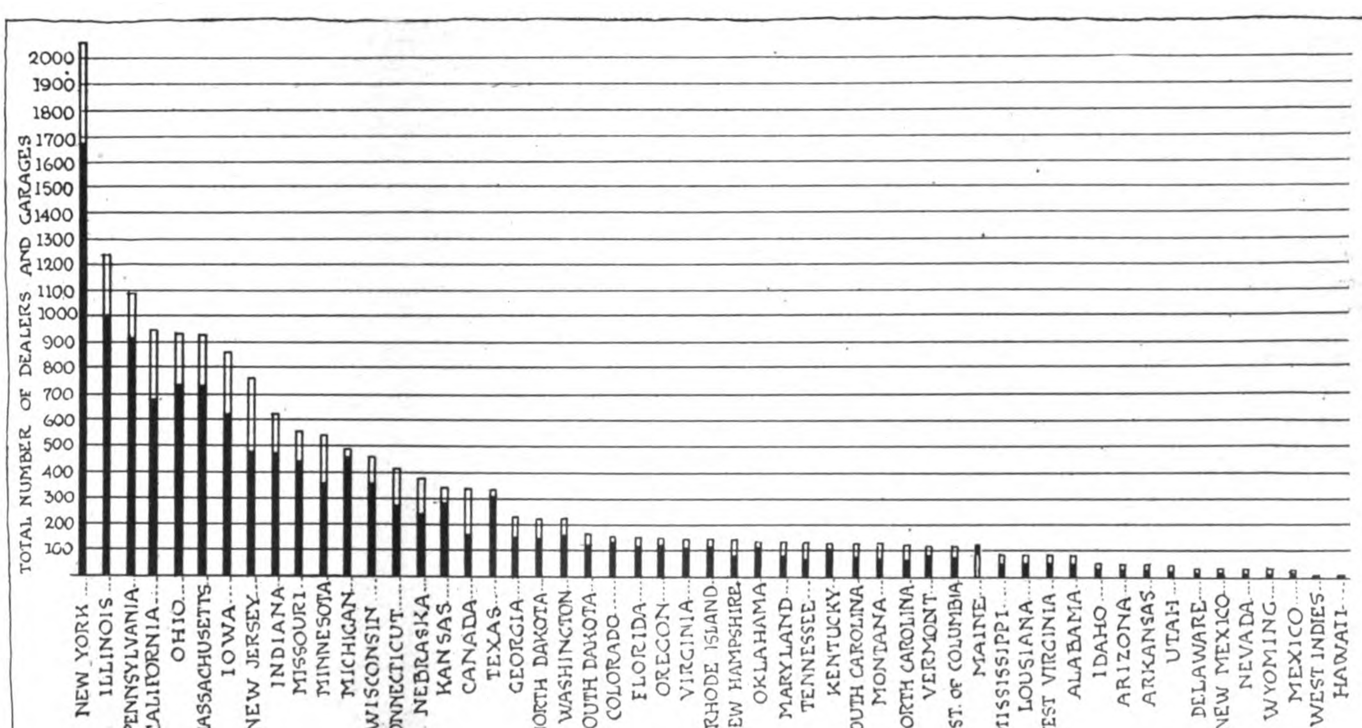


Diagram showing distribution of dealers and garages in the United States, Canada, Mexico, West Indies and Hawaii

I. C. C. Warns Railroads

Commission Serves Notice That Reform Must Be Instituted To Relieve the Car Shortage Situation

Wheeler Buys Out Schebler—Crude Rubber Down Again —Other News Notes of the Automobile Industry

GOOD news for the industry was contained in the optimistic statements issued by numerous representative railway officials as to the alleviation of the shortage of freight cars and the prospect for an adequate supply by the time the automobile shipping season begins. The net shortage up to November 2 was more than 40,000, but to the gratification of the automobile industry it is announced that the exceedingly heavy movement of grain during October has brought forward the peak of the railroad load so that it will probably be passed before the end of November. The total net shortage is 12,881 more than reported at the last fortnightly period. Presidents of the Atchison, Wabash, Illinois Central, Northwestern and Great Northern report full traffic but little congestion. The New York Central and Erie have more than they can handle, but both roads are hopeful about cleaning up in a few days.

The fine weather for shipping during the past 6 weeks is generally given as the reason for the degree of facility with which the situation has been handled. If the weather continues good through November and fairly good in December, the traffic problem will be normal during the automobile shipping season, according to railroad officials.

What amounts to unofficial notice has been served upon the railways of the United States by the Interstate Commerce Commission that the railways must adjust the present arrangements concerning the prompt return of freight cars that have been diverted from their own companies. Franklin K. Lane, of the commission, calls attention to the fact that it is little less than stealing for one railroad to withhold and use the cars of another railroad, particularly during periods of stress like that noted in the present grain movement.

The commission has issued a circular to the railroads to increase the speed of freight trains and calling attention to the fact that 25 miles a day is too small an average movement for freight cars. Another recommendation is for a higher per diem demurrage charge so that poorly equipped companies will have less motive for withholding the cars of better equipped roads.

James S. Marvin, traffic manager of the N. A. A. M., has a statement from one railroad which has 175 automobile cars, showing that on November 1 the company had only sixteen of the cars in service on its own lines. The remainder, 159 cars, were being used by other roads, needless to say that their service is not in the shipment of automobiles.

The attitude of the Interstate Commerce Commission is simply that it insists that the railroads remedy an inexcusable situation themselves or else the commission will take jurisdiction.

It is estimated that the total net shortage of cars at the peak of the load will be not more than 50,000.

Wheeler Buys Out Schebler

INDIANAPOLIS, IND., Nov. 4—Frank H. Wheeler has bought out the interest of his partner, George M. Schebler, in the firm of Wheeler & Schebler, manufacturers of the Schebler carbureter. The business will be continued by Mr. Wheeler without a change in firm name, Mr. Wheeler to be sole owner. The consideration has not been made public.

The growth of the company, which has been conducted as a partnership, has been almost phenomenal. Mr. Schebler, who was a mechanic in moderate circumstances, brought out the Schebler carbureter and found himself without sufficient capital to develop and manufacture his invention. Mr. Wheeler became associated with him, and the two started in an extremely modest way in small quarters on the second floor of a building in North Alabama street.

In a remarkably short time the business outgrew its quarters and it was found necessary to erect the enormous plant that is now operated on the south side of the city. This plant is said to be one of the largest of its kind in the world.

Mr. Schebler has been obliged to retire from the firm on account of ill health. He may devote most of the next few months to traveling, in the hope of improving his health. His physicians have advised him for some time that he must retire from business.

Crude Rubber Continues to Sag

Crude rubber was easier again in the world's markets during the past week. The price level sagged to a basis of $1.01 1-2 for up-river fine and was steady in the plantation grades, pale crêpe standing at $1.02 1-2. While actual sales amounted to practically normal volume of business there was little selling pressure and less active bidding. Receipts continue to increase from both plantations and indigenous fields.

Receivers Framing Maxwell Schedule

The manufacturing schedule of the Maxwell-Brisoce Motor Company for 1913 is being framed in accordance with the action of the United States District Court, which authorized the issuance of $1,500,000 of receivers' certificates to finance the undertaking.

Automobile Securities Quotations

SPECULATION and investment in automobile securities marked time throughout the past week, while the tire companies monopolized the center of attention. Goodyear sold ex-dividend and so did Goodrich. Ajax-Grieb, which is now closely held, was marked up sharply on small trading. Firestone bulged up and then came back and Miller and Swinehart each went up and stayed up. International seems to have turned the corner and is on the up-grade again. The automobile list was steady as a general thing. The following tabulation shows the current level compared with that a year ago.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	170	200
Ajax-Grieb Rubber Co., pfd	..	..	97	100
Aluminum Castings, pfd	..	..	100	102
American Locomotive, com	35	35½	43½	44
American Locomotive, pfd	103	103½	106	106½
Chalmers Motor Company	..	..	145	152
Consolidated Rubber Tire Co., com	7	10	11½	15
Consolidated Rubber Tire Co., pfd	10	20	50	55
Firestone Tire & Rubber Co., com	170	176	278	282
Firestone Tire & Rubber Co., pfd	106	108	105	107
Garford Company, preferred	..	..	99	101
General Motors Co., common	38	39	34½	35½
General Motors Co., preferred	77½	78½	77½	78½
B. F. Goodrich Co., common	*234	*238	†‡70	†‡71
B. F. Goodrich Co., preferred	*118	*120	†‡107	†‡107½
Goodyear Tire & Rubber Co., com	225	235	‡368	374
Goodyear Tire & Rubber Co., pfd	104	106½	104½	105½
Hayes Manufacturing Company	..	..	..	90
International Motor Co., com	..	..	19	21
International Motor Co., pfd	..	..	74	76½
Lozier Motor Company	..	..	40	50
Miller Rubber Company	..	..	143	147
Packard Motor Car Co., pfd	104½	106	105½	107
Peerless Motor Company	..	..	115	120
Pope Manufacturing Co., com	40	48	28	30
Pope Manufacturing Co., pfd	65	70	69	71
Reo Motor Truck Company	8	10	8	10
Reo Motor Car Company	23½	25	19	22
Studebaker Company, common	..	..	42	42½
Studebaker Company, preferred	..	..	94½	95½
Swinehart Tire Company	..	..	99	101
Rubber Goods Mfg. Co., com	85	95	100	..
Rubber Goods Mfg. Co., pfd	100	105	104	108
U. S. Motor Company, com	23	25	⅛	⅝
U. S. Motor Company, pfd	67½	68½	1½	2
White Company, preferred	..	..	105	108

*Old. †New. ‡Ex-div.

Progress was reported by the officers who have the work in hand but no inkling of its scope has been made public. The whole enterprise is a temporary expedient for the purpose of advancing the work so that it will be possible to turn out Maxwell cars for 1913 at the beginning of the marketing season.

The sale of the property to a reorganizing corporation and the continuance of its activities so that a sale can be made on a better basis than scrap are said to be the immediate objects to be attained.

The deal with the Flanders Motor Company remains in a state of uncertainty. It has been announced at United States Motor headquarters that appraisements have been made on each side and that agrement as to terms is a matter of negotiation. It was positively stated that no official development would be announced prior to November 11, when the form of the decree of sale will be discussed before Judge Hough.

In the meantime the outstanding stocks of the parent corporation and the claims of the creditors are being deposited with the Central Trust Company and it is said that the total of claims now deposited amounts to nearly 75 per cent.

A. B. of T. Holds Monthly Meeting

The regular monthly meeting of the Automobile Board of Trade was held Wednesday morning according to schedule. On account of the election a small attendance was present and the program contained nothing but matters of routine. The Board of Trade meeting had been tentatively scheduled to be held in Detroit next week when the National Association of Automobile Manufacturers assembles for a quarterly session, but it was decided that the merger matter and other important business had not progressed sufficiently at this time to warrant such a proceeding.

Market Changes for the Week

FEW materials changed their prices during the past week despite the fact that a satisfactory degree of activity prevailed throughout the market. Tire scrap rose \$.00 1-4, due to trading conditions. Lead dropped \$.25 per 100 pounds and copper electric rose \$.00 1-8. Rubber experienced a slight lowering in price, owing to lack of trade, closing at \$1.02 at a loss of \$.01. Tin, beams and channels, gasoline, Bessemer and open hearth steel remained constant throughout the week. Cottonseed oil rose to \$5.79 and then dropped to \$5.76, experiencing a loss of \$.04. Rapeseed oil rose \$.01. Sulphuric acid and cyanide of potash remained unchanged.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.	.09¼	.09¼	.09¼	.09¼	.09¼	.09¼	....
Beams & Channels, 100 lbs...	1.61	1.61	1.61	1.61	1.61	1.61	....
Bessemer Steel, ton	28.00	28.00	28.00	28.00	28.00	28.00	....
Copper Elec., lb..	.17⅛	.17⅛	.17⅛	.17⅛	.17⅛	.17¼	+ .00⅛
Copper, Lake, lb..	.17⅛	.17⅛	.17⅛	.17⅛	.17⅛	.17⅛	....
Cottonseed Oil, October, bbl....	5.80	5.79	5.76	5.76	5.76	5.76	— .04
Cyanide Potash, lb.........	.19	.19	.19	.19	.19	.19	....
Fish Oil (Menhaden) ...	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @....	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime..	.88	.90	.90	.90	.90	.90	+ .02
Lead, 100 lbs.....	5.00	5.00	4.95	4.95	4.90	4.75	— .25
Linseed Oil.......	.58	.58	.58	.58	.58	.58	....
Open-Hearth Steel, ton......	29.00	29.00	29.00	29.00	29.00	29.00	....
Petroleum, bbl., Kansas crude...	.70	.70	.70	.70	.70	.70	....
Petroleum, bbl., Pa. crude.......	1.65	1.65	1.65	1.65	1.65	1.65	....
Rapeseed Oil, refined....	.68	.69	.69	.69	.69	.69	+ .01
Rubber, Fine Up-river Para..	1.03	1.03	1.03	1.03	1.03	1.02	— .01
Silk, raw Ital.....	....	4.40	....	....	....	4.40	....
Silk, raw Japan...	....	3.95	...	....	....	3.95	....
Sulphuric Acid, 60 Beaumé.....	.99	.99	.99	.99	.99	.99	....
Tin, 10 0lbs........	5.02	5.02	5.04	5.03	5.04	5.02	....
Tire Scrap.......	.09½	.09½	.09¾	.09¾	.09¾	.09¾	.00¼

Dynamo Patents In Test

General Electric Company Sues Rushmore for Alleged Infringement of Winding and Regulating Rights

Defense Will Set Up Rushmore's Own Patent as a Bar to the Action and Technical Battle Impends

TRENTON, N. J., Nov. 4—Suit has been entered in the United States District Court for the District of New Jersey by the General Electric Company against the Rushmore Dynamo Works charging infringements of the Barry and Steinmetz patents, numbers 884,555 and 713,523, which are alleged to cover certain principles of winding and regulating electric dynamos involved in the electric lighting and starting systems used in the automobile art.

The Rushmore company has proceeded on the principle that patent 1,016,037, granted to Samuel W. Rushmore, Jan. 30, 1912, for an electric lighting system for automobiles does not infringe the rights of the complainant's patents.

The suit has been started but the matter is not likely to come to an issue before the middle of January and may not be heard before vacation in 1913, although this is by no means certain.

The Barry patent was granted April 14, 1908, and is for a system of regulating dynamo electric machines. The chief element of the idea is its provision for limiting maximum voltage of the generator, irrespective of its speed or load. The device was primarily intended to cover generators driven from the axles of railway cars, but the principle is said to cover automobiles as well. In accomplishing the object the inventor resorts to two windings with a system of balances to control the voltage.

The Steinmetz patent was granted for a compound wound generator, November 11, 1902. It covers a method of compensating for the variation in voltage due to variation in permeability of the magnetic circuit. This is accomplished by automatic compensation; diverting current from a field coil; using parallel circuits; two magnetomotive forces and by passing current through a field coil.

On behalf of the defense it is stated by Mr. Rushmore that the Rushmore patent, granted specifically for an electric lighting system on vehicles, does not infringe either of the other patents cited in suit. The dynamo is driven from the propelling axle or engine at widely differing rates of speed. In order to prevent the burning out of the lamps when the voltage is high, due to the high rate of speed of the propelling mechanism, or the destruction of the storage battery from overloading, some system of compensation is required. Rushmore's invention consists essentially of a ballast coil made of iron or other metal having a high positive resistance temperature coefficient when heated and so arranging the various parts that sudden rises in voltage and consequent rushes of current are opposed by the ballast coil, proportionately to the rises in voltage, and the fluctuations are absorbed by the battery.

According to the statement of Mr. Rushmore his patent was granted after a close scrutiny and familiarity with the prior art and the claims of his patent were drawn by Dr. Albert F. Ganz, of Stevens, and George Cooper Dean, electrical and patent law expert.

In commenting on the Barry and Steinmetz patents, Mr. Rushmore says that in the Barry device it is attempted to control the voltage of the dynamo irrespective of current output, with individual ballasts to protect each lamp. The Steinmetz patent seeks merely to compensate for variation in magnetic permeability of his dynamo when driven at constant speeds in order to maintain constant voltage at widely varying loads, according to Mr. Rushmore.

M.A.D.A. Preparing To Pay Its Creditors

Asks Extension Until March so That Profits of Show May be Applied To Racing Debts

Daimler Company Aggressive in Enforcing Patent Rights of Licensees But Inactive as Trade at Large

MILWAUKEE, WIS., Nov. 4—A plan whereby every creditor of the Automobile Dealers' Association, promoter of the 1912 international road races at Milwaukee on October 2, 3 and 5, will be paid dollar for dollar, is now being brought to consummation by the association's committee in charge of financing the $43,000 deficit incurred by the conduct of the speed carnival. The basis of the plan is to extend the time of payments until March 1, 1913, and the arrangement is contingent upon the acceptance of it by at least 90 per cent. of the creditors. In the meantime the association will be able to earn sufficient funds to cover the entire deficit, it is stated. The annual motor show will be held under auspices and management of the M. A. D. A. some time in January and is always the source of a neat profit, which will be applied to the general funds to cover the indebtedness.

Creditors have received extension agreement forms to fill out and mail to the offices of the association without delay and the plan will become operative if 90 per cent. of the claimants come forward. The agreement reads as follows:

"Representations having been made to the undersigned as creditor of the Milwaukee Automobile Dealers' Association that said Association, as the result of the automobile races recently held by them in Milwaukee, have liabilities far in excess of their ability to pay; and,

Whereas, if a pro rata settlement to all creditors of said Association were made at the present time the same would result in an exceedingly small dividend to creditors; and,

Whereas, representation has been made to the undersigned creditor that said Milwaukee Automobile Dealers' Association have plans in mind, which, if carried out during the next few months, are likely to result in profit to said Association, which, together with other funds which they may be able to raise, will enable said Association to make a substantial, if not a full, payment of their obligations at a subsequent date:

Now, therefore, the undersigned, in consideration of the mutual promises hereby made, do hereby extend the time of payment of the amount due from said Milwaukee Automobile Dealers' Association to the undersigned respectively to the amounts set opposite their several names until March 1, 1913, and hereby agree to take no action or legal steps or proceedings of any kind whatsoever against said Milwaukee Automobile Dealers' Association, or any of its debtors, upon said account until after March 1, 1913.

This extension shall be valid and binding upon the undersigned only upon condition that ninety (90) per cent. in amount of the present indebtedness of the Association is so extended.

Mercedes Patents Not In Issue

The campaign recently instituted by the Daimler Manufacturing Company to protect its licensees under the Daimler patent rights has been confined so far to owners of Mercedes cars which have been purchased without recourse to the American licensees. So far no aggressive action has been taken to assert the patents themselves against the rest of the trade. But that such action is not impossible is suggested by the notices that have been sent out to automobile owners on behalf of the Daimler Manufacturing Company.

The patents are very broad and apparently cover a number of elements in common use in the industry. Thus far none of them has been finally adjudicated in the United States Courts, although the foreign courts have passed upon some of them.

According to the company, the present action is to affect only those owners of Mercedes cars who made their purchases from foreign agencies and imported the cars direct. These number only a few, compared with the large number in use in the United States.

The bankruptcy proceedings against the Daimler Import Company are still in the courts and a final adjudication may not take place until December.

Olympia to Set New Show Record

LONDON, Nov. 4 (*Special Cable*)—The Olympia Show will be the greatest motor trade exhibition the world has ever seen, according to the opinion generally expressed in automobile circles of Great Britain. Every available foot of space has been utilized in the vast hall and the value of the exhibits amounts to $1,250,000. Many of the notable importing firms and corporations have been squeezed out by reason of the extraordinary demand for space from British manufacturers. There are 353 exhibitors duly installed. This constitutes an entirely new record.

In the car section there are 119 exhibitors; in the carriage section, thirty-five; in the component and accessory section, 150; tire and wheel, thirty-nine; press, eight, and associations, two.

Great Britain has 45 per cent. of the exhibits; France, 23 per cent.; Germany, 10; Italy, 7; Belgium, 6; the United States, 6; Switzerland, 3 and Holland 3 per cent.

The show will be opened formally on Friday night and all indications point to the establishment of a new set of show records.

Hoosier S. A. E. Elects Officers

INDIANAPOLIS, IND., Nov. 4—At the first of the winter meetings of the Indiana branch of the Society of Automobile Engineers, held in Indianapolis on the evening of October 31. officers for the ensuing year were elected as follows: George A. Weidley, of the Premier Motor Manufacturing Co., chairman; Herman G. Deupree, of the Remy Electric Co., secretary, and Chester S. Ricker, of the Henderson Motor Car Co., treasurer.

The topic of the meeting was self-starters, the speakers being W. G. Wall, of the National Motor Vehicle Co.; W. E. Raiguel, of the Ignition Starter Co.; Chester S. Ricker, of the Henderson Motor Car Co.; Joseph Lamb, of the Ignition Starter Co.; E. V. Hartford, of the Hartford Suspension Co.; Charles Crawford, of the Cole Motor Car Co., and Howard Marmon, of the Nordyke and Marmon Co.

Dodge Company To Handle Buffalo

BOSTON, MASS., Nov. 2—The Dodge Motor Vehicle Company has taken on the Buffalo electric as an exclusive line in the territory included in Norfolk, Suffolk, Essex, Plymouth, Middlesex and Worcester counties, the deal having been closed by H. W. Russell on behalf of the Buffalo company. The Dodge concern has handled gasoline cars at Cambridge and in Boston. The order provides for an allotment of 100 cars.

New Starter Company Incorporated

INDIANAPOLIS, IND., Nov. 4—With an authorized capitalization of $150,000, the Ham-Meix Manufacturing Company has been organized and incorporated in Indianapolis to manufacture self-starters for gasoline motors. Those interested in the company are: Harry W. Hamilton, Benjamin F. Meixell, Harold Taylor and Samuel B. Sutphin.

18,000 See Brighton Beach Election Derby

Mason Racers of Milwaukee Fame Defeat a Dozen Veteran Performers—Racing Extends Until After Sunset

French Sealed Car, 3,000-Mile Run Planned for March—Christy Establishes Arizona Track Record

BEFORE a crowd estimated at nearly 18,000 a program of races was given at Brighton Beach on election day, the feature of which was the Election-Day Derby at 100 miles. This brought out a ponderous field of thirteen starters and stretched out so far that darkness fell during the last third of the distance, causing the finish to be drawn in the dark.

The Mason pair finished the full course and were awarded the two chief purses; Wishart's and Pullen's Mercers came next with ninety-eight and ninety-five laps respectively; Menker's Kline covered ninety-two laps and the Le Cain Stutz made ninety. Costello's G. J. G. was still running at the end but it was several laps behind the Stutz.

The race developed a number of mishaps and while nothing should detract from the honors won by the Masons, the Stutz, driven by Dave Lewis, was eliminated at a fortunate point for the winners. The same may be said for the National and two of the Mercer cars besides the ones that were placed.

The start was delayed about 30 minutes too long and the field was too large for the course, but fortunately no fatal accidents marked its running. At the end of the first 10 miles the National led with the Stutz pair close up. At 20 miles the Le Cain Stutz showed in front with Thebaud's G. J. G. second and the Ferguson Mercer third. At 30 miles the Lewis Stutz was out in front and running swiftly and steadily. His teammate was second and the G. J. G. third. The Le Cain Stutz blew a tire on the first turn and lost two laps, the G. J. G. and Mercer (Ferguson) moving up a peg. Whalen went over the embankment in mile 31, breaking the wheel of his National and putting it out of commission. Whalen and his mechanic were shaken up but not seriously hurt. The next striking happening was when the Lewis Stutz turned over at the head of the stretch, bending its front axle and eventually putting it out.

The last 30 miles were run in the growing darkness and the finish found the steady-going Masons at the head of the procession.

Besides the 100-mile race, a 10-mile event for cars with less than 300 cubic inches displacement was run, and was won by Lewis in his Stutz, against a field of eight contenders. A 10-mile free-for-all handicap was taken by Mitchell in a Mason, who defeated a field of nine contestants, while the 5-mile handicap for cars of less than 300 cubic inches piston displacement went to Ormsby in a Kline.

Throughout the race both the cars were prominent, but not in the first flight. They suffered little tire trouble and the Mitchell Mason was in front until near the end, when Mulford came along and wrested it from his teammate. The record was not disturbed owing to the caution necessary in the latter stages.

The policing was inadequate to handle such a large crowd. It is estimated that 1,200 automobiles were parked at the track.

Sealed Cars to Compete in France

PARIS, Oct. 12—With bonnets nailed down and all essential parts sealed, medium-powered French cars having a chassis price of not more than $1,600 will take part in a 15-day 3,000 miles endurance test round France next March.

It is believed that the maintenance of all the seals intact for 15 consecutive days will not serve to prove the greater worth of the cars, while it will prevent the drivers giving those daily attentions necessary for any piece of mechanism, and which owners are quite willing to give at the beginning of a day's run. On this account the front and rear axles and the steering gear will be permanently sealed. The bonnet, the radiator filler cap, the underpan and the footboards giving access to the clutch and gearbox can have their seals broken for 10 minutes only every mornig. At the expiration of this time the seals will be replaced and cannot be broken without the loss of points.

The arrangement will allow drivers to screw down grease cups, verify their motors, fill the tanks and make slight adjustments, but the time will not be long enough to make any repairs. The breakage of the radiator filler cap will entail a loss of 2 points; if the underpan of the footboard seals are removed, 3 points will be deducted for each; the lifting of the bonnet will cause a loss of 4 points. If the permanent seals are lost the car will be eliminated, and failure to maintain an average of 18 1-2 miles an hour on any of the stages will also entail disqualification.

With a $1,600 limit the whole of the popular medium-powered cars will be admitted. The limit has been fixed on the chassis instead of the complete car because of the wide difference in body value on this type of European chassis. They vary, indeed, from two-seaters worth about $150 to handsome inside-steering limousines listing at $600 to $1,000. In all cases the competing cars must be completely equipped touring models having not less than two seats with hood, windscreen, horn, running boards, lamps, headlights, etc. Numerous entries have already been received for the tour.

Christy Set New Arizona Record

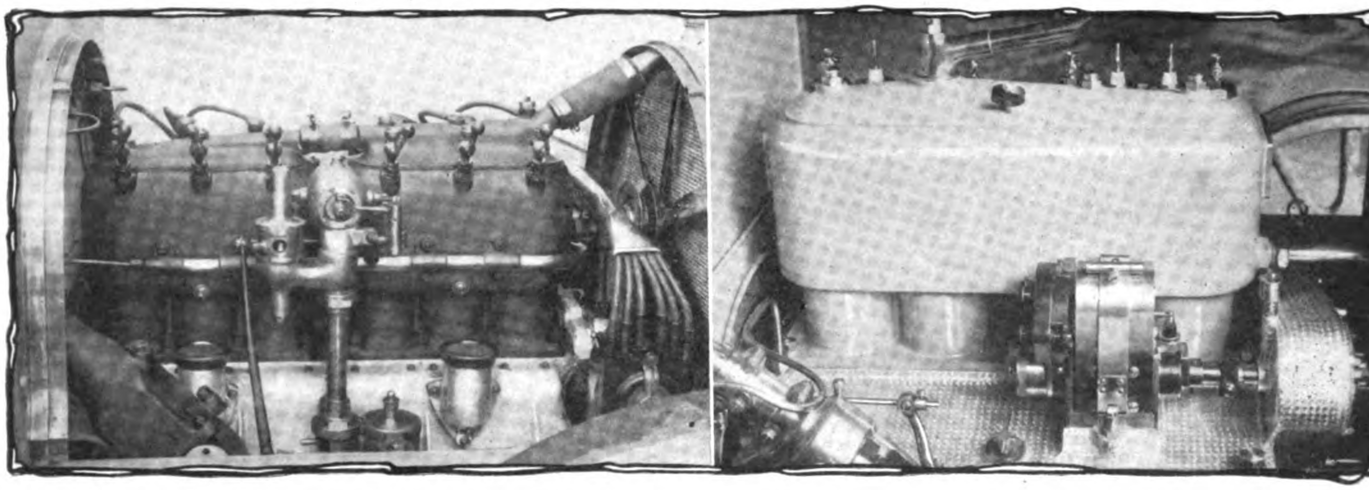
PHOENIX, ARIZ., Nov. 4—*Special Telegram*—Driving a Christy, rated at 120 horsepower, Barney Oldfield established a new mark for the mile on an Arizona circular mile track. The Christy finished the trial in 50 1-2 seconds, which is 1 3-10 seconds faster than Tetzlaff's time with the big Fiat last Thursday.

PHOENIX, ARIZ., Oct. 31—*Special Telegram*—Breaking the Arizona circular dirt track record for the mile, a Fiat 120-horsepower car driven by Tetzlaff set the new mark at 51 4-5 seconds. In the 50-mile feature event for cars over 300 cubic inches piston displacement, a Fiat driven by Tetzlaff won in 51:51 without difficulty of any kind. Another Fiat, Hill driver, was second in this event. Tire trouble delayed the Benz entry, driven by Meloane and the Cadillac handled by Soules. A broken steering knuckle caused the Cino, driven by Heinzmann, to plunge through the fence, smashing a wheel and shaking up the driver.

The Hill Fiat won the 15-mile handicap free-for-all in 15:57 while the National was first in the 15-mile event for cars that participated in the Los Angeles-Phoenix race having more than 230 cubic inches piston displacement. The time was 15:58 1-5. The Soules Cadillac won the 10-mile handicap in 10:44.

Boston Dealers Finish Race Meet

SALEM, N. H., Nov. 4—The uncompleted program of motor races which were originally scheduled for October 12 at Rockingham Park race track was run off here Tuesday, when the Boston automobile dealers who had cars entered conducted the events under their own auspices, no admission being charged. There were five events on the program. The first was the 1-mile time trials, in which Harry Grant won first and second places and Harry Cobe in a Jackson third. Their times were respectively: :57 3-5, 1:01 1-5 and 1:02 2-5. Harry Cobe in a Jackson won the 10-mile race with another Jackson driven by Charles Basle taking second. The 25-mile vent was captured by Jack Le Cain driving a Stutz, with Cobe in a Jackson second. The 20-mile match race between Grant in a Stutz and Le Cain in another Stutz was won by the former. The final event was a time trial for amateurs with George Downs in a National, the only entrant, his time being 1:05. The races were well atetnded.



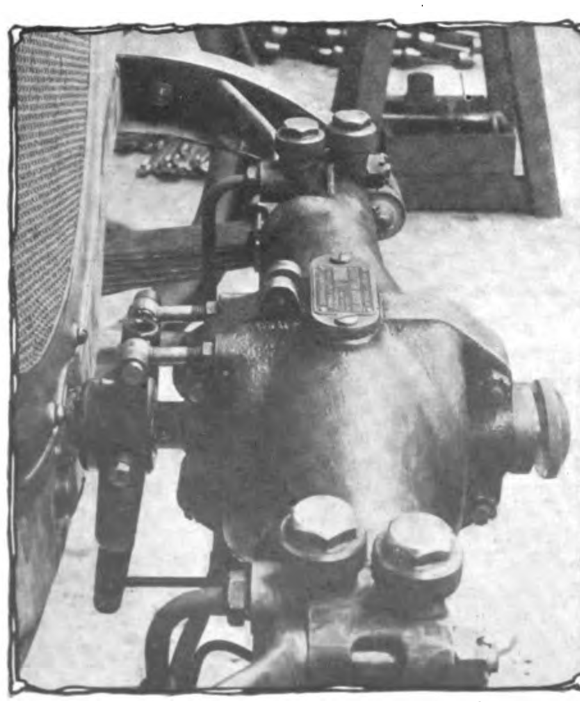
Delaunay-Belleville motor for 1913 on the left and the Unic 1913 on the right with chain-driven timing gear

European Manufacturers Still Like Small Motor

Single-Cylinder Motors Abandoned and Small-Bore Fours Substituted in De Dion, Delage, Sizaire-Naudin and Peugeot Factories; Demand for Twin-Cylinder Motors Also Dropping Rapidly; Many Have Increased Stroke

EUROPEAN shows have not yet thrown open their doors, and as it is the practice of the English, French and German manufacturer to keep his new types back to the last possible moment, full data on next year's models are not yet available. Sufficient information has been secured, however, in the various French factories to indicate the general trend for the coming year. Following the example of the last two seasons, 1913 will be a year of detail but none the less real improvements, without any landslide toward non-poppet valve motors or the adoption of any of the wonderful hydraulic transmissions rumored in various quarters.

The 1913 season will see the abolition of the one lunger, and, to a very large degree, of the twin-cylinder model. Economic considerations have kept them well to the front, but after gradually falling off in public favor they have at last been dropped as unprofitable and replaced by small four-cylinder types. This statement should be supplemented by the explanation that the single and the twin may obtain a new lease of life in the very light, cheap class of car officially known in England as the cycle-car, and having more relation to the motorcycle than to the full-grown touring car. The Panhard company, which has never been accused of acting rashly, has abandoned its only twin-cylinder type and replaced it by a four-cylinder of 2.7 by 5.5 inches bore and stroke. It is the smallest four-cylinder ever produced at this factory. De Dion Bouton, a world-famed maker of singles, will build these for stationary purposes only, and although retaining the twin, will add an 8-horsepower four, from which it can be inferred that the twin will be stifled out after another year. Gregoire has abandoned the twin for a new four; Delage has ceased making singles; Lorraine-Dietrich has practically abandoned the twin model. Renault is peculiar, for he has a big demand for twins to be used for taxicab purposes. Even he, however, has been obliged to produce a four-cylinder for the London market, and is supplying nothing but fours and a smaller number of sixes for touring purposes. Sizaire-Naudin, after making nothing but singles, now produces nothing but fours; Peugeot and Lion-Peugeot, another single-cylinder enthusiast, has dropped the one lunger, retained the twin, and put on the market a four-cylinder of only 2.1 inches bore.



Compressed air starter on the Delaunay-Belleville

French manufacturers stand firm for the small and medium motor. There is no tendency whatever towards bigger motors, although every effort is made to get increased power out of existing dimensions. Four-cylinder motors of more than 4 inches bore are in a very small minority. There are a few firms, notably Delaunay-Belleville, producing six-cylinder cars of 3.8 by 5.5 inches bore and stroke, but even these are largely outnumbered by the fours and sixes from the same factory of only 3.3 by 5.1 inches bore and stroke. To the French idea a motor of 3.5 inches bore, four cylinders, is big enough for any load; to the majority it is too big, and 3.1 is sufficient for any reasonable person.

There has been a general increase in piston stroke without any extremes. Such firms as Hispano-Suiza, Gregoire, Sizaire-Naudin, Ballot, having ratios varying from 2.2 to 1 to 2 to 1, have not changed their position, but a large number have moved up from 1.3 to 1.5 or 1.6, and there is a notable convert in Panhard with its new small four-cylinder having a stroke-bore ratio of 2 to 1.

Silent chain drive for cam and magneto shafts, etc., has increased in popularity. There is not an example of any manufacturer who has tried chains going back to meshing pinions, but there are a number having formerly made use of pinions who now carry chains. In a few cases, where the chain has been refused, manufacturers have adopted a spring drive for the crankshaft pinion.

Probably 75 per cent. of French manufacturers now use forced-feed lubrication through a hollow crankshaft. The remaining 25 per cent. is largely made up of big manufacturers who, having developed various types of pump circulating systems refuse to drop them for the increasingly popular forced-feed type. Among the younger progressive firms, the firms specializing in small high-efficiency motors, forced feed is invariably adopted. Attention is being paid to detail refinements of the forced-feed system. Attempts are being made to automatically maintain a constant level in the sump or crankcase reservoir; to cool the oil by ribs on the base chamber, or otherwise, to adopt a greater number of filters and make them easily dismountable; to give facilities for regulating the oil pressure at will; all oil leads are being made internal, and in a large number of cases are steel tubes cast in the crankchamber.

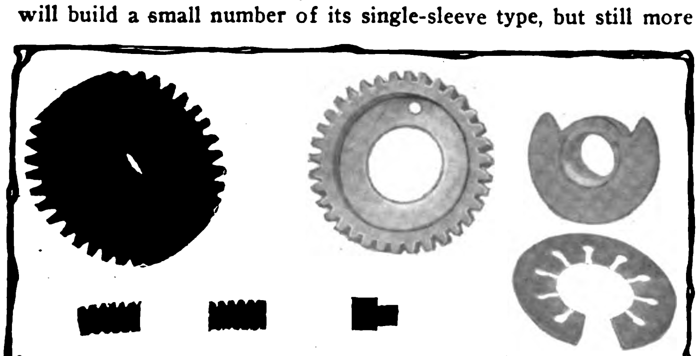
There will be no change in the situation regarding clutches. Where three speeds have existed manufacturers are now providing a fourth. It is a claim on the part of the public which has to be met, and is often met reluctantly. The worm gear has made slight progress. Those manufacturers who have taken it up have probably done so more to meet the requirements of the English market than that of their own country, for it must be admitted that the French motorist is generally satisfied with bevel gearing. The De Dion Bouton has adopted worm drive for three chassis—two eight-cylinder type and one four-cylinder. Gregoire is using it on all their chassis fitted with the Knight motor and also on a new small four-cylinder car; Bayard-Clement has a worm drive for a Knight-engined car; Darracq built a small number of cars with worm drive, but is not pushing the idea. The majority will adhere to the bevel.

There have not been the practical developments that were expected in the non-poppet valve field. Panhard will use Knight motors for at least three-quarters of its 1913 output; Gregoire will produce about 250 cars with the Coventry-built Knight motor; Mors will build rather more; Bayard-Clement will produce probably 200 or 300 chassis with Knight motors. After having bought the patents for the Reno-Bois valveless motor Unic has decided to do nothing, at any rate for the 1913 season. C. L. C., at present building a single-cylinder rotary-sleeve motor, will have a four-cylinder on the same principle at the Paris show. Buchet will bring out the Dubois-Rousseau reciprocating ring type; Vinot-Deguingand has abandoned the same. Delahaye has a valveless motor in preparation, but it is very doubtful if it will be ready for the Paris salon. Rolland-Pilain will build a small number of its single-sleeve type, but still more poppet-valve types. Schneider, after a lot of experimenting with a valveless motor, appears inclined to confine his efforts to one semi-racing model, all the others having poppet valves. C. I. D. will make rotary-ring types exclusively, but the total output of the factory is not very high. Darracq will have two small rotary-valve motors and one big poppet-valve type. There may be others in the experimental stage, and it may be found, when the show opens, that I have overlooked some notable exception.

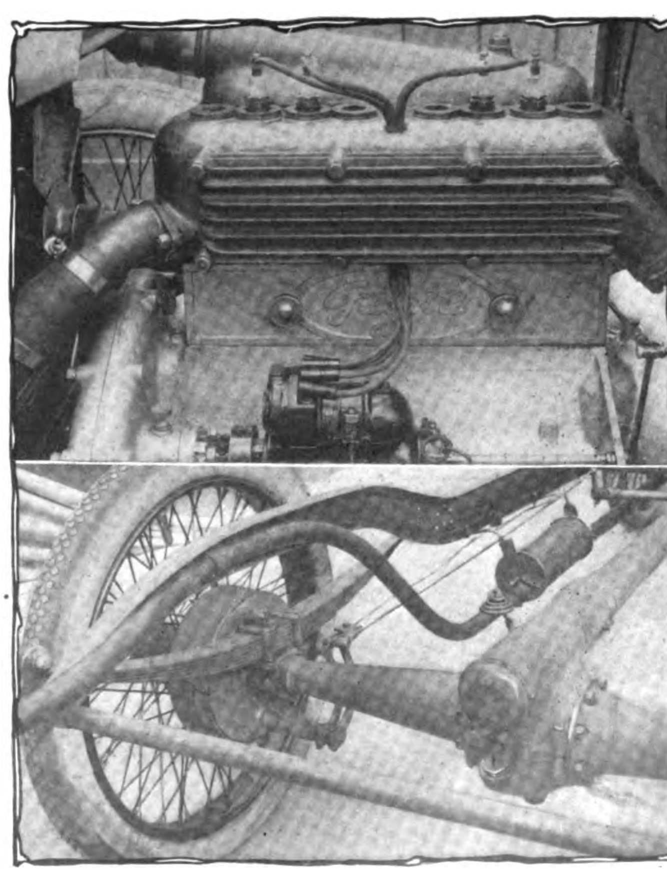
In the transmission there is a tendency towards the abolition of torque and radius rods, all the propulsive effort being transmitted through the rear springs. In the matter of springing the tendency is towards three-quarter elliptics, but this is doubtless more a concession to fashion than because of any inherent superiority in this type. Whatever the type, springs are being made broader and longer with a view to easy riding qualities.

In France no great enthusiasm has been shown for either the self-starter or electric lighting. Delaunay-Belleville appears to be the only firm making use of a self-starter, and this is not a standard feature, but is fitted as an extra. It is of the compressed-air type mounted across the frame just at the base of the radiator and connected up to the front end of the crankshaft by means of a coupling operated from the dash. The electric lighting situation is different, for a very large number of owners have a dynamo and lighting equipment installed when the body is fitted, but no manufacturer appears to have thought it necessary to include such a fitment as an integral part of the chassis.

Wire wheels are growing in favor, a number of firms making them a standard equipment and others, while prevented from doing so by reason of the extra cost, making the fixed hubs to be interchangeable with those of the type of wire wheel in which they are interested. Thus, if wire wheels are preferred, the owner has only to pay the extra cost of the wire type compared with the artillery pattern, and is put to no additional expense for the changing of the hubs. In addition to Rudge-Whitworth and Riley, who were the first to get on the French market, there are several makes of wire wheel manufactured in France and a few makers who supply detachable artillery wheels.



Details of spring drive pinion on end of crankshaft in Chapins and Dormer motor



Four-cylinder Gregoire motor and the double brakes mounted on rear wheels

Question of Wear and Durability of Long Stroke Motors Argued by the Hypothetic Method—New Near-Quartz Glass Figures in Lamp Improvement—Popular Views on Waste of Fuel—Heavy or Light Omnibuses—Late Type of Fire Engines

ON WEAR of Long Stroke Motors—In order to compare the mechanical efficiency of long and short stroke motors, with which question that of wear and durability is intimately connected, Mr. Faroux, the well-known authority in France, analyzses the conditions arising in two motors supposed to be of equal power, equal bore, equal cylinder volume and equal mean effective piston pressures. This supposition eliminates divergencies whose effect it would be difficult to estimate convincingly. Now, if one of these motors has a short stroke, say 90 millimeters, and the other a long one, say 180 millimeters, the supposed data have to be mutually reconciled by a difference in the number of revolutions. As the mean pressures are the same in both motors, the power is determined by the equation

$$W = KpSv$$

in which K is the coefficient of mechanical efficiency, p the mean pressure, S the piston area and v the linear piston speed per second, the latter equalling double the stroke l multiplied by the number of revolutions per minute, n, divided by 60; or

$$v = ln \div 30.$$

If the mechanical efficiency of the two motors were equal, their piston speeds would have to be equal, and for purposes of comparison it is therefore fair to assume provisionally that the short stroke motor, in accordance with the formula, must make twice as many revolutions per minute as the long stroke motor; and then to consider what happens.

In the first place, whatever the length of the stroke, the crankpin never makes more than one revolution in the bushing of the connecting-rod knuckle for each turn of the crankshaft. And, as piston pressures are equal, the two crankpins will be of practically the same diameter and the distance traveled by a point on their circumference will be the same for each turn. The work spent in friction in the connecting-rod bearings will thus be twice as great in the square motor as in the long one.

As the piston changes direction twice as often in the square motor as in the long one, the destructive effects of inertia will be greater in the former. To be sure, the latter will have a longer and therefore a heavier connecting-rod, but this cannot offset the disastrous effect of doubled rotary speed. Under the combined action of doubled friction in the crankpin bearings and twice as many arrests and accelerations of the reciprocating parts, the square motor will begin to knock earlier than the long one. And once play in the bearings has been started, the effects of interrupted inertia will aggravate themselves progressively.

The valve action gives rise to another loss of power. The valves of the square motor in order to function, for example, 2,400 times per minute must be equipped with much stronger springs than required for the long motor, where the valves serve only 1,200 times per minute. The gas tension remaining in the cylinder at the end of the power stroke is practically the same in both cases. Hence a greater power is needed for raising the valves of the short cylinder, and this power must be applied twice as often.

As between two motors of equal power and equal bore, the mechanical efficiency will thus be inferior in the short motor; it will wear more rapidly and will be less silent. A second example may be offered. Two motors of the same cylinder volume, the same average piston pressure and turning at the same angular speed may be compared. The first one may have a bore and stroke of 98 by 98, for example, and the second one 78 bore by 156 stroke, which will give both a cylinder volume of 3 liters. The piston area of the first one will be 75.43 square centimeters and that of the second 47.784, which figures are in the proportion, approximately, of 1.6 to 1.

Now, if the crankpins in the two motors were of the same diameter, the short motor would spend in friction in the crankpin bearings 1.6 times more work than the long one. But as the short motor has the larger piston area, the bearings of its crankshaft must be of larger diameter to resist the impulsion of the explosions. Assuming a pressure from the explosion of 30 kilograms per square centimeter, one crankshaft must sustain 2,250 kilograms and the other 1,410. The larger diameter of the pin will make the circumferential speed proportionately greater in the short motor, and consequently the friction in its bushings will be greater, as well as the wear resulting from it. The short motor will, then, also in this case reach the knocking stage earlier than the long one. [However, the wear is also distributed over a larger surface.—Ed.]

The forces of inertia are also to the disadvantage of the short motor. Its connecting-rod has to transmit a force which is 1.6 times higher and it must have a larger section. This is offset in part by the greater length of the connecting-rod of the long motor, but the end which follows the reciprocating motion of the piston must be heavier in the short motor and the piston itself likewise, since it is larger and transmits the same power by a slower movement. Finally, in order to guide the larger piston as perfectly as the smaller one is guided its length should be in proportion to its diameter.

The reciprocating masses are thus seen to be larger in the short motor and consequently the forces of inertia are more destructive. [However, their linear speed is much smaller, which is after all the element which counts for most.—Ed.]

In the matter of the piston and cylinder friction the short motor suffers by comparison, too. If the connecting-rods work with the same angularity, the amount of friction is essentially equal in the two cylinders, but it is distributed over a longer cylinder wall in the long stroke cylinder, and there is therefore smaller tendency to ovalization. [However, the area of the cylinder wall in the long stroke cylinder being smaller, under the supposition of equal cylinder volumes, and the degree of concavity greater, this point does not seem conclusively settled. —Ed.]

Reverting to the comparison of motors with equal bore, piston speed and mean effective pressure, the amount of friction for each stroke is also here the same, but the number of strokes in the short motor is twice as high as in the long one and the wear and ovalization of the cylinder therefore more rapid.

At both extremes of design the short motor is thus found to be inferior to the long stroke motor of the same power in mechanical efficiency and resistance to wear.—From *La Vie Automobile,* October 19.

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MANY Ways of Wasting Gasoline—It stands to reason that waste of fuel may be due to faults in the gas mixture, faults in the use of the gas mixture, faults in the motor, faults in the use of the motor, faults in the vehicle and faults in the use of the vehicle; and this list of possible causes may be further subdivided. If the gas mixture is too rich the waste is self-evident; if it is too poor and does not give power enough for the work on hand the practical consequence is that the throttle is opened or that the gear is lowered, so that either larger charges are used or more of them, in both cases with the result that more gasoline is used than would be the case if the mixture were at its best for the work on hand. At this point the fault may lie in the carbureter or in choosing the wrong gear for the desired vehicle speed; it may also lie in wrong gear proportions making it impossible to choose a degree of throttling and a gear which work together for fuel economy at a desired vehicle speed. In the use of the gas mixture the question of ignition is uppermost, it being always understood that when the best possibility for power development is missed then gasoline is wasted. Weak ignition, resulting in a slow explosion, and late ignition both result in hot exhaust in which the heat units of the fuel are dissipated. Lack of efficiency due to indifferent motor design is by far the most important cause of fuel waste. The best motors of this day show by tests that not more than one-half the amount of fuel is used in them for a given power, as compared with the amount used in motors of antiquated design or the motors which were the best found in any automobile constructed 6 or 7 or even 4 years ago.

Under faults in the use of the motor, as distinguished from faults in choosing the gear with which the motor is to work, the most important is the employment of a motor which is too large for the kind of work asked of it. However, nearly all automobile motors are too powerful for their average work, so as to be powerful enough for emergencies and fancy performances, and the highest possible fuel efficiency can therefore not be expected of them. Similarly the four-cylinder motor and, in still higher degree, the six-cylinder motor use more gasoline for a driven amount of work than a good single-cylinder motor, the thermic and the mechanical losses being all greater than in the simpler machine with a suitable flywheel, yet no one wants to return to the older type. Fuel efficiency is not an absolute requirement when conflicting with style and convenience.

The fuel waste which is of greatest interest to the motor car owner is that which is due to causes which it comes within his province and competence to remove or obviate.

Many of these relate to his own manner of using his vehicle, and some of these may be enumerated. In ordinary pleasure cars the valves are not large and the average carbureter is made or adjusted to feed its mixture in a manner conforming with this fact. These relatively small valves act as brakes on the motor power, by strangling the flow of gases, long before the highest motor speed is reached. Now, if the driver wants to speed up and opens his throttle accordingly, he frequently opens it more than necessary for getting the speed he wants and thereby sets the motor to work partly against itself. This source of waste occurs practically only with motors of old design and small power or motors equipped with a governor not properly co-ordinated with the throttle.

In using the brake for stopping the vehicle on every occasion when the throttle might better be resorted to for slowing up gradually a considerable waste of fuel is incurred in the aggregate, some of the wasted fuel slopping over from the fuel jet.

Poor compression in the motor is a prolific source of waste by reducing the power obtained at a given position of the throttle. Many motors are tight when cold but leak compression when hot, a condition most frequently due to poor lubricating oil. It may be recognized most readily by observing the breather tube. If visible grayish gas is discharged from it a piston leak may be inferred, even though none is noticed in cranking the motor. Valve leaks and all other leaks in the economy of the motor are in the same class of causes.

Clutches which slip a little all the time, without it being noticed as a rule, and neglected lubrication throughout the mechanical working parts of the vehicle are often forgotten as possible causes of fuel waste when a car owner notices that his gasoline bills are running higher than they used to or higher than those of his neighbor who perhaps has a similar car and a similar carbureter.—From *Automobil-Welt,* October 11 and 18.

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Reflector System for Lamps—A new German construction is shown in Fig. 1. It is one of the industrial upshots of that practical manufacture of near-quartz glass which is already assuming considerable proportions, in so far as a similar design with ordinary glass in the small auxiliary reflector scarcely would be practicable owing to the proximity of the flame. The heat in conjunction with unavoidable irregular cooling from air currents would color and crack it, while the near-quartz, as it might appropriately be called, shares with pure quartz its indifference to heat and heat-changes in a large measure. Its expansion and contraction are almost nil, and it has been claimed that its mechanical strength has been made equal to that of glass lately. The same material is used for the one-piece face crystal of the lamp. The two reflectors are backed with silver. With a diameter of 25 centimeters (10 inches), not counting the rim portion covered under the metal flange, the large reflector which is always behind the flame has a focus of only 9 centimeters, and will thus send out a compact bundle of light rays when the flame is placed within this distance, while the percentage of light received directly from the flame is increased in proportion to its nearness. The small reflector intercepts only the least valuable of the reflected rays, viz., those striking the main reflector at nearly right angles, and, on the other hand, adds much to the total volume of light emitted by throwing an inverted image of the other side of the flame back into the main reflector, which thus practically receives light from two flames. If it is now desired to remove the strong glare, out of consideration for traffic coming in the opposite direction, or if it is wanted to send light out at a wide angle so as to illuminate a sharp curve, the small reflector is turned right about by means of a Bowden wire connection to the driver's seat and takes the position as shown at the right side in Fig. 1 and in dotted lines in the central drawing of the same, in which it cuts off all rays from the flame to the large reflector. The light now comes from the small reflector only and the rays from it are highly divergent, as indicated by the drawing, while throwing a strong light over a wide scope of the ground immediately in front of

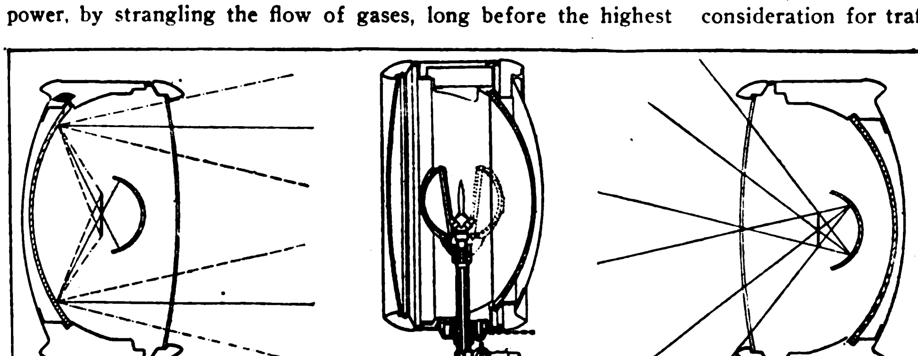

Fig. 1.—German searchlight acetylene lamp with reversible auxiliary reflector to kill glare and light turns of road

the vehicle. The central crossing of rays kills the glare straight ahead. Different effects may be obtained by having the axes of the two lamps which are ordinarily carried on a vehicle either slightly divergent or parallel or slightly converging, the latter arrangement giving a very strong illumination of the middle of the road by overlapping of rays. This reflector system is intended for use with an acetylene light source and gives the best results with dissolved acetylene and a two-jet burner. When an acetylene gas generator is used, the gas pressure is liable to vary considerably—with the small care ordinarily given to generators by the average driver—and this variation affects the quality and volume of the reflected light detrimentally. For use with a generator a single-jet burner is found most suitable. The gas consumption for a lamp of 10-inch diameter is about 25 liters per hour.—From *Zeitschrift d. M. M. Vereins*, Sept. 30.

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HEAVY or Light Motor Buses—As very few motor buses for public traffic have been built in the United States while they have been in general use in France and England since 1907, it appears likely that the type of construction which has been developed in one of these countries will be taken as a model whenever a project for the establishment of motor bus lines shall have reached the point of actually impending realization in America, and it becomes interesting to note that the heavy type of omnibus used in Paris, for example, is not looked upon with undivided approval, but that on the contrary several important shortcomings are charged against it, although nothing better to take its place has so far been developed in practice.

Mr. Contet presents in *La Technique Automobile* the characteristics of this type which is used in two varieties, one the Schneider-Brillié and the other designed and made at the Dion-Bouton works. The motors are placed under the driver's seat to reduce the wheel base. They have four cylinders in three different dimensions: 125 by 140, with a maximum speed of 900 revolutions, 115 by 140 turning at 1,050 revolutions and 120 by 130 (the Dion vehicle), the latter also of what is now termed slow motor speed like the others. The compression was originally 4.75 kilograms per square centimeter, but this was reduced to 3.6 kilograms. The cooling is by thermo system and Solex centrifugal air-pump radiator which gives complete satisfaction. The drive is by shaft to the differential and from the differential shafts by small pinions to spurwheels secured upon the driving wheels. The driving thrust was at first transmitted by rigid rods of pressed steel, but these vibrated enormously and now the thrust goes through the main leaves of the rear springs alone, with perfectly satisfactory results. The fuel first used in 1906 and 1907 was carburetted alcohol, which proved too expensive. Subsequently benzol was adopted and the consumption of this fuel has been gradually reduced to 50 liters per 100 kilometers. The vehicle seats from 28 to 34 passengers.

The defects of this type have largely to do with its weight. The chassis for the 34-passenger vehicle weighs 4,400 kilograms, the body 1,600 kilograms, making a total for the empty vehicle of 6 tons and with passengers considerably more than 8 tons. The double-deckers were still heavier. As a result of this weight the macadamized streets where the buses pass with some frequency are rapidly deteriorated, and the inhabitants of apartment houses on the stone-paved streets complain of the trembling and shaking of the houses caused by this traffic. In several instances damages have been legally collected from the omnibus company on this account.

To ease the steering of the vehicles it has been necessary to use a very low steering gear ratio, rendering necessary a large movement of the steering wheel and resulting in veritable gymnastics by the drivers, to which new drivers have to become accustomed before a vehicle can be entrusted to them. As the streets where the buses mostly travel are naturally—in other cities than Paris—the narrow ones where street car tracks are objectionable, the presence of vehicles measuring 7.5 meters in length and 2 to 2.3 meters in width is fraught with many inconveniences.

With a view to remedying these defects it may be considered, says Mr. Contet, if the development which has taken place in motor construction since the time when the heavy type of bus was first placed in commission does not now justify a radical departure from the principles which were then laid down and which have dominated this branch of automobile construction ever since.

The progress made involves, for example, that motors of high speed and high compression and generally of a power and fuel efficiency far superior to that of the motors still used in the buses can now be made quite as durable as the older type. Especially with benzol as the fuel, the high compression of modern motors would lead to much smaller consumption than 50 liters for 100 kilometers, the combustion would be more perfect and considerable money now spent for removing carbon deposits in the bus motors—a feature which has been blamed upon the benzol—would be avoided.

By using a high-speed motor it will be possible to reduce considerably the weight of all the mechanical organs which share in this high speed. Altogether a lighter type of vehicle seems to suggest itself as practicable the moment it is assumed, in accordance with facts which have by this time been abundantly verified, that a motor of the modern light design will resist the wear and tear of the traffic. A vehicle with 20 to 25 seats should probably be the largest size. It should not weigh more than 5,000 kilograms fully loaded. Such a vehicle, in order to scale an incline of 8 degrees at 8 kilometers per hour would require power equal to 14 horsepowers and, figuring with a loss of 50 per cent. in the transmission, it would be safe to specify a motor of 30 horsepowers, which may now be built with cylinders of 85 millimeters (3.4 inches) bore and 40 millimeters (5.6 inches) stroke with a compression of 6 kilograms and a maximum speed reduced by a governor to 1,500 revolutions. Such a motor would not have to work hard except on the inclines, and could be operated with three gear speeds.—From *Technique Automobile*, October 15.

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FIRE Engine Features—Among the numerous fire engines with centrifugal pumps which are turned out at German automobile factories one made at the Benz-Gaggenau works recently attracted attention at a local exhibition in Dusseldorf and at competitive trials arranged for a convention of fire departments in Rhenish Prussia and Westphalia. The four-cylinder motor gives 52 horsepowers at 800 revolutions per minute, 63 at 1,000 revolutions and 75 at 1,200 and drives a centrifugal pump with four disks made by Ehrhardt & Sehmer. Geared to 1,700 revolutions per minute this pump discharges 2,000 liters (528 gallons) at a manometer pressure of 100 meters, which is taken to indicate that the pump will deliver this quantity at a height of 100 meters if the water is led to this altitude within the hose. At the trials the height of the throw from nozzles of 25 millimeters (1 inch) diameter was 40 to 45 meters with a manometer pressure of 11 atmospheres (110 meters), and with nozzles of 30 millimeters diameter a height of 50 meters was reached by a pressure of 13 atmospheres.—From *Allgemeine Automobil-Zeitung*, September 27.

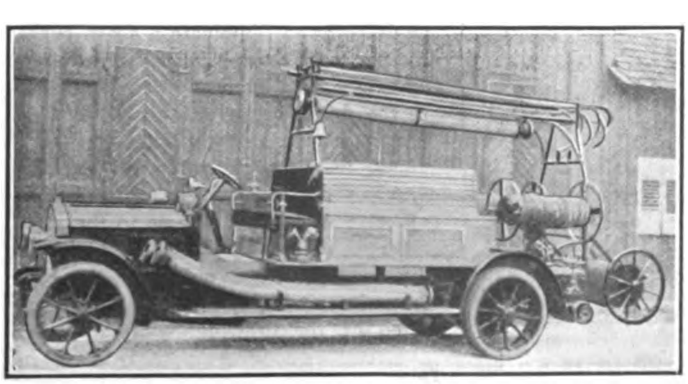


Fig. 2.—New German fire engine with quadruple centrifugal pump

Recording Cost of Trucks

Why Exact Records Are Required To Utilize Few Trucks on an Efficient Basis

One or Two Simple Forms Help in the Establishment of Standards of Maintenance Cost

WHILE systematic recording of the work done by motor trucks has shown that these vehicles if utilized to their full capacity are always more economical than if the same work were done by horses, the statement is frequently heard from the users of single commercial vehicles that these do not pay. By this latter profound expression the owner means to say that the expense of his motor deliveries is too high in proportion to the work accomplished. It has been shown over and over again. however, that if such cases exist the fault is not with the automobile but with the people handling it. Cost of upkeep is a most elastic figure, and seems to be influenced by these factors:

(a) Direct expense for fuel, oil, tires and repair parts;

(b) Wages of driver, helper and mechanic, where the labor of a skilled man has to be called upon to keep the car tuned up;

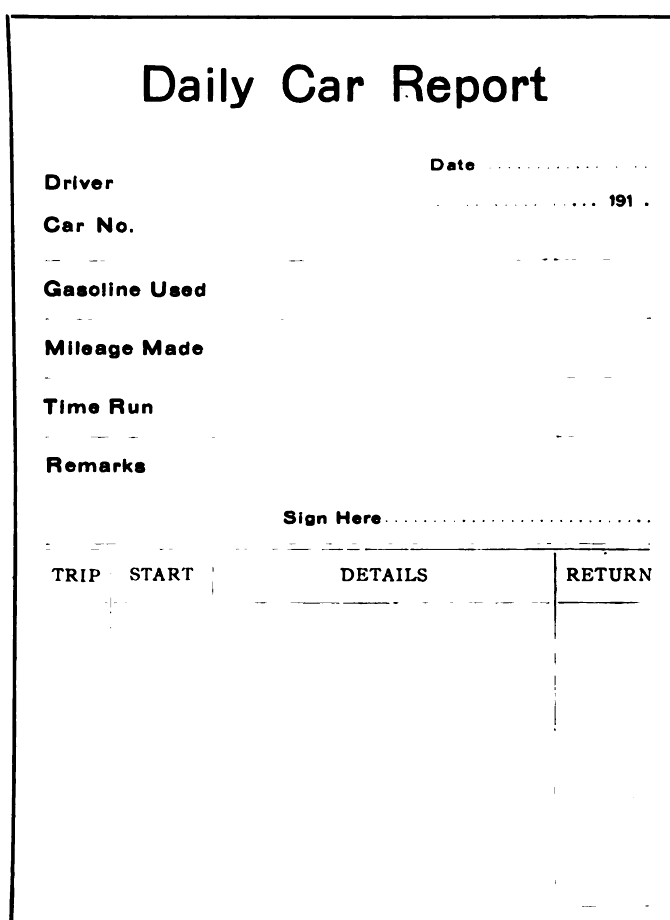
(c) Work accomplished, that is weight carried for a number of miles in a number of hours, as compensation for the expenditures incurred.

If the user of a single freight automobile who claims that it does not do more efficient and economical service than horse teams consuming the same amount of money will keep a detailed record of the cost and work of his vehicle, he will in every case be able to locate a cause for the high-priced maintenance of the vehicle, a cause which may be eliminated. It may be that the truck is not running one-third of the time while out on deliveries, which of course greatly reduces its value, or increases its operating cost; or perhaps the driver does not treat the truck as it should be treated, so that waste of fuel, frequent replacement of tires and necessity of repairs of the mechanism result. By keeping a record of the work done by the truck every day and the fuel consumed thereby, two principal factors of upkeep are determined, and by further records repairs, tires and lubricants used may be kept track of. As soon as a sufficient number of records are at hand, the owner should approach the dealer who furnished him with the car, show him his records and invite suggestions as to reduction of upkeep expense. In the majority of cases the dealer, when confronted with the records of 2 or 3 months' operation, will be able to propose a solution of the user's problem within a few minutes or will come to his assistance in some other way, so that finally the standard of expenditure is reduced. This is part of the service the dealer owes to his customers.

A form which is proposed to be used by the user of one or two trucks is shown in Fig. 1. In practice the form, which is to be printed on thin cardboard, may be made as deep as necessary to permit of recording all the deliveries made by a truck in a day. The form is started when the truck leaves the garage or store in the morning, the time of starting being entered together with the number of the trip, in this case, one. Under details the names of the companies or individuals called on by the truck are recorded, and in this way the record may simultaneously be used as a general receipt, if the owner desires to use a blank somewhat wider and accommodating a column for the receiver's signature. When the truck returns to the store, the time of its arrival is marked on the form, and the second trip with its starting time are also recorded, and so on, until the working day is over. The important records of the gasoline consumed by the truck during the day, of the mileage traveled and the running time, giving the hours and minutes the truck was actually moving on the road, are entered on the upper portion of the form and serve as the most valuable part of the records. Under remarks, extraordinary delays, mishaps, etc., find their place. By printing the reverse side of the form with the four columns, like the face side, the space of the blank may be considerably increased, and a greater amount of actual work may be recorded on a blank without enlarging its size.

A similar blank which is not shown here and which serves for summing up all the records made in a month will help the owner to gain a concrete idea of how his truck costs were composed in that space of time. This sheet has spaces for recording the total amounts of gasoline, cylinder oil, transmission and differential grease, tires, and spare parts used, with a possibility of giving a detailed record of the latter item. Furthermore the total number of miles run during the month and the total number of running hours are noted on this sheet, as well as the following facts which are readily calculated from the records: average speed, consumption of fuel and lubricant per mile, total cost of upkeep per mile, and, if possible, fuel and tire cost per ton-mile.

In some cases the dealer may not be able to inform the user of what standards of expenditure may be expected in the maintenance of a truck, and in this case the best thing to do is to address the factory, or nearest selling branch of the manufacturer. It happens very frequently that the owner considers his case absolutely singular and original, and therefore may be inclined to believe that he cannot expect good advice from outsiders. But it is a fact that the cases of trucks which do not pay may be classed under a few types, according to the variables which enter into the cost of truck upkeep, and which are enumerated above. Upon addressing competent experts in truck operation ninety-nine out of 100 owners find that their case is typical and easily to solve.



Daily Car Report

Driver

Date .... 191 .

Car No.

Gasoline Used

Mileage Made

Time Run

Remarks

Sign Here ....

TRIP	START	DETAILS	RETURN

Fig. 1—Blank which is proposed for keeping track of the operating cost for a single-truck owner

Foreign Constructions Designs and Practices

Working Conditions Should Be Brought Into Consideration in Testing Steels for Constructional Purposes

High Temperature, Heavy Load and Shock to Be Sustained Often Overlooked by Engineers in Selecting Material

STEEL for automatic construction is not, as a rule, tested under the identical conditions of the use to which it is to be put in subsequent practice.

Testing plants are needed where the test conditions will closely approximate practical running conditions of the car. But these tests have always been difficult to make. Some of the methods take too much time that it is often preferable and productive of more good to proceed by rule-of-thumb and after acquiring the necessary experience follow the beaten path.

If the general importance of testing materials under conditions akin to practical use is sufficiently appreciated, it will suffice here to review some of the processes which appear to be good in view of the facts and the general need. **If steel is to be subjected to temperature changes during service, that the steel should be tested under identical conditions of temperature change is advocated.**

The necessity for adequate testing of materials covers a wide range of activity, especially as engineering work is so close to the unknown that it must be regarded as uncertain. Take, for illustration, a fine specimen of a boiler plate; it is tested cold, at the temperature of the surrounding air, but it is subjected, not only to high temperatures, but a too wide temperature variation in practice. What, but uncertainty, attends the life of the boiler? It is not in temperature change alone that uncertainty rests. It is said that good steel for a bridge structure must have its sulphur and phosphorus constituents down to 0.04 per cent. If the steel is to be used as framework for a building, however, these constituents may be even above 0.06 per cent. In this allowable variation between bridges and buildings, so far as sulphur and phosphorus in steel are concerned due notice is taken of the effects of these constituents on steel, but when it comes to automobiles do we continue to differentiate? No! Why not? It requires absolutely no argument to show that steel is subjected to a far greater difference in shock as between automobile and bridge use than between bridge and building use.

In building work while the load is considered live it is not the same serious live load as the members of a bridge must labor under. In consequence, a lower factor of safety, as it is called, is used in the building structure than in the bridge. It is also the practice to use poorer steel in the building than in the bridge. In a word, while the general physical properties of the two steels may be quite the same, the sulphur and phosphorus contents will differ as stated.

Do engineers make due allowance for the effects of additional shock? No! On the contrary they reduce the factor of safety and demand no better steel than that which is used in bridge construction work so far as sulphur and phosphorus are concerned.

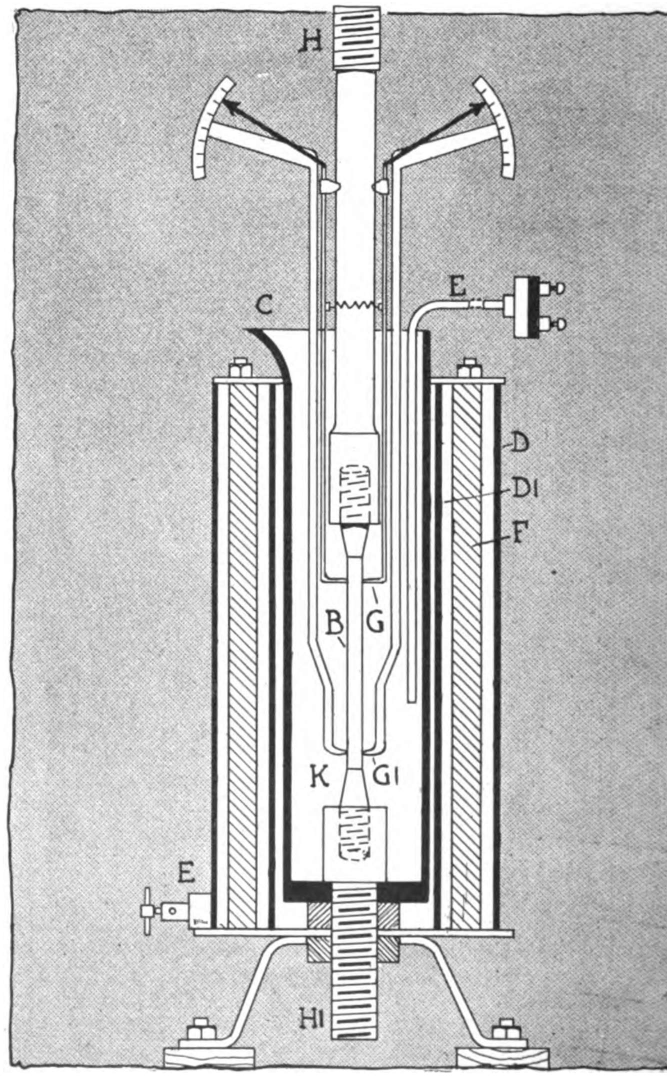


Fig. 1—Section of Steel Testing Machine in the Krupp laboratory at Essen, Germany, employed to test steels at high temperatures

The parts designated are: B, vertical specimen bar to be tested; H, top holder for specimen, and HI, bottom holder for same; G and GI, top and bottom gauges for test specimen; C, crucible for test, and K, salts used in crucible to generate necessary heat; D, is outer shell; DI, inner shell; F, spacer between shells; and E, necessary electrodes.

Fig. 1, a section of a testing machine used in the Krupp plant at Esseu-Ruhr, Germany, for testing steel at high temperatures, proves that steel makers of the first class fully appreciate the need of just such tests. In this example the specimen of **the steel to be tested is adjusted to the holders in the usual way, excepting that a special form of crucible filled with barium or other salts is provided, and an instrument of precision is fitted to the whole in order to observe**

the elastic limit of the steel when the temperature is raised to the desired point.

The temperature is raised due to the melting of the barium or other salts in the crucible, an electric current being used, with electrodes fitted in the crucible for the purpose. In order to keep the molten salts in the crucible, it not only stands vertically, but the bottom holder, which must pass through the bottom of the crucible, is provided with a suitable packing for the joint. **The crucible and its fittings, adjusted and related as indicated, go into a testing machine for the pull to be exerted, but this pull is only sufficient to determine the elastic limit of the steel at the desired temperature.** Boiler plates, for instance, are tested at a dull red heat. Other materials are tested at the temperatures at which they are required to do practical service.

Referring now to shock tests, remembering that it is of no great value to know the conventional physical properties of automobile steel if the shock resistance qualities are not known, it will suffice for the purpose here to show one method which is quick, accurate, and capable of being worked by the regular force of men in any ordinary plant.

The shock test sanctioned and advocated by the German Union for the testing of materials is the one referred to here. The test bar is of rectangular section, 30 by 30 millimeters, with a distance of 120 millimeters between supports. The test bar is notched to the center, Fig. 2.

The Charpy pendulum testing apparatus is used to make the shock test using the test bar of the size mentioned and advocated by the German Union. The head H, Fig. 2, on the free end of the pendulum strikes its blow against the test bar B, fair in the plane of the notch N, with sufficient force to rupture the test bar. It remains merely to note the force in kilogram-meters or foot-pounds required to rupture the test bar. This information is given direct by means of a registering device fitted to the Charby pendulum apparatus.

That there is a great and serious variation in the shock ability of different steels is quickly told by the use of this apparatus. That the conventional physical properties, as they are usually given, is a fair index of the quality of a given steel for a purpose is far from the truth. But this should not be wondered at. It is well understood that both good and bad steel may come from the same chemical composition. It is also understood that good and bad steel may come from the same heat, and it is even possible to get good and bad steel from different sections of the same bar.

The great point, under the circumstances, is to know as much about the steel to be used as possible. It is sound to say that nothing of great value is known unless the shock test is made as well as tests for conventional physical properties as tensile strength, elastic limit, elongation and contraction of area of the test bar. But if there is to be a display of ignorance about steel used in automobile construction, if the user is to accept the steel maker's grading of the fabric, the shock test as here referred to should not be disregarded. A bad piece of steel can never get by in the shock test—its presence will be proclaimed. A good piece of steel will always be known by its shock-resisting qualities.

Then, too, if steel must be heat-treated, the dangers are great when poor steel is used, and these dangers are too great to be ignored even when good steel is used. **But the shock test will find trouble if the heat-treatment given a grade of steel is inadequate for the need, and, since these shock tests may be quickly made, it is easy enough to conduct a few experiments for the purpose of determining the best heat treatment for a given grade of steel.**

In order to show just about the reasonable expectation from the use of steel for automobile purposes taking the Charby shock test as the index of quality, a few tests of Krupp steel are here given, Table A.

In the steels mentioned the shock-resisting qualities vary between 361 foot-pounds per square inch and 1,987 foot-pounds. This wide range of shock values by the Charby test shows in the face of the fact that, in these steels the sulphur and phosphorus constituents range as low as 0.013 and keep below 0.028 per cent. in the poorest of these products.

It will be seen under these circumstances, that shock-resisting qualities in steel, while these qualities depend upon low sulphur and phosphorus for initial results, are variable over a wide range on other counts.

Before stating the reasons for the variations noted, it is necessary to observe that, for dependable results, and, in order to be able to predict the approximations of variation, the sulphur and phosphorus constituents must be suppressed as they are in these steels.

Referring now to the steels reported, the product E. 120 O shows the highest shock-resisting qualities, namely 1,987 foot-pounds per square inch, against 1,245 foot-pounds for E. F. 60 O. This is in the face of the fact that the E. F. 60 O is the finest grade of chrome-nickel steel, whereas the product E. 120 O is a cementing, case-hardening, nickel steel.

It is in the chemical composition of these steels that search must be made for the reason of the difference. The carbon content is 0.10 to 0.15 in the E. 120 O, nickel steel, but the carbon constituent is 0.20 to 0.25 in the E. F. 60 O chrome nickel steel.

The hardening effect of carbon is well understood. It is fair to expect that shock-resisting qualities will decrease as the steel is hardened by addition of carbon. The nickel content happens to be the same in both of these grades of steel. It holds at from 4.40 to 4.50 per cent. The effect of nickel, as such, must be the same in both specimens. If it is not possible to account in any other way for just the difference in shock-resisting qualities observed, it must not be forgotten that the E. F. 60 O steel holds 1.60 per cent. of chromium, whereas the E. 120 O steel is barren of chromium.

Examining the steel F. 48 O., which is higher in carbon and in chromium that E. F. 60 O steel, and devoid of nickel

TABLE A—KRUPP STEEL SHOCK TESTS

Brand	Pounds Per Square Inch, E. L.	Pounds Per Square Inch, T. S.	Per Cent. Elongation In Inches	Per Cent. Reduction of Oven	Shock Test Foot, Pound per Square Inch
E. F. 60 O. highest grade of chrome nickel steel	103,835	119,482	22.7	67	1,245
E. F. 34 O. grade of chrome nickel steel	102,413	127,020	20.7	60	1,006
F. 48 O. finest grade of chrome steel for structural purposes	105,248	132,000	16.7	58	772
E. 120 O. finest grade of nickel steel for case hardening	61,163	84,206	31	70	1,987
A. 7 J. finest grade of carbon steel for structural purposes	51,226	81,788	27.3	65	555
A. 9 J. special grade of carbon steel for use in crankshafts	66,853	105,685	17.7	60	361
C. 46 O. special steel for side frames of automobiles	88,047	113,792	23.5	65	900

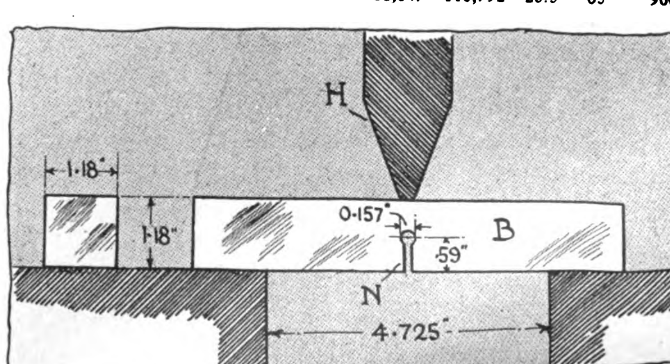


Fig. 2—Diagram showing size of test bar B and conditions surrounding tests of steels in Krupp laboratory for shock-resisting properties using the Charby pendulum apparatus

it will be seen that the shock resisting qualities fall to 772 foot-pounds per square inch. This reduction of shock ability is due first to the increase in carbon, second to the considerable chromium content, and third the absence of nickel, which element is present in the steel used in the comparison.

It might be said that nickel is superior to chromium, that carbon is detrimental and should be suppressed, and that increasing the number of the elements used adds materially to the uncertainties, but the statement if made would only be true from one angle of observation.

The fine grade of carbon steel A. 9. J., which is a steel for crankshafts, hence high in carbon but having no chromium or nickel, has shock-resisting qualities down to 361 foot-pounds per square inch, and in the face of the fact that this is a high value for carbon steel, only to be realized when the metalloids are low and the steel is well fabricated. It is evident that shock-resisting power reaches a low ebb in the absence of chromium or nickel if the carbon content is increased in order to get hardness for bearing purposes and strength to resist torsion, as in this example.

Were it possible to do without hardness for bearing purposes, lowering the carbon, all other things equal, would give the result of A. 7. J., increasing the shock-resisting power of the steel from 361 foot-pounds to 555 foot-pounds. But the addition of about 2.00 of chromium to the higher carbon steel brings the shock resistance up to 772 foot-pounds. Then lowering both carbon and chromium a little and adding 4.40 to 4.50 per cent. of nickel raises the shock-resistance to 1,245 foot-pounds, as the table shows, or, by lowering the carbon to the minimum and eliminating chromium the 4.40 to 4.50 per cent. of nickel in the steel affords almost the extreme of ductility, and, in this case at any rate, the shock-resisting qualities go up accordingly, reaching the high level of 1,987 foot-pounds. **The only way apparent at the moment to get higher shock-resisting qualities lies in the increase in the nickel constituent, but this idea cannot be extended beyond 6 per cent. of nickel, without changing the characteristics of the steel, so that its use for purposes here referred to becomes out of the question.**

There are practical reasons why it may not be desirable to take advantage of the very high shock-resisting qualities of E. 120 O, nickel steel, excepting for certain exacting undertakings resorting to the process of cementation to realize hardness of surface. In the same way, choice may fall upon A 9 J. carbon steel with its relatively low shock-resisting qualities, but it would be fatal to either of these undertakings were a steel substituted, one with an excess of sulphur or phosphorus, for then, instead of the definite values here given for shock-resisting qualities, great uncertainty would creep in, excepting that a much lower shock-resisting power would be assured.

Constructional Features Acquit Driver

The peculiar case of a German automobilist who was acquitted of violation of a local anti-smoke ordinance has been closed recently, and special interest attaches to the case, as the decision in favor of the defendant was brought about by constructional features of the vehicle involved. The driver of the vehicle, on June 13, 1912, passed through the village of Vohwinkel and his car developed intense smoke and an odious smell, and on June 26 he was sentenced to pay a fine of 5 marks ($1.25). The driver appealed against this decision and demanded that the case be taken into court, he having been sentenced by the police authorities. When questioned before the general sessions, the defendant admitted that on the day in question his car had for some time emitted large quantities of smoke and an evil odor; but at the same time he maintained that he could not avert these nuisances, due to the peculiar construction of the machine. On June 13, he said, he drove down a steep hill into Vohwinkel, and it was necessary for him to have the motor clutched to the transmission with the low gear in mesh, to produce the needed braking effect on the hill. As the motor must not give any power impulses, he could not give it any gas, but the automatic lubricating system continued to supply the cylinders with oil which was stored in the combustion chambers. As soon as the truck arrived on level ground, he gave the motor gas and the cylinders, beginning to work, burned the considerable quantities of oil which had accumulated during the travel down-hill, thereby giving rise to smoke and odor production. This statement of the defendant regarding the impossibility to avert the nuisances with which he was charged was corroborated by a technical expert under oath, whereupon the court found that it had been impossible for the driver to prevent his car from producing the smoke and smell. The defendant was then acquitted of the charge and the state was charged with the cost of the proceedings. This course of the events was, to a large extent, due to the skill of the lawyer representing the defendant, who proved very capable in obtaining the material evidence and the corroboration of the expert, upon which the defendant was acquitted.

Double-Disk Truck Wheel

How to make wheels for trucks so well that they will survive the evils of service without using rubber for tires is the problem which is being struggled with abroad. Fig. 3 shows, in part section, a plan that is being considered. The disks of steel look like a cone clutch, so far as shape is concerned, as it is used to transmit power from a motor to gearbox. These clutch faces press against the bevels of the wooden felloe. The steel tire is shrunk over the wood felloe and the steel discs are bolted to flanges of the hub and also held against each other near the felloe by a series of bolts. Resiliency is secured both by the inherent qualities of the metal and by the mounting of the felloe which is wedge-like in form. The wedge formation of the felloe will put a decided tension on the bolts which connect the two steel disks and therefore they are closely spaced as may be seen in the illustration.

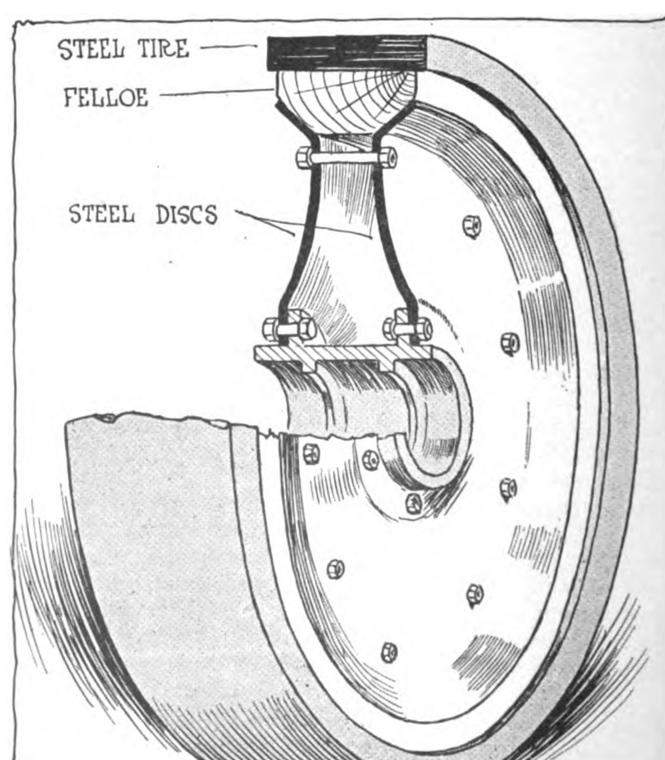


Fig. 3—Sectional view of double-disk truck wheel designed to obviate necessity for rubber truck tires

The Engineers' Forum

Autogenous Welding May Be Made a Boon to the Repairman as Well as to the Manufacturer

M. Keith Dunham Comments on Mr. Tucker's Article in The Automobile *for October 17, on European Welding Practice.*

BOSTON, MASS.—Editor The Automobile:—In the issue of The Automobile for October 17, the article on Welding, European Methods and Uses, by Mr. Tucker, is extremely interesting and Mr. Tucker shows familiarity with his subject. Especially to the manufacturer the article is of more interest than to the repairman. While the English language is supposedly the same, we in Yankee Land certainly do have a different method of expression than our cousin across the water, and a repairman, unless he has studied welding carefully, will find the article by Mr. Tucker shooting over his head.

Autogenous welding is one of the most simple things possible to understand; used in its most common form with oxygen and acetylene there is a heat of approximately 6,300 degrees Fahrenheit concentrated in a fine point. With this heat any of the commercial metals may be united merely by fusing together the edges (which are butted) and filling in the depression made by any butt weld with a stick or a rod of the same material. Ofttimes a repairman, on first seeing the process, confuses this feeding-in rod with solder, inasmuch as the rod flows freely under the flame. There is no comparison, of course, with solder, as the parts are thoroughly fused together and made homogeneous.

Mr. Tucker states in his heading Autogenous Welding System that in practice a proportion of four volumes of acetylene to five of oxygen gives better results than the theoretical two volumes of acetylene to five of oxygen. The best authorities in this country agree that the proportions of oxygen and acetylene are chemically fixed and to produce a neutral welding flame the consumption of gases will be approximately the same in any torch. On a pressure type blowpipe there is no question that the flame is more easily kept neutral than in an injector type. Any intelligent workman, after a 15-minute explanation, can readily adjust a well-made torch so that his proportions of oxygen and acetylene are correct, or, in other words, so that he has a neutral welding flame.

In this section of the country, and to a large extent the same holds true throughout the United States, the trend of the times is toward the use of safety-storage acetylene rather than generators, especially where there is only repair work to be done. In nine repair shops in the city of Boston devoted to repairs and manufacturing by the oxy-acetylene process, eight use safety-storage acetylene.

Every automobilist is familiar with safety-storage acetylene: to him it is commonly known as Prest-O-Lite or Searchlight gas and the ordinary tank for this purpose has 40 cubic feet; larger tanks are made, however, for welding purposes, but they are built upon the same principle and simply contain more gas than the automobile tanks.

Oxygen throughout the country is supplied by the manufacturers in loaned cylinders, so that a repairman wishing to take advantage of a high temperature flame to weld a chassis, for instance, needs the proper reducing valves, torch, horse and connections, and he can connect to an automobile lighting tank and his oxygen cylinder and with the flame weld the break together in position. Figuring the highest possible cost of gases in this section of the country they could not exceed $2 for a job of this character, so that Mr. Tucker's claim that the safety-storage system is expensive will not be admitted by repairmen in this country.

The use of the tank system in England may be impractical, but in the United States the rapid development of the acetylene companies, manufacturing gas and selling it by this system, is conclusive proof that it is thoroughly practical.

Automobile parts, as a rule, are costly enough so that the price of the gas in a repair job is not an item. If the gas costs 50 cents by the generator method to weld an automobile cylinder, the tank system does not prohibit the automobile repairman from using it merely because the gas in this way would cost 75 cents on salvaging an article worth at least $15 and he can well afford to spend $1 on the cost of raw materials and supplies.

The chief thing for the repairman to remember is that with the safety-storage system of acetylene and the use of high pressure oxygen in cylinders there is no care whatever with his apparatus and it is ready for use when he wants it merely by opening a valve and when he closes the valve the gas does not deteriorate and the outfit is ready any time for an emergency. With the generator system considerable care is required and a large investment necessary, which to the ordinary repairman is almost prohibitive.

The garage with a welding outfit as a part of its shop equipment will always find plenty of uses for it, have the reputation of getting its customers out of trouble quickly and thoroughly and will add materially to its income—M. Keith Dunham, general manager Waterhouse Welding Company.

The Use of Mathematics by Engineers

In an editorial article on this subject *Engineering*, of London, recalls some remarks once made by Rankine in accounting for the disrepute in which mathematics had fallen among practical engineers, to the effect that any theory of engineering, to be worthy of the name, must take cognizance of the whole of the facts and factors concerned, and not merely of those which it is possible to put into mathematical form. By sinning against this rule, the mathematics advanced in each case become subject to contempt exactly in the measure as too much is claimed for them. Every practical engineer knows indeed far more than it is possible for him to formulate in equations. Bit by bit, as experience accumulates, certain of these factors become amenable to mathematical methods, but in the initial stages of a novel development good guesswork is almost the only guide on which the practical engineer can rely. There is, however, unquestionably an immense mass of data pigeon-holed uselessly in the archives of manufacturers simply because the mathematical knowledge required for analyzing these records effectively is not possessed or applied by the technical staff. Much would be gained if such data were brought to public notice.

The Interchangeable Body

Used Mainly by Moderately Wealthy, as Very Rich Can Afford Separate Machines--Superfluous for Others

INTERCHANGEABLE bodies for automobiles so that the car can be kept in service the year around are a subject that interests the industry from a variety of angles. Save for the concerns dealing in very small cars handled in New York, every company asserts that a greater or less proportion of its customers use more than one body on a single chassis.

In the case of the Peerless, for instance, the proportion is said to run as high as 50 per cent. In the Cadillac experience it is 40 per cent. In other cases it runs about 15 per cent., according to statements gleaned from sales managers, but the majority is lower and the average of all the estimates would be not more than 10 per cent.

Definite figures are more difficult to obtain than even the sales managers think, for so many factors enter into the proposition that at best the figures given by the companies themselves are little better than guess work.

The business in extra bodies is not increasing, according to the generally expressed opinion along the row. The reason for that conclusion is double-headed, and is as follows: The man who can afford to purchase an expensive car, can also afford to own a supplementary automobile. Thus, the wealthy motorist may own a powerful, costly touring car for use 6 or 8 months in the year and an inclosed car for winter use. The man of moderate means who has an automobile may feel that he can not afford the extra car, but the same reason would lead him away from the idea of using an extra body. With the very wealthy no useful purpose is served and with the man of moderate means no solution to the problem is presented by the extra body.

Thus the use of the interchangeable body is limtied in its scope and extent to a few lines. The limousine is growing in demand for year round service by the class of buyers who use automobiles from the necessities of their station in life. With this class the limousine, having a large carrying capacity and equipped with a motor larger than that used in the average town car, is a favorite. The class referred to has plenty of money, but its members are not rated as very wealthy. The multi-millionaire class is equipped with a variety of automobiles for various seasons and uses. In neither of the above-mentioned classes is there any appreciable call for interchangeable bodies.

The moderately wealthy class is where the interchangeable body has its greatest use. The man who can spend $5,000 a year on the operation of his car is the one who presents the most fertile field for extra bodies. He must have a chauffeur, for the owner who drives hardly fancies running a town car or even a limousine and after deducting the chauffeur's pay, the appropriation of $5,000 would hardly warrant the ownership of two cars.

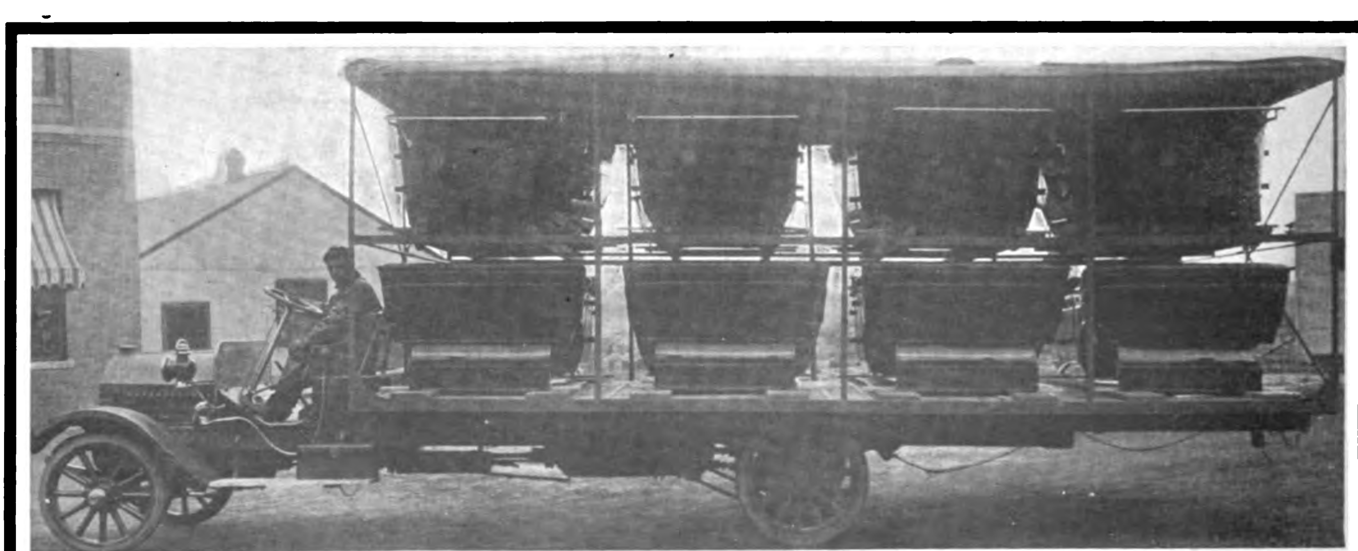
The man of comfortable means who owns a car uses it for pleasure in very large proportion and drives himself. There is only a small market for extra bodies in such cases and practically none at all where the expenses of running the car itself represent all the man can afford to pay for automobiling.

Nevertheless the business constitutes a factor in the automobile industry and there are probably 5,000 automobiles in New York and its immediately contiguous territory which use an extra body. In the great establishments of the body-builders in and about New York there are storage facilities for 2,000 bodies. The remainder are kept in public and private garages, barns and even attics. Fewer customers in proportion to the total number who own extra bodies had the change made from one type to the other in 1911 than they did in 1910. This indicates that they have added to their automobile equipment, rendering the change unnecessary or that they are using the enclosed type more freely in summer than heretofore. Approximate figures show that of the stored bodies about 70 per cent. are for touring cars. Whether this percentage is carried out is uncertain in the absence of a detailed canvass among the thousands of owners.

Novel Way of Transporting Bodies

The R-C-H Corporation, Detroit, Mich., uses a special type of truck for the transportation of bodies between the body factory and the assembling plant. The truck is here illustrated and has a wheelbase of 196 inches and an overall length of 21 feet, the body being 10 feet, 6 inches wide and 8 feet, 10 inches high. This gives space for the superimposed arrangement of two rows of four R-C-H touring car bodies each, or of 11 roadster bodies, each of which is crated in an individual compartment. The peculiar construction of the body which is specially adapted for its purpose, gives the truck a side appearance not unlike the front of an aeroplane. The vehicle makes four or five trips a day, each of which is 16 miles, and travels at a rate of 12 miles an hour.

It is easily seen that the use of this single freight automobile for body transportation greatly facilitates the handling of this part of car equipment.



Special truck used by the R-C-H Corporation, Detroit, Mich., for carrying bodies from the body factory to the assembling plant

Monster Gotham Garage

Remodeled Boarding Stable Has 60,000 Square Feet of Floor Space and Storing Capacity for 300 Automobiles

ONE of the largest garages in New York City, in which at times 300 cars are housed and where automobiles pass the door sometimes at the rate of one a minute, has been developed from a huge boarding stable. This is the Joscelyn garage, 120 West Fifty-second street, which is described below, in order to illustrate the possibilities of creating a modern garage out of a stable.

As the accompanying floor plan shows, the three-story building which is 200 by 100 feet, with the longer side facing the street, is divided into three portions, the last compartment to the right being still used as a boarding stable by the former owner of the building. The garage building proper consists of three sections divided by two fire-walls into a right and left storage place on each floor, while a central space accommodates the elevator, the entrance on the ground floor and the chauffeurs' rooms on the two floors above, while on the top floor this central space is also devoted to the garage work.

Caring for Chauffeurs' Comfort

The floor plan while illustrating the arrangement of elevator and wash rack, which of course is the same for all floors, illustrates the street floor especially, on which the entrance if formed between the two middle fire walls, and the superintendent's office located adjacent to it. The locations of patrons' telephone and checker's office are also shown and attention is called to the fact that the checker is situated in a wooden box some 15 feet above the floor. This arrangement has been illustrated on page 482, THE AUTOMOBILE, of September 5. Next to the telephone booth there is a small stairway which winds up to the chauffeurs' rooms on the two floors above. The floor above the street level contains the chauffeurs' barber shop and billiard room, while on the next floor facilities for reading and writing have been provided.

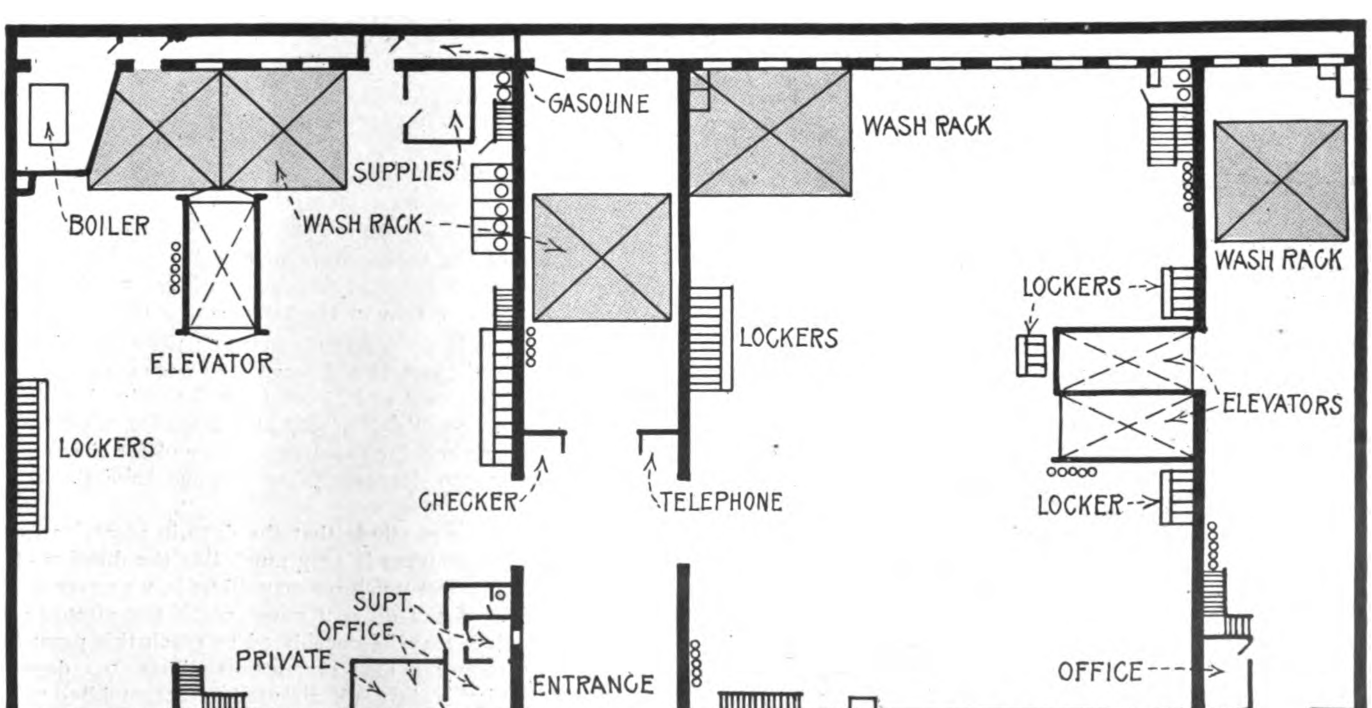
A rigid system of storing cars and accessories has been evolved at this garage. It is controlled by the chauffeurs themselves, and ordinarily, has nothing to do with the garage management. Each chauffeur is given two lockers, one for keeping his spare tires, etc., and one for his clothes. As to the car storage system, the entire garage has been divided into individual spaces of equal size which are capable of accommodating a car of any dimension. Each car always uses the same space. The cars are arranged along the walls, whereby a passageway in the middle portion of each floor compartment is left free. The lockers which are also arranged along the walls, are located as shown in the plan.

To prevent all interference in the system of operating the lockers, each locker is fitted with a single key, this being given to the chauffeur, while a master key is kept in the office of the superintendent. This permits of opening the locker for the chauffeur in case of his losing or misplacing his own key.

While the garage does not operate a repair or supply department, it furnishes its patrons with supplies by means of the following system. If a client is in need of a part or material, the garage undertakes to send an order to the dealer who handles the required goods, and after delivering it to the patron, charges it to him on his monthly bill. A supply room on the ground floor serves for the storage of accessories left by transient clients for a short time.

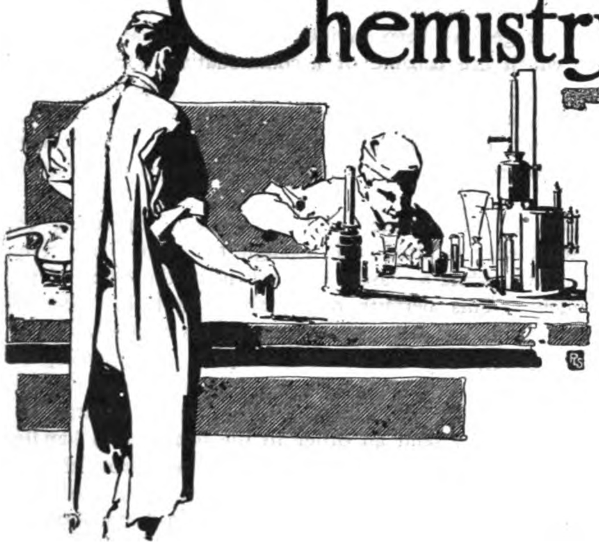
As above stated, the capacity of the garage is 300 cars, but at present only about 190 are kept there, these requiring the services of about 100 men, part of whom work in day time and part in the night. In addition to the facilities named before, there are others that a garage with so large a clientèle cannot do without. An efficient steam-heating system is installed throughout the buildings, the steam being conducted in long, coiled pipes along the walls, which are brick-covered, thereby providing a better heat insulating medium than concrete would. The appliances for fire prevention and protection are in accordance with the orders of the city fire department, and they include sand pails and chemical extinguishers. The illumination, in addition to daylight entering through tall windows, is by incandescent lights, principally drop lights, which so far seem to present the most efficient means for garage lighting.

All the equipment has been designed or rather installed with the special purposes of garage work in view, and it can only be said that the men in charge of the enterprise have solved their problem in an excellent manner.



Floor plan of Joscelyn garage which was constructed by adapting a large boarding stable for the specific requirements of automobiles

The Chemistry of Cylinder Oils



Viscosity of the Oil Does Not Affect the Thoroughness of Engine Cylinder Lubrication

Part II

Being the second of a series of articles on cylinder oils which will appear from week to week. Discussions are invited and the columns of THE AUTOMOBILE *are open to pertinent criticisms.*

By W. Jones

IN the twenty samples of cylinder oils which we have so far tested it is shown that **the viscosity has no relation to the specific gravity, nor does the carbonizable carbon depend upon this in the least.** We therefore consider that **the specific gravity will not have much, if any, value in determining which of a number of oils would be likely to give the best results in practical use in the engine.**

The viscosity, however, is of somewhat more importance, the carbon figure appearing to more nearly follow the viscosity, although it does not do so entirely. We would, therefore, give more consideration to the viscosity on this account, and also to a certain extent for the lubricating value of the oil.

It is generally considered that the viscosity of an oil largely affects its lubricating value. That the thicker the oil is, the better lubricant we have; that such an oil would tend to keep the two wearing surfaces apart better than a thin oil. That that would be the case under some conditions, undoubtedly is true; but it would not necessarily be the case under all conditions. For instance, if we wish to lubricate a very heavy shaft, it is frequently considered to be necessary to use a very heavy or thick oil, so as to help bear up the shaft, and prevent its weight from pressing through the film of oil which keeps the two surfaces apart. Now, if this shaft was moving only slowly, this argument would have some weight. But if the shaft is to revolve rapidly, a much thinner oil could be substituted to advantage, as it would be found that the thinner oil would be carried under the shaft much more easily than the thicker, and would therefore preserve the film more effectively.

Then again, we must consider the effect of heat on the viscosity of the oil, even if it should be found that a thick oil, or high viscosity, would give us the **best effect. We must consider not the oil as it is in the can, but the oil as it is in use, at the temperature of the engine or shafting, as the case may be.**

There does not appear to be any **very good law for the drop in viscosity, except perhaps at the lower temperatures; but when we come to the higher temperatures, such as we have in automobile cylinders, the viscosity of an oil could only be determined by actual test, and tests at such temperatures would be very difficult, if not impossible, to make.** We can, however, make such tests up to **500 degrees Fahrenheit** without much difficulty. In our **list of twenty oils** published in last week's issue we find **that while we have** viscosities from 1.7647 to 18.6071 at 80 **degrees Fahrenheit;** at the temperature of 212 degrees Fa**hrenheit we find that** this difference **has been very much reduced, and that these two extreme cases now stand at 1.1428 and 2, showing that** they not only have both **dropped, but that the higher the viscosity is at the low temperature the more quickly it drops, and this we find to be the case generally throughout the list.**

If we should attempt to formulate a law based on these figures we would find that these oils would all pass the unity mark at temperatures between about 250 degrees Fahrenheit and 400 degrees Fahrenheit. This we do not find to be the case. No. 1867, Table A1, being the lowest viscosity at 80 degrees Fahrenheit, is 1.7647; at 212 degrees Fahrenheit it is 1.1428, and at 350 degrees Fahrenheit we still have a viscosity of 1.0357, while theoretically it should reach unity at about 280 degrees Fahrenheit.

Again in No. 1870, which at 80 degrees Fahrenheit is 6.1764, at 212 is 1.4285, and at 350 degrees Fahrenheit we have the same figure, 1.0357. This oil should pass unity at about 270 degrees Fahrenheit. Now, taking the other extreme in No. 1896e at 80 degrees Fahrenheit we have 18,6071; at 212 degrees Fahrenheit we have 2.; at 350 degrees Fahrenheit we have 1.1071; at 400 degrees Fahrenheit we have 1.0714; and at 500 degrees Fahrenheit we have 1.0357.

If we should attempt to calculate the drop on this oil from the drop between 80 degrees Fahrenheit and 212 degrees Fahrenheit, we might expect it to pass unity at about 250 degrees Fahrenheit. This shows that all the laws on the subject are not of much use.

We notice that in these three oils we have arrived at the same figure, but at different temperatures. In the first two we got there at the temperature of 350 degrees Fahrenheit, while in the last we only got there at 500 degrees Fahrenheit. We also notice here that at the temperature of 350 degrees Fahrenheit there is no difference between the two first oils, while in the third there is a difference of 0.0714, or between 1.0357 for the first two and 1.1071 for the third. Again, we see in the first two oils, No. 1867 and No. 1870, we have at 80 degrees Fahrenheit for the first 1.7647, and for the second 6.1764, while at 350 degrees Fahrenheit we have the same figure, 1.0357.

From all this we conclude that the drop in viscosity from low to high temperatures is very much like the dilution of a solution, that however much we may dilute it, we never reach pure water. That the oil will never reach the viscosity of water, although it may be considered to reach this point for all practical purposes at temperatures above 500 degrees Fahrenheit, and therefore all oils used in automobile engine cylinders have practically the same viscosity in the cylinder when in operation. That it makes little or no difference as far as the viscosity is concerned, if we use No. 1867 with a viscosity of 1.7647, or No. 1870, with a viscosity of 6.1764 The lubrication in the cylinders would be, as far as the viscosity is concerned, the same.

After this consideration of the viscosity bearing on the the lubrication value of the oil, we would naturally look at the list from a different standpoint than before. We now can see why the oil No. 1867, at the top of the list, has given such universal satisfaction. We would now be more likely to select an oil with a low viscosity figure. We should not, however, depend entirely upon this one test, for, as we have already noted, the carbon figure does not entirely follow the viscosity, therefore the carbon figure should always be taken into account.

There are also some other determinations to be considered, such as the acidity and the effect of these acids on the metal of the cylinder. These subjects will be taken up later.

Volatility of Petroleum Distillates

NOTHING leads to more exact knowledge of the indefinite character of petroleum compounds than the information which comes during the process of making flash and fire tests. These hydrocarbon compounds of the methane paraffin series are only indefinite, however, in their proportions of carbon and hydrogen. Confining the discussion to refined hydrocarbon products, **it is a fair inference that the compositions of the products are substantially limited to fractions composed of carbon and hydrogen, with but mere traces of other elements, unless, on occasions, it will be found that a small content of oxygen will be present in the mixtures.**

In conducting flash tests, the flash point depends largely upon the rate of the heating of the liquid. The equipment used for this purpose consists merely of a small pan or dish partly filled with sand, with a royal Berlin porcelain dish about 2.75 inches in diameter and 1 inch deep, resting upon and slightly bedded in the sand, in which the liquid to be tested is placed. Heat is applied to the under side of the protecting pan by means of a gas flame from a Bunsen burner, and a thermometer is so placed that the mercury bulb rests in the center of the porcelain dish, so held in place by any suitable means, as a frame, that the bulb of the thermometer will be submerged in the liquid, but it is not permitted to contact with the bottom of the porcelain dish. **Provision must be made to apply flame to the surface of the liquid to be tested; this may be done by lighting the end of a length of fine string or coarse thread; but a needle flame from a gas burner, with a rubber hose connection, is better.** Flash test apparatus is stock among dealers in laboratory equipment.

In dealing with hydrocarbon liquids, when it is desired to conduct flash tests, a sufficient knowledge of the characteristics of the liquid is usually available to enable the tester to make a surmise of the probability, thus saving a long exploration. But if the heat applied is at a rapid rate the flash point will be found at a relatively low temperature. If the heat is applied at a very gradual rate the flash point will be determined at a relatively high temperature. And these differences will be noted for all of the hydrocarbon liquids.

The reason why the flash test affords different temperatures depending upon the rate of the application of the heat is that the constituent fractions of the liquid are not all of the same volatility. If, for illustration, a sample of 150 degrees Fahrenheit fire test petroleum is taken, even though it proves to be of this quality, the fact remains that the flash point can be developed at a temperature considerably lower than it should be for a 150-degree Fahrenheit fire test petroleum product; it is a mere matter of urging the heat. If the heat is urged, the more volatile constituents will be evaporated fast enough to evolve enough vapor to support a flash. If the heat is applied at a very gradual rate the more volatile constituents will be evolved at such a slow rate that they will float away in the air, never affording a sufficient presence of vapor to make a flashing mixture.

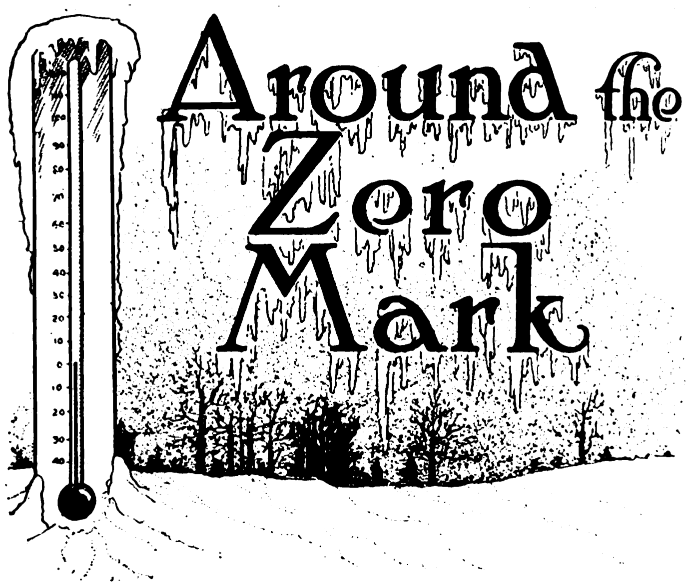
The lower the flash point of the liquid, the greater will be the difficulty of conducting a proper test. This is partly on account of the restriction in the range of the temperature; but, for the most part, it is due to larger proportions of the more volatile fractions of the petroleum in the mixture. Unless the heating is done with care at a slow and gradual rate, if the liquid is of the lighter fractions of the petroleum, the flash point and the burning point will merge. It will be understood, of course, that the only difference between the flash point and the fire point of a liquid lies in the fact that with a mere flash combustion is not supported; the fire point, on the other hand, represents the temperature at which combustion is supported. It is not out of place to infer, from what has already been said, that if the liquid is a close fraction distilled within a narrow range of the temperature the flash point and the fire points will be close together. Heating at a rapid rate, since it produces a considerable volume of the more volatile constituents of the liquid, promotes the merging of the flash point and the fire point, due to the considerable amount of the heat of the subsequent flashing, thereby releasing enough of heat to promote a burning temperature in the body of the liquid. Frequent flashing also has the same effect.

The rate of the heating of the liquid, under the circumstances, must be uniformly maintained for tests of this sort; otherwise the readings, both for the flash and the fire test, will be so variable in their character that the comparison of tests will be for naught. It is the practice in some laboratories to raise the heat at a rate of 15 degrees Fahrenheit per minute; this is for all petroleum products which have a fire test of 300 degrees Fahrenheit or over.

TABLE A1—ANALYSES OF AUTOMOBILE CYLINDER OILS—BY W. JONES

No.	Specific Gravity	Specific Viscosity at 80° F.	Specific Viscosity at 212° F.	Carbon per cent	Flash Point °F.	Fire Point °F.	Specific Viscosity at 350°F.	Acidity	Mgs. Iron Loss per 100cc Oil	Sulphuric Acid%
1867	0.8684	1.7647	1.1428	0.30	325	358	1.0357	.00294	0	0
1868	0.8984	3.2353	1.3214	0.70	384	432	.....	.00441	2.66	0
1869	0.8992	4.1764	1.3571	0.75	404	460	.....	.00588	2.00	0
1870	0.8948	6.1764	1.4285	1.03	422	474	1.0357	.00490	1.33	0
1890/a	0.8755	5.7657	1.4285	0.80	458	504	.....	.....	0	0
1890/b	0.8651	3.8571	1.3035	0.72	448	510	.....	.....	1.33	0
1894/a	0.8985	3.5714	1.2857	0.95	408	454	.....	.....	1.33	0
1894/b	0.9103	4.4643	1.2500	1.70	428	474	.....	.....	2.00	0
1896/a	0.8860	2.2500	1.3214	0.65	420	476	.....	.00249	0	0
1896/b	0.8866	3.6428	1.2500	1.00	424	476	.....	.....	0	0
1896/c	0.8868	4.6071	1.4285	1.10	428	478	.....	.....	2.66	0
1896/d	0.8874	6.3214	1.4285	1.10	428	490	.....	.....	2.66	0
1896/e	0.8976	18.6071	2.0000	2.35	454	526	*1.1071	.00441	0	0
1897	0.8747	3.8571	1.4285	0.44	438	494	.....	.00294	0	0
1914/a	0.8953	5.1428	1.2857	0.52	412	464	.....	.....	1.33	0
1914/b	0.8756	4.1085	1.3571	0.70	434	490	.....	.01029	3.33	.0324
1914/c	0.8801	7.5353	1.5357	0.93	450	506	.....	.....	3.33	.0223
1934	0.8705	3.3928	1.2143	0.55	440	494	.....	.....	0	0
1935	0.8777	3.5714	1.2500	0.78	438	486	.....	.....	0	0
1936	0.8738	3.5714	1.2500	0.53	442	494	.....	.01225	4.00	.0286

*At 400° F., 1.0714; at 500° F., 1.0357.



Experiences of an Automobilist in Cold Weather Which Bring Out the Importance of Proper Safety Measures

By Barry NacNutt

Readers of The Automobile *are invited to submit accounts of cold-weather experiences and criticisms of those appearing in these columns.*

SOUTH BETHLEHEM, PA., Nov. 4—In the past 2 or 3 years, the practice of driving automobiles the year around has become more and more general and I think there are now but few owners of cars who lay them up during winter weather. There is no question, however, but that there are difficulties met with in winter which do not obtain during the summer months and the following experiences relate most of the difficulties that I have had in operating my car in cold weather. With the exception of the tire trouble, all of my difficulties may be obviated and I hope that those who drive cars under similar conditions may profit by my experiences.

For 2 or 3 years I have kept my car in a garage which is heated by hot water and therefore have done away with one of the most trying annoyances that the man who takes care of his own car has to encounter. Nothing is more uncomfortable than to work around a car with the thermometer in the garage well under freezing, and never is it more exasperating to attempt to start a cold engine than in the morning when one is in a hurry to get to his office.

But unfortunately I am compelled to leave my car standing outside for 3 or 4 hours, morning and afternoon, in an exposed position and it is this exposure of the car to the cold which has caused most of my difficulties.

With the thermometer below 15 degrees and the engine cold, I find it almost impossible to start the car using the ordinary grade of gasoline, about 65 degrees Baumé. I have flooded the carbureter, injected raw gasoline into the cylinders, etc., but with no result. A friend of mine has compounded a mixture of hydrocarbons of very low boiling point which I have found will start the car satisfactorily at all but extremely low temperatures, it being only necessary to inject about a teaspoonful of the mixture into each cylinder. When the temperature has been in the neighborhood of 10 degrees below zero, I have found that I could only start the car by using gas, either illuminating gas or acetylene gas from the tank, allowing the gas to flow into the intake and running the engine until it had warmed up sufficiently to produce the necessary vaporization of the gasoline.

On one occasion I was unable to obtain any gasoline flow from the tank to the carbureter. The car was hauled to the garage and upon investigation I found that the feed pipe had become clogged with ice. This was explained by the fact that in the earlier part of the day there had been a severe sleet storm. The filler cap on the gasoline tank, which is exposed, had lost its gasket and undoubtedly enough water had leaked into the gasoline tank to cause the trouble.

For some years I have used a solution of denatured alcohol in water in the radiator during the winter weather. This I have found entirely satisfactory, the solution being non-corrosive and inexpensive, 5 gallons of denatured alcohol sufficing for two seasons.

A very peculiar thing happened once during last winter. After starting the engine and running the car for about 15 minutes, I found the engine becoming very hot and soon traced the trouble to lack of circulation of the cooling water. Upon investigation I found that the cooling water had frozen in the form of slush in the pump preventing its action, and yet the solution in the radiator was unfrozen. This was evidently due to the fact that the solution at the pump was weaker in alcohol than that in the radiator, but I am unable to account for this effect. This experience was not repeated during the winter and it would be interesting to know if other automobilists have noticed this phenomenon of a partial separation of the alcohol from the water in one part of the circulating system.

Another difficulty that I have encountered is the lowering of the E. M. F. of the dry cells used for ignition. This lowering of the E. M. F. of the dry cells by reduction of temperature is only serious when three-quarters of the life of a dry cell has been exhausted. Under these conditions, a dry cell which will give a sufficiently high E. M. F. at ordinary temperatures is practically worthless at a temperature around zero. The lowering of the E. M. F. of a storage cell is not so marked as that of a dry cell, but there is danger in the use of storage cells of the electrolyte freezing, the freezing point of the solution of sulphuric acid used in a storage cell being about 10 degrees Centigrade.

I think that few drivers realize the great danger that exists in running an automobile engine in a confined space where there is not a large amount of fresh air to mix with the exhaust gases. I knew, of course, of the danger from inhaling carbon monoxide but did not have brought home to me the very small amount of this gas necessary to produce a toxic effect until I had had the following experience. I was tuning up the carbureter, running the engine with the car in the garage, and had left one of the large entrance doors open about a foot and also had the side door of the garage open. I happened to be standing in such a position that the draft blew the exhaust gases past me. In 5 minutes I began to feel dizzy and, realizing the trouble, hastily left the garage and got into fresh air. But for 3 hours I was very sick with the symptomatic nausea and headache of carbon monoxide poisoning. One may be sure that since then I leave the doors of the garage wide open when it is necessary to run the engine while in the garage.

Carbon Monoxide in the Muffler

Of course, if the carbureter is properly adjusted the amount of carbon monoxide in the exhaust of a gasoline engine is very small, provided the gas does not come in contact with hot carbon which reduces the carbon dioxide to carbon monoxide. As the muffler of an automobile engine is always more or less foul with soot and as this soot becomes highly heated by the exhaust, there is reason to suppose that under these conditions quite a large amount of carbon dioxide is reduced to carbon monoxide and so, even with a well adjusted carbureter, there must be a fairly large production of carbon monoxide in the muffler.

The fact that rubber becomes hard and inelastic at low temperatures is, of course, well known, and I frequently notice an in-elasticity of the horn bulb on very cold days, the bulb taking a long time to regain its normal shape after having been squeezed. It is fortunate that during the coldest weather there is usually a good layer of snow on the ground which covers up the sharp stones in the roads; for one can see that, as the

Among the New Books

Works Which Have Recently Appeared That Should Appeal to Automobilists as Well as Those in the Industry

CARE AND OPERATION OF AUTOMOBILES. By Morris A. Hall, American Society of Mechanical Engineers. Published by the American School of Correspondence, Chicago, Ill. 140 9 1-2 by 6 1-2-inch pages, with 69 illustrations. Cloth, $1.40.

The author has intended this work for the private owner who desires to take care of his own car and thus minimize the expenses of its upkeep. The book is divided into two sections, the first deals with private garages and the repairs which may be safely undertaken by the amateur; the second treats of the automobile itself and includes instructions on the proper management of the car as well as its construction. There is nothing complicated or technical about the style in which the author gives his information, the book being made purposely elementary throughout. The private owner who is not an automobile expert will find much that is useful knowledge in its pages.

GASOLINE ENGINES, THEIR OPERATION, USE AND CARE. By A. Hyatt Verrill. Published by The Norman W. Henley Publishing Company, New York City. 320 5 by 7 1-2-inch pages, with 150 illustrations. Cloth, $1.50.

As a comparative study of the different devices used in the gas engine this work should be of value to the student although in some parts the author has neglected to take into consideration the steps made in recent years. This is notably the case in speaking of automatic intake valves of which mechanical errors we have seen the last. In this connection he states that "several excellent motors utilize this system." A few pages further on, however, he gives an excellent and detailed description of the Knight sleeve valve as well as of some of the more advanced types of rotary valve. The rudimentary principles are carefully studied and while the book may not be recommended for the advanced student or one who has followed the industry from day to day, it should prove a satisfactory text book for the beginner.

ENERGY AND VOLTAGE DIAGRAMS OF LARGE GAS ENGINES; THEIR USE AND LAYOUT. By Paul L. Joslyn. Published by The Gas Engine Publishing Company, Cincinnati, O. 70 pages, with numerous diagrams and tables. Cloth, $2.

The designer of large gas engines has to consider many things which on small engines are often left to be worked out after the engine has been built in its first form. With small engines, it is not so expensive or so difficult to change some points, and it frequently happens that very radical changes in construction are so effected. But with the engine of several thousand horsepower, it is impossible to do this. So far as can be done, everything must be worked out in advance. Castings and machine work run into a large amount of money on engines working on blast furnace gas, and to scrap a cylinder or a bed casting because some change is found necessary may amount to several thousands of dollars in initial expense, manufacturing cost, delays, etc. In this book, the author gives the methods of laying out energy and velocity diagrams for large engines operating on blast furnace, producer or natural gas, with instructions as to their use, etc. The data given is the result of actual designing of this character on some of the largest engines built in America and Europe and will be found of advantage to the designer working on engines of this character.

SCARBOROUGH'S ROAD MAP AND MOTOR GUIDE OF MINNESOTA. Published for and under the auspices of the Minnesota Automobile Association. 872 pages, with complete maps. Heavy paper, $1.00.

More than 550 routes are mapped and outlined in this folder and the automobilist of Minnesota, Iowa, Wisconsin or Missouri should consider one of these route books as part of his necessary equipment if he intends to do any extensive touring about his home or neighboring states.

THE GASOLINE AUTOMOBILE. By Victor Lougheed, member S. A. E., and Morris A. Hall, member American Society of Mechanical Engineers. Published by the American School of Correspondence, Chicago, Ill. 307 6 1-2 by 9 1-2-inch pages, with numerous halftone and zinc engravings. Cloth, $2.50.

Divided into three distinct parts this book forms a complete text or reference book for the study of the modern automobile. As distinguished from the standard work on gas engines it includes a section which is devoted to the explanation of the different types of bodies found on the modern car while the garage question is also thoroughly analyzed both from the standpoint of the public and the private garage. The authors have made a successful attempt to get away from the stereotyped form of automobile book illustrations. Actual sketches and reproductions made from photographs of cars in actual use at the present day are used in place of the oftentimes impossible pen-and-ink sketch. Among the interesting and valuable chapters are those devoted to the driving and the repair of the pleasure automobile.

DAS AUTOMOBIL, SEIN BAU UND SEIN BETRIEB—A handbook for automobile owners by Diploma-Engineer Freiherr von Löw. Second revised edition, 1912, with 363 illustrations. Published by C. W. Kreidel Publishing Co., Wiesbaden, Germany. Price 6 Mark ($1.50).

For those who read German this book is of especial value because the author does not only understand his subject practically and theoretically, but also possesses the gift of picking out the essentials and presenting them in plain and lucid language. He knows all the steps in the evolution of automobile design and the reasons for the changes which have taken place from time to time. The style is very brief and meaty, and even readers well versed in the subject will not fail to find valuable sidelights when looking up matters of special interest to themselves. The illustrations are specially drawn and very clear, each of them serving a definite purpose in the presentation of a fact or an idea. A book of similar qualities in English would be of unusual merit as an aid to teachers in the automobile schools.

FARM GAS ENGINES. By H. R. Brate. Published by The Gas Engine Publishing Company, Cincinnati, Ohio. 195 5 by 7-inch pages, with line cut illustrations. Cloth, $1.00.

There are some excellent points on the carburetion and ignition of gas engines in this work which apply not only to farm engines but to any piece of motor driven apparatus. The remarks on the carburetion of kerosene are especially timely in view of the world-wide protest against the rise in the price of the more volatile petroleum products. In fact the title of this work is far narrower in scope than are the contents and it can be perused with great interest by any one interested in gasoline engines.

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elasticity of the rubber is greatly reduced by the cold, cuts and subsequent blowouts would be of frequent occurrence.

I have tried various non-skidding devices but have found that chains are the only satisfactory arrangements to prevent slipping on muddy roads or roads covered with snow and ice. Steel studs in casings themselves, or in protective coverings, soon wear down and then become worse than useless. Even when new, the space between the studs becomes filled with snow which melts under the pressure of the wheel and then freezes, producing a slippery coating of ice on the tire which is very dangerous. In slimy mud, this sort of non-skid device is useless.

If one drives his automobile with care, serious skidding need never occur under any conditions; but I have found that in order to produce the necessary traction between the rear wheels and the road, it is imperative to use a non-skid device, and, as above stated, chains are the only satisfactory solution of the problem. If the chains are put on the wheels loosely enough to creep, the extra wear on the tires caused by them is inappreciable.

Drive Pinion Should Mesh Correctly; Fibre Disks Have Long Life; Causes of Transmission Trouble; Ether Costs Too Much for General Use; Cost of Laying Up Car; Use of Anti-Freezing Solutions; Ordering a Definite Spiral Spring

Drive Pinion Meshes Improperly

EDITOR THE AUTOMOBILE:—I am having trouble with noisy differential bevel gears. I have adjusted the small pinion forward but it only prevents gears from humming for a short time. I removed axle housing and found that gears were apparently in perfect condition. Ball bearings on differential are adjustable in either direction. I have been told by good authority to move differential to one side, bringing gears a trifle out of mesh, while another equally good authority tells me to put them into mesh still deeper.

Any advice that you can give me will be appreciated.

Plymouth, Mich. SUBSCRIBER.

—If the gears are in good condition and have not worn away a simple adjustment will cure the noise of which you complain. As may be seen in Fig. 2, there are three ways in which the pinion can mesh with the large differential gear. It can be too far forward or back and it can be in correct mesh. It is evident that the direction in which the pinion is too be moved depends on how it is now in mesh with the large bevel wheel. Should the pinion be too deeply engaged move it back, and vice-versa. You will also find an adjustment on the large wheel which will enable you to move it more closely toward the pinion. When the proper mesh is secured there will be practically no noise so long as the parts are kept lubricated with grease or non-fluid oil.

Fiber Disks Will Stand Wear

Editor THE AUTOMOBILE:—I have a 1908 50-horsepower Rainier which I want to overhaul during the cold weather. As means of quieting valve stem taps I thought of cutting out the screw bolts that lift valve and filling in with fiber when operating fiber would strike valve stem instead of steel. How long would fiber last after first adjustment? If it would stand the tapping or lifting up on valve for 2,000 miles and then need adjustment, I would not object to adjusting the screw bolts then, but if it did not last long it would not be worth while.

2. What can be done to quiet noisy timing gears? Mine are oiled from oiler, three pipes leading to top of timing gears and the oil dropping on them lubricates. Would grease, if used, run into motor through front bearing and cause gumming up of motor?

New York City. GEORGE RUDY.

—1. These fiber disks are used on many cars and the adjustments are not required more frequently than with the metal-to-metal contact, while there is undoubtedly a marked diminution in the amount of noise. They will run 25,000 miles before requiring renewal and will not require adjustment more than every 2,000 miles.

2. The only thing that will quiet noisy timing gears is packing them in grease. This has the drawback that you state: namely, the grease is apt to work its way through into the crankcase of the motor and as a result will gum the latter up in a short time. When timing gears become very noisy it is a sign of wear and a new gear should be inserted.

Transmission Trouble Causes

Editor THE AUTOMOBILE:—I am driving a certain car in which the second gear became worn out after very slight service. A friend has an old model of the same make in which he has transmission trouble frequently. We are wondering if part of this is not owing to the placing of transmission and differential on back axle with inadequate support. Is it not better practice to place transmission further forward on the frame?

Odel, Neb. CHAS. N. HINDS.

—There are so many good cars which have not the slightest trouble that have the gearset mounted in conjunction with the rear axle that it can hardly be stated that this system is not so good as that in which the gearset is mounted amidships. Where the bracing is insufficient, however, to prevent changes in the alignment of the gears the trouble you mention is sure to materialize. In the models of the last few years in all the cars which are mounting the gearset aft of the propeller shaft, there has been a tendency toward stiffening the structure at the rear end of the frame. It is not likely that transmission has suffered because it has been placed near the rear axle, but because the material was softer than it should have been.

Ether As an Aid to Combustion

Editor THE AUTOMOBILE:—The quality of gasoline that I am using is very poor. Ether has been recommended to increase power. Will you kindly inform me through THE AUTOMOBILE the quantity of ether to use to gallon of gasoline?

Sacketts Harbor, N. Y. L. W. DAY.

—It would be highly impractical to attempt to use ether continuously to offset the bad effects of poor gasoline. There are many physcicians who make a practice of priming with ten drops of anaesthetic through each priming cup in very cold weather after the car has been standing. Last winter a certain physician made some experiments in the line of adding ether to the gasoline in the tank and came to the conclusion that he got better results when he added about 1-2 ounce of ether to each 10 gallons of gasoline. Anaesthetic ether is expensive, and hence it is impractical for the motorist to use it continuously. Commercial ether contains a certain percentage of water which would more than likely render it unfit for use in the motor cylinder.

Average Cost of Repairs

Editor THE AUTOMOBILE:—Would you please let me have some information on the following: What is the probable cost of overhauling a four-cylinder motor car? What is a reasonable amount to pay for a set of valves ground; also for timing valves and magneto?

Newark, N. J. A CAR OWNER.

—Overhauling the motor will, of course, include the valve timing, etc., and the cost of this will to a large degree vary with the repairs which are necessary. Many people let their motor go without a general overhauling until it gets in such a condition that it cannot work satisfactorily, while others who are wiser either have this work done or do it themselves once every year if the car is run all year round or once every two seasons if the car is laid up in the winter. Assuming the average case where the motor is overhauled every other year, the cost for the average type of 30-horsepower four-cylinder motor would be about $50, figuring on an average of 66 hours work at a labor charge of 75 cents an hour. If any extra parts are needed this would, of course, be extra and should the bearings be badly worn the time would be longer. To grind the valve and time them and the magneto, would be the work of one day of 10 hours, the cost would be $7.50 ordinarily. In some of the more inaccessible motors the cost would run above this, while in others it would run below. This is about the average charge to be expected.

Denatured Alcohol Evaporates

Editor THE AUTOMOBILE:—Since the use of anti-freezing radiator solutions is now necessary, I would like a little information concerning the use of denatured alcohol for this purpose. I have filled by Overland cooling system with half alcohol and half water, which I understand is safe for temperatures down to minus 25 degrees Fahrenheit, but since alcohol evaporates faster than water, the question is, will I always have half alcohol and half water in the cooling system, provided I use the same solution in replacing that which evaporates, or will such a large portion of the alcohol evaporate that my solution will eventually become nearly all water and thus be unsafe as an anti-freezing liquid?

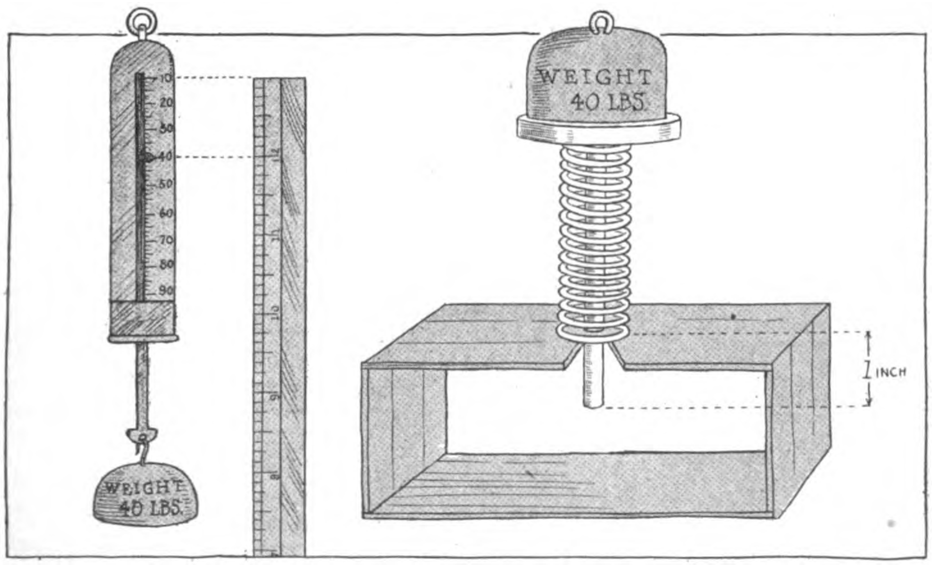


Fig. 1—A 40-pound-to-the-inch spring will compress 1 inch under a 40-pound weight

2. How can I tell what proportion of alcohol and what of water I have in the cooling system?

3. Some time ago one of your correspondents asked some pertinent questions regarding five-cylinder, four-cycle motors with cranks set 72 degrees apart. THE AUTOMOBILE replied that information regarding such an engine was rather scanty and asked its subscribers for a discussion of the subject, but as yet I have not noticed any article throwing light on the matter. I for one would like to know just why such a motor could not be built to operate successfully. The explosions in a five-cylinder motor would overlap each other so as to produce a continuous torque the same as in a six, and since five cylinders would weigh less and require a shorter crankshaft and shorter hood with less complication generally, I fail to understand why such an engine is not manufactured and used instead of the heavy, long, complicated and expensive six-cylinder motors so much in vogue at the present time. I would be pleased to have the opinion of some gas engine designer regarding the above.

East Canaan, Conn. D. C. CANFIELD.

—1. On pages 839 and 840 of the issue of THE AUTOMOBILE for October 24 there is a full discussion of all the non-freezing solutions, which includes an answer to questions 1 and 2. It may be stated, however, that the evaporation will occur and that the condition of the solution in the radiator may be determined by the specific gravity. The specific gravity of the correct solution is noted and the mixture is kept at this specific gravity by the addition of more denatured alcohol every time a marked evaporation is detected. The specific gravity is determined by a hydrometer.

2. This question is answered under above reply.

3. No discussion has developed on the five-cylinder motor for the probable reason that it has not been tried to such an extent that any one knows anything concrete about it. THE AUTOMOBILE, in the issue of September 12, published the opinion of Mr. Herman Dock on this subject. Mr. Dock at one time was manufacturer of such a motor and his views may be taken with full confidence by the investigator and at the same time with the feeling that they are given by one who is an authority on the subject. He said, in part: "I believe the only reason why this type of motor is not being built is because its merits have not been investigated, for, in my judgment, which the performance of a motor of this type will bear out, there is nothing in the line that will equal them unless it be a seven cylinder.

"In one or two instances wherein I tried to interest automobile manufacturers in this engine I was met with the argument 'that the public were satisfied with the four or six, therefore, why the use of improving?'

"In a five-cylinder engine there is nothing to invent, but I did, I believe, build the first one of its class in Philadelphia in 1901. Since then in connection with the concern which had the contract I built the government field searchlight engine and others and wherever they have been put in commission they give satisfaction.

"For automobile use they are much superior to the four or six as the shaft is in constant torque, one cylinder being always in pressure, and the machines in which I have ridden with the five cylinders are the best hill-climbers of any.

"As to balancing, this class of engines was a surprise, for while I was building the first one many interested engineers saw it and the general opinion of all was that it would be so out of balance as to be worthless.

"But, as a matter of fact, it is the quietest, smoothest engine I have found and more flexible by far than its four- or six-cylinder brother.

"Finally it is my belief that whenever some enterprising manu-

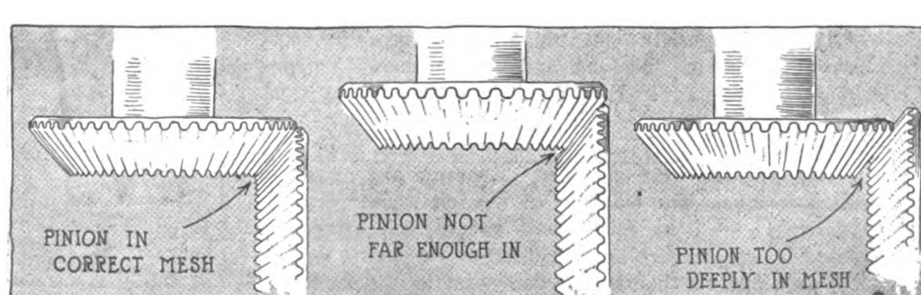


Fig. 2—Diagram showing how pinion can be too deeply or not deeply enough in mesh

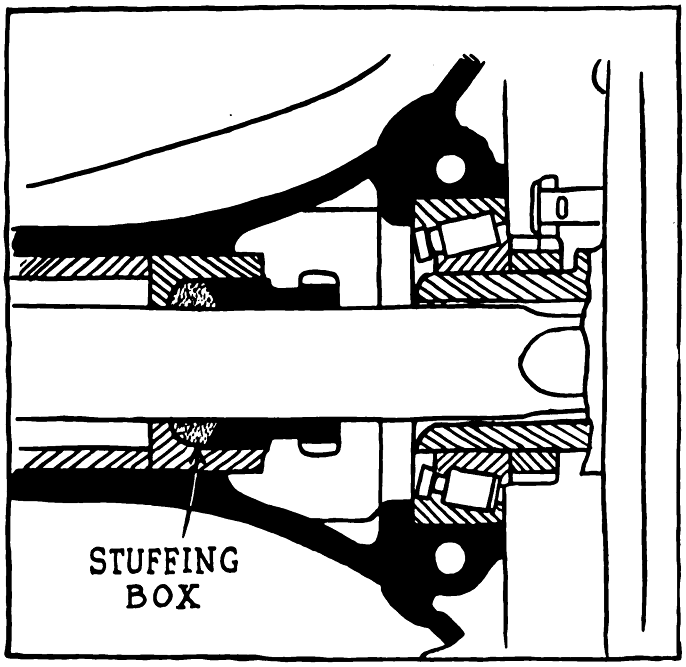


Fig. 3—Installation of felt or hemp packing box at inner end of drive axle

facturer of automobiles take up the five cylinder he will have a walkover and command the field, given that his production is always first class."

This is an interesting topic and one which could be further discussed to advantage. There is a lack of data as regards actual performance on the road and Mr. Dock does not state what cars were ever manufactured that used this motor. THE AUTOMOBILE has no record of any such.

How to Order Spiral Spring

Editor THE AUTOMOBILE:—I desire to order a spring that will compress 1-inch under a 40-pound weight. What must I tell the spring maker? Is a 40-pound spring one that will compress or extend 1 inch under a load of 40 pounds? I have asked several people regarding this and they all seem to disagree on the subject.

Saratoga Springs, N. Y. C. J. WILKINS.

—There is more or less confusion as to what a 40-pound spring would be. That is, whether it would be a spring which had a total capacity of 40 pounds or whether it would compress 40-pounds to the inch. The particulars necessary in ordering the latter would be the diameter of the spring, the length when under no load, the length under a given load and a brief description of the purpose for which the spring is intended.

Keeping Oil from Brake Drums

Editor THE AUTOMOBILE:—In THE AUTOMOBILE for October 10, page 734, you say a thick wadding of felt is placed around the drive axle and acts in the nature of a stuffing box. Would you please tell me as definitely as possible about this. How thick should the felt be? What shape and size are the pieces of felt? What tools are used to put it in with? Is the entire space from bearing to bearing filled up, and how much? How long should it last in miles run? How do you get it out when it becomes worn?

Mongaup, N. Y. GEO. S. BELDING.

The felt is in the form of a ring or washer and about 1-2 inch thick as a rule The diameter of the felt washer depends upon the size of the drive axle. As a general rule more than one of the felt washers are used to close up the space between the drive axle and the housing at one point in the length of the axle. Should there be no provision in your car for these washers it would be suggested to secure four felt rings for each side. The hole through the center of the washer should be ordered 1-16-inch in diameter less than the size of the drive axle, as it is easy to stretch them over the axle and get a tight fit. The outside diameter of the washer should be a trifle greater, say 1-4 inch, than the inside diameter of the axle housing at the point at which it is desired to place the washers. In a floating axle the felt washers would be slipped over the drive axle close together from the differential end and then worked into place by the most convenient means possible. It is impossible to state what sort of a tool would be best without seeing the car and noting the conditions. The entire space from bearing to bearing is not filled. Only 2 or 3 inches is necessary if the felt is a tight fit. The washers should last for at least two seasons' use. It can be removed by taking out the drive axle and poking it out. Almost every car in existence has some means of checking the flow of oil from the differential housing to the brakes and a few of these are shown in Figs. 3, 4 and 5 with an idea of illustrating what makers do to prevent the slipping of the brakes from the gathering of oil on the lining of the shoes.

From these illustrations it will be seen that in most cases the interior of the axle housing has been designed to take the felt washers and hold them in place. A stuffing box is employed by some while the spring shown in Fig. 5, is used by others. Felt washers may be jammed into the space between the axle and the housing, however, should there be no such provision for their installation.

Street Gamins Bother Motorists

Editor THE AUTOMOBILE:—There is a law which requires that cattle must be kept off our public highways, yet there is no law in regard to children being kept from playing in the middle of the streets.

The one great argument always used is that children in the big cities have no other place to play. It is the children in the country that cause more than one-half the trouble. There can be no doubt at all that they have more than sufficient room to run and jump to their heart's content without endangering the lives of motorists as well as their own lives by darting out into the road at any old time regardless of what is coming.

If it were only the young one's carelessness that caused accidents we might be more lenient with them. Children can hardly be supposed to understand the real dangers to be apprehended from automobiles. Very often, in this supposedly educated coun-

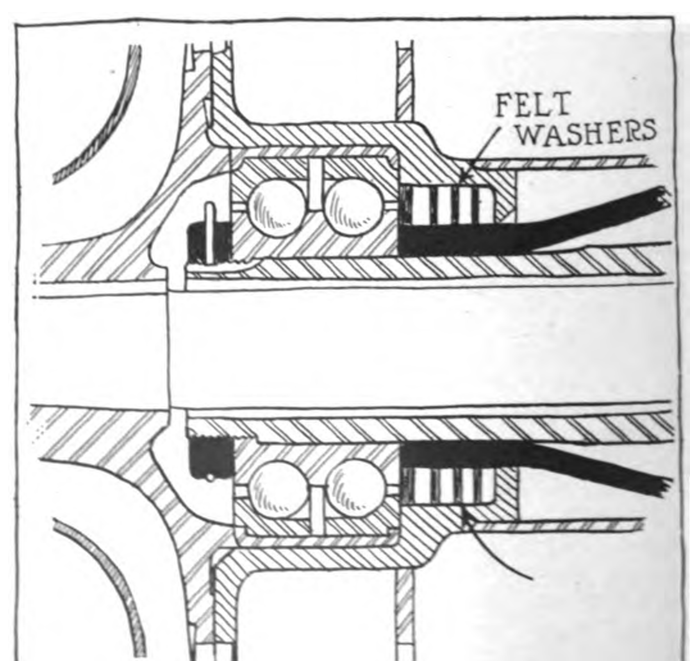


Fig. 4—Some makers put felt packing at the wheel end of the axle to exclude the oil

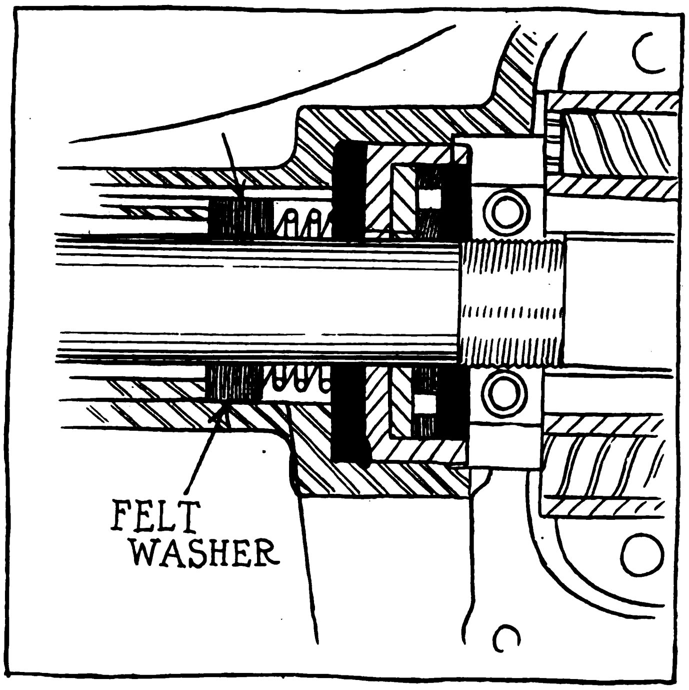


Fig. 5—Easy installation of most cars. Felt washers used with spring

try of ours, children throw dirt and rocks at approaching cars. Either a driver must pass through a country settlement at such speed as to prevent damage to his car by pure deviltry on the part of little children in the street and risk hitting one of them, or else he must drive slowly with a tolerably sure knowledge that he will get a rock thrown at his car or a handful of dirt in his face.

Two weeks ago I was driving my car along a country road in the Berkshire Hills. I was going at a speed of 14 miles per hour and climbing a small hill. Several children saw my machine approaching and ran to the side of the road. I slowed up and passed them, barely moving. One can never tell just what a kid is going to do! As the machine reached a point directly beside the children, one of the smallest ones picked up a handful of sand and pebbles and with a well-directed throw completely blinded me. I held my machine in the center of the road and stopped instantly, but not before one of the other children had darted in front of my mud guard. When I cleared my eyes of dirt the child was lying in the road behind the machine. I gave my number, offered to call a doctor or take the injured one to the Hospital and be of service in any way possible.

Six or eight people witnessed the accident and they all agreed that I was in no way to blame. This did not prevent the police from arresting me and holding me under $2,000 bail. After 2 weeks' fight put up by the best lawyer money could secure I was cleared. It cost me several hundred dollars and caused me great inconvenience. I had to appear three different times in the country court, 5 or 6 hours by the railroad from New York. Everyone would have been thoroughly shocked had I suggested sueing the mother and father of the 3-year-old child who was to blame. The youngster I hit was up and about in 3 days. This is the justice of some of our automobile laws in this glorious free country.

It is hardly possible that the government can control children directly or make them see the danger of playing in the street. It is also hardly possible that the same government can keep the children from becoming a menace to motoring. In fact, they are that already. But cannot the parents of these children teach them the right and wrong in regard to their actions in the street? What mother would see her offspring deliberately break an electric lamp without reprimanding him? What mother would stand by and let her child steal apples from a street vender? Yet parents feel no responsibility at all in regard to automobiles.

The animosity shown toward motor vehicles some years ago was pardonable. The same feeling today is ridiculous—and unpardonable. True, there are many who drive cars that care very little for the rights of those living along the road, but the percentage of careful drivers has doubled itself. The percentage of automobile haters has not cut itself in two.

A short time ago a young child; perhaps 4 or 5 years old; threw a rock the size of an egg at me. It missed my head and dented in the car door, entirely ruining the enamel. Then the offender ran into his house, conveniently near and left me to pay all the damages as usual. If that rock had hit me it would have been all over except the funeral expenses. As it was, it only took $25 out of my pocketbook.

Let the parents of American children wake up! Do you want your youngsters to become known to the automobile world as pests? Do you wish every driver to put on full speed the instant he sights a child? Which is the most dangerous, cars passing your house at the rate of speed far exceeding the limit to avoid your children or 15 miles an hour with the assurance to the motorist that he will not be annoyed. The common people of this country must decide and they must decide now.

New York City. EUGENE JONES.

Wiring Diagram for Mea Magneto

Editor THE AUTOMOBILE:—Will THE AUTOMOBILE kindly tell me how to wire up my Mea magneto for a four-cylinder car? Is it necessary to have a separate coil?

Wichita, Kan. C. SQUIRES.

—Assuming that you want the cylinders to fire 1-4-3-2 the wires would be connected up in the manner shown in Fig. 6. Should it be desired to fire according to any other order all that is necessary is to change the wires leading to the plugs. For instance in firing 1-3-4-2, all that would be required would be to interchange the wires leading to spark-plugs Nos. 3 and 4. No extra coil is required with this magneto as there are both primary and secondary windings on the armature. The low-tension winding ordinarily is short-circuited by a breaker which opens at certain points of each revolution with the result that a high voltage is generated across the high tension winding at the moment of the break, and a spark is produced across the spark gap in the cylinder to which it is connected. In the diagram the primary current is generated in the coarse winding P and serves to induce a current in the secondary winding B which passes through the connecter ring and a brush supported by the brush holder G. The high tension lead C communicates between this brush holder G and the revolving segment of the high tension distributer H. The ground connection of the spark-plugs I is represented by the dashed lines A. The primary circuit is represented by the line B, which shows communication between the circuit breaker E and the armature. The condenser is represented at F.

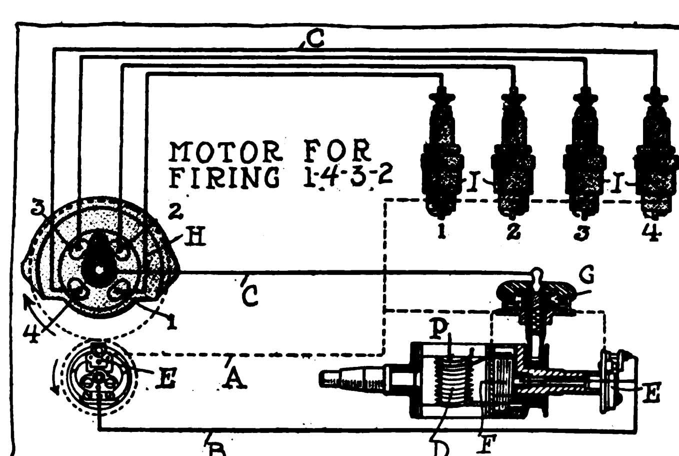
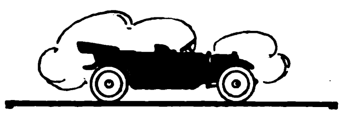
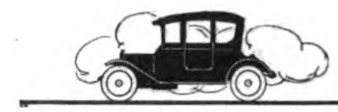


Fig. 6—Wiring diagram for use with a Mea magneto of four-cylinder car.

Coupé Design for 1912 Chalmers Chassis





Scale Drawings and Details of Light Four-Passenger Body for Winter Travel

By George G. Mercer

OF the Chalmers models, a 30 touring car chassis has been selected on which to show the third of the closed-body designs. This chassis is a 1912 Chalmers 30 with 115-inch wheelbase and 34 by 4-inch tires. The stock chassis that has been in service during the season should give a good account of itself with the body design here illustrated, as the power, tires and springs are sufficient to take care of this 750-pound body.

The chassis changes required are new rear fenders and gasoline tank, the location of this latter changed from under front seat to the compartment at the rear, Fig. 5. In this position the tank shows a filling plug projecting above the cover of the compartment and it will be necessary to use pressure feed. The old tank can be made to do service either by adding the filling plug, as specified, or by having the cover of the compartment made to raise for filling. This will save on the expense. Another item that will reduce cost is to make use of the stock rear fenders that are used on the runabout, as these are the same shape as those illustrated. No other change is required to the chassis, the locations of the levers, change and brake are right for the closed body and the electric dash lights will be entered as part of the body equipment.

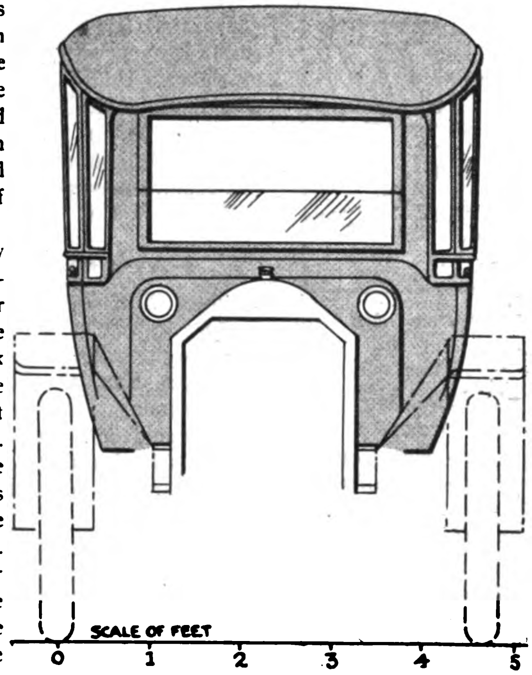


Fig. 1—Front view of Chalmers 30 coupé design

The makers of this car also furnish a model 30 with 104-inch wheelbase and the stock bodies are a runabout and small coupé, generally called a physician's coupé. The object in choosing the 115-inch wheelbase chassis is to furnish a design that does not conflict with the stock body and that is large enough and yet light enough to be used to replace the touring body in the winter season, and in addition it may be said that this design is equally applicable for use on the model 36 and will fit the chassis of either the 30 or the 36-horsepower cars.

The science of getting the article most applicable for one's needs is to examine exhaustively a number of samples, then, after eliminating, make the final selection from the remaining few. Body designs are chosen by the same method and as no one design is all merit or demerit, the final choice is often a combination of the essentials of a number. The design here reproduced is in no sense a substitute for the stock body design, but is one having totally different features; it is intended as the complement to the five-passenger touring body and to alternate with this latter for service during the winter months.

The illustrations show a four-passenger body with the seating arrangements for two on the front seat and two on the rear seat, all facing forward. This design has a true flush-sided effect. The lower side panels at the front are graduated to the dash and blend into the cowl, which is well rounded, Fig. 5. The rear side panels are formed in one piece with the back panel and the rear corner is rounded, Fig. 2. The roof is arched and the corners rounded over. The compartment at the rear is made just large enough to contain the gasoline tank, the size of which is indicated, Fig. 5, and under the rear seat is a lock 7 inches high, 20 inches deep and 40 inches wide.

Inclosed body designs of the coupé type have a fault that has been difficult to overcome, namely, the access to the seats. In some cases the entrance on the right side is entirely blocked by

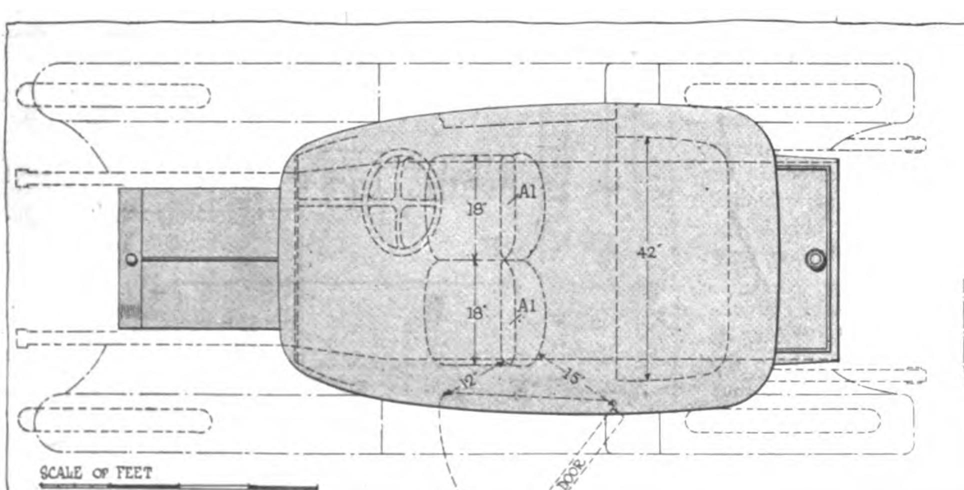


Fig. 2—View from above of suggested Chalmers coupé

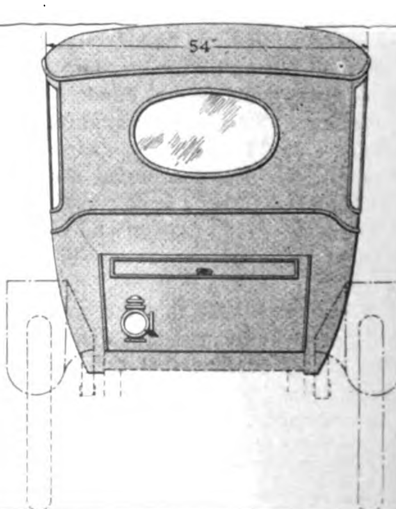


Fig. 3—Rear view of coupé

the levers, and if the body is of the four-passenger type similar to this one, the difficulties are greater than with the two-passenger body. The location of the steering wheel back of the dash only enters into the calculations on a very short wheelbase chassis.

One solution of this difficulty is the offset doors. This was illustrated in the coupé design published in THE AUTOMOBILE October 31, 1912, and another solution is that presented in this design. Fig. 5 shows a door 30 inches wide over the mouldings with the seats indicated in dotted lines. The front seat is made individual and the cushion part is made to tip up. A, Fig. 5, shows the cushion elevated. On Fig. 2 the top view of the cushion is indicated by A1 and the open position of the left door shown by dotted lines. The entrance to front and back seats is marked. To the rear the passage is approximately 15 inches and to the front approximately 12 inches is obtained between the body framing and the bottom of the raised seat. The individual front seat cushions are each 18 inches wide. The rear part of these seats and the backs are built solid to the lower framework of the body, the cushion part is hinged and when dropped to the horizontal is supported by a solid top at the back end, no partition or framework being used under the front of the seat as this would interfere with easy entrance. The rear seat cushion is comfortable both in depth and width for two people and the thickness of the cushion which is 10 inches will insure the maximum of comfort. Ample foot room is allowed by the partial open space under the front seat. The head room over the seat is the maximum for a coupé body.

The general dimensions of the body while affording ample room inside are well within the allowance that will insure a compact and light-weight body. The extreme width is 54 inches over all and the length from front to back of the body is 76 inches.

The windows on the sides of the body are approximately the same width back and front of the doors, these latter being placed about central in the body to carry out this harmonious effect. All windows on the sides and back are made with the frameless glass; the back window is stationary and those on the sides all drop the full length. The front windshield is made with the customary rain visor division, with the part below the cut stationary and that above it hinged at the top and made to swing outward. The supporting rods in the forward position are short arms that slide on perpendicular rods inside the front pillars. The roof extends forward of the pillars 8 inches, Fig. 5, and serves as a partial protection from the down beat of rain and snow. It assists in keeping the glass clean.

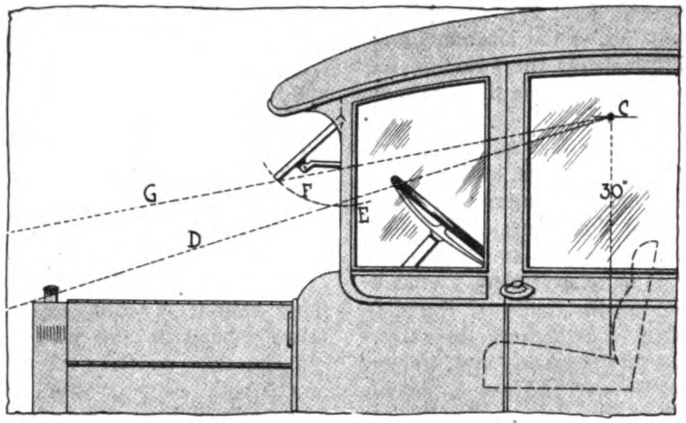


Fig. 4—Diagram showing method of determining the correct position of windshield and swing-visor

Carriers for extra tires are not illustrated as it is not practical to put them on the running board, on account of the very wide door, but provision can be made for them at the rear of the gasoline compartment. It will be necessary to carry the tires in a nearly perpendicular position.

Fig. 4, a section of the front of the body, shows the seat, front windshield and the top of the engine hood. Its purpose is to illustrate a suggestion for determining the proper height up for the cut in the windshield glass, so that when the swing part is forward as a visor the opening is right for the driver to see through. If the cut is too low, the swing part is proportionately longer and the opening will in turn be greater, thereby allowing more cold air and rain to enter.

The point C is located in a perpendicular line from the back of the seat, at a height of 30 inches. This is the height of vision of the average man and is a rule applied by trimmers and top makers. From C a line is carried to the top of the hood at the front and is marked D. The point where line D passes through the glass E is the line of cut through the glass and will be the lower line of the swinging section.

Line D is the line of vision of the average person, seated in

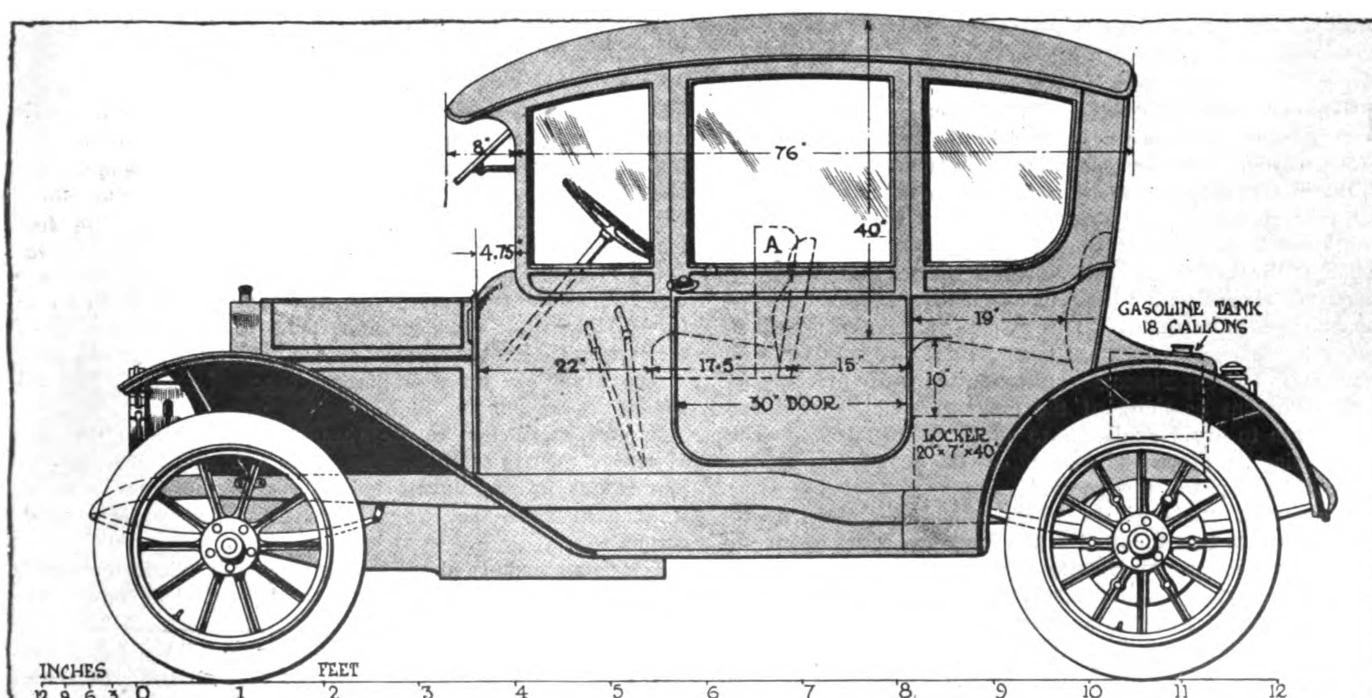


Fig. 5—Side view to scale of suggested coupé design for Chalmers 30 chassis

position to drive the car and allows free sight over the front of the radiator. It can be readily seen that if the location of the cut E is made without the proper calculation the swinging section will be either longer or shorter than will give the maximum of vision with the minimum of opening.

In other words, if, for example, the line E was made 1 inch lower then the line of travel of the swinging section would have a radius 1 inch greater than F and the intersecting point with line G would be further toward the front; consequently the actual open space to obtain the range of vision between the lines D and G will be greater by 1 inch lower than E and by 1 inch further forward than the intersecting point of F and G.

This example shows how important it is to have the correct line of cut that will suit the position of the driving seat, and the rule illustrated is as simple as any in use and can be readily applied by any person.

The construction of the body is aluminum 16-gauge panels with aluminum mouldings and the framing is of good quality ash. The heavy mouldings on the door pillars and those back and front of the door and the front pillar are made of wood and are worked solid on the framework. The rear compartment is made of aluminum panels and wood framing and the lid at the top lifts off when the filling cap of the gasoline tank is removed.

The roof is rounded over on the edges more than ordinarily and is made with the customary laminated wood roof panel, which is glued on the top edge of the side and end top rails, and when set the rounded edge is formed by planing the roof rail and the panel edge sufficiently to get the shape. The top canvas is drawn over the roof and the edges fastened under the drip moulding that extends all round. The bows inside to support the arch are placed 7.5 inches apart. This construction is sensible and any bodybuilder will guarantee his work made according to this specification.

This style of roof is in harmony with the general body design illustrated, and, moreover, it is a design of roof that is meeting with favor when used in connection with a body design having all the exterior lines rounded.

The style, applicableness of the design for the make of chassis and use for which it is intended, as well as the type of construction, have been detailed in a general way, and also the special features, that is, the extra width of the door opening to the seats and the proper method of determining the cut in the front windshield, have been outlined sufficiently. It now remains to consider the finishing up of the job and the cost.

The finishing up of the body, that is, the nice attention to details and making sure that the job is really complete, is a matter that only the reliability of the firm doing the work is a guarantee for. No specifications can insure thoroughness on the part of the mechanic. The best practice, if cheapness is not the one thing desired, is to buy reliability from a firm with an established reputation, and when making the contract, select from samples, cloth and lace for trimming the seats, doors and sides of the body, cloth or satin for lining the roof, carpet for the floor and silk for the curtains. The toilet cases can be selected from samples and will vary according to price; there should be at least one complete toilet case and one card case and one ash or cigar tray to be put on the doors. Corded hat racks are useful and pockets of ample proportions can be placed one on each side at the front of the door opening and two small pockets can be placed at the rear of the front seat back; this will be useful for those seated at the rear. The interior woodwork is walnut to conform to the finish of the dash and two electric dash lamps are placed in the dash with only the rim and the glass projecting. This is illustrated in Figs. 1 and 5. The current for lighting these lamps will also be used for the dome light in the roof.

The listed color specifications for Chalmers closed bodies, 1912, are upper body panels black, lower body panels either Chalmers blue or Brewster green, and chassis, including wheels and hood, black, and these colors are applicable for the design submitted. The trimming will conform in color to the body color selected.

The cost of a special made body of the design illustrated, finish and appointments to be equal to the stock limousine body, will be approximately $1,300 to the retail trade. This is a fair average price and it can be increased or reduced according to the will of the customer, who may want more or less than specified.

Practical Application of Autogenous Welding to Aluminum

From a Paper Read by Dr. F. Carnaveli Before the Institute of Metals, London, Eng., Continued from Last Week.

THE experiments on this group were carried out with two types of metal, one designated by the letter S (see Table V), consisting of pure aluminium containing 99 per cent. of the metal in the form of rods of two different diameters (30 and 12 millimetres respectively) and of flat bars, 6 millimetres thick; the other sample used during the test was in the form of rods, 15 millimetres in diameter, consisting of aluminium alloyed with 3 per cent. of copper (a type of alloy in common use industrially). The welding material consisted of thin rods of metal of identical composition with both types respectively. The experiments were conducted under precisely the same conditions as those of the previous series, special care being taken to avoid oxidation, to which the metal is so easily liable during the process of welding. For this purpose appropriate deoxidising powders were used.

Micrographic study of the several samples, pursued by the same method as that followed in the foregoing series of investigations, enabled one to identify without difficulty the welding zone by its coarsely granular structure. This structure is a consequence of the high temperature attained by the metal in fusion. In the case of a sample 8 millimeters in diameter and 80 millimeters in useful length which was cooled after welding, the weld zone showed thin, dark filaments which are the margins of the big crystals, while within the crystals themselves are seen small, and exceptionally numerous, dark, rounded inclusions—less abundant in the other samples—formed by the oxide which has remained imprisoned in the metal. In this case oxidation was especially active during the process of fusion. This structure, which repeats itself in the various samples of type S, undergoes modifications varying according to the different treatment to which the metal is subjected. Hammering, for instance, tends to approximate the structure of the weld-zone to the original texture of the metal; while reheating tends to make the texture of the entire weld-zone homogeneous, eliminating the interval strains set up within the metal as a consequence of rapid fusion and similar rapid cooling.

In contradistinction to the phenomena observed in the case of copper, the oxy-acetylene autogenous welding of pure aluminium results in an intimate union between the latter and the welding material, the two substances forming an inseparable corpus.

The data accumulated and the observations made in the course of this series of experiments with the oxy-acetylene autogenous welding of aluminium, show—

1. That sudden heating and rapid fusion of the metal subjected to the welding process alter its physical and mechanical properties in a manner analogous to that observed in the case of copper, though in less degree. They set up within the metal

TABLE IV—SHOCK TESTS MADE ON SAMPLES OF BRASS AND BRONZE WITH THE CHARPY APPARATUS

No. of Sample	Initial Dimensions of Sample	Thermal Treatment	Indicated Angle	Breaking Test Kgr. Mm.	Mean Chemical Analysis: Of the Metal. Per Cent.	Mean Chemical Analysis: Of the Welded Zone. Per Cent.	Remarks
A1	Rods, diameter= 40 millimetres.	Rough fusion.	128°	4.646	Cu=94.2 Sn=5.7	....	Not welded.
A2	Rods, diameter= 40 millimetres.	Reheated.	119°	6.698	....	....	Not welded.
A3	Rods, diameter= 40 millimetres.	Cooled in air after welding.	141°	2.112	....	Cu=94.89	Welded; medium-grained fracture, with small vacuoles.
A4	Rods, diameter= 40 millimetres.	Reheated after welding.	132°	3.807	....	....	Welded; medium-grained fracture, with vacuoles.
B1	Rods, diameter= 40 millimetres.	Reheated.	134°	3.407	Cu=87.9 Sn=11.01 Zn=1.03	....	Not welded.
B2	Rods, diameter= 40 millimetres.	Cooled in air after welding.	140°	2.286	....	Cu=90.2 Sn=9.01 Zn=0.8	Welded; finely granular fracture, with numerous vacuoles.
B3	Rods, diameter= 40 millimetres.	Reheated after welding.	139°	2.464	....	....	Welded; finely granular fracture, with numerous vacuoles.
C1	Rods, diameter= 40 millimetres.	Reheated.	136°	3.019	Cu=87.1 Sn=9.3 Pb=3.48	Cu=89.7 Pd=2.9	Not welded.
C2	Rods, diameter= 40 millimetres.	Cooled in air after welding.	145°	1.457	....	....	Welded; finely granular fracture, with numerous vacuoles.
C3	Rods, diameter= 40 millimetres.	Reheated after welding	139°	2.464	....	....	Welded; finely granular fracture, with numerous vacuoles.

latent internal strains, and modify its structure detrimentally.

2. That the structural modifications, induced by excessively rapid heating during the process of welding, take the form of coarse crystallization of the metal.

3. That, so long as all the necessary precautions are observed in the process of welding, the changes in the mechanical properties of pure aluminium, such as breaking strain, ductility, hardness of the weld-zone, are not very profound, although a notable increase in brittleness is observable, as is shown by the results of shock tests. The presence of copper, however, modifies profoundly in a detrimental sense the mechanical properties of aluminium.

4. That, in consequence of the feasibility of achieving with pure aluminium a perfect and homogeneous weld of the metal, both mechanical (hammering) and thermal (reheating to 450 degree to 500 degree C.) treatment is extremely efficacious, in that it sets up greater homogeneity in the weld-zone, and eliminates the effect of the excessively rapid heating undergone in process of welding, ameliorating consequently the quality of the metal.

5. That whenever aluminium contains small quantities of other elements easily oxidizable at high temperatures (as(for example, copper), the oxidation of the metal in fusion is facilitated, also the inclusion within it of granules of oxide detrimental to the mechanical properties of the weld-zone.

6. That, taking into account the results obtained, as also the foregoing conclusions, we may assert that the oxy-acetylene autogenous welding of aluminium, when carried out with the necessary precautions, is capable of extensive application in practice, especially for the autogenous welding of small parts.

In connection with Table IV it is interesting to note that considerable variations occur in the composition of bronzes and brasses according to the number of constituents of the alloy and in proportion to their affinity for oxygen and to the volatility of the oxides formed therefrom. Thus, in the bronzes of type B, Table IV, in the welded zone, there is an average diminution of 19 per cent. in the proportion of tin; while the loss of zinc, a more easily oxidized metal than tin, amounts to 22.3 per cent. (the original proportion present being smaller than that of tin). In brasses, wherein the percentage of zinc is much higher, its decrease in the welded zone is 28.7 per cent.

TABLE V—SHOCK TESTS WITH THE CHARPY APPARATUS

Number of Sample	Initial Dimensions of Sample.	Thermal and Mechanical Treatment	Indicated Angle	Breaking Test. Kgs. Mm.	Brinell Hardness (average), 50C Kgs.	Remarks
S1	Rods, 20 mm. in diameter.	....	117°	7.181	......	Not welded.
S2	Rods, 20 mm. in diameter.	Reheated.	110°	8.936	27.2	Not welded.
S3	Rods, 20 mm. in diameter.	Cooled in air after welding.	141°	2.112	......	Welded; medium grained fracture; small vacuoles.
S4	Rods, 20 mm. in diameter.	Reheated after welding.	119°	6.698	25.9 in the weld.	Same as above, but no vacuoles.
S5	Rods, 20 mm. in diameter.	Hammered and reheated after welding.	128°	4.646	27.2	Same as above, but no vacuoles.

Harking Back a Decade

FROM *The Automobile and Motor Review*, November 1, 1902:

The Massachusetts Automobile Club, of Boston, although but a babe in years, has already attained to the proportions and vigor of a full grown organization. It occupies a club house expressly built for it. The club was formed in 1900 and now has a membership of 160. Col. James Taylor Soutter is president. Charles J. Glidden is an enthusiastic member.

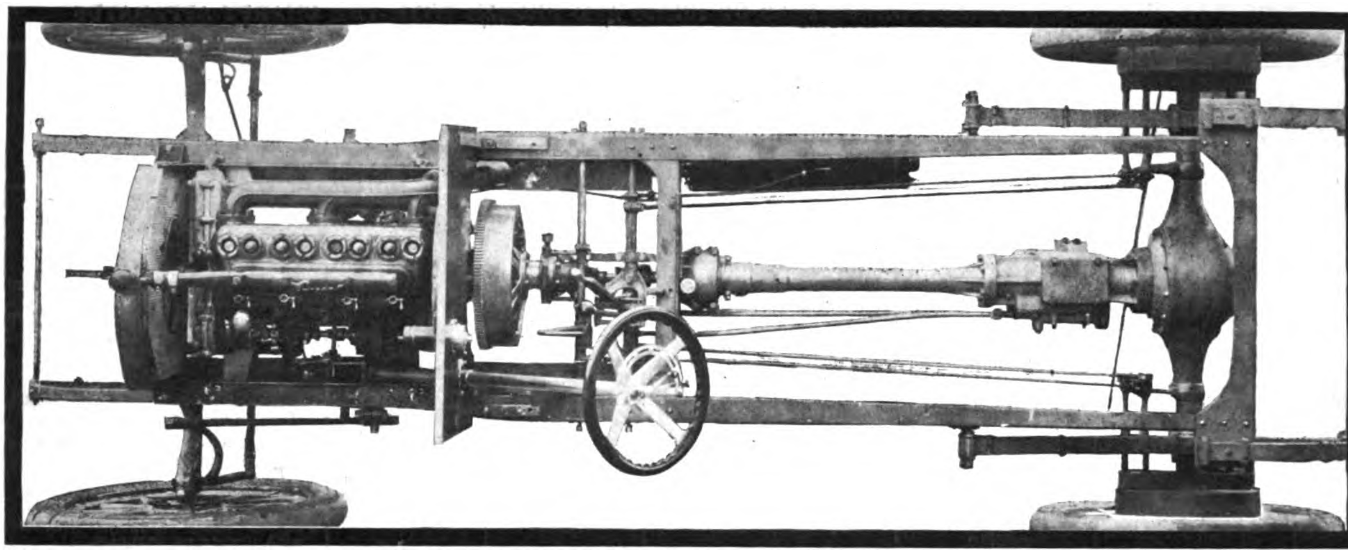
The license clerk at Cleveland, O., has announced that 414 automobiles have been registered by him since the new law went into effect last summer.

The Massachusetts State Highway Commission is at present making an inspection of the main highways of the Bay State, using a Locomobile surrey for the purpose. They will visit 350 towns and will traverse the state from end to end. It is expected that a considerable appropriation will be made to improve the roads in the Berkshires.

J. A. Seitz, of Syracuse, who recently completed a tour through Ontario, reports that the people in the rural districts were almost as badly frightened by the appearance of his automobile as were the horses.

The plan put forward by the Standard Welding Company, of Cleveland, for standardizing automobile rims as to the number of lug holes and spoke holes is attracting much attention. In the 26 and 28-inch rims, there are five lug holes and in the 30-inch size and larger, the number is eight.

The entry list for the fifth exposition of the automobile at Paris closed October 10. The show will open December 10 and remain in session until Christmas.



Chassis of the four-cylinder 1913 Lenox, showing position of the gearbox at the rear of the propeller shaft

Lenox Adds a Six

Motor Develops 61.5 Horsepower on the Block—Four Cylinder Model Will Be Continued

FOR 1913 the Lenox Motor Car Company, Boston, Mass., offers a new six-cylinder car beside the four-cylinder machine. Aside from the difference in the wheelbase length and in the motors, the two are practically the same in constructional features, although the six-cylinder is made somewhat heavier than the four and the parts whose length depends upon the wheelbase are necessarily different in the two models. The wheelbase of the six-cylinder is 130 inches, while that of the four is 118 inches.

The four-cylinder model is practically the same as for 1912, except that a number of mechanical refinements have been introduced, none of which, however, is radical. The aims in making these changes were simplification of construction, greater accessibility, economy of time and attention of maintenance, and the minimization of running expense.

The four-cylinder motor is of the vertical L-head type with the cylinders cast en bloc with the valves at the right side. The S. A. E. rating is 29.8 horsepower, but the engine will develop 45 brake horsepower. The six-cylinder motor is of the T-head type and is larger and more powerful, having a rating of 38.4 by the S. A. E. formula and developing 61.5 horsepower on block tests. It has a bore of 4 inches and a stroke of 5 inches, the exhaust valves being at the left and the intake at the right.

Upper—Four-cylinder Lenox touring car for 1913
Lower—Six-cylinder—note cowl on both models

The cylinders are cast of gray iron and 20 per cent. steel with integral waterjackets so designed that the water circulates entirely around each cylinder. The cylinder blocks are open above the combustion chamber heads and this renders complete cleaning of the waterjackets possible and insures perfect flow of the cooling water. The flange base is wide and with side webs forms recesses beneath the valve pockets covered for the protection of the valve mechanism. The cylinder block is machined rough bored, reamed, aged and finished by grinding, this process eliminating all casting strains.

Pistons Carry Oil Grooves

The pistons are carefully turned and ground, being fitted above the wristpins for four compression rings of the diagonal split eccentric type, ground to size on the edges and peripheries. There are two oil grooves at the bottom of each piston.

The upper half of the aluminum alloy engine base casting carries the main and camshaft bearings, and a central transverse web carries the center main bearings, the lower section being divided by a horizontal web containing the oil pools for the splash lubrication. Below this is the oil reservoir.

The crankshaft is a nickel steel drop forging, the crankpins being 2 inches in diameter and the main bearings 2 inches in diameter forward and 2.125 inches diameter at the center and rear. These being respectively 3.625 and 4.5 inches long, give a total of 11.125 inches bearing length.

The bearings are of nickel babbitt in bronze journals. The camshaft is of nickel steel drop forging 1.125 inches in diameter, with integral cams. The camshaft has three bearings, each 2 inches in diameter and 2 inches long. The camshaft bearings are of phosphor bronze. The shafts are hardened, heat-treated and ground to size. The camshaft is forged with a forward flange to which the timing gear is bolted.

The connecting-rods are I-section drop forged heat-treated steel and carry bronze journals lined with nickel babbitt. The large ends of the connecting-rods carry oil scoops. The wristpins are of hardened steel and are secured in the piston bosses by set-screws.

The valves have nickel heads and carbon steel stems and the ports are 2.25 inches in diameter. The valve tappets are of the mushroom type with set-screws and lock-nuts for adjusting for wear. The stems, tappets and springs are inclosed.

Lubrication is by a spring-returned plunger pump driven by an eccentric off the camshaft. This pump forces the oil to the bearings. The camshafts, crankpins, wristpins, valve tappets and the pistons and cylinder walls are lubricated by splash.

The cooling system consists in a centrifugal pump forcing the water up to the waterjackets to the large radiator, which is 2 inches deeper on the four than on the six. Auxilliary cooling means consist in a large belt-driven fan.

Ignition is by a Mea high-tension magneto driven by a flexible coupling to the water-pump shaft.

The carbureter is of the automatic float-feed two-jet type with a long waterjacket and auxiliary valve controlling the high-speed intake. This has a strangling tube which prevents any accumulation of gasoline at the seat of the auxiliary valve and insures against choking of the motor when accelerated after running slow.

A Gray & Davis electric starter, consisting of a motor and battery, is used. A 6-volt, 90-ampere-hour storage battery furnishes the current for driving the dynamo for starting and lighting.

A cone clutch is employed, faced with leather, beneath which five helical springs being installed in bosses for adjusting the tension. Behind the clutch is a Hartford universal joint. The shaft is coupled to the rear section of the shaft by a squared sleeve in which the sections slip. The rear end is connected in the large globe end of the torsion tube containing the propeller shaft.

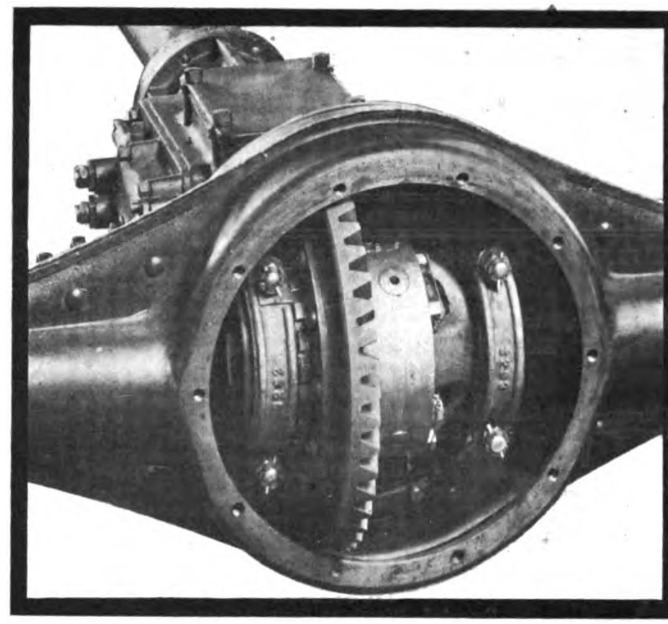
Interlock Provided in Gearset

The gearset is of the selective sliding gear type with three speeds forward and reverse, the driving pinion being on the transmission shaft. There is an interlock between the shafts so that only one of them may be operated at a time. A bronze cage with annular ball bearings carries the differential gear mounting and the bearings may be adjusted at either side to the pinion gear.

The rear axle housing is of pressed steel, the axle being three-quarters floating, of the single-bearing type, with the wheels mounted on annular ball bearings. The driving shafts are 1.5 inches in diameter and the wheels are secured with tapered nuts and keys. The gearset case may be opened at the top or the left side for examination and the differential by removing the cover plate.

The front axle is an I-section drop steel forging 1.75 inches wide and 2.625 inches deep, dropped in the center. The bearings for the pivots are in the yoke instead of in the pivots and the pivot pins are carried in hardened steel bushings. The pivots carry ball thrust bearings at the top and the wheel spindles are fitted with annular bearings.

The springs are of Krupp silico-manganese steel, the front springs being semi-elliptic, 36.5 inches long and 1.75 inches wide, and the rear three-quarters elliptic, 43.5 inches long and 2 inches wide.



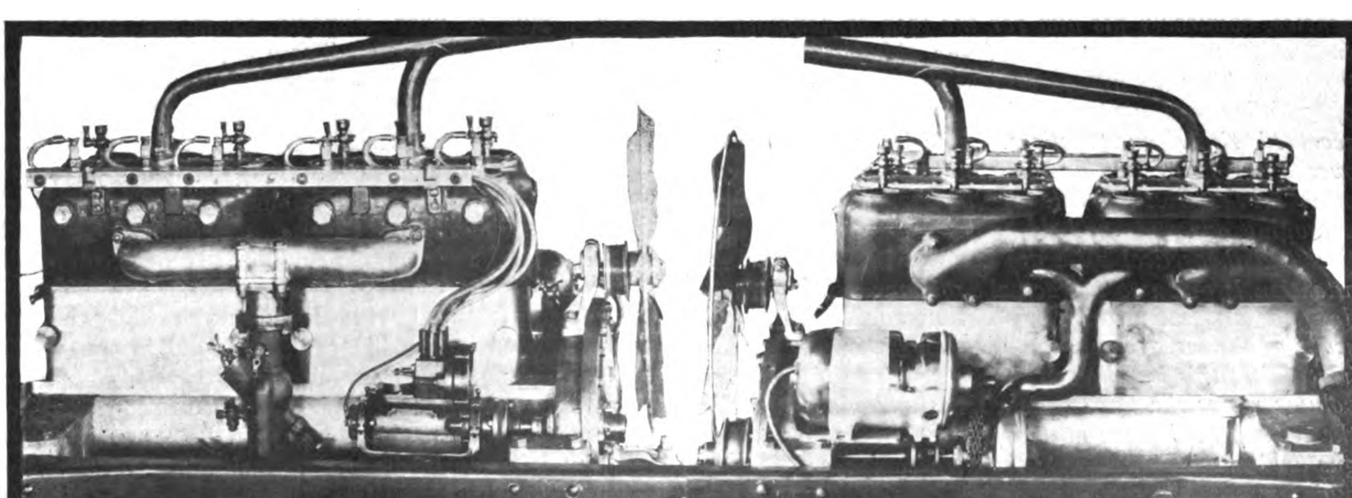
Rear construction, showing accessibility of bevel gear and differential

The wheels are of the artillery type of second growth hickory, 36 inches in diameter and having twelve spokes 1.75 inches wide. The tires are 36 by 4 inches all around.

The frame is a pressed steel channel section 3 inches wide and 4 inches deep, dropped 3.5 inches forward of the upper half of the rear springs. The heavy rear cross-member is carried beyond the side-members and the ends, supported by brackets, form the upper supports for the springs. The frame is stiffened by the clutch rocker shaft and the control lever shaft.

Lenox cars are furnished in four to seven-passenger touring or inclosed types, as well as in roadsters of two, three, four or five-passenger capacity. All types have a cast aluminum cowl. The 17-gallon gasoline tank is installed beneath the front seat.

All cars are fully equipped, having besides the Gray & Davis starting and lighting system mohair tops, lamps finished in black enamel and nickel, quick detachable demountable rims, foot rail, robe rail, tools, tire holders, bulb horn, adjustable windshield and speedometer. Storage space is provided under the rear seats of the touring cars and the rear decks of the roadsters..



Left—Intake side of the six-cylinder Lenox motor, showing the way in which the valves are inclosed. Right—Exhaust side of the motor with Gray & Davis lighting and starting dynamo

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Announcement

NEXT week THE AUTOMOBILE *begins the publication of a series of articles on Carburetion by Robert W. A. Brewer, one of the leading European authorities on the subject. The selection of Mr. Brewer hinged on the fact that during the last year he has traveled extensively in America familiarizing himself with the American carbureter field, which fact, coupled with his comprehensive knowledge of the European carbureter tendencies, admirably fits him for the task of handling the subject from the viewpoint of the old world and also the new. This fits him to present the European theories of gasoline and air regulation, as compared with the accepted American practices. The series will extend over a period of two or three months, appearing every other week. Each article of the series will be short, averaging one and one-half pages in length. The practical and theoretical sides are handled in the series, and attention is given to the actual problems with which the designer and manufacturer are concerned. Within the scope of the series comes the question of temperature and heat units; this is followed by the problem of surface to volume ratio; the third article takes under consideration the jet and its design; in the fourth the value of exhaust gas analyses is considered; the fifth compares American and European design in so far as moving parts are concerned, and the succeeding articles treat with other aspects of carburetion.*

Exit the Small Car

The 1913 European Tendencies

EUROPE has ostracized the single-cylinder car. After faithfully nurturing it for over a decade, after developing it to a high stage of perfection, after carrying it to the zenith in the racing field, it has gone down to immediate and inglorious oblivion. Scarcely a relic of it will be found in the offering of France, Germany and England for next year. It has all gone as an avalanche. The single-cylinder type has exited, the small four has occupied the stage. The demand for flexibility has made the change, coupled with the demand for low horsepower rating and low gasoline consumption.

The new four of France, as announced by nearly a score of its prominent manufacturers, has ratings from 8 to 12 horsepower, on a rating which gives the same results as the S. A. E. equation in use in this country and the R. A. C. rating in Europe. True, such a motor is a tiny tot, with its four cylinders in a block casting and often just 2.1 inches in bore and with a stroke of twice that measurement. In millimeters the measurements are 55 x 120, there being very few makers who exceed the 120-millimeter stroke, and with them the bore ranges between 55 and 75 millimeters.

By manufacturing motors of these proportions the efficiency is high and high crankshaft speeds are obtained, in fact, imperative. With such a motor the gear ratio on direct is from 4 to 1 to 6 to 1. With all of them the four-speed gearbox is essential, as it permits of keeping the motor speed up in the efficiency range no matter whether on the level road, on the hill, or on the rough surface. With such motors the fuel economy is from 35 to 45 miles per gallon of gasoline, another essential in continental countries.

European makers are exhibiting much more good judgment in these little cars than merely that of motor economy and flexibility, namely, that weight is being reduced in the general make-up of these cars. A few American makers were early to recognize the merit of weight reduction, but too many of them are still adding more horsepower, adding more weight and cutting the price. This is poor economy to maker and poorer economy to the operator. There is plenty of bore, there is plenty of stroke, and there is plenty of body, but efficiency is lacking all along the line. Refinement and more accurate workmanship are the needs of the hour.

The European small car differs quite radically from the average American small car in that its parts are as finely finished as in the most expensive machines. If shock-absorbers are stock equipment they are in keeping with the gears of the four-speed set, which are of the finest metal manufactured with the highest skill. The ball-bearings used in the big car are found in the smaller one. The same accuracy characterizes every detail of the small creation. Originally the European small car is a more expensive product than the American small car, but it is much cheaper to maintain. Its fuel consumption is very much less; its tire expense is less, and its general maintenance is less because of the materials and workmanship it incorporates.

Trading New Cars for Old Is Bad Salesmanship

President H. O. Smith of the Premier Motor Manufacturing Company Outlines the Standpoint of the Salesman and the Manufacturer and Explains How the Second-Hand Car Problem Will Take Care of Itself

THE automobile is a very live subject. The automobile industry has attracted a tremendous number of very live men—and I can assure you that Indianapolis feels complimented that those men who are gathered here should have spent the time and money that they have in coming to this convention. And may I add that I believe that the selling problem is the big problem, not only with the automobile industry, but with every other line of industry. We soon get to the point where it is not so great a difficulty to produce an article? It may be difficult to produce an article on a basis to properly compete; but the proper distribution of the article, to be able to produce the article could have been made, irrespective of its merits, and then properly distribute it as a problem, and may I say that with the motor car as with all other articles of merchandise nearly, and confining it to the motor car, I believe that a good dealer can hold up a poor car a little while, but a poor dealer cannot hold up a good car very long. Therefore, you see that I place the greatest stress today with the great development of the motor car on the distributor. The development of the motor car and the demand are very natural. It is strictly in line with the times. It is based on the transportation problem, and every agency which has had to do with the transporting of thought, merchandise, or human beings in a more practical and economical way than has been done by other agencies previously employed have invariably met with endorsement and have gone forward.

Prospectives Generally Users

Take the salesman of today: The average salesman that is employed—is it not true that when he first comes to us he presents a list of prospective buyers? Now, follow down this list and what do you find? You find that his list almost invariably includes or is confined to those who today own motor cars, who are already converts to the use of motor cars; but he has conceived the idea that if we pay that man enough money and buy his old car at an attractive enough price to the other fellow, he can possibly place another new car with him. But I want to ask you as practical dealers, have you broadened the influence and scope of the automobile one particle until you have placed that traded-in car, provided it is of any use, if there is any use left in it? I say, No! Of course, we cannot entirely get away from this trading problem, and it is one of the big problems we are all confronted with and wrestling with; but I believe this—as soon as we get to the point where we do not pay any more for the second hand car than the second hand car is really worth or will sell for, that the second hand car problem will to a very great degree take care of itself.

I want all of you dealers to take this as absolutely sincere, and I believe that I am expressing the real feeling of all automobile manufacturers, and I know it is true of the manufacturers of Indianapolis—that they realize and appreciate that the interests of the manufacturer and the interests of the dealer are identical. Every dealer is interested in knowing that the concern with which he is affiliated is prosperous. Every manufacturer on the other hand is interested in knowing his dealer is prosperous.

The manufacturer has two problems—producing and selling. In the selling department every broad gauge distributor must recognize that the dealer associated with his interests is a part ot his selling organization, and why should any dealer join with any distributor that is going to be careless as to the welfare of any part of his selling organization?

We have only scratched the possible surface of the demand for the motor car. The big problem with us today is not—can this country absorb 200,000, 300,000, 400,000 or 500,000 automobiles in a given period? As I see it, the question with us today is—will we develop the uttermost buying power as soon as those cars are delivered?

I could name you one city in the United States which last fall, according to the record, had one automobile, I believe, to every nineteen men, women and children, and yet that city proved to be one of the best markets of the past season. This only gives you a suggestion of the great possibilities that are before us.

Looking at the commercial side of the proposition, the huckster who today is within only 5 or 6 miles of the city and compelled to do his work on land valued at $100 to $1,000 per acre, with good roads and the motor propelled vehicle, instead of being located in or very near to the city limits, will be operating 5, 10 and 15 miles from the city on $150 to $200 an acre land. This is also true of many suburban residents now concentrated about the railroad station when there are hundreds of acres of more desirable land further removed. The tendency of population is away from the city and the suburbanite needs an automobile.

So that, gentlemen, we may all figure without a question on the permanence of the motor car. Why? Because it is a practical proposition. Its demand is on a practical basis. You need not fear anyone who has once kept it, the use of the motor car reverting to the old methods if it is possible for him to continue to have an automobile. It would be just as reasonable for us to think of us turning back to the prairie schooner or the horse-drawn street car as to go back to the old methods of transportation.

The dealer today in many instances when he approaches the manufacturer first asks, not for "Let us see what the details of your product are," but "What is your discount?"

All Are Entitled to Profits

I think there is one of the specific things we might all think about very seriously. The manufacturer is entitled to a fair, legitimate profit. The dealer is entitled to fair, legitimate profit. But there is a limit to what represents a fair, legitimate profit, and the profitable business at the end of the year is not always traced to the largest discount. You must remember that low basic cash list prices and long discounts cannot run together. It ought to be true that the straight cash buyer gets the best price. It is not always so. We very often forget that so much cash and so much allowed for a car do not always represent the net cash return; so that I think it is fair to the manufacturer, and it is to the dealer's interest, to consider the product first that is offered, and the discount second. There is not a dealer in this house but what will say, "I will take a modest but fair discount if I have a product that can sell for the full amount, rather than take an abnormal discount which might carry with it a less profit; a lower price, which does not command cash returns in the majority of instances.

European Patents

ALERT in mind, though dwelling on limited areas when measured with American standards, inventors and engineers of central and western Europe, including the United Kingdom, are ever at work to improve on past practice, especially in the youngest of professions, the automobile industry. Though their efforts attack problems of many classes, a few great tasks seem uppermost in most minds now, these referring to the construction of sensitive carbureters and highly efficient valve mechanisms. At the same time, other details are also being improved, both as regards engine operation and increased comfort of the passengers of the automobile, and some very clever devices proposed to solve the wheel-and-tire problem have been introduced in European patent offices. In this review THE AUTOMOBILE gives abstracts of the most interesting automobile patents which were granted by the British Patent Office during the month of August.

Manufacture of Tires—Describing a new type of mold in which casings are formed.

This patent has reference to a machine for the molding of sectional tires, these being shaped on cores C of elliptical cross-section. While these cores give the inside surface of the casings its shape, the outside is formed by a mold either composed of two parts which are clamped together, or, as in Fig. 1, of packing material P. This is made up from layers of metal or rubber and fabric which are held in position by a wrapper W. The convex portions of the outer mold which serve for the shaping of the casing beads are reinforced by thin metal strips M.

No. 9,321 British—to Margetts International Sectional Tire Company, London, England. Granted August 8, 1912; filed April 15, 1912.

Gasolene Engine Carbureter—Operating on the principle of surface radiation for the evaporation of the fuel.

As Fig. 2 shows, the carbureter referred to in this patent is formed as a chamber C jacketed at J and containing a number of foraminous screens S, onto which fuel is sprayed from a nozzle N which is controlled by a needle valve V. The air drawn in by the engine enters through the carbureter valve V1 mounted eccentrically upon a shaft V2. The opening L in this valve represents a low-speed air passage which remains open even at the minimum motor speed. The air supply which is swept along the curved wall of the chamber C is thereby given a whirling motion and is heated by contact with the jacketed walls, while the starting air is heated by the following device: A cylindrical screen S1 containing concavo-convex screens S2 and inclosed with them in a casing C1, is heated by removing the casing, pouring gasoline over the screens and igniting it, after which the casing C1 is replaced, while air enters through the ports A. The throttle valve T serves to regulate the amount of mixture drawn into the motor, the air used for this purpose being so directed by the valve V1 that it strikes the screens S, whose large surface assists in the evaporation of the fuel sprayed upon them by the nozzle N.

No. 9,504 British—to W. P. Thompson, Liverpool, Eng. Granted August 8, 1912; filed April 19, 1912.

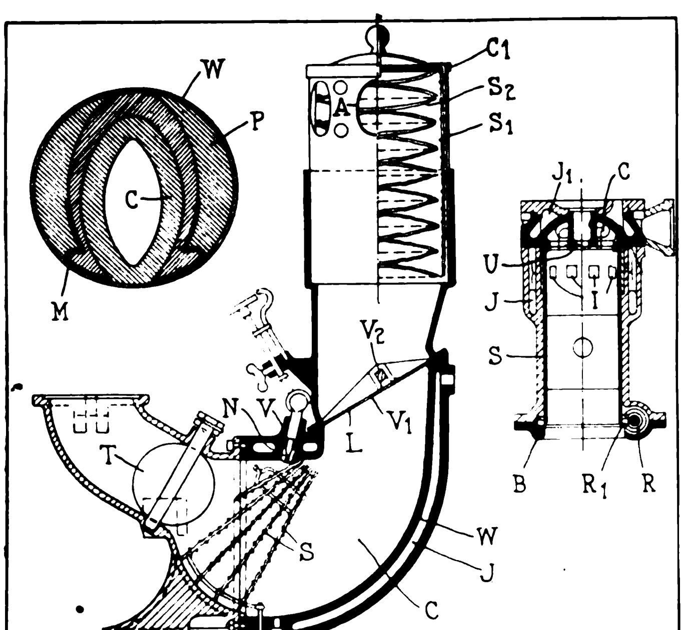


Fig. 1—Margetts tire-making mold. Fig. 2—Thompson screen carbureter. Fig. 3—Gerhardt sleeve-valve motor

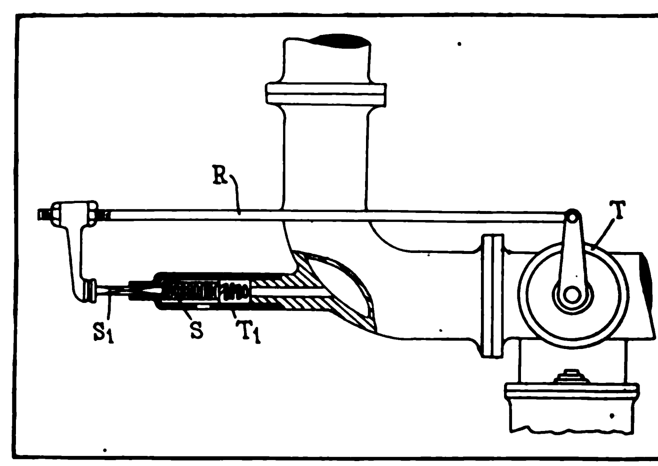


Fig. 4—Webb positive-acting auxiliary air supply for gasoline engine carbureters

Sleeve Valve and Its Cooling—Being a cylindrical valve which is intermittently rotated by a grooved roller.

The sleeve valve S, Fig. 3, is contained inside the cylinder of an internal combustion motor, being closed in the same and having its upper end U fit tightly against the lower surface of the cylinder head, in which an exhaust chamber C is formed. Exhaust ports provide communication between combustion and exhaust chambers when the sleeve is in certain positions, while the admission of fresh gas is governed by a series of intake ports in the wall of the sleeve which are arranged slightly below the level of the horizontal exhaust ports. The fresh mixture before entering the cylinder passes through the jacket surrounding its walls, thereby cooling it, while the same end is obtained in the case of the cylinder head by water circulated through its jackets. The rotation of the sleeve valve S, which is stationary during the compression and explosion strokes, is had by the use of a grooved roller R engaging a series of rollers R1 mounted upon the lower periphery of the valve.

No. 9,741 British—to P. Gerhardt, Wilmersdorf, Berlin, Germany. Granted August 8, 1912; filed April 21, 1912.

Internal-Combustion Motor Carbureter—In which the auxiliary air valve is operatively connected to the throttle shaft and positively operated.

Positive action of the auxiliary air valve of the carbureter referred to in this patent is obtained by using a valve in the form of a spring-loaded sleeve S which has a port in its wall and slides in a tubular support T1. To prevent rotation of the valve, its spindle is squared, and, as Fig. 4 shows, the valve is connected by a link and the rod R to the throttle T so that when the latter is opened to a predetermined extent the sleeve is moved in its support, admitting air through a port in the cylindrical wall of the same.

No. 11,180 British—to G. Webb, Monmouth, Eng. Granted August 28, 1912; filed May 9, 1912.

Pneumatic-Tire Tread Band—Composed of studded fabric or leather which may be bolted to a suitably shaped tread surface.

The subject-matter of this patent are the tire and tire cover shown in Fig. 5. This tire comprises a fabric layer F around which is arranged a leather layer L built in two parts. These

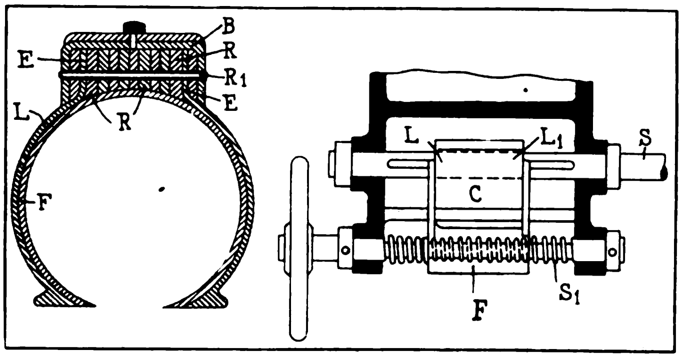


Fig. 5—Withy pneumatic tire tread. Fig. 6—Baird two-cycle motor intake valve

parts have upstanding edges E, between which rings R, made of leather, compressed fabric or any other suitable dense material are secured by tubular rivets R1. The layer L may be covered by a studded rubber or fabric tread band B which is punched and may be secured to the layer by bolts or laces passed through the rivets. It is not necessary to use the tread band with the tire.

No. 11,449 British—to R. Withy, North Camberwell, London, Eng. Granted August 28, 1912; filed May 11, 1912.

Intake Valve Mechanism—In which part of the charge is returned to the compression chamber.

The admission valve, Fig. 6, is designed for the use with two-

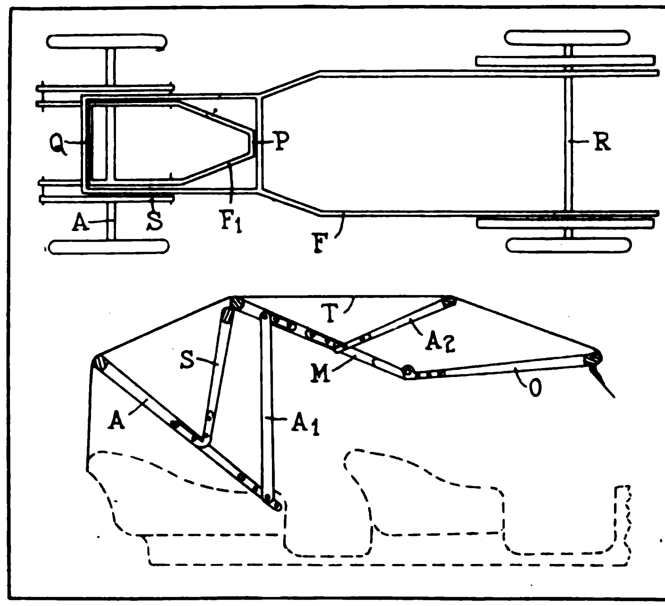


Fig. 7—Cleaver frame and subsidiary frame construction. Fig. 8—Hennessy automobile top construction

cycle motors returning part of their charge to the crankcase or whatever compression space takes the place of the same. The valve is actuated by a cam C mounted on a spindle S and adjusted axially by a fork F which engages a screw S1. The cam has surfaces of different lengths. L and L1, which determine the period during which the admission valve remains open.

No. 11,340 British—to J. O. Baird, North Shields, Eng. Granted August 28, 1912; filed May 10, 1912.

Motor Vehicle Design—Comprising a secondary frame upon which the front portion of the vehicle is carried.

This patent refers to the construction of an automobile, as shown in Fig. 7, in which the main frame F is carried by the rear axle and resiliently supported on it. At two points, P and Q, a subsidiary frame F1 is pivotally connected to frame F in a substantially longitudinal, horizontal axis. The subsidiary frame is also given a resilient support by spring S which rests upon the front axle.

No. 9,444 British—to H. C. Cleaver, London. Granted August 8, 1912; filed April 18, 1912.

Automobile Top Construction—In which the top is attached to the body at two points only.

This patent refers to a top construction, Fig. 8, in which, on

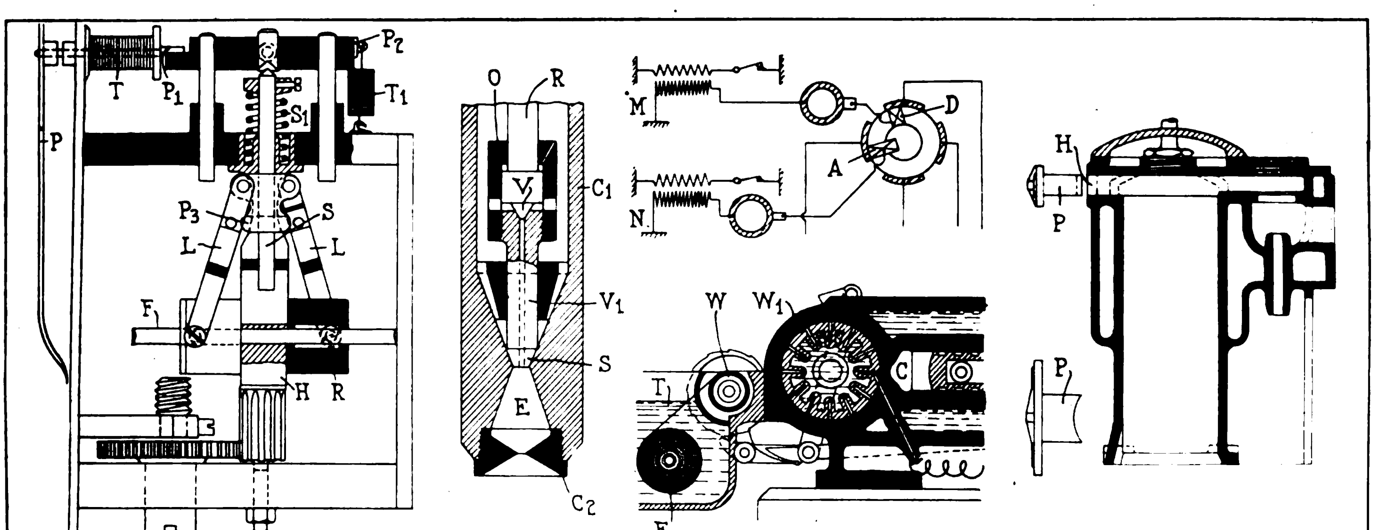


Fig. 9—Robinson centrifugal speedometer. Fig. 10—Breuer fuel admission device. Fig. 11—Bosch two-magneto ignition. Fig. 12—Thorn explosive motor. Fig. 13—Wingfield cylinder-cleaning design

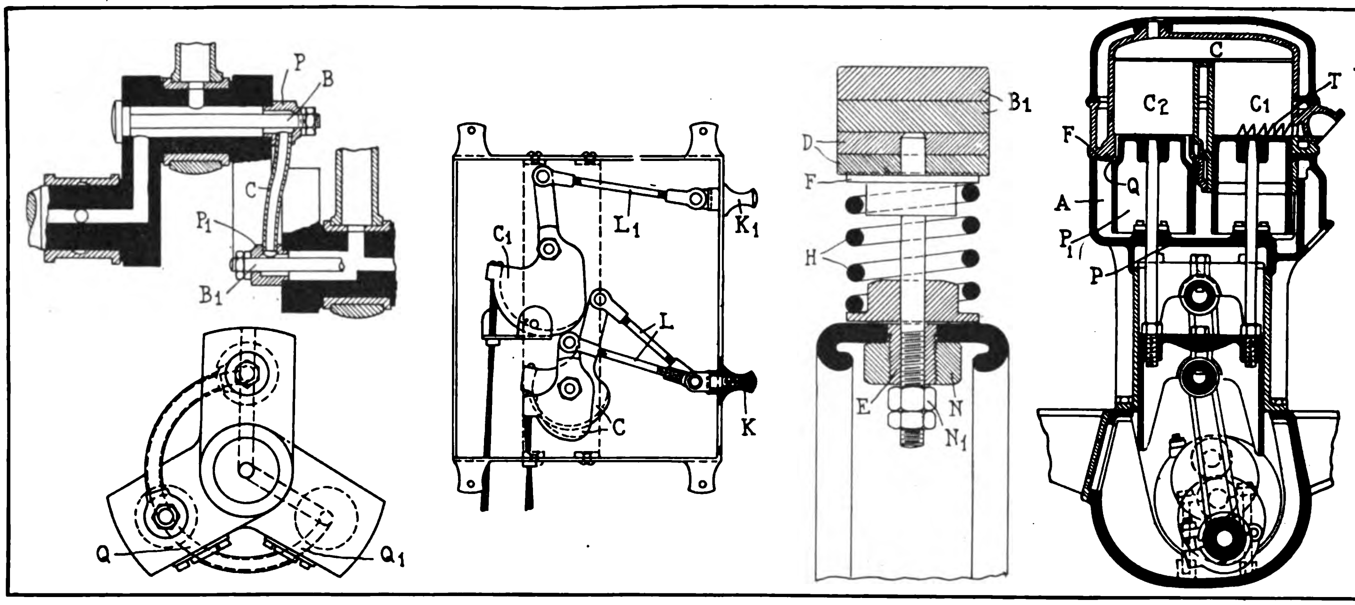


Fig. 14—Delaunay-Belleville crankshaft lubrication. Fig. 15—Bowden control mechanism. Fig. 16—Sutcliffe coiled-spring automobile tire. Fig. 17—Giles twin-cylinder automobile engine

each side of the top, an arm A is hinged to the body of the vehicle at V, at the rear of the entrance doors. The arm A is connected to the arm M by the hinged rod A1 and the short arm S. An outrigger arm O extends over the driver's seat, and an auxiliary arm A2 supports the top material T.

No. 9,334 British—to A. Hennessy, Liverpool, Eng. Granted August 8, 1912; filed April 26, 1912.

Centrifugal-Force Speedometer—In which weights move radially on a transverse rod.

This patent refers to a centrifugal speedometer, Fig. 9, construction in which the indicator is moved by a spring control. The rotating masses R which serve as a governor are carried by a hollow central spindle H, they being free to move radially on the transverse rod T. As they move, they lower through links L the spindle S which is axially positioned in the spindle H and movable independently of the same. The depression of the spindle S acts against the resistance of a spring S1 which is followed by a plate P2 pressed down by the springs T and T1. The latter spring tends to rotate the indicator P so that its movement is arrested by the abutments of the eccentric pin P1 against a cutaway portion of the plate P2.

No 9,929 British—to J. W. Robinson, London. Granted August 14, 1912; filed April 24, 1912.

Internal-Combustion Engine—Describing a fuel admission device for a type of engine in which liquid fuel and air are admitted to the engine cylinders.

The subject-matter of this patent, a fuel admission device, is seen in Fig. 10. It consists of a conical valve V seated in the throat of a Venturi tube. When fuel is admitted to the interior of the casing C1 it passes to the top of the valve seat S, and, when the valve rod R lifts, lost motion between valve V and its cap causes the valve V to be opened first. As the rod R is lifted further, the valve V1 is unseated and fuel is admitted into the expansion chamber E where air is mixed with it and whence it is passed through an orifice in the removable cap C2.

No. 10,365 British—to A. B. Breuer, Manchester, Eng. Granted August 21, 1912; filed April 28, 1912.

Magneto Ignition for Automobile Motors—Comprising two current sources independent of one another and operable on the same set of spark-plugs.

The invention to which this patent relates consists in the use of two distinct sources of ignition current, one of which is used for starting and the other during the continued running of the motor. Confusion of the currents is prevented by the use of a distributer in the secondary circuits. The diagram, Fig. 11, shows the arrangement of this ignition system for a four-cylinder motor. The distributer arm D is connected to the magneto M serving for normal running of the motor, while the arm A is connected to the starting magneto N, which latter may be driven by hand or by a spring wound by the driver or the engine. The angular distance of the arms D and A corresponds to the difference in timing for starting and normal runninng.

No. 9,840 British—to Robert Bosch, Stuttgart, Germany. Granted August 14, 1912; filed April 22, 1912.

Explosion Motor Proper—Utilizing as fuel an explosive which is decomposed when submitted to an electric or other kind of shock.

An engine which is driven by the use of an explosive instead of a fuel burning in the presence of oxygen is shown in Fig. 12. The explosive E, in the shape of one or more bands, is kept in a water tank T on a wheel submerged in water, whence it is fed to a drying wheel W and to chambered wheel W1. The latter cuts off pieces of the explosive band or bands, the size of these pieces being capable of regulation. In a cylinder C the explosive is exploded by an electric spark.

No. 10,011 British—to M. Thorn, Hamburg, Germany. Granted August 14, 1912; filed April 25, 1912.

Cylinder Cleaning Opening—Which is provided in the upper portion of the wall and is ordinarily closed by a plug.

A cylinder may be cleaned upon removing a plug P which fits into a hole H formed in its wall, Fig. 13. The most advantageous position is opposite the valves, or, at any rate, such that the valves and spark-plug will not be interfered with upon cleaning the interior of the cylinder.

No. 9,994 British—to W. Wingfield, Norbury, Surrey. Granted August 14, 1912; filed April 25, 1912.

Method of Lubricating Crankshafts—In which the influence of centrifugal force is overcome.

The lubricating systems for bored crankshafts illustrated in Fig. 14 is applicable to engines whose shafts have at least three crankshaft throws between each two bearings. The lubricant flows through circular tubes C, which are either secured to connecting pieces P, P1 fastened to the crankpins by bolts B, B1 or to flanged pieces registering with passages Q, Q1. In either case the use of passages C avoids the deterring effect of centrifugal force upon the lubricant passing from end crankpins to the middle of the shaft.

No. 10,629 British—to Soc. Anoyme des Automobiles Delaunay-Belleville, St. Denis, Seine, France. Granted August 21, 1912; filed May 2, 1912.

Driver's Control Mechanism—Comprising a group of Bowden wires.

This patent has reference to a control system as seen in Fig. 15. Bowden wires are used to provide connections between the mechanisms to be governed and knobs K and K_1, which are fastened to the dash and in reach of the driver. Each wire is operated through a cam C, C_1 and a link L, L_1, in turn actuated by the knobs mentioned. The latter are forced to move in a straight path by the shape of their bearings.

No. 10,661 British—to Bowden Brake Company, Birmingham, Eng. Granted August 21, 1912; filed May 2, 1912.

Mechanical Automobile Wheels—In which helical springs are used to insure resiliency and leather to form the tread surface.

In this wheel, Fig. 16, a series of studs are used which are formed, near their outer ends, with collars having flanges F. The inner ends of the studs are screw-threaded and pass through flange blocks D. The latter are held in place inside the rim by screwed extensions E and nuts N. Between the flanges helical springs H are in position which provide resiliency. The flexible portion of each wheel is made up by a rubber or leather-band tread B and non-stretchable belting D. Lateral movement of the tire is averted by the engagement of the extremity of the stud and a circumferential slot. The tire is put in place on the wheel felloe by drawing in the studs, this being done by means of the nuts N_1.

No. 10,722 British—to E. Sutcliffe, Brighouse, Yorkshire, Eng. Granted August 21, 1912; filed May 3, 1912.

Internal-Combustion Engine—In which a pair of cylinders is formed with a common combustion space.

The engine described in this patent and shown in Fig. 17 has a pair of cylinders having a combustion space C in common. The front ends of the cylinders open into a single compression chamber separated by a partition P from an inclosed crankcase. Through the port X a combustible mixture is allowed to enter the pump space A, passing thence to the cylinder C_2 through inclined ports Q in the piston P_1. The exhaust leaves through triangular ports T. A flange F supports the cylinders on the top portion of the basechamber.

No. 10,563 British—to J. A. Giles, Derby, Conn., U. S. A. Granted August 21, 1912; filed May 1, 1912.

Internal-Combustion Motor Valve—Being of the rotary distributer type.

The rotary valve V, Fig. 18, serving inlet and exhaust controls a port P covered by the piston when at its upper center and has passages E_1 and E_2 leading to the inlet and exhaust manifolds, respectively. These passages are so inclined as to have their axes intersect near the port P. The valve body has recesses in which sliding pieces are contained, being pressed away from the cylinder by springs. Thus, during compression and power stroke, tight fits are obtained between the valve body and the inlet and exhaust passages. The manifolds F_1 and F_2, for inlet and exhaust, have removable covers G_1 and G_2, so that, when the valve is withdrawn, access may be had to the port P.

No. 11,300 British—to H. V. J. Jouffret, Paris, France. Granted August 28, 1912; filed May 10, 1912.

Automobile Carbureter—In which the proportions of hot and cold air may be regulated.

The subject of this invention is seen in Fig. 19, showing a hollow tube T with a perforated conical end E located above the mixture tube M of the carbureter. Tube M is surrounded by a chamber C containing a helical rib H and heat-absorbing packing. Exhaust gases passing through C heat the rib H. For starting the tube T, through which the hot-air supply enters, is heated by wires W_1 connected with a battery, while cold air may be admitted through valve V. The valve W controls the mixture produced by the air entering through holes H_1 and fuel from the nozzle N.

No. 10,988 British—C. T. B. Sangster and W. Evands, Birmingham, Eng. Granted August 28, 1912; filed May 6, 1912.

Intake Valve Gear—Referring to motors to be operated by compressed air when ignition system fails.

This patent relates to a type of internal-combustion motor which is now principally used for marine purposes, and in which compressed air is used for starting as well as in case of failure of the ignition system. The compressed air is admitted to the cylinder by way of a mechanically actuated valve V, Fig. 20, and an automatic one V_1, which is so constructed that pressure and duration of air supply is automatically regulated, to prevent the admission of air when the engine operates on the ignition system and under reduced loads. The valve V has a double stroke and during part of the explosion stroke it is opened by forward or reverse cams C, which are tapered and axially adjustable. The control is by a lever connected to the throttle and a pressure-reducing valve in the compressed-air passage.

No. 11,230 British—to C. H. T. Alston, London. Granted August 28, 1912; filed May 9, 1912.

Multi-Jet Carbureter—In which the fuel jets are formed by grooves in the carbureter casing.

In this carbureter, Fig. 21, gasoline enters through the float-chamber F cast integral with the carbureter casing C, whereby a space F_1 is formed which serves as a hot-air jacket. The fuel passes from F to a series of jets P_3 which are formed as grooves in the conical surfaces of the casing C and a liner L and are arranged over one-fourth of the inner circumference of C. The suction-actuated piston P regulates both the hot-air and fuel supply through P_1 and the auxiliary-air supply entering by way of P_2. It has a triangular port Q with apex uppermost to control the number of jets in action. To keep constant the length of the port portion of P_1 open to incoming air, a triangular port is placed adjacent to Q. Air ports P_2 are controlled by ports Q_1 in P, registering with them and thereby providing passages. The baffle B on the piston P is designed to facilitate the mixing of air and fuel.

No. 11,167 British—to H. Lindblom, Liverpool, Eng. Granted August 28, 1912; filed May 9, 1912.

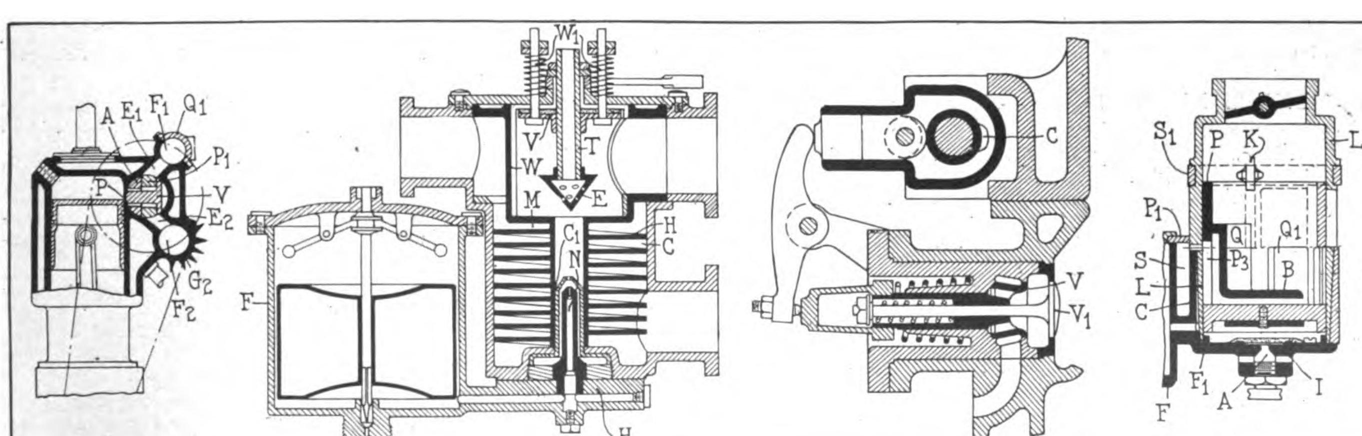
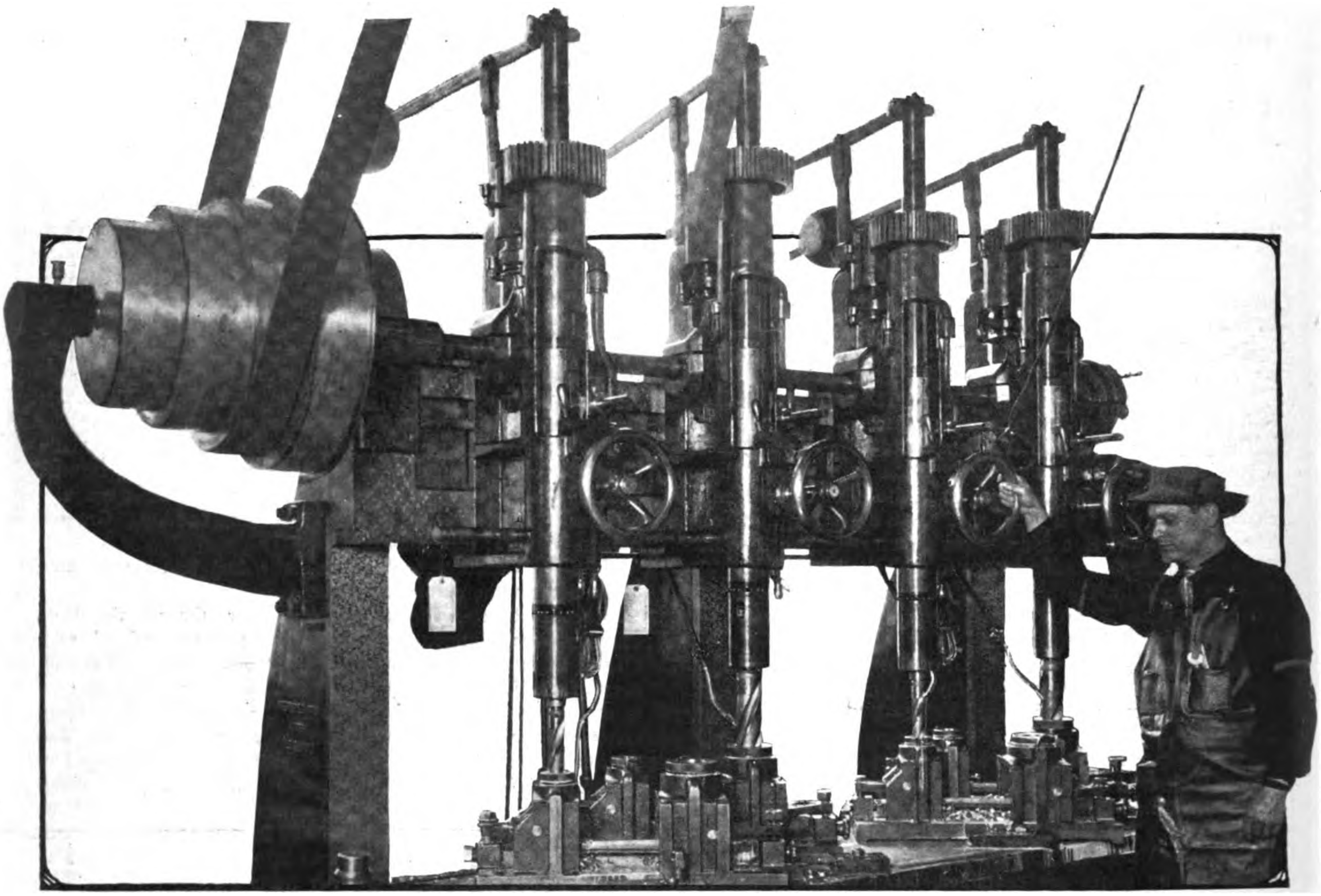


Fig. 18—Jouffret rotary valve automobile motor. Fig. 19—Sangster-Evands carbureter adjustable for hot-and-cold air ratio. Fig. 20—Alston intake valve gear. Fig. 21—Lindblom carbureter.

Factory Miscellany



Connecting-rod boring machine used by the Chalmers Motor Car Company, Detroit, Mich. It turns out 300 rods per day

Chalmers connecting rods are made in quantities. In the above illustration is shown a machine that is a true time-saver. This machine has been used extensively in locomotive building and has proved its merit in the shops of the Baldwin Locomotive Works. It has been taken over by only two automobile concerns for use in the manufacture of connecting-rods, the Chalmers company being one of them. This machine can turn out a completely bored connecting-rod in 3 minutes. It takes an operator and a helper to work it and by its use they can turn out approximately 300 finished connecting-rods in one day. Before the installation of this big machine the work was done on three small machines, each requiring a man to run it and the combined capacity was seventeen connecting-rods. The machine has been rebuilt from its original form and now has three spindles, allowing many parts of the work to overlap each other when the operator and his helper are working together. The saving of time and money has been considerable but what is of equal importance is the saving in total floor-space required per part produced. In other words, the output has been increased while the required space per part has been decreased, thus securing a highly desirable point in the increase of factory efficiency.

KLINE'S Richmond Plant—Twenty employees of the Kline Motor Car Corporation, York, Pa., including a number of mechanics and other workmen, left recently for Richmond, Va., in order to install the machinery and complete the other preliminaries for the opening of the company's new plant in that city. The factory is built in two parallel wings, connected at one end by a shorter wing, in front of which and connected with it is a two-and-one-half-story office building. The material is brick and the trimmings are of white stone. The structure stands on a concrete foundation and the floors of the factory are cement. The accompanying illustration shows the factory.

Electric Company Incorporated—The Electric Motor Sales and Repair Company is the name of a new plant recently incorporated to do business in Winnipeg, Man.

Cadillac's Addition—The Cadillac Motor Car Company, Detroit, Mich., has taken out a building permit covering the erection of an addition to its plant, to cost $29,000.

Goodyear Building—The Goodyear Tire & Rubber Company, Akron, O., is having plans prepared for two large additional factory buildings, the erection of which will be started early next spring.

Purchase Findlay Property—A group of Toledo, O., and Lima capitalists have formed a syndicate with a view to purchasing the property of the Findlay Motor Company, Findlay, O. If the deal is consummated the plant will be operated at Findlay.

Knight Builds Addition—The Knight Tire & Rubber Company, of Canton, O., which recently increased its authorized capital stock from $331,500 to $1,500,000, will erect a large addition to its plant. When the new structure is completed the capacity of the plant will be largely increased.

Hart Company in Canada—The Hart Accumulator Company, of London, Eng., manufacturer of storage batteries, will establish a factory in western Canada. E. J. Clarke, managing director of the company, will recommend that a large plant be built at either Winnipeg or Fort Williams, Ont.

Only Temporary Quarters—The Lavigne Gear Company, formerly of Corliss, Wis., and now located at Racine, Wis., is temporarily occupying part of the old Racine-Sattley Company's plant, and the recent move was in line with its plans to establish a permanent home of its own in Racine. The Lavigne company during last week occupied factory No. 17 of the Racine-Sattley works, affording 48,000 square feet of floor space. Two hundred men are now employed, and the output is being considerably enlarged. As soon as the officers have selected a site for permanent location, ground will be broken for a large and modern fireproof factory.

Rebuild Forge Shops—The Studebaker Corporation is preparing to rebuild the forge shops at Clark street, Detroit, Mich.

Chalmers to Build—The Chalmers Motor Car Company, Detroit, Mich., has given construction contracts for a plant addition.

Hudson Plans Addition—The Hudson Motor Car Company, Detroit, Mich., plans to build an addition to its plant at Oakland, Cal.

Crose Truck's Factory—The Crose Auto Truck Company is taking bids for a two-story truck factory, 80 feet by 140 feet, to cost $30,000.

Jackson's Factory Plans—The Jackson Motor Car Company, Jackson, Mich., contemplates a branch factory, to cost approximately $200,000.

Kelly Awards Contract—The Kelly Motor Truck Company, Springfield, O., has awarded the contract for the erection of its proposed factory addition.

Eclipse Enlarges—Contracts have been let by the Eclipse Machine Company, Elmira, N. Y., for an addition, 125 feet by 60 feet, to their factory building.

Federal Building—The Federal Motor Company, Indianapolis, Ind., has given a contract for a factory addition, one-story high, and to cover 50,000 square feet.

Truck Company Builds—The Hydraulic Auto Truck Company is planning the erection of a plant at Los Angeles, Cal., for the manufacture of hydraulic trucks. W. E. Barnes is president, and D. L. Whitford is general manager.

New Birmingham Company—Automobile tops, cushions and covers are being manufactured in Birmingham, Ala., by the recently organized Birmingham Auto Top Company. This is the only plant of its kind in the South. The company is capitalized at $60,000, which was subscribed locally. C. R. Christopher and C. G. Ryan organized the company and are at the head of its management.

Calendar of Coming Automobile Events

Shows, Conventions, Etc.

Nov. 16-23........Atlanta, Ga., Annual Show, Auditorium-Armory, Atlanta Automobile and Accessory Association.
Jan. 2-10..........New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 4-11..........Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-25.........New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 22-25.........Geneva, N. Y., Annual Automobile Show.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Buffalo, N. Y., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Jan. 30-Feb. 1.....Canandaigua, N. Y., Annual Automobile Show.
Feb. 1-8...........Chicago, Ill., Annual Automobile Show.
Feb. 10-15.........Chicago, Ill., Truck Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 11-15.........Ottawa, Ont., Annual Automobile Show.
Feb. 15-22.........Newark, N. J., Annual Automobile Show, First Regiment Armory, New Jersey Automobile Exhibition Company.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 24-Mar. 1.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
March 3-8..........Pittsburgh, Pa., Annual Automobile Show.
March 8-15.........Boston, Mass., Annual Automobile Show.
March 19-26........Boston, Mass., Annual Truck Show.
March 24-29........Indianapolis, Ind., Annual Automobile Show.

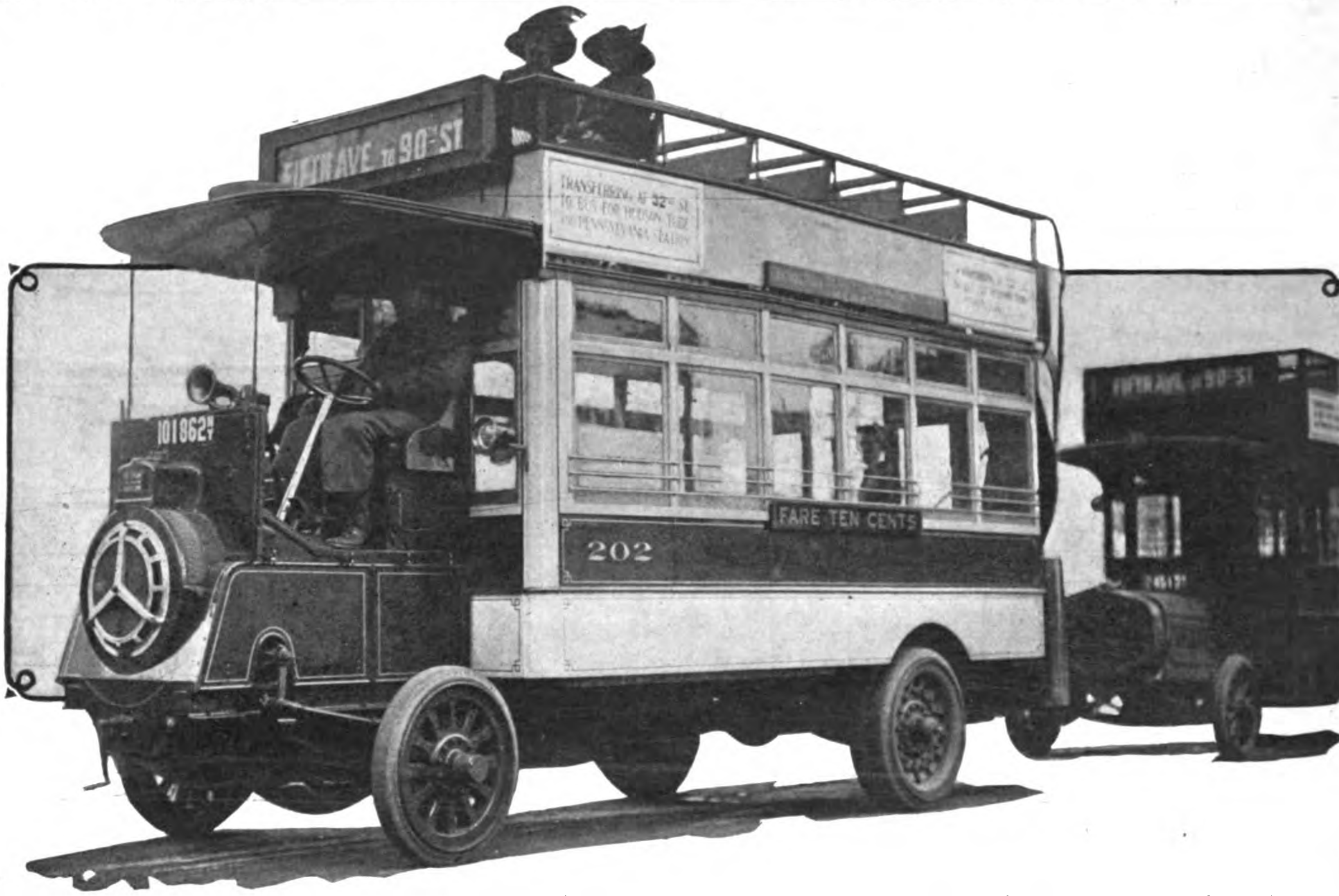
Race Meets, Runs, Hill Climbs, Etc.

Nov. 9.............Sociability Run, Louisville, Ky., Louisville Automobile Club.
Nov. 29-30.........Richmond, Va., Track Races, State Fair Grounds, Richmond Automobile Club.
May 30.............Indianapolis, Ind., 500-Mile Race, Speedway.

Proposed Contests

Nov. 3-5-6.........Track—Shreveport, La., Shreveport Automobile Club.
Nov. 7.............Track, Santa Rosa, Cal., Barney Oldfield.
Nov. 9.............Track, San Jose, Cal., Barney Oldfield.
Nov. 10............Track, San Francisco, Cal., Barney Oldfield.
Nov. 13............Track, Stockton, Cal., Barney Oldfield.
Nov. 15............Hill Climb, Greenville, S. C., Automobile Club.
Nov. 16, 17........Track, Sacramento, Cal., Barney Oldfield.
Nov. 23, 24........Track, Fresno, Cal., Barney Oldfield.
Nov. 28-29.........Track—Richmond, Va., Richmond Automobile Club.
Nov. 28............Road Race—Visalia, Cal., W. H. Lipton.

New factory of the Kline Motor Car Corporation at Richmond, Va., to which the company is now moving its machinery and equipment



New type of De Dion bus adopted by the Fifth Avenue Transportat ion Company, New York City. Old type is shown in the background

NEW De Dion Bus—The Fifth Avenue Bus Company, Æolian Building, New York City, recently purchased a De Dion bus. Its horsepower is 36, bore 110 millimeters, stroke 130 millimeters; the wheelbase is 13 feet, and the weight 10,000 pounds. Its inside carrying capacity is 25 and the outside is 22. It has three speeds forward and one reverse. The above photograph gives a comparison of the old style of bus and the new.

National Moves in Boston—W. H. Stevens, who has the National agency in Boston, Mass., has moved from the Autocar building on Beacon street to 1920 Boylston street near Massachusetts avenue.

Limric as a Lecturer—Howard B. Limric, manager of the New England branch of the Goodrich Rubber Company recently delivered a lecture illustrated with lantern slides to the students of the Boston Y. M. C. A. automobile school.

Lowe Makes a Change—L. H. P. Lowe, formerly connected with the Charles T. Jeffery Company, of Boston, Mass., handling the Rambler line, has resigned to accept a position as sales manager of the Dodge Motor Vehicle Company in that city.

Ford Removes—The Ford Motor Company, Philadelphia, Pa., has removed to 257-259 North Broad street. The past week also witnessed the opening of the Ford company's new service and assembly building at South Sixteenth street and Washington avenue.

Bay State A. A. Plans Banquet—The officials of the Bay State A. A. of Boston, Mass., are planning to hold the annual banquet of the association in Boston on December 8 and some of the prominent manufacturers will be invited to address the members.

Shouse Sales Manager—E. A. Shouse has been appointed sales manager of the C. & F. Motor Car Company, San Francisco, Cal.

Large Contract Given—The Jackson-Church-Wilcox Company, Saginaw, Mich., has closed contracts for a volume of steering gears for 1913 cars between 75,000 and 85,000.

Premier's Fall Display—The Premier Motor Sales Company, Indianapolis, Ind., is holding its annual fall display and opening in its salesrooms in North Delaware street. The rooms are attractively decorated in autumn leaves and the complete Premier line is on display.

Roberts Resigns—Thomas R. Roberts has resigned the sales managership of the United Motor Philadelphia Company and formed a co-partnership with Charles M. Reeves, to take over the local agency of the Marion. Under the firm name of Roberts & Reeves headquarters have been established at 1336 Race street.

Minnesota's Road Improvement—Contracts for construction of 2,700 miles of highway in Minnesota next summer will be authorized by the state highway commission. Seven hundred miles will be absolutely new road in the northern part of the state. Surveying, stumping and sand hauling will be done in the winter. The mileage will be completed by fall.

De Tamble's Troubles—E. N. Hill, Thomas De La Hunt and Frank F. Taylor have been appointed by H. C. Sheridan, referee in bankruptcy, to take an appraisement and inventory of the property of the De Tamble Motors Company at Anderson, Ind. When the appraisement and inventory is completed, the property will be offered for sale. J. C. Teegarden was recently appointed trustee to represent about $75,000 worth of unsecured claims against the company.

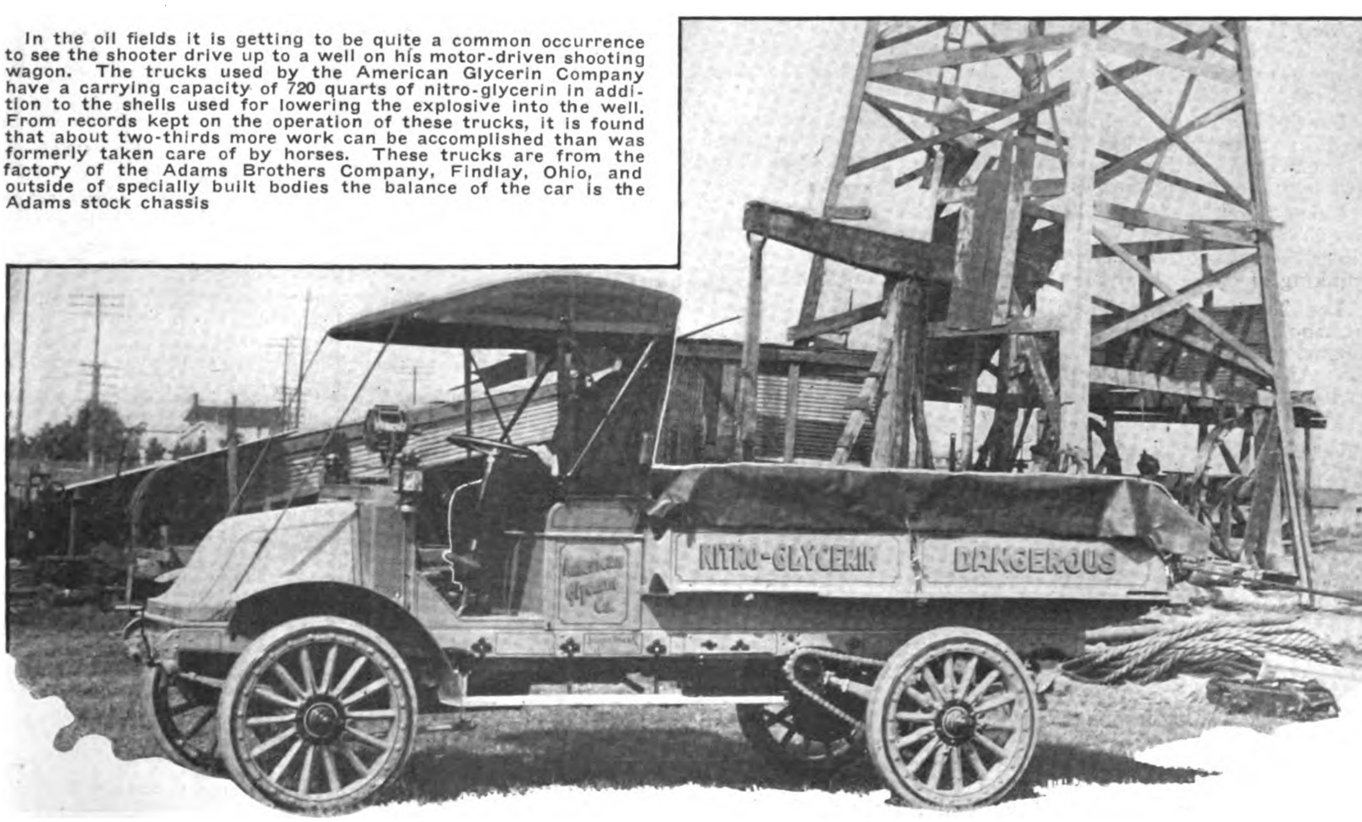
New Agencies Established During the Week

PLEASURE CARS

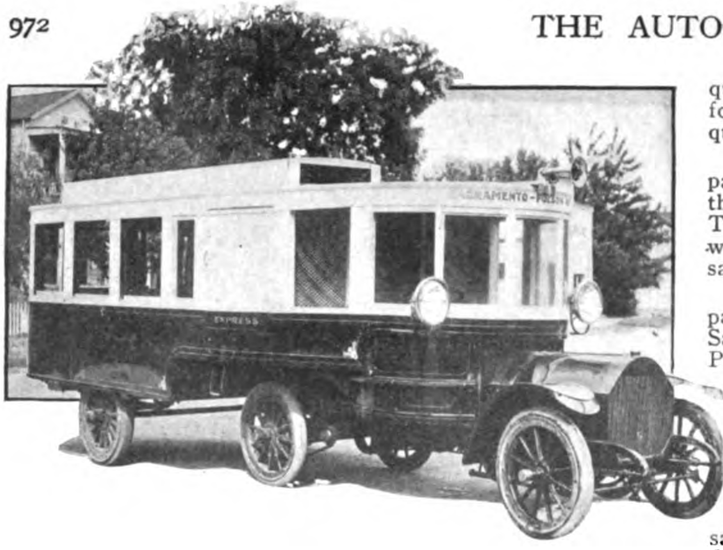
Place	Car	Agent
Albany, N. Y.	Franklin	Clarence G. Heck.
Aledo, Ill.	Moon	E. B. Miller.
Anaheim, Cal.	Henderson	P. J. Weisel & Co.
Baltimore, Md.	Stutz	Stutz Sales Co.
Buffalo, N. Y.	Wagenhals	Edgar C. Messersmith.
Butte, Mont.	Packard	Montana A. Gar. Co.
Calvert, Tex.	Henderson	G. T. Bergeson.
Cambridge, Md.	Marathon	E. J. Brannock.
Canton, O.	Moon	Auto Service Co.
Cincinnati, O.	Havers	Western Motor Car Co.
Columbus, O.	Abbott-Detroit	Snyder Automobile Co.
Columbus, O.	Bergdoll	Kaiser Motor Car Co.
Columbus, O.	Flanders	Everett Auto Sales Co.
Columbus, O.	Hupmobile	Kaiser Motor Car Co.
Columbus, O.	Oakland	Oscar Lear M. C. Co.
Columbus, O.	Locomobile	Engle & Vincent.
Columbus, O.	Oldsmobile	Oscar Lear M. C. Co.
Columbus, O.	Premier	Edward Miller.
Columbus, O.	Velie	Engle & Vincent.
Cuyahoga Falls, O.	Henderson	Falls Auto & Sales Co.
Danville, Ill.	Henderson	D. D. Snyder & Co.
Decatur, Ill.	Moon	North Main St. Gar.
Easton, Md.	Ford	H. E. Clark & Co.
Fall River, Mass.	Franklin	Eckberg & Place Garage Co.
Fargo, N. D.	Henderson	Bergen Auto Co.
Fond du Lac, Wis.	Hupp	E. W. Clark M. Co.
Fond du Lac, Wis.	Jackson	E. W. Clark M. Co.
Frederick, Md.	Krit	H. A. Hann.
Frederick Co., Md.	Paige-Detroit	James E. Solt.
Grand Rapids, Mich.	Henderson	W. S. Farrant.
Harrington, Wash.	Chalmers	J. Thompson & Son.
Haines City, Fla.	Henderson	Wynn W. Scott.
Houston, Tex.	Moon	Northrup & Clark Co.
Lancaster, Pa.	Henderson	Auto. & Supply Co.
Lordsburg, Cal.	Henderson	Williams Bros.
Madison, Wis.	Chalmers	Hokanson Auto Co.
Mechanicsburg, Pa.	Kline	Charles Schroeder.
Mendota, Ill.	Rambler	George Wendel.
Miami, Fla.	Henderson	Dr. Chas. L. Wetzel.
Milwaukee, Wis.	King	Hustis Bros.
Milwaukee, Wis.	Stevens-Duryea	Hustis Bros.
Milwaukee, Wis.	Studebaker	J. G. Wolleager Co.
Minneapolis, Minn.	Stevens-Duryea	J. P. Snyder A. Co.
Moneta, Ia.	Moon	Louis Ruwe.
Monroe City, Miss.	Henderson	Monroe City Auto Co.
Montgomery, Ala.	Henderson	H. L. Hattemer.
Montreal, Que.	Cole	Royal Auto Co.
Pacific Grove, Cal.	Henderson	H. Nuttall.
Petersburg, Va.	Moon	Wm. P. Atkinson Co.
Philadelphia, Pa.	Pope-Hartford	Wallace Auto Co.
Phillipsburg, Pa.	Kline	H. B. Scott.
Phoenix, Ariz.	Hupmobile	J. S. Morrison.
Salisbury, Md.	Henderson	F. J. Adams.
Saranac Lake, N. Y.	Henderson	H. J. Morse.
San Francisco, Cal.	Kline	Frank O. Renstrom & Co.
Savannah, Ga.	Kline	Edward J. Thompson.
Seattle, Wash.	Pathfinder	Van Brunt M. C. Co.
South Bend, Ind.	Franklin	Warde L. Mack.
Steelton, Pa.	Kline	Bartram Shelly.
St. Louis, Mo.	Marion	Neustadt Automobile & Supply Co.
St. Louis, Mo.	Speedwell	Meyer-Rusch Automobile Co.
St. Paul, Minn.	Premier	Norton & Bingham.
St. Paul, Minn.	Premier	Central Auto Co.
Stockton, Cal.	Henderson	S. F. Ruff.
Toronto, Can.	Moon	Auto. Sales Co., Ltd.
Toronto, Ont.	Regal	Ross Motor Car Co.
Ventura, Cal.	Henderson	Wesley B. Parker.
Washington, Mo.	Moon	C. A. Krumsick.
Waynesboro, Ga.	Henderson	R. C. Neely & Co.
Wilkes-Barre, Pa.	Henderson	[illegible]. D. Hershberger.
Winnipeg, Man.	Cole	Breen M. Co.
Youngstown, O.	Moon	Regal Sales Co.

COMMERCIAL VEHICLES

Place	Car	Agent
Albany, Ore.	Federal	Barrett Bros.
Austin, Tex.	Federal	Ben M. Barker.
Bakersfield, Cal.	Federal	Ben L. Brundage.
Boise, Idaho	Federal	Wade & Adellman.
Boston, Mass.	Federal	C. E. Whitten.
Cincinnati, O.	Federal	Cincinnati Motor Car Co.
Connellsville, Pa.	Federal	Connellsville Garage.
Denver, Colo.	Federal	W. W. Barnett.
Detroit, Mich.	Federal	Thompson Auto Co.
Fitchburg, Pa.	Federal	Robert W. Powers.
Fresco Co., Cal.	Federal	[illegible]. W. Hobson Co.
Grant's Pass, Ore.	Federal	Allen & Dunn.
Greenville, S. C.	Federal	W. Conway Thompson.
Hollywood, Cal.	Federal	[illegible]. E. Carroll.
Hamburg, N. Y.	Federal	D. W. Brodbeck.
Houston, Tex.	Federal	Alamo Automobile Co.
Imperial, Cal.	Federal	Edgar Bros.
Independence, Ore.	Federal	Hanna Bros.
Long Beach, Cal.	Federal	McKenzie & Bellows.
Los Banos, Cal.	Federal	W. M. Roberts.
Minneapolis, Minn.	Federal	Pence Auto Co.
Newark, N. J.	Federal	B. F. Adams & Co.
New Orleans, La.	Federal	Fairchild Auto Co.
Pomins, Cal.	Federal	Whip & Zander.
Poughkeepsie, N. Y.	Federal	R. B. Kelly.
Reno, Nev.	Federal	[illegible]. R. Wainwright.
San Antonio, Tex.	Federal	Alamo Automobile Co.
Santa Ana, Cal.	Federal	[illegible]. W. Neely.
San Diego, Cal.	Federal	Hunt Auto Co.
San Jose, Cal.	Henderson	[illegible]. Ramselius.
Salem, Ore.	Federal	B. C. Boedigheimer.
Salt Lake City, Utah	Federal	Cheeseman Auto Co.
Springfield, Mass.	Federal	Fitchburg Hardware Co.
St. Louis, Mo.	Brown	Meyer-Rusch Automobile Co.
Stockton, Cal.	Federal	Sampson Iron Works.
Tacoma, Wash.	Federal	W. J. Pruitt.
Taunton, Mass.	Federal	Pacific Car Co.
Union, N. J.	Federal	Union Auto Co.
Ventura, Cal.	Federal	R. C. Dennison.
Watsonville, Cal.	Federal	H. G. Brewington Co.
Whittier, Cal.	Federal	Saunders Bros.



In the oil fields it is getting to be quite a common occurrence to see the shooter drive up to a well on his motor-driven shooting wagon. The trucks used by the American Glycerin Company have a carrying capacity of 720 quarts of nitro-glycerin in addition to the shells used for lowering the explosive into the well. From records kept on the operation of these trucks, it is found that about two-thirds more work can be accomplished than was formerly taken care of by horses. These trucks are from the factory of the Adams Brothers Company, Findlay, Ohio, and outside of specially built bodies the balance of the car is the Adams stock chassis



Novel Locomobile stage coach in service between Sacramento and Folsom, Cal. It makes two trips a day, averaging 90 miles

Bendel Supplants Bremer—M. D. Bendel has succeeded F. G. Bremer as manager of the Twitchell-Gauge Company, Chicago, Ill.

Elmer Leaves Grant—H. H. Elmer, general manager of the Grant Motor Car Company, Cleveland, O., has severed his connection with that concern.

Automobile Value Placed—The basis of valuation of an automobile has been placed at $600 for Oshkosh, Wis., cars and $300 for those owned in the country districts.

Schwartz Resigns—A. E. Schwartz has resigned as general manager and treasurer of the Bergdoll Motor Car Company, New York City. His resignation takes effect on November 7.

Baker Increases Space—Additional show room quarters for the Baker electric, Philadelphia, Pa., have been established at 1927 Market street by the Carroll A. Haines Company.

Goes to Olympia Show—R. M. Lockwood, manager of the foreign department of the Regal Motor Car Company, Detroit, Mich., has gone to England to attend the Olympia Show in London.

Moline Self-Starter Equipped—The Moline Automobile Company, East Moline, Ill., will equip its 1913 car with an electric self-starter and lighting system, each operating independently of the other.

Alco Moves—The Longstreth Motor Car Company, Philadelphia, Pa., dealers in the Alco line, will about November 15 remove to the company's new sales and service building, 2126-28-30 Market street.

Smith-Milwaukee Delivery—The A. O. Smith Company, of Milwaukee, Wis., has just made delivery of a squadron of four Smith-Milwaukee worm-drive trucks to The Texas Company at its Chicago, Ill., branch.

Buick Show a Success—The second annual show inaugurated by the Boston branch of the Buick Motor Company closed last week and it proved a success. Other dealers are thinking of doing the same thing during the fall season.

Lee Tire in West—The Lee Tire & Rubber Company, Conshohocken, Pa., will be represented in the West by Chanslor & Lyon, whose branches are at San Francisco, Cal.; Los Angeles, Fresno, Portland, Ore.; Seattle and Spokane, Wash.

Kliesrath Visits Europe—V. W. Kliesrath, chief engineer of the Bosch Magneto Company, New York City, will sail for Europe November 7. He will make the rounds of the automobile factories and incidentally visit both the London and the Paris shows.

L. A. Austin Resigns—L. A. Austin has resigned his position as sales manager and advertising manager of the Rutenber Motor Company, Marion, Ind., to take effect November 1. He will be connected in the future with the Mais Motor Truck Company, Indianapolis, Ind.

Chief Instructor Engineering—Mr. Julian Chatel, the general manager of the Rochet-Schneider car agency of Canada, has been apointed chief instructor of automobile engineering and mechanics in connection with the Montreal Technical High School.

Stewart District Managers—The Stewart Motor Corporation, Buffalo, N. Y., has appointed E. E. Dennison district manager for Illinois, eastern Iowa and Missouri, with headquarters at Chicago, Ill., and W. T. Butler, district manager for New York state and northern Pennsylvania, with headquarters at Buffalo.

Lozier Acquires Property—The Lozier Automobile Company, Philadelphia, Pa., has acquired by a long term lease the stable property, 66 feet by 184 feet, at the corner of Twenty-first and Ludlow streets. Approximately $40,000 will be expended to reconstruct the building for automobile sales purposes.

Piggins Factory Branch—The Piggins Motor Truck Company, of Racine, Wis., has established a factory branch in San Francisco, Cal., to take care of the entire Pacific coast. President E. N. McNab, now in that city, has appointed J. I. McLaughlin manager. Arrangements are now being made for the erection of a permanent building on Golden Gate avenue.

Johnson Sales Manager—W. C. Durant, vice-president of the Republic Motor Company, Detroit, Mich., has appointed Ted Johnson as general sales manager, with headquarters at Detroit. He will have entire charge of sales for the Chevrolet Motor Company and Little Motor Car Company and for all of the subsidiary companies of the Republic Motor Company.

New Frisco Insurance Company—The American Automobile Insurance Company has entered the San Francisco, Cal., field to make a strong bid for the automobile insurance business, the major portion of which has long rested with the Fireman's Fund Insurance Company, a California corporation. The American Company has appointed J. W. Francis manager here.

Locomobile's Stage Coach—Unique in appearance is the Locomobile stage coach in service between Sacramento and Folsom, Cal. This stage, known as the Sacramento-Falsom Air Line, is in daily use between these two points, making two trips a day, averaging about 90 miles. The total weight of the conveyance is 6,000 pounds and the extreme length 24 feet. The accompanying illustration shows the car.

Automobile Incorporations

AUTOMOBILES AND PARTS

ACTON, O.—Davis King Company; capital, $200,000; to deal in automobiles. Incorporators: A. W. Davis, Hobart E. Mead, B. A. King.

AKRON, O.—Akron Welding Company; capital, $10,000; to manufacture and deal in automobiles. Incorporators: Milton N. Smith, George D. Stiver, Edward H. Boylan, David H. Morgan, Lucile H. Smith.

BOSTON, MASS.—Ultra Motor Car Company; capital, $100,000; to deal in automobiles. Incorporators: R. H. Randall, Elisha A. Bragg, C. A. Parker.

BUFFALO, N. Y.—Lafayette Motor Sales Company; capital, $10,000; to sell automobiles. Incorporators: Frank J. Batt, Annie E. Groh.

CAMDEN, N. J.—Hendricks Manufacturing Company; capital, $250,000; to deal in automobiles and accessories. Incorporators: F. R. Hansell, John A. MacPeak, F. S. German.

CLEVELAND, O.—Perrine Manufacturing Company; capital, $10,000; to manufacture and deal in automobiles. Incorporators: R. A. Wilbur, Charles S. Wather, H. H. Burton, Benjamin A. Gage, A. S. Dole.

DETROIT, MICH.—Sprung Carbureter & Clutch Company; capital, $45,000 to engage in the manufacture of automobile parts. Incorporators: William Healy, J. S. Kennary.

DETROIT, MICH.—Tyro Manufacturing Company; capital, $5,000; to manufacture automobiles. Incorporators: Roy I. Wellington, William C. Stuart, F. J. B. Gerald.

HATTIESBURG, MISS.—Hattiesburg Automobile Company; capital, $10,000; to deal in automobiles. Incorporators: M. D. Fohey, H. S. Buscher, Charles Ehlers.

LOUISVILLE, KY.—Highland Motor Transfer Company; capital, $5,000; to deal in automobiles. Incorporators: John Rommel, C. P. Schillinger, Conrad H. Gutermuth.

LOUISVILLE, KY.—Southern Motors Company; capital, $100,000; to deal in autumobiles. Incorporators: A. T. Hart, Richard V. Look, Graeme G. Bolts, Raynale Whitehand, A. L. McCormick.

MADISON, N. J.—Michigan Motor Sales Company; capital, $10,000; to deal in motor vehicles. Incorporators: Elmer L. Reynolds, Alvah L. Reynolds, Clara Reynolds.

MEMPHIS, TENN.—P. R. Flanigan Automobile Company; capital, $10,000; to deal in automobiles. Incorporators: P. R. Flanigan, J. J. Carrigan, T. M. Scruggs.

MENOMINEE, MICH.—D. F. Poyer Company; capital, $75,000; to manufacture motor trucks. Incorporator: D. F. Poyer.

MT. EATON, O.—Mt. Eaton Supply Company; capital, $60,000; to deal in automobiles, implements, etc. Incorporators: J. A. Yohn, F. B. Schlafly, Charles L. Schaffer, Robert Kenwell, Albert Pfister, Ira C. Wellbaum.

NEW YORK CITY, N. Y.—A. M. A. Company, Inc.; capital, $5,000; to deal in motors, engines, etc. Incorporators: N. Pohly Myers, Walter C. Allen, Harry N. Allen.

PETROLIA, ONT.—Petrolia Motor Car Company, Ltd.; capital, $300,000; to manufacture automobiles. Incorporators: William English, Charles H. Metcalf, John A. McKenzie.

ST. LOUIS, MO.—Brashear Truck Company; capital, $5,000; to deal in motor trucks. Incorporators: Boyle O. Rides, Lewis S. Haslam.

WASHINGTON, D. C.—Croton Motor Car Company; capital, $300,000; to manufacture automobiles. Incorporators: J. P. Stoltz, A. M. Linn, J. D. Bigger, J. I. Brownson, J. H. Donnan, H. C. Warne, C. S. Caldwell, G. W. Dudderar, R. M. Paxton.

Bretz Off to Europe—J. S. Bretz has sailed for Germany, where he will visit the F. & S. bearing factory at Schweinfurt.

Leech Manager Oakland—E. K. Leech has been made manager of the new Oakland branch in Philadelphia, Pa.

Essenkay's Houston Office—The Essenkay Sales Company has established a Houston, Tex., office at 217 Carter Building with H. H. Hassel as manager.

Increasing Repair Facilities—The E. W. Clark Motor Company, of Fond du Lac, Wis., is planning to considerably increase its storage and repair facilities.

Gotshall in St. Louis—N. S. Gotshall has been shifted from traveling representative for the Lozier interests to manager of the St. Louis company, St. Louis, Mo.

Establish Louisville Office—Wilcox Brothers, who have secured the agency for Fisk tires in Louisville, Ky., have established an office and salesroom at 941 1-2 South Third avenue.

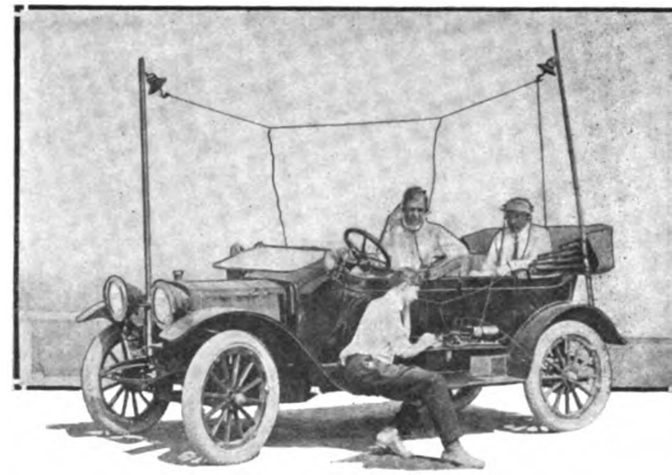
Anderson Heads Ford Branch—W. C. Anderson is to have charge of the Ford branch which opened October 1 in Minneapolis, Minn. He will have charge also of the St. Paul subbranch.

Averill Resigns—H. R. Averill, who has been connected with the Pullman Motor Car Company, of York, Pa., for 6 years as general sales manager, has resigned, resignation taking effect November 1.

Automobile at Dairy Show—A number of enterprising Milwaukee, Wis., dealers are making automobile exhibits at the International Dairy Show which is being given in the Auditorium from October 22 to October 31, inclusive.

Phipps Electric Organized—The Phipps Electric Automobile Company has been organized in Detroit, Mich., by Joel G. Phipps for the purpose of manufacturing electric automobiles. Mr. Phipps was formerly general manager of the Grinnell Electric Car Company.

Hay Leaves Ford—Thomas J. Hay, who for 7 years was manager of the Chicago branch of the Ford Motor Company, recently created a sensation among the local trade by retiring from his position. Dayton Keith, who has been Indianapolis manager of the Ford company, has been named as his successor.



R. C. H. car used by E. C. Hanson, of Los Angeles, in recent wireless telephony experiments between Lookout Mountain and Long Beach

Puncturine Company Incorporated—The Detroit Puncturine Company was recently incorporated in Detroit, Mich. The officers of the concern are: M. H. Chamberlain, L. N. Taylor and K. R. Montgomery. The concern manufactures a tire compound which is intended to heal punctures and cuts in the envelope.

Will Silence Critics—The permanent improvement plan of Milwaukee county, Wis., is elaborate and will silence critics, who declare that Milwaukee county's highways are not only the worst in America, but there seems to be no inclination to improve them. The 12 miles of concrete road built this year will be increased to 52.

Paducah Automobile Service—A daily automobile service has been established between Paducah and Roaring Springs, 40 miles. The Quanah, Acme & Pacific Railroad is now being extended from that place to Roaring Springs and the automobile service will be operated between the two points until the railroad is finished.

Birmingham Cars Tour—Eighteen cars from Birmingham, Ala., took part in the second Birmingham-Meridian tour. The visitors were met at Livingston, Ala., by twenty-five Meridian cars who escorted the guests into the city. All the whistles in the city were tied down and a rousing welcome accorded the Birmingham people.

Lacroix Exclusive Agent—Paul Lacroix has signed a contract whereby he becomes exclusive agent in the United States for the Mercedes car. The contract extends to 1920. The headquarters of the new concern, the Mercedes Distributing & Importing Company, of which Mr. Lacroix is president, are at 1770 Broadway, New York City.

Completes Route Marking—The Lake-to-River Road Association, organized recently by Milwaukee, Wis., and other state interests affected by the planning of a good highway across the state of Wisconsin, from Lake Michigan to the Mississippi River, reports that it has completed the marking of the route by means of banding telephone posts, as in Iowa. The distinguishing mark is a white band on each post, a red X being placed in the center.

Hupmobile Wins Award—The final award in the Studebaker-Hupmobile controversy resulting from disqualification of the former car in the annual reliability run of the Minnesota State Automobile Association for leaving the course at Foxhome, Minn., has been made by the contest board of the A. A. A. to the R. W. Munzer & Sons Company, for the Hupmobile. Protest was originally made by the Studebaker corporation. The award carries the Minneapolis Daily News cup for light car class with it.

Shanks Goes East—Charles B. Shanks, who has been appointed general sales manager of the Kelly-Springfield Motor Truck Company, of Springfield, Ill., will leave San Francisco, Cal., for the East to assume the duties of his new position. Shanks is well known in American automobile circles as the former sales manager of the Winton Motor Carriage Company and the F. B. Stearns Company, of Cleveland. Shanks has turned the management of the Kelly motor truck branch in San Francisco over to Frank G. Miner, who has been his assistant.

Automobile Incorporations

White Plains, N. Y.—General Rim Company; capital, $150,000; to deal in automobiles and parts. Incorporators: Robert W. Ashley, Frank Oberkirch, William Kaul.

GARAGES AND ACCESSORIES

Albany, N. Y.—Albany Motor Racing Association; capital, $1,000; to carry on automobile racing. Incorporators: J. D. Keeler, R. P. Keeler, S. H. Shaw.

Albany, N. Y.—Carbone Company, Inc.; capital, $200,000; to deal in all kinds of rubber tires, etc. Incorporators: W. E. Greene, G. C. Leonard, W. G. Van Loon.

Buffalo, N. Y.—Frontier Garage & Livery Corporation; capital, $25,000; to conduct a general garage business. Incorporators: Francis L. Hoff, Giles G. Meinell, George P. Mitchell.

Chicago, Ill.—Auto Combination Lock Company; capital, $50,000; to manufacture automobile supplies. Incorporators: H. M. Snow, H. L. Mason, F. W. Robinson.

Chicago, Ill.—M. R. L. Resilient Tire Company; capital, $25,000; to manufacture automobile supplies. Incorporators: L. M. R. Labee, M. O. Lundholm, R. W. Moore.

Detroit, Mich.—Baid Sales Company; capital, $10,000; to manufacture and deal in automobile accessories. Incorporators: W. C. Chapman, R. P. Baubie, G. A. Breeze.

Mount Vernon, N. Y.—Mount Vernon Auto Express Company; capital, $1.500; to carry on an automobile express business. Incorporators: Luci Jacobsen, Elizabeth Jacobsen, Fred Cardillo.

New York City, N. Y.—Cathedral Park Garage, Incorporated; capital, $1,000; to carry on a general garage business. Incorporators: Morris Klein, Samuel Klein.

New York City, N. Y.—Columbia Taxicab Company; capital, $5,000; to conduct a general taxicab business. Incorporators: John Graham, James Pathe, Patrick Garrity.

New York City, N. Y.—Globe Tire Company; capital, $500; to manufacture tires. Incorporators: Ralph W. Morrison, R. D. Placak, F. F. Nichols.

New York City, N. Y.—Hallett Point Garage, Inc.; capital, $5,000; to conduct a general garage business. Incorporators: August Kiel, Jr., Thomas D. Tompkins, Gustave Rees.

Paducah, Ky.—Henry Brothers Taxicab Company; capital, $200; to conduct a taxicab business. Incorporators: Finis Henry, Toy Henry, E. E. Henry.

Toronto, Can.—Auto Top & Buggy Company, Ltd.; capital, $200,000; to manufacture automobile tops, etc. Incorporators: James E. Day, John M. Ferguson, Edward V. O'Sullivan.

CHANGES OF NAME AND CAPITAL

Canton, O.—Knight Tire & Rubber Company; increase of capital from $500,000 to $1,500,000.

Louisville, Ky.—Kentucky Automobile Company; increase of capital from $65,000 to $100,000.

Port Huron, Mich.—Havers Motor Car Company; increase of capital from $115,000 to $175,000.

Toledo, O.—McNaull Automobile Tire Company; increase of capital from $50,000 to $75,000.

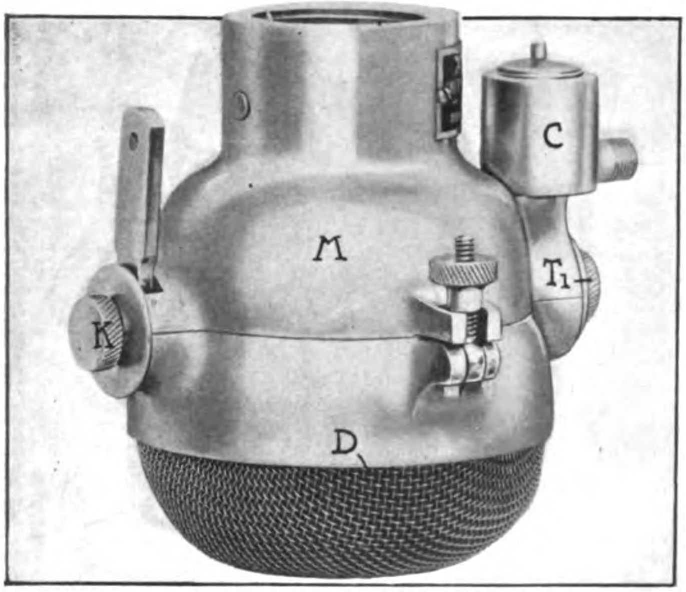


Fig. 4—Side view of fully assembled A. B. C. carbureter

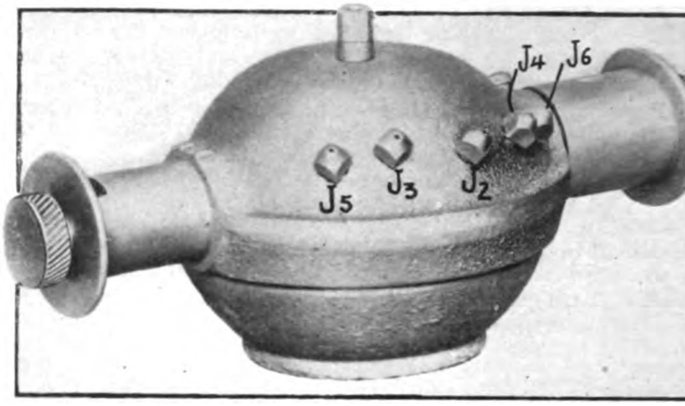


Fig. 1—Float chamber of the A. B. C. automatic carbureter

A. B. C. Carbureter Has No Adjustments

Constant Ratio of Mixture Is Obtained By the Use of Co-operating Float Chamber and Throttle

Multiple-Jet Design Is Claimed to Be Proof Against Leakage, Fire, Theft and Clogging Up of Nozzles

AS the result of 2 years' experiments, the International Accessories Company, 115 Broadway, New York City, announces its multiple-jet, adjustmentless, automatic carbureter. This carbureter is, in a large measure, what is ordinarily termed fool-proof; besides it is leakage-proof and backfire-proof. It is composed of three elements, namely, the upper half of the carbureter casing formed in unit with the needle valve casing, the float chamber and the lower half of the carbureter casing which is formed with a double wire screen separating the air space which surrounds the float chamber from the exterior atmosphere.

The construction of these elements is illustrated in the accompanying cross sections, Figs. 2 and 3. The upper casing M is of a conventional concentric-float design and its throat contains a butterfly type of throttle valve. A lateral portion of the part M is bored to receive the vertical downward extension of the needle-valve casing C which contains a weighted needle valve for regulating the admission of gasoline to the float chamber. Gasoline flowing from the tank to the carbureter enters the device at G, passes the needle valve N and then flows down through the passage P formed in the downward extension of the casing C. In this passage a connecting stem S is in place, the upper end of which is secured to the weight resting on the needle valve, while its lower end rests upon that of the float lever. The gasoline coming down through P enters the float chamber F through the circular bore B, into which the extension of the valve casing fits.

The float chamber is journaled in lateral, horizontal extensions of the casing, which are cut along the contact line of the upper and lower carbureter-casing halves. To insure tightness between the passage P and the bore B of the float chamber, the sleeve S1 formed with a knurled screw head is used as a bearing for this end of the float chamber axis. Fig. 2 shows that this end of the float chamber is made open, but is closed in practice by a plug formed on S1. The float F1 is made up of laminated cork which, according to the company's tests, has not absorbed any gasoline through 18 months of continued service, this being the greatest endurance test made with the A. B. C. carbureter. The float is held concentric with respect to the vertical axis of the chamber by a rod R which is bored down from its upper end to the depth of about 1 inch. The single float lever is securely fastened to the float and is fulcrumed at F2, so that its free end is always under the weighted stem of the needle valve. By this expedient the stem is made to follow at all times the end of the lever, so that when the fuel has reached the proper level in F the float is lifted, the end of the float lever depressed and the needle valve closed due to the weight of the needle N and the stem S.

The proper level of fuel in the float chamber is that of the highest spraying jet in action for a given position of the throttle. Reference to Fig. 2 brings out the fact that the operating lever O which fits into the right equatorial extension of the float chamber at the same time tilts that chamber and the throttle T, Fig. 3, which is connected to it through the hooked rod H fitting in the bore of rod R. At the approximate level of the bore B the float chamber carries six small plugs formed in its surface, which are bored for minute passages varying in diameter from .014 to .022 inch, in case of a 1.25-inch carbureter. Five of these bored plugs or nozzles are disposed on one side of the float chamber and the sixth on the other. All these nozzles act as outlets for the fuel jets; but the nozzle which is on one side, is distinguished by its double office of low-speed and compensating jet. This nozzle is fitted, inside the chamber, with a thin pipe extending down to the level L1, whereas the other five nozzles are not continued inside the float chamber.

Air Enters Through Double Screen

Before taking up the manner of operation of the several jets, it should be noted that the air passing through the carbureter enters through the double screen D, Fig. 2, which is made of one layer each of fine and coarse wire. All this air passes around the equatorial belt of the float chamber before going through the throttle; and as the float chamber and the throttle are tilted at the same time and by the same means, it has been possible to so dimension these parts that the horizontal cross section of the throttle opening is at all times equal to that formed between the float chamber and the carbureter casing. In this way, unlike other types of carbureters, the A. B. C. device is of adjustable size, being, for various throttle openings, a .125, .25, .5, .875 or 1-inch carbureter. The capacity of the air intake is always equal to that of the throttle.

When the opening of the throttle is a minimum, only the low-speed nozzle comes into action, resulting on the use of a single jet. The gasoline evaporated at the mouth of this nozzle is sucked up by the vacuum effect of the suction strokes of the motor, and is atomized by this suction only, as it is forced out through the minute bore of the nozzle. A thickening of the float chamber casing just below the slow-speed nozzle protects the latter from direct contact with the air sucked into the motor, the gasoline leaving it only on account of the pressure in the throttle passage, which is below atmospheric. As soon as the float chamber is tilted further, however, not only are the throttle and carbureter openings increased, but the nozzles for the higher speeds jets, J2, J3, J4, J5 and J6, Fig. 1, are lowered and immerged in the fuel in the order of the jets named. The air passing them sucks out and atomizes the fuel supplied by them. These five nozzles are of different bore and consequently capacity, so that they provide the various correct gasoline-air ratios necessary to give efficient combustion at the various motor speeds. After J6 has been brought into action, if the throttle is opened further, the opening around the float chamber becomes wide enough that a considerable air current rushes past the slow-speed nozzle and increases the fuel delivered from it, by adding its jet-blower effect to the pure vacuum effect of motor suction exerted before.

A peculiar feature of this float chamber construction is that, due to the location of all nozzles well above the bottom of the chamber, no water or sand is able to clog up the jets. The makers state that this has been borne out by numerous tests, and that as much as a teaspoonful of sand and a tablespoonful of water did not in the least alter the behavior of the carbureter. In addition to this feature it should be noted that the removal of foreign matter from the float chamber is an extremely simple undertaking. As the bore B has as much capacity for outgoing matter as for incoming, water and sand are easily passed out through it after the float chamber has been taken out of the carbureter casing.

That this is a simple matter and the work of but a few seconds, will be shown at once. A pair of eyebolts fitted with thumbnuts and attached at diametrically opposite points of the lower half of the carbureter casing are fastened to the upper casing half as shown in Fig. 4. By loosening both thumbnuts and tilting down the eyebolts, the lower half carrying the screen may be taken off and the float chamber including sleeve S1, the lever O, and the screw K, Fig. 2, removed, after disconnecting the hook H from the eye of the throttle lever L, Fig. 3. It is now easy to spill the contents of the float chamber through the above-mentioned bore.

A nice feature which ought to appeal to tourists deserves to be mentioned in this connection. As the float chamber is removed, the needle and its stem drop, thereby shutting off the gasoline supply. This has not only the advantage, that it becomes unnecessary to turn off the gasoline cock, but presents a possibility of leaving the car alone on the road, if necessary, it being impossible to start the motor except by replacing the float chamber or the whole carbureter.

Another point of interest lies in the fact that no impurities may enter the carbureter except by way of the gasoline line. All air is passed through the double screen D, Fig. 2, one layer of which is of 16-mesh and the other of 50 mesh. The main purpose of this screen, however, is to prevent the spreading of a flame entering the carbureter as a backfire from the motor. The principle applied is the same as used in the miners' lamp, and as tests have demonstrated is equally efficient in both cases.

Excepting the steel wire screens and the cork float, almost all the parts of the A. B. C. carbureter are made of brass. An exception is the needle valve; this part is made at present of German silver as well as of Monel metal, an alloy closely related to the one first named. The company has not yet decided which metal will finally be adopted for the manufacture of all needle valves.

Carbureter Is Flexible and Efficient

The perfect automatic working and the absence of adjustments having been elucidated above, it remains to state that numerous tests have created what must be called a favorable impression with those present at such tests. The carbureter proved both flexible and efficient. Its weight is small, being, for example, 4 pounds for the 1.5-inch size. The A. B. C. is made in the following sizes: 1 inch, 1.25, 1.5, 1.75 and 2 inches.

The method of installing this carbureter is slightly different from the ordinary process, due to the different shaping of the throttle portion of the casing. As the latter is not formed with an integral flange, as is the case with most other designs, it is necessary to use a flanged connection attaching to the manifold, which fits around the threaded neck of the throttle extension of the casing. If the carbureter is specially made for any given make of car, it may, of course, be furnished with a flange if it is so desired, or the manifold throat may be so designed as to directly take in the throttle portion of the carbureter.

The few parts of which the carbureter is made are manufactured standard and in large quantities, so that they may be replaced if necessary. Tests made to examine the interchangeability of parts and its effect on engine operation, and these have developed the fact that the changes made did not produce any appreciable change in the operation of the engines tested.

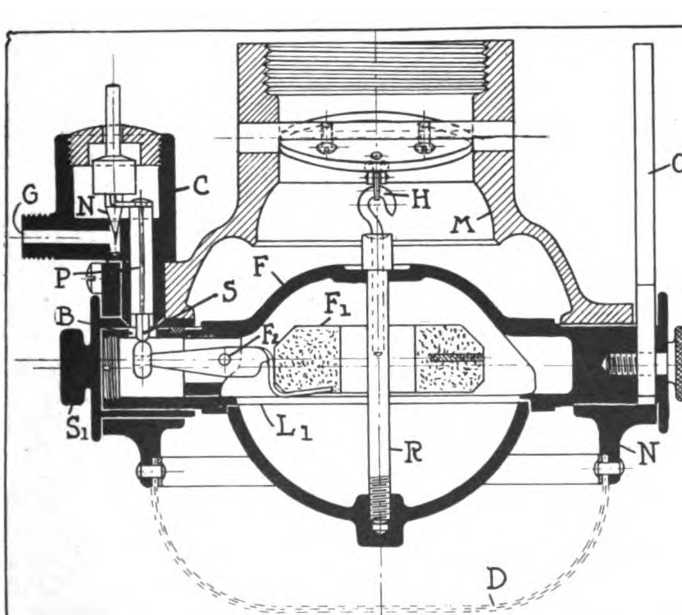


Fig. 2—Longitudinal section of A. B. C. carbureter

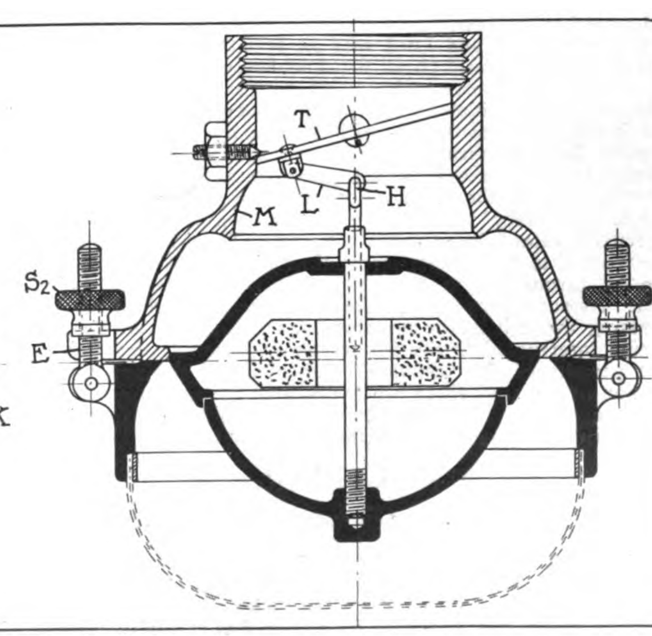


Fig. 3—Transverse section through A. B. C. carbureter

Moore Automobile Jack; Continental Electric Horn; Novel Rim-Removing Tool; Grossman Connectors and Windshield Cleaner; Tyre-Tonic; New Wrenches and Pliers; Endura Packing; Sealo Puncture Preventative

Moore Tire-Saving Jack

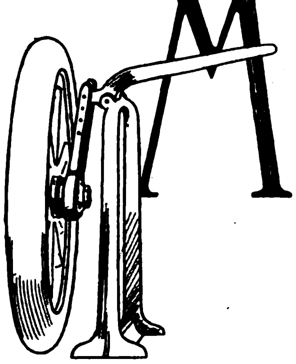


Fig. 1—Moore tire-saving Jack

MEANS for rapidly and easily jacking up automobiles are ever increasing and as the latest production in that line, the Moore tire-saving jack is being announced. This accessory, made by J. C. Moore & Company, Racine, Wis., is distinguished by its simple construction and the possibility of quick application. It consists of a steel support cast integral with a horizontal base, Fig. 1, and extending about 3 feet above the same. On top of the vertical supports the jack mechanism, consisting of a pawl-and-ratchet controlled lever, is attached. The short end of the lever is formed with a depending steel noose, which in using the jack is placed under the hub cap, so that by depressing the long end of the lever the axle is elevated and the jack is locked in this position by the action of a pawl dropping into a ratchet carried on the pivot which serves as fulcrum for the lever.

Continental Vibrator Signal

The Motor Car Equipment Company, 55 Warren street, New York, has just brought out a vibrator-operated electric horn, which, as may be seen in Fig. 2, is of extremely simple design. There are no square portions in either the horn casing or the sound intensifier, which gives the signal of peculiar appearance. The overall length of the horn is 10.5 inches and the diameter of the intensifier 5.5 inches. In the view of the vibrator mechanism the simple construction of this part of the horn is evidenced; the mechanism consists of a small electro-magnet mounted on a case baseplate B and fitted with an armature A, which is carried on a vibratory steel sheet S. The latter is in metallic contact both with the horizontal part H of the base casing and with the angle A1 insulated from H by rubber washers. A1 is fitted with a screw S1 contacting with S normally. Current is admitted to the horn by means of the two contacts C and C1; a wire leads from C to the contact screw on the baseplate, which is insulated from the latter. Both vibrator coils are connected in parallel, thereby producing a strong magnetic field, when the circuit is closed by pressing a button. The path of the current is from C to the contact screw, through both coils and a wire up to A1, through S1 to A, S, H and B, whence it grounds back to C1. As soon, however, as the coil is magnetized by the current passing through it, the armature A is attracted, and the current being interrupted at the former point of contact between S and S1 permits of the armature being returned through the spring action of the steel sheet S. Every time the armature is attracted by the magnet it strikes the rod R, which is fastened to the diaphragm, thereby producing an impact.

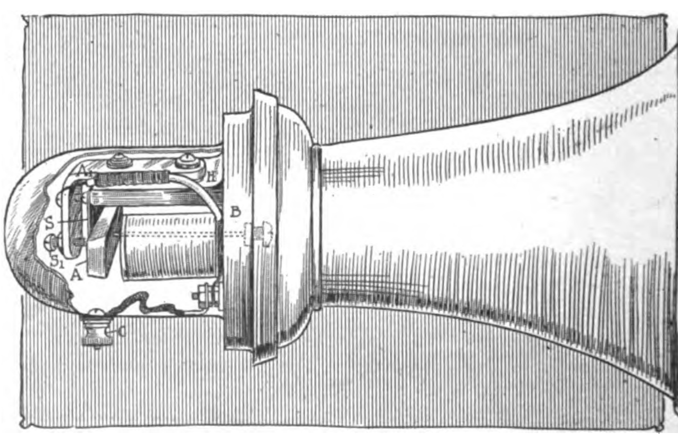
Perfection Rim Remover

The Perfection Manufacturing Company, New Martinsville, W. Va., has designed a tool for the removal of a rim in a quick and easy manner. This tool is made of one piece of steel pressed at both ends with heads and beaks like bird heads. The beak portions permit of wedging the tool under the ends of the locking ring as well as for lifting up the tire so that the valve comes clear out of the hole. The tool and its application are so simple that its use is clear from the illustrations, Figs. 6 and 7.

Grossman Novel Accessories

The Emil Grossman Company, 250 West Fifty-fourth street, New York City, have added several new accessories to their line, and among these the special ignition assembly and the Security windshield cleaner, Figs. 5 and 6, are of such nature as to command especial interest. The former accessory represents a new and handy method of providing connections between distributer posts and of averting short circuits in the line, while the latter insures a clear windshield in rainy weather.

As Fig. 5 of the Red-Rib Ignition Wire Assembly shows, this outfit is composed of as many heavily insulated wire leads as there are spark-plugs used in the power plant. The length of each individual lead may be varied depending on the position of the magneto distributer with relation to the engine, and the wires extending from there to the cylinders are held together by rubberized fabric, as far as possible, separating only where a lead branches off to its spark-plug. Under the rubberized binder each



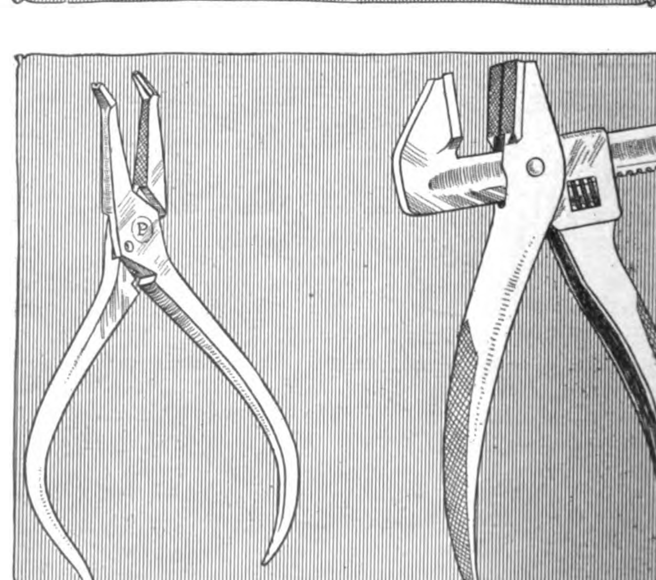


Fig. 2—Continental electric vibrator horn for automobiles
Fig. 3—Mesnard cotter pin pliers. Fig. 4—Starrett tool

wire is surrounded by a substantial rubber coating, and on both ends is fitted with connectors or terminals; two types of terminals are used, one fitting on the binding posts of the distributer and the other of the terminals of the spark-plugs. These respective connectors are also shown in Fig. 5. The assembly may be produced to fit any make of car and any position of the magneto on a car.

The security windshield cleaner consists of a guide, which slides on the horizontal top member of the windshield frame and of a metal rod which is bent, roughly speaking, as a U and attached to the guide. The short leg of the U carried on its end a socket in which a small, spring-urged plug is contained which, when the cleaner is in place in the windshield, bears against the rear side of the pin. It thereby presses the pan against the rubber strip carried in a slotted clamp which is attached to the other leg of the U-member, and which may be moved along the front side of the windshield, cleaning off whatever moisture is there as a consequence of rain. The cleaner may be installed in less than a minute's time, as it merely slips over the top member of the frame and is in no way secured thereto.

Tyre-Tonic Solution

The Sturdy Manufacturing Company, 2637 Michigan avenue, Chicago, Ill., now manufactures a compound which is applied to the face of tires for the double purpose of improving their appearance and filling up small cuts in the tread so that water finds no way into the fabric layers. In this way a repeated treatment with the solution, which comes in cans of various sizes, prolongs the life of a tire, as the fabric is protected from the attacks of mildew, the latter being known as one of the principal reasons of shortened tire life. The compound consists of a carrier solution, which contains rubber and a paint body in suspension, and must be stirred thoroughly before application. The liquid which contains the rubber and paint is inflammable and therefore it is necessary to use caution in handling the solution. The Sturdy company furnishes it in both white and battleship gray.

Turner Improved Pump Cap

The Turner Brass Works, Sycamore, Ill., has made an additional improvement on its line of blowtorches, which facilitates the reinserting of the pump washer after oiling the same. Ordinarily some difficulty is experienced in this work, as the leather washers show a tendency to buckle when reinserted in the pump cylinder after oiling. At present, the pump cap and former, as the new accessory is named, is applied to the leather washer after it has been oiled and within a few seconds the washer is given its exact original shape, so that it may be returned into the pump cylinder without any trouble. Of course the use of this device is not confined to the line of blowtorches, but it should prove equally serviceable to the owners of furnaces.

Mesnard Cotter Pin Pliers

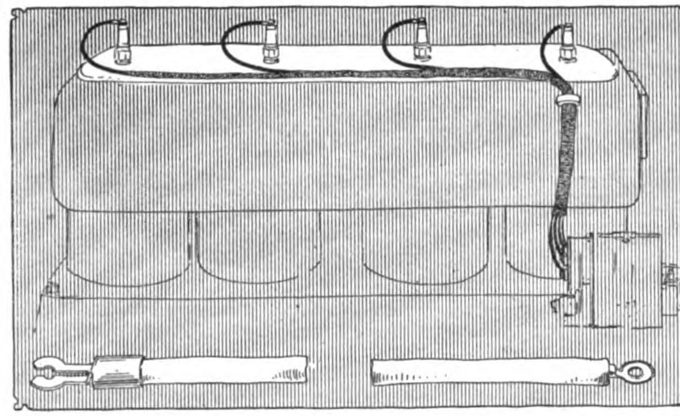
Pliers especially adapted for the inserting and bending of cotter pins have been designed by the Modern Sales Bureau, 1712 Michigan avenue, Chicago, Ill. Under the name of Mesnard's cotter pin pliers this concern markets the small and handy tool shown in Fig. 3, which is tongue-shaped and differs from an ordinary tongue but by the special shaping of its short lever ends. The faces of these short levers are knurled and the extreme ends bent in an angle and formed with a slot for taking in the cotter pin ends. Both pieces—the tool consists of two parts—are held together by a pin P driven through a stout portion formed between the long and short lever ends.

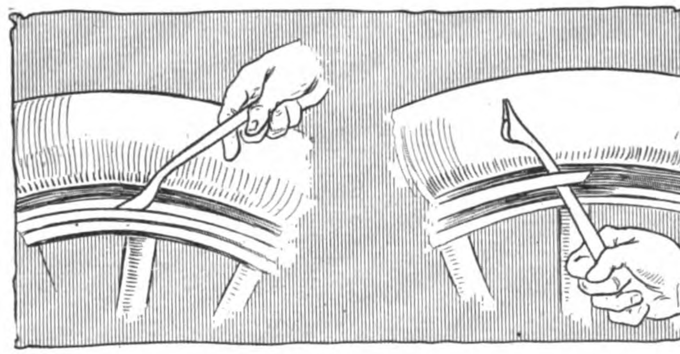
Endura Sheet Packing Material

A departure from packing materials is the new product of the Endura Manufacturing Company, Sixty-third street and Eastwick avenue, Philadelphia, Pa. This packing material comes in sheets of varying thickness, ranging from .015625, to .125 inch, the square yards of sheets having these two thicknesses weighing .75 pound and 6 pounds respectively. Endura is a dark gray material made of vegetable fiber which has been impregnated with inorganic materials; the effect of this treatment being that while the packing is combustible it offers considerable resistance to the heat and does not easily catch fire. It contains neither asbestos nor rubber, is claimed to make an absolutely tight joint and to calk perfectly under the action of water. Due to this property it should not be used in intense dry heat.

Starrett Wrench and Pliers

A clever combination tool, which may be used with equal efficacy as a wrench or as a pair of pliers is shown in Fig. 9, it being the product of the L. S. Starrett Company, Athol, Mass. It is made of hard, nickel-plated steel and consists of three relatively movable portions, the right-angled wrench-and-plier jaw, the straight jaw, which is fitted with a 6-inch handle and a





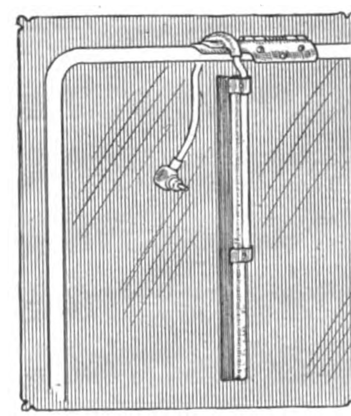


Fig. 5—Red-Rib wire assembly for neat and short-circuit proof conducting of the ignition current to the motor cylinders. Figs. 6 and 7—Two views showing the application of the Perfection tool, in removing the locking ring off a quick-detachable type of rim. The tool may be also used to advantage in taking the tire off and getting the valve out of the rim hole. Fig. 8—Appearance of the Security windshield cleaner for clearing a shield in rainy weather, in place on a windshield of standard design

second handle of the same length, the end of which is formed to be fitted over the extension of the right-angled piece and contains a worm engaging the transverse rack on the underside of the above-mentioned extension. The straight jaw is pivoted through the end of the other handle, so that its angle against the face of the right-angled jaw may be changed, depending on whether the tool is to be used as a wrench or plier. The handles are nicely knurled to give the tool a high-class appearance, and while this aim has been realized throughout, the strength of the device is fully up to the requirements of any work to which its size permits it to be put.

Sealo Pneumatic Tire Treatment

To prevent puncture troubles, the Sealo Tire Company, 1409 Michigan avenue, Chicago, Ill., has compounded Sealo, a liquid which is injected into the inner tube to prevent the air from escaping therefrom, even should the rubber wall be pricked by a pointy object. Sealo is injected into the tube, through the valve stem and by means of a special gun, and when in the tire covers the entire inner surface of the tube, while it retains at all times its liquid state. When the tube is punctured, the outward pressure of the compressed air forces Sealo into the wound, thereby plugging up the same and preventing the air from leaving the tube.

Claudel Carbureter Handled Here

In The Automobile of October 31, the address of the Claudel Carbureter Company in Paris was stated. This carbureter is handled in this country by D. McRa Livingston, 1784 Broadway, New York City.

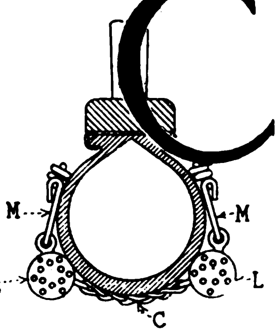


Fig. 1—Simmons anti-skid device

COMPENSATING Carbureter Construction—In which increases of fuel and air are regulated by a connecting mechanism.

The subject matter of this patent, a carbureter, Fig. 2, comprises a fuel chamber C and an atomizing chamber C2 which extends diametrically across C, a nozzle N projecting from C into C2. A throttle T is located in one end of the atomizing chamber and a mechanism M is provided, which operates T and N at the same time, thereby maintaining at all speeds an adjusted ratio between fuel and air admitted to the motor. In the end of C2 opposite to the throttle means for admitting an air current and directing it into the center of C2 are provided; these means are adjustable and vary proportionately with the throttle opening.

No. 1,042,982—to Leonard Sliger, Indianapolis, Ind. Granted October 29, 1912; filed May 31, 1911.

Anti-Skidding Device—Comprising rubber-covered ball-links which are held tightly against the lateral surfaces of the tire tread.

This patent describes an anti-skidding apparatus consisting of a pair of side links L, Fig. 1, on which flexible balls are formed, the latter being in contact with the side surfaces of the tire tread. The links L are supported on the tire by means M, which in turn are connected by members C extending across the tire, holding opposite links together.

No. 1,042,722—to Turner W. Simmons, Bridgeport, Conn. Granted October 29, 1912; filed November 24, 1911.

Rotary Cylinder Valve—Comprising a valve plug worked out in a number of semi-cylindrical shells, forming communications between motor and manifolds.

This patent refers to a so-called valveless motor, in which the poppet valve is supplanted by a rotary plug valve positioned above the combustion chambers of the motor cylinders, Fig. 3. The valve plug P1 is contained in a casing C provided with ports P communicating with the cylinders and with inlet and exhaust passages. The valve plug is composed of as many pairs of semi-cylindrical shells as there are cylinders in the engine. There is an inlet and an exhaust shell for each cylinder and they are constructed with openings affording communication with the inlet and exhaust manifolds when they register with the cylinder openings.

No. 1,042,712—to Albert E. Moorhead, assignor to American Rotary Valve Company, Chicago, Ill. Granted October 29, 1912; filed July 28, 1911.

Internal-Combustion Engine—Two-cycle design in which a valve mechanism carried by the crankshaft regulates the passage of mixture from the crankcase to the combustion chamber.

The engine referred to in this patent has a crankcase C, Fig. 4, formed with a cylindrical interior which has a port opening into its cylindrical surface. A working cylinder C1 is arranged on the crankcase with a piston P in it. In the crankcase a crankshaft S with a crank C2 is inclosed, being connected to the piston by a rod and carrying a valve structure disposed 180 degrees away from C2. A semi-annular shoe S1 is mounted on the valve structure and governs the port through which a fuel mixture enters the crankcase, whence it is passed to the working cylinder.

No. 1,042,970—to William H. Richman, Philadelphia, Pa. Granted October 29, 1912; filed August 25, 1908.

Demountable Rim—Which is carried on the beveled portions of two interlocking felloe rings.

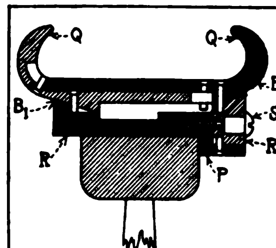
The rim this patent relates to is seen in Fig. 5, being carried on a felloe constructed of a fixed ring R with an annular recess on one side into which fits a removable ring R1. Screws projects through R1 into R; R1 has notches formed in it. Pins P in the notches of the fixed ring guide the movable ring into place. Each rim is beveled on one side from its outer to its inner edge, so that a depressed, annular bed is formed between the rings for a rim.

No. 1,042,478—to Albert D. Reid, West Chester, Pa. Granted October 29, 1912; filed May 22, 1912.

Windshield for Automobiles—A V-shaped design which may be tilted forward.

Fig. 6 shows the subject matter of this patent, a V-shaped windshield which is independent of the motor bonnet, above which it is secured. The shield S swings about a rear horizontal axis A and is fitted with a rigid arm F extending forward to a fixed portion of the motor bonnet, to which it may be attached.

No. 1,042,925—to John L. Kennedy, Washington, D. C. Granted October 29, 1912; filed October 6, 1910.



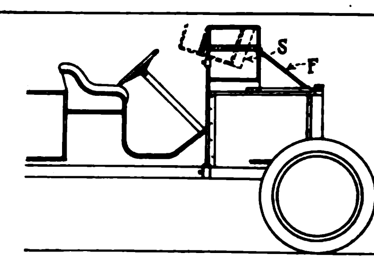
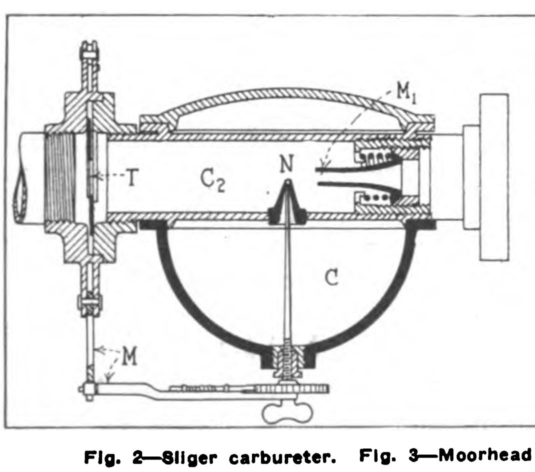
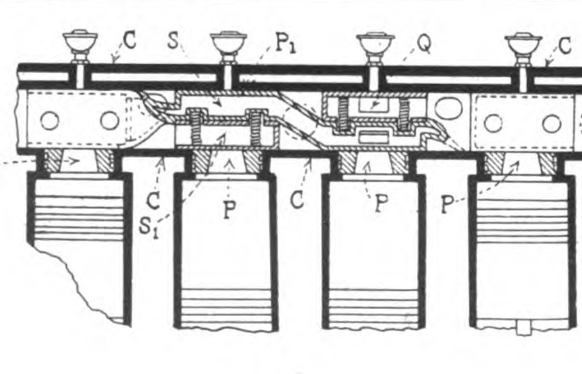


Fig. 5—Reid demountable rim. Fig. 6—Kennedy windshield





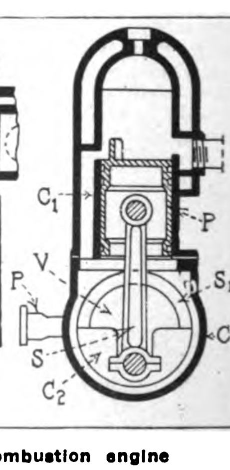


Fig. 2—Sliger carbureter. Fig. 3—Moorhead rotary cylinder-plug valve. Fig. 4—Richman internal combustion engine

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The AUTOMOBILE

English Car Tendencies for 1913

First Report of Annual Olympia Exhibition Which Opened in London, November 8—Fewer Car Models—Silent Chain Drive Universal—Wire Wheels Gain—Fewer Sixes

1913 Models Show Numerous Refinements in Lubrication, Suspension, Gearboxes, Clutches and Other Features—Statistics of British Car Industry for Present Season

By J. S. Critchley

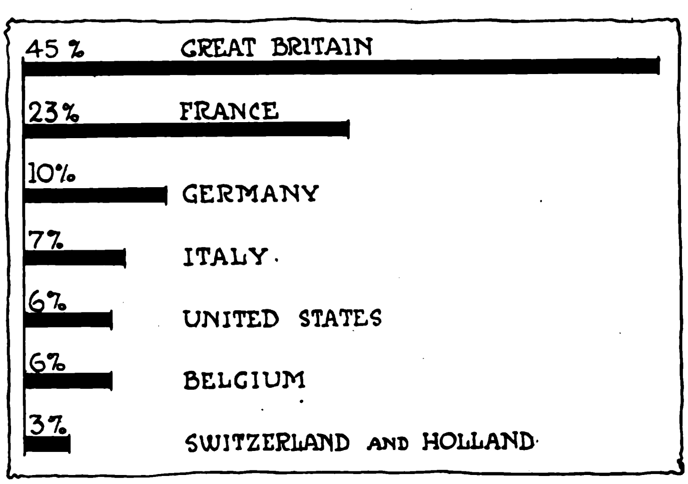


Diagram illustrating the percentage of the exhibitors representing the various countries whose manufacturers are displaying their products at the Olympia show in London. United States is fifth

LONDON, Nov. 2—*Special Correspondence* — One week from today the annual Olympia show will have opened its doors disclosing one of the greatest motor exhibitions which Europe has had an opportunity of witnessing. In all, 353 exhibitors are installed, this constituting a new record. There are 119 exhibitors in the complete car section; thirty-five body-builder exhibits; 150 accessories; eight press, and two associations.

Of these exhibits Great Britain has 45 per cent.; France, 23 per cent.; Germany, 10; Italy, 7; Belgium, 6; United States 6; Switzerland and Holland, 3, as may be seen in the accompanying diagram.

Although the English manufacturers have been slower than usual in announcing their new models, it has nevertheless been possible to obtain an accurate estimate of the improvements that have been made by the different companies. All of them have had their new products out for months, but in not a few instances have kept the details as quiet as possible.

In a word, 1913 will not be a startling year. There is nothing radical offered. Contrasted with the shows of 2 and 3 years ago there is little in the way of sensations. Rather there has been a perceptible decrease in the use of certain constructions, which the experience of a year or two has tested; and, on the other hand, there is an equally perceptible tendency towards other constructions which have been well tried out during this period. Then, again, many of the standard constructions remain practically as they were during this season.

The six-cylinder motor has lost somewhat as compared with 1912. For next year there are twenty-two distinct six-cylinder models, whereas for 1912 there were twenty-six. The list shows one or two concerns that have discontinued six-cylinder construction, notably Adams, two Standard models, Crowdy, etc. The horsepower of the sixes listed for next year range from 23 in the small Star to 59.9 in the Napier. The popular rating is between 23 and 30.

There is a slight reduction in the total number of models of all motor types for next year, showing that several of the concerns have reduced the number of models they are marketing, there being only one English company, namely, Vauxhall, which has increased its number of models.

The stroke-bore ratio leans slightly to an increase. This is particularly so in the new models. The maximum stroke, 160 millimeters, or 6.4 inches, is not found in many models, one being the 20.1-horsepower Sunbeam, with measurements 90 by 160; a stroke of 150 millimeters is used in four models with bores under 100 millimeters, namely, Sunbeam, 80 by 150; Calthorp, 80 by 150; Star, 90 by 150; and Vulcan, 80 by 150. A recent test of long-stroke efficiency was that of the Sunbeam, 80 by 150, on Brooklands, when in a 10-lap standing start an

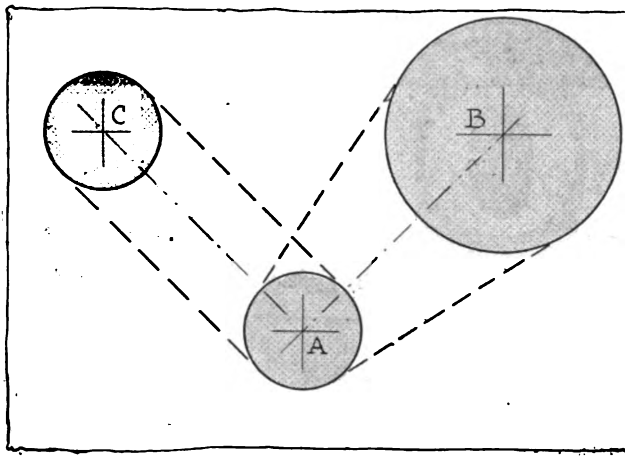


Fig. 1—Silent chain-drive scheme for camshafts where distance A-C does not exceed 7 inches

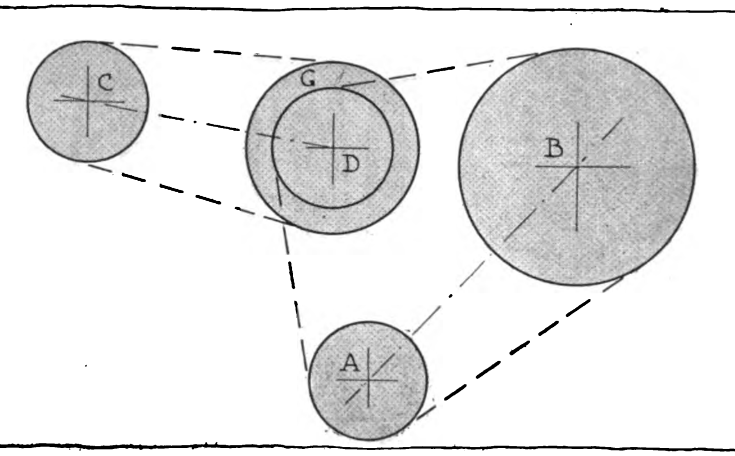


Fig. 2—Popular silent chain-drive arrangement where distance A-C exceeds 7 inches

average speed of 93.8 miles per hour was made, and in the flying half mile, 101.87 miles per hour. These engines tuned for racing purposes give slightly over 70 horsepower.

There have been few changes made in bore and stroke measurements of 1912 models which are continued for the 1913 market. In every case where a change has been made the stroke has been increased as the tabulation on page 326 showing the various 1912 and 1913 English models indicates. These stroke changes generally run as follows: From 120 millimeters to 130, from 100 to 120, from 110 to 120, from 110 to 130, from 115 to 130, etc.

Non-Poppet Situation

The non-poppet valve motor begins 1913 much as it began 1912 with the Knight type gaining in prestige. This is particularly the case on the Continent where Clément, Mors and Gregoire in France have decided to bring out Knight models; in Belgium where Germain has adopted it in addition to the Minerva, and in Germany where Dobey will manufacture it for next year in addition to Mercedes. Panhard will produce 80 per cent. Knight models for next season; Daimler in England builds it exclusively; the English Deasy will continue it in all models, but the Rover of England, which has used it this year in single and two-cylinder types, has discontinued these, and will use poppet valves in its two and four-cylinder 1913 models.

The Argyll motor with its single-sleeve valve will be produced in two models, namely, 80 by 120 and 110 by 130, the former being a new model. In this motor the junk ring in the head has been eliminated, with a resulting gain of reduced friction.

The Itala non-poppet type is being built in two sixes, 25 and 35 horsepower. This valve is a vertical rotating type, one valve serving as intake and exhaust for two cylinders.

Apart from these non-poppet types there is little change compared with a year ago. A great number of experiments have been carried out and many new engines tested or given long demonstrations, but the majority of them have been rejected. One that is now before the public is the improved Reno-Sphinx with its internal sliding valve. An English company has taken over the patents and has developed a neat design. The valve shaft is worm-driven from a vertically inclined shaft, the inclination being for the purpose of bringing the camshaft close to the cylinder walls thereby making the engine more compact. The engine is 90 by 130.

In reviewing the motor design tendencies, one is impressed with the great leaning towards increasing the number of crankshaft bearings, so that for next year the two-bearing shaft with a four-cylinder motor is rarely met with, one of the few examples being the new 10-12 Star model 80 by 120. There is not a perceptible tendency to increase the number of crankshaft bearings for a four-cylinder motor to more than three, but the shaft diameters are being increased, and the 40-millimeter shaft is quite common for a motor with an 80-millimeter bore. Die-cast white metal bearings are increasing; a few concerns adhere to the method of lining up gunmetal backings with bearing materials, and the Austin is one of the very few still using phosphor bronze.

The en bloc system of casting cylinders is decidedly on the increase, and in practically all recent designs is predominant. These cylinder castings are found in connection with the Wolseley, Star, Sunbeam, Vauxhall, Swift, Arrol-Johnston and Straker-Squire and many others.

Vauxhall is the only company which has increased the number of models for 1913 by the introduction of a four-cylinder 95 by 140. The practice adopted by this firm as regards bore-stroke ratio has been worked out not only on scientific lines, but also in connection with the many successes achieved by the Vauxhall cars on the racing track. In the O'Gorman trophy race held during last month the winning Vauxhall, 89.7 bore by 118 stroke, and with a piston swept volume of 2,983 cubic centimeters, achieved a remarkable record of an average speed of 92.5 miles per hour over a distance of 30 miles.

An examination of this list will indicate that there is a tendency towards the reduction of the number of models made by individual firms. For instance, the Wolseley company has ceased to construct its 79 by 120 model and the 100 by 130, and will in future construct only one four-cylinder model, namely, the 90 by 120 R. A. C. rating, 20 horsepower.

Prices show only slight alterations, and in only a few cases will any reduction be found.

Few Sixes for 1913

Referring to the six-cylinder models this class of car has been dropped entirely by the Standard company, which has hitherto constructed two sixes. No new six-cylinder models are projected, which is evidence that the six-cylinder car has not increased in popular favor. The prices in this class remain practically stationary, with a reduction of $50 in the case of the six-cylinder Sunbeam. The bore and stroke of this class also remain practically stationary.

The Daimler company will no longer build its 80 by 130 model, having increased the bore to 90 millimeters, whereas the Sunbeam company has, on the other hand, reduced the stroke of its 90-bore from 160 to 130 millimeters. This reduction in stroke is a notable modification, as hitherto the Sunbeam company has been the pioneer of the long-stroke engine. The change is probably due to the fact that the long-stroke engine is never quite so smooth in its running as the comparatively shorter stroke.

Undoubtedly the lack of popularity in connection with the six-cylinder cars is due to the improved controlability and silence of the four-cylinder models, which meet in every way the requirements of the average motorist.

There is no general disposition on the part of the manufacturers to rate their engines at any higher rating than they arrive at by the R. A. C. formula, in fact, in the majority of cases the manufacturers' ratings compared with the R. A. C. ratings are found to be at a slightly lower figure.

The method of driving cam and magneto shafts by means of chains introduced by Daimler in the Knight engine is now universally adopted. One of the most generally used arrangements is shown in Fig. 1, and has proved satisfactory in every instance where the chains have been of sufficient dimensions, and where the distance A-C does not exceed 7 inches. In this diagram two drives are shown from the crankshaft pinion, the wheel B being on the camshaft and wheel C on the pump or magneto shaft. The centers in connection with this arrangement should be fixed. An alternative arrangement, Fig. 2, which should be use where distance A to C exceeds 7 inches. In this case the crankshaft pinion A drives the camshaft wheel B by means of a chain running over the adjustable wheel D, mounted on a bracket which swings about the center of C, so that the centers of C and D are fixed, while adjustment is provided from the camshaft chain. The wheel G may be of equal size to the wheel C or larger according to the speed required at C. The adjustable axle of the wheels D and G may also be provided with suitable means for driving a fan. The width of chain to be employed for camshaft drives is governed by the bore, valve diameter, spring pressure, cam profile and the auxiliary drives from the camshaft such as oil, water pump and fan. Experiment has shown the best results are to be obtained from adopting the chain slightly shorter in its over-all length than is finally required, running in the chain on an adjustable jig mounted over wheels slightly smaller in diameter until the shortage above named has been taken out by the running in process. The result is that the component parts of the chain have by this process been allowed to settle down, such settling being caused in great measure by the initial sag of any chain.

The proportion of cars fitted with thermo-syphon is still in the majority, being well over 50 per cent. The well-known firms fitting pumps to all models are Austin, B. S. A., Talbot. Daimler, Deasy, Napier with its six-cylinder cars, Lanchester, Rolls-Royce, Sunbeam, Vauxhall and Wolseley. These firms have made no departure from their last year's practice. The six-cylinder Sheffield-Simplex 89 by 127; Crossley four-cylinder 101 by 139, and Humber 105 by 130 are probably the most powerful motors in the thermo-syphon list.

With regard to radiators, the honeycomb type is not so popu-

Comparison of Four- and Six-Cylinder Cars for 1912 and 1913

Name	1912 Bore and stroke	1913 Bore and stroke	Bore and stroke in inches	R.A.C. h.p.
Pilot	65 x 110	No change	2.56 x 4.33	10.25
Turner	60 x 100	No change	2.36 x 3.94	8.9
Swift	— —	65 x 100	2.56 x 4.33	10.25
Light Cars	65 x 110	Not made		
Light Cars	— —	75 x 120	2.95 x 4.72	13.9
Belsize	69 x 130		2.72 x 5.12	11.9
Arrol-Johnston	69 x 120	No change	2.72 x 4.72	11.9
Briton	68 x 120	No change	2.68 x 4.72	11.5
Star	68 x 120	Not made		
Star	— —	80 x 120	3.15 x 4.72	15.9
Humber	68 x 120	69 x 130	2.72 x 5.12	11.9
Austin	68 x 89	Not made		
Austin	— —	76 x 89	2.99 x 3.50	14.4
Calthorpe	69 x 125	No change	2.72 x 4.92	11.9
Enfield	76 x 120	No change	2.99 x 4.72	14.4
Alldays				
Vulcan	80 x 120	No change	3.15 x 4.72	15.9
Enfield	86 x 108	Not made	3.38 x 4.25	18.4
Alldays	86 x 108		3.38 x 4.25	18.4
B. S. A.	75 x 114	No change	2.95 x 4.49	13.9
Rover	75 x 130	No change	2.95 x 5.12	13.9
Belsize	94 x 121		3.70 x 4.76	22.0
Argyll	72 x 100	72 x 120	2.83 x 4.72	12.9
Humber	78 x 110	75 x 130	2.95 x 5.12	13.9
Sirron	80 x 110	80 x 120	3.15 x 4.72	15.9
Swift	68 x 110	75 x 110	2.95 x 5.12	13.9
Bentall	100 x 95	No change	3.94 x 3.74	24.8
Star	80 x 120	No change	3.15 x 4.72	15.9
Chambers	86 x 101	No change	3.38 x 3.98	18.4
Rothwell	80 x 127	No change	3.15 x 5.00	15.9
Rothwell	101 x 127	No change	3.98 x 5.00	25.5
Standard	79 x 120	No change	3.11 x 4.72	15.6
Alldays	85 x 108		3.35 x 4.25	18.0
Vulcan	90 x 120	Not made		
Vulcan	— —	80 x 150	3.15 x 5.90	15.9
Wolseley	79 x 120	Not made		
Star	90 x 120	Not made		
Star	— —	80 x 150	3.15 x 5.90	15.9
Hillman	89 x 114	89 x 110	3.50 x 4.33	19.6
Turner	75 x 120	Not made		
Turner	— —	69 x 110	2.71 x 4.33	11.9
Enfield	86 x 108	No change	3.38 x 4.25	18.4
Bell	90 x 120	No change	3.54 x 4.72	20.0
Straker	87 x 120	No change	3.42 x 4.37	18.8
Austin	89 x 115	No change	3.50 x 4.52	19.6
Calthorpe	80 x 150	No change	3.15 x 5.90	15.9
Enfield	100 x 115	100 x 130	3.94 x 5.12	24.8
Clement	85 x 120	95 x 120	3.74 x 4.72	22.5
Deasy	75 x 110	75 x 114	2.95 x 4.49	14.0
Swift	85 x 120	90 x 120	3.54 x 4.72	20.0
Humber	90 x 120	No change	3.54 x 4.72	20.0
Crossley	79 x 120	No change	3.11 x 4.72	15.6
Arrol-Johnston	80 x 140	No change	3.15 x 5.51	15.9
Sirron	80 x 127	No change	3.15 x 5.00	15.9
Sunbeam	80 x 150	No change	3.15 x 5.90	15.9
Alldays	101 x 130		3.98 x 5.12	25.3
Star	— —	90 x 150	3.54 x 5.90	20.0
Clement Talbot	80 x 120	No change	3.15 x 4.72	15.9
Dodson	80 x 120	No change	3.15 x 4.72	15.9
Iris	80 x 114	No change	3.15 x 4.49	15.9
Thames	80 x 135	Not made		
Adams	88 x 120	No change	3.46 x 4.72	19.2
Albion	79 x 127	No change	3.11 x 5.00	15.6
Argyll	80 x 120	No change	3.15 x 4.72	15.9
Baguley	90 x 130	No change	3.54 x 5.12	20.0
Napier	82 x 127	No change	3.23 x 5.00	16.7
Singer	80 x 130	78 x 125	3.07 x 4.92	15.1
Armstrong	80 x 135	No change	3.15 x 5.31	15.9
Deasy	80 x 130	No change	3.15 x 5.12	15.9
Dennis	90 x 110	Not made		
Dennis	— —	80 x 130	3.15 x 5.12	15.9
Rover	90 x 130	No change	3.54 x 5.12	20.0
Daimler	80 x 130	No change	3.15 x 5.12	15.9
Wolseley	90 x 120	No change	3.54 x 4.72	20.0
Calthorpe	90 x 150	No change	3.15 x 5.90	15.9
Bell	101 x 140	No change	3.98 x 5.51	25.3
Rothwell	101 x 127	Not made		
Dennis	90 x 130	No change	3.54 x 5.12	20.0
Aberdonia	89 x 127	No change	3.50 x 5.00	19.6
Argyll	90 x 140	Not made		
Clement	102 x 111	Not made		
Crowdy	89 x 120	Not made		
Daimler	90 x 130	No change	3.54 x 5.12	20.0
Maudslay	90 x 130	No change	3.54 x 5.12	20.0
Singer	90 x 130	No change	3.54 x 5.12	20.0
Thornycroft	101 x 114	No change	3.98 x 4.48	25.1
Armstrong	85 x 135	No change	3.35 x 5.31	18.0
Vauxhall	90 x 120	No change	3.54 x 4.72	20.0
Humber	105 x 130	105 x 140	4.13 x 5.51	22.0
Deasy	90 x 130	No change	3.54 x 5.12	20.0
Crossley	101 x 140	No change	3.97 x 5.51	25.3
Crowdy	110 x 120	Not made		
Dennis	100 x 130	No change	3.94 x 5.12	24.8
Sunbeam	90 x 160	No change	3.54 x 6.30	20.0
Armstrong	95 x 120	Not made		
Bell	115 x 150	117 x 150	4.60 x 5.90	34.0
Austin	110 x 127	No change	4.33 x 5.00	30.0
Hillman	127 x 127	No change	5.00 x 5.00	40.0
Wolseley	101 x 130	No change	3.98 x 5.12	25.4
Vauxhall	— —	95 x 140	3.74 x 5.51	22.5
Armstrong	100 x 120	No change	3.94 x 4.72	24.8
Clement	107 x 130	No change	4.21 x 5.12	28.5
Clement Talbot	101 x 140	No change	3.98 x 5.51	25.3
Daimler	101 x 130	101 x 140	3.98 x 5.51	25.3
Lanchester	101 x 101	No change	3.98 x 3.98	25.3
Crowdy	127 x 140	No change	5.00 x 5.51	40.0
Argyll	101 x 130	No change	3.98 x 5.12	25.3
Iris	108 x 133	No change	4.25 x 5.24	28.9
Thornycroft	114 x 127	Not made		
Dodson	100 x 140	No change	3.93 x 5.51	24.8
Austin	120 x 127	Not made		
Wolseley	120 x 130	Not made		
Daimler	124 x 130	No change	4.88 x 5.12	38.1
New Engine	114 x 114	No change	4.49 x 4.49	32.3
Iris	127 x 133	No change	5.00 x 5.24	40.0
New Engine	127 x 114	No change	5.00 x 4.49	40.0

SIX-CYLINDER CARS

Name of car	1912 Bore and stroke	1913 Bore and stroke	Bore and stroke in inches	R.A.C. rating
Vulcan	90 x 120	No change	3.54 x 4.72	29.4
Belsize	94 x 121	Not fixed		
Star	80 x 120	No change	3.15 x 4.72	23.8
Standard	79 x 120	Not made		
Arrol-Johnston	80 x 120	No change	3.15 x 4.72	23.9
Adams	88 x 110	Not made		
Daimler	80 x 130	90 x 130	3.45 x 5.12	30.4
Standard	89 x 108	Not made		
Clement Talbot	80 x 120	No change	3.15 x 4.72	23.8
Sunbeam	90 x 160	90 x 130	3.54 x 5.11	30.4
Napier	82 x 127	No change	3.23 x 5.00	25.3
Maudslay	90 x 130	No change	3.54 x 5.12	30.5
Crowdy	89 x 120	Not made		
Sheffield-Simplex	89 x 127	No change	3.50 x 5.00	29.4
Sheffield-Simplex	89 x 127	No change	3.50 x 5.00	29.4
Vauxhall	90 x 120	95 x 120	3.74 x 4.72	30.1
Wolseley	90 x 130	No change	3.54 x 5.12	30.4
Austin	110 x 127	No change	4.33 x 5.00	45.9
Deasy	90 x 130	No change	3.54 x 5.12	30.2
Daimler	101 x 130	101 x 140	3.97 x 5.51	38.2
Sheffield-Simplex	114 x 114	No change	4.49 x 4.49	48.6
Lanchester	101 x 101	No change	3.97 x 3.97	38.4
Armstrong	90 x 130	90 x 150	3.54 x 5.90	30.
Napier	102 x 127	No change	4.01 x 5.00	38.4
Rolls Royce	114 x 120	No change	4.49 x 4.72	48.6
Napier	127 x 127	No change	5.00 x 5.00	59.9
Wolseley	114 x 146	No change	4.49 x 5.75	48.6

A study of the above tables is of interest because they show the English trend. They show that for 1913 the average horsepower for four-cylinder English cars is 19.8, while for 1912 it was the same; for six-cylinder cars the average for 1913 is 36.8, while for 1912 it was 34.74. 90 per cent of the changes made for the new season have been towards a higher horsepower, but this has been neutralized by the number of small cars newly brought out. The average horsepower of the American car for 1912 was about 34.3

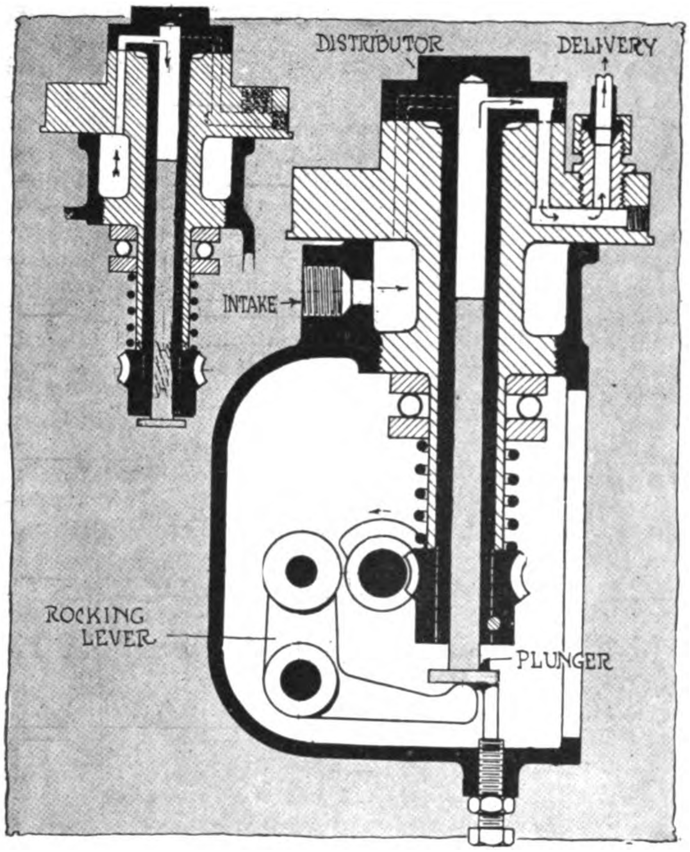


Fig. 3—Dodson oil pump on suction and discharge stroke

lar as the ordinary gilled-tube type, and Wolseley is the only conspicuous firm to adhere to it. The disposition of the radiator on Renault lines is found in connection with the Dodson, Deasy and Arrol-Johnston cars, and does not appear to be in any degree more popular than in previous years, nor is it likely to be in view of the tapering bonnets and scuttle dash boards which are the prevailing fashion. In all the best made cars of both small and high power the radiators are hinged to the side members in order to take up strains set up by deflection of the frame. Little or no change is apparent in the contour or shape as seen from the front, the only variation being in the radius of the curve adopted by the various makers.

The position with regard to lubrication is practically the same as previously. The entirely forced system to all bearings adopted by Crossley, Napier, Armstrong, Star, Vauxhall, Maudslay, Rolls-Royce and Sunbeam in past years is still in evidence, but the more popular system is still the forced to main bearings and trough systems to the connecting-rods. Practically no engine is now built which relies on splash alone. Makers generally are showing no disposition to alter their various systems which have previously been adopted, but are simply improving in detail. Rotary pumps are the most usual for circulating the oil, but where higher pressure is desired the forced pump comes in. A pressure of 20 to 30 pounds is usually found to be quite ample for ordinary work, which can easily be obtained by the rotary pump. For very high-speed work considerably greater pressure has been found necessary, and many of the cars which have done so well at Brooklands during the past season have had oil pressure of over 70 pounds per square inch.

One difficulty arises in connection with the entirely forced system, and that is the tendency to over-lubrication of the pistons by reason of the oil being forced through at too high a pressure. To prevent this baffle plates and scraper rings to the lower end of the piston are frequently adopted. Another method is to fit baffle plates, above which a chamber is formed to run along the whole length of the crankcase immediately beneath the cylinders. This provides an inter-communication between the various cylinders so that the piston suction of the ascending piston is compensated for by the descending one, and thus the oil spray from the crank-chamber is not drawn on to the cylinder walls to the same extent but merely the oil which has been splashed through the opening formed in the baffles for the connecting-rods.

Another point which militates against the freer adoption of the completely forced system is that of initial cost.

Except for racing purposes very little has been done in the way of insulating the oil reservoir from the crankcase for cooling purposes, nor does the ribbing of the outside surface of the sump receive any serious attention. For indicating the operation of the oil pump a pressure gauge is more usually fitted than an indicator.

An expensive but extremely efficient type of plunger pump is that used with the Dodson motors, Fig. 3.

This pump is comprised of a rotating barrel with a plunger that operates within it. In the upper end of the barrel is an opening which registers in turn with the intake and delivery port. As the plunger goes down the opening registers with the intake and the plunger sucks in the oil. On the up stroke of the plunger the opening registers with the delivery port and the plunger forces the oil through it. The reciprocating motion is given to the plunger by a cam operating on a rocking lever and the revolving motion is given to the barrel by a worm acting on the same shaft as the cam.

Another type of oil pump is shown in connection with the Vauxhall engine, Fig. 4.

A plunger pump is situated at the front end of the engine. The plunger of the pump, A, has a ball delivery valve B and an oil suction valve is placed at C; this latter ball valve is prevented from rising too high from its seat by the taper pin D. Oil enters the pump from the lower part of the sump E and passing the valve B on the downward stroke of the piston, flows through the drilled passage F in the first place into the air chamber G, which latter relieves the oil passages and pipes of any shock that might be due to the intermittent action of the pump. It will be noticed that the pump plunger has at its upper end a second piston H and the purpose of this piston is merely to prevent the passage of oil otherwise than through the drilled port F when the plunger is taking its downward stroke.

This method of construction, while it does away with the necessity for a stuffing box or long guide, enables the plunger to be withdrawn with facility and despatch. The pump is driven by a small crankpin having a ball bearing J. The oil on passing out of the air chamber G flows to the longitudinal pipe K, whence by way of short curved pipes, such as L, each of the main crankshaft bearings is fed from the underside through the bearing cap. Oil escapes from the bearing and drops into the sump E, whence it is filtered before again being drawn into the pump. A small chamber M is attached to the side of the crank-chamber; this chamber contains a float N of similar construction to those used in connection with the constant level of the gasoline supply. The float has a needle O which at all times registers the depth of oil in the sump. This needle is easily visible by lifting a flap of the bonnet and is not at all in an inaccessible position as are some glass gauges used for the same purpose. A pressure gauge on the dashboard shows the pressure in the lubrication circuit, and a tell-tale rises and falls at each stroke of the pump and indicates that the system is working and in order.

A very neat fitting is furnished in connection with the clearing of the oil sludge from the crankcase. The Vauxhall has used this particular fitting for a couple of seasons, but it deserves to be described here. A body piece is screwed into the bottom of the oil sump and this contains an ordinary mushroom valve pulled in a downward direction by a spring. Onto the underside of the body piece is screwed a cap and the length of the spindle of the valve is such that when the cap is screwed home the valve is forced from its seat. In this position any dirt or thick oil falls to the bottom of the cap, and is not affected by the pump suction. On removing the cap the valve is permitted to seat itself and thus seal the opening in the sump bottom, while the contents of the cap may be thrown away and the cap replaced in its original position.

A small air pump is employed to deliver aid for lifting fuel from the gasoline tank. This pump has its trunk piston driven from the same pin which operates the oil pump. Both the suction and delivery valves are steel balls retained upon their respective seats by light helical springs. The piston, it will be noticed, does not reach the top of the pump cylinder, so that a high compression of the air would not be possible under any circumstances. There is, however, a small spring loaded safety valve at R which can be adjusted as to the pressure at which it shall blow off by the milled nut S. Air passes to the gasoline tank by way of the pipe T.

The Bosch magneto has become almost a standard feature with the British manufacturers. The fitting of the ordinary type or dual type is simply a matter of the price of the car, dual ignition being found in practically every car over $2,000. The dual system is most usually worked with one set of plugs. Two complete systems, magneto and coil, with separate distributers and plugs are only found on the very expensive cars, and generally in these cars the two systems are separate and independent. In view of the great reliability of the high-tension magneto the luxury of these two sets seems to be almost superfluous. Automatic advance is not taking on, while fixed ignition is only found with cheap cars. With regard to protection of magnetos the Bosch company has recently introduced a waterproof type which is entirely damp-proof in every possible way.

The number of firms who are discarding their own type of carbureter and taking up well-known models is becoming very prevalent. The Zenith, Claudel, Hobson, S. U., Solex and White & Poppe take a very large proportion of the trade. The Wolseley company has recently adopted the S. U. and the Sunbeam the Claudel-Hobson. It is quite clear that the manufacturers are leaving the question of carbureters in the hands of firms devoting themselves entirely to this component which is not only a saving of work done in the companies' factories, but a direct economy as well.

Self-starters are just beginning to receive serious attention. Wolseley is fitting as stock a self-starter on its six-cylinder models and at a charge of $100 to its four-cylinder models. The starter is a compressed-air type, Fig. 5. The air pump is driven by chain and sprocket provided with a clutch coupled to the end of the lay gearshaft. The compressor has two vertical cylinders with a pair of atmospheric outlet and twin delivery valves, and non-return outlet valve being placed in the air delivery pipe. The air is compressed into a steel reservoir, a gauge on the dash registering the pressure. The distributer has four cams driven from the end of the camshaft. The cams lift the distributing valves through tapered fingers which are withdrawn except when the distributer is moved into the starting position. Normally when the vehicle is running the pump is out of engagement, depending of course upon the pressure in the store tank. The shut-off valve is conveniently placed at the side of the chassis, which is closed when the vehicle is not in use and opened before starting. All the joints are most carefully made with the same material as is used for Diesel engines. The pipes are of steel with special connections used in submarine work. Spring loaded non-return injector valves are fitted in the exhaust valve caps of the cylinder. The distributer is so arranged that when not actually starting the engine no parts are in motion. The starting lever on the dashboard is so arranged that it throws the tappet levers into position between the starting cams and valve stems, this being combined with a motion which opens the air admission valve. Of course, the air compressor can be arranged to pump the tires, thus increasing the operator's comfort in more than one way.

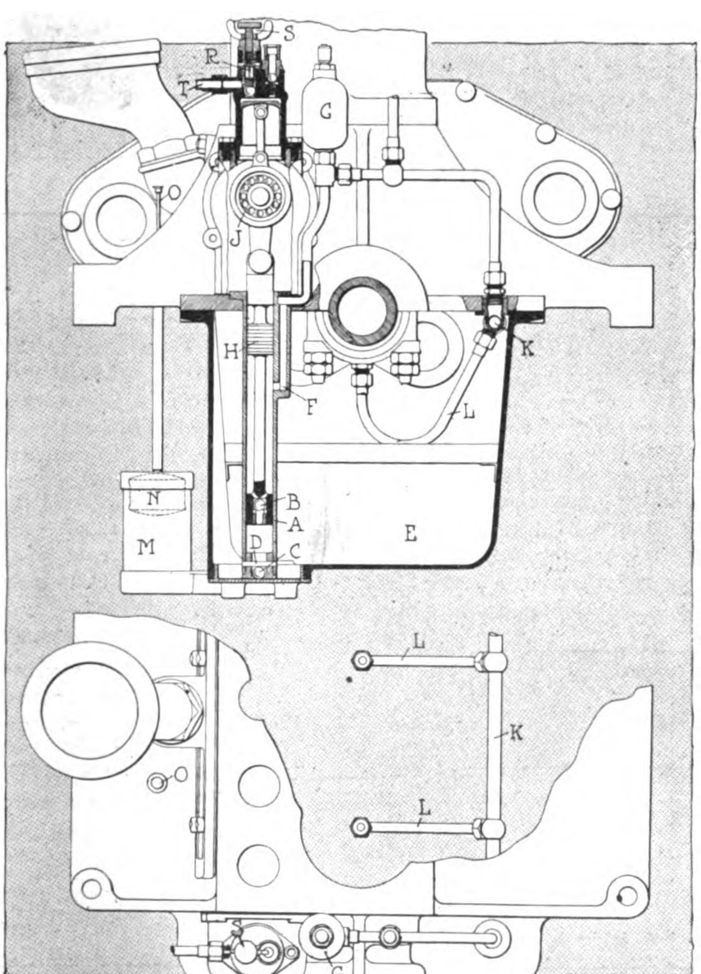


Fig. 4—Vauxhall motor oiling system

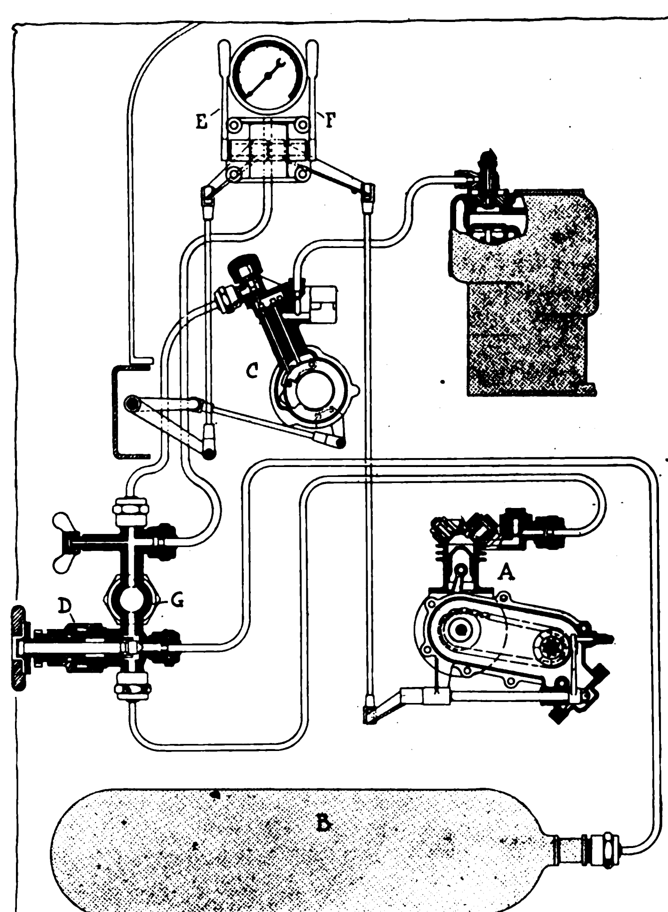


Fig. 5—Wolseley compressed air self-starter, one of the two self-starters in use on English cars

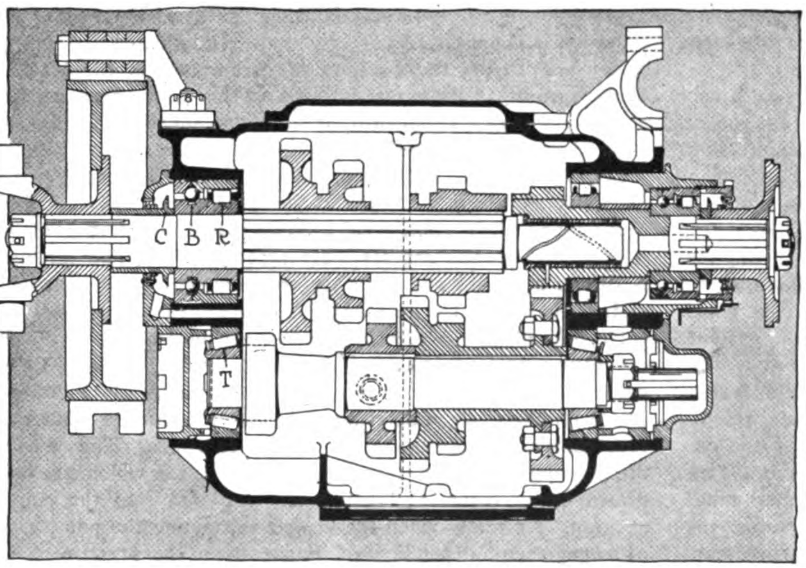


Fig. 6—Wolseley gearbox for 16-20-horsepower car

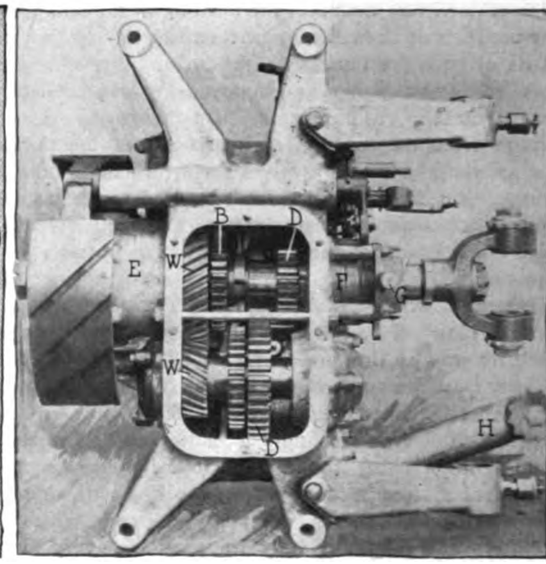


Fig. 7—Napier six-cylinder car gearbox

Wolseley is the second firm in this country to adopt the self-starter as stock equipment, the previous one being the Adams, also using compressed air. Now that a start has been made in fitting self-starters the further adoption will make more rapid progress. Many firms are looking closely into the proposition, and the most favorably received are compressed air and electric Acetylene starters as used in America are not looked upon with any favor.

Detachable wheels are making great headway, and the makers supplying these without extra charge have doubled for 1913. The detachable wire wheels of the Rudge-Whitworth or Riley type predominate, and a larger number of makers is using the pressed-metal wheel of the Sankey pattern, and this type is receiving considerably more favor than during the past season, one of the reasons being that it more nearly approaches the wooden wheel in apparance. It is a very much easier wheel to clean and has proved itself in practice to be as strong as the wire type. The chief advantage of the wire type is in connection with the saving effected in the wear of tires. This saving was demonstrated by the number of Daimler cars of heavy construction which have been used for hiring purposes. Fifty were fitted with wire and fifty with wooden wheels, and after a very extended period of time it was found that the total mileage of tires fitted over wire wheels was 172,731 and the total mileage of the tires fitted over wooden wheels was 102,524. The tire sizes were 935 by 135. The writer's own experience confirms this to some extent, as with the same car 33 per cent. extra mileage was got out of the tires when fitted to the wire wheels.

Where changes are being made in the number of speeds it is found that such change is from three to four. A notable change has been made by the Napier company with their 15-horsepower Model de Luxe, which has hitherto been fitted with only three speeds. For the future a four-speed gearbox can be supplied. Humber is adopting four speeds in its 68 by 130 and its 75 by 130. Standard, Dodson, Dennis, Calthorpe, Bell, 10-horsepower; Austin 12-horsepower, Swift and Sheffield-Simplex are all supplying four-speed gearboxes in place of last year's three-speed models. With these modifications the four-speed gearboxes are considerably in the majority. Short, compact gearboxes of the one-piece casting type notably give the best results, and the aim of every manufacturer is directed to this end. The multi-spline shaft is universally adopted, and the six splines are increasing in numbers, although not predominating. Spigot shafts are in many cases fitted with ball bearings.

Fig. 6 shows the latest Wolseley gearbox product for its 16-20 four-cylinder chassis. This gearbox is remarkable inasmuch as it is fitted with three different types of bearings, namely, the parallel roller R, Timken roller T and ball B. The gearbox

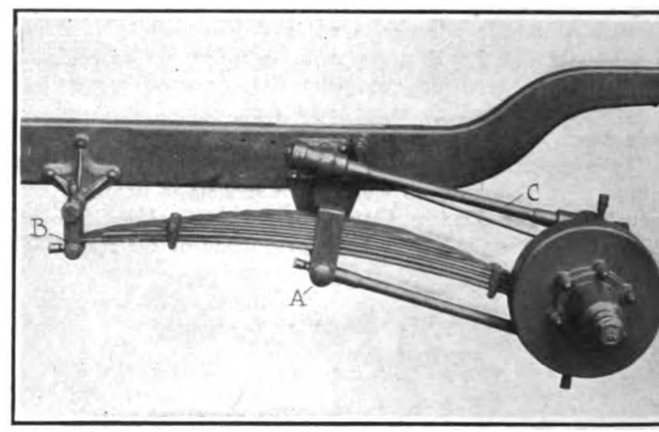


Fig. 7 A—Deasy Lanchester spring system

is arranged for four speeds, and there are six splines on the shaft carrying the sliding gears. There is no longitudinal division of the gearbox, and special means are taken for preventing the oil from escaping along the shaft, oil catchers C and felt pads being employed. The size of the brake drum fitted to the shaft is typical of the better-class British cars. Brake diameters and widths have increased to very substantial proportions. The large diameter of the gearbox shaft is worthy of notice.

In the gearbox of the six-cylinder Napier, Fig. 7, compactness is the cardinal characteristic, so as to make the shafts as short as possible for stiffness and for silence of gear changing. The box is aluminum suitably webbed. The countershaft is driven by helical-cut gears and the second speed sliding gear acts as top speed direct driving dog which meshes with internal cut teeth in the main shaft helical gear.

The gears are of large proportions, the mainshaft is specially interesting, runs on ball bearings, and at the rear end revolves in a large double row bearing within the casing projecting beyond the gearbox proper. The shaft is thus supported immediately under the brake drum and will properly withstand strains thrown upon it by application of the brake, which, again, is an entirely new type internally expanding, having all its mechanism inside the drum. The mainshaft has a large adjustable stuffing-box at either end so oil cannot escape on to the brake.

The front stuffing-box has its gland notched and a spring bolt locks in any position after adjustment.

The oil filler is conveniently arranged under the driver's footboard; it also acts as a level indicator as when filling the oil should be poured in so that it just appears in the orifice.

An interesting method of gearbox lubrication is shown in connection with a patent taken out by Wolseley, No. 20,228. Although this arrangement of lubrication is not standardized, it, however, foreshadows construction which may materialize as a commercial practice at a subsequent date.

Fig. 8 requires but little explanation. The gears revolve in troughs and in the bottom of the gearbox is a sump which contains a quantity of oil. This is circulated by means of a pump in a similar manner to the troughs provided for lubricating the connecting-rod ends. The principle is shown applied not only to sliding gearboxes, but also to worm drives, and for lubricating chains in connection with engine timing gears.

The chain-driven gearbox is making no headway in connection with pleasure cars, an objection to it being the extra weight. Maudslay introduced this type last year, but is not continuing it.

A recent patent taken out by Wolseley, Fig. 9, shows a combination chain-and-spur gearbox which indicates that considerable thought is being directed to the chain-driven gearbox. The chain box has been so successful with omnibuses that its adoption for pleasure cars is certain to be more conspicuous in the near future. With the Wolseley box the third gear is directed by dog clutches, the second speed is by silent chains and the first speed by gears. Reverse is partly through chains and partly through gears. The driving shaft is shown at A and the driven shaft at B, this being connected to the propeller shaft as usual. For the direct drive the dog clutches C are engaged. For the second speed the dog clutches D are engaged when the power passes through the chain wheels E (chain not shown) to the layshaft, reaching the driven shaft B through the chain on the chain wheels F. For the first speed the dogs D are disengaged and the gear sleeve G moved to the left. The power then passes through the gears H, and so to the gear sleeve G, and thence through the gear wheels J to the driven shaft. The gear sleeve G is mounted on bearings upon the layshaft so that the two can rotate independently. For the reverse gear the sleeve G is moved to the right, meshing the dogs K, while the gear wheel L engages the wheel J on the driven shaft B. The reverse is therefore through chain wheels E and gears J and L, the layshaft and sleeve then revolving in the same direction.

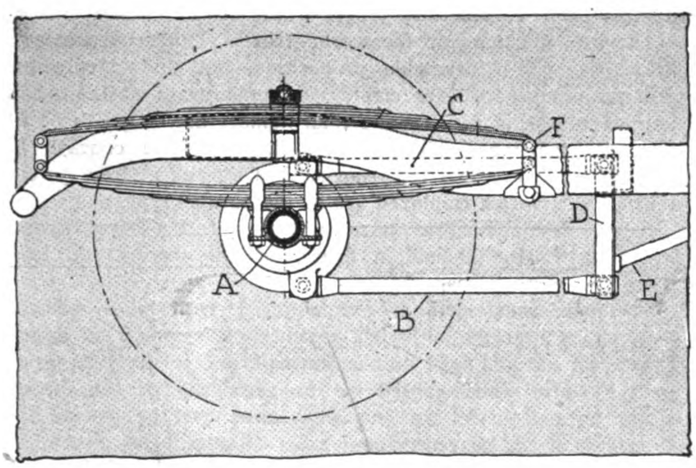


Fig. 7 B—The Austin featured rear spring system

The underslinging of wheel springs is becoming more prevalent. Wolseley adopted this last year, and now Daimler is following with its 20-horsepower model. This practice of underslinging is but a return to a practice which was common 10 years ago. The chief advantages are that it enables the springs so to convey the torque of the axle casing when the drive is first taken up or the brakes are applied, and that the dithering which is common under these conditions to a large number of cars is prevented. The radius and torque rods minimize this feature, but there is no doubt that with a carefully designed underspringing the best results can be obtained without the additional fitting of torque and radius rods. The objection from the user's point of view is the fear of breakage from the spring clips, but of course it is quite a simple matter to provide a sufficient strength in these parts. Daimler is employing two spring clips placed diagonally instead of the more usual parallel system.

Springs are to be long, wide and with little camber so that when loaded they are practically flat, and the three-quarter elliptic is most favored. The dimensions with a well-designed car suitable for a covered body will have springs 48 inches long, 2.5 inches wide and composed of about six plates. Instead of shackle plates under the two parts of the spring shock-absorbers, or in reality spring shackle plates are usually provided.

The Lanchester system of springing adopted by Deasy, Fig. 7A, consisting of an inverted half elliptic leaf spring at each side in combination with parallel link motion. The spring is fixed to a bracket which is pivoted at A. Its front end is attached to the shackle B, while its rear end is housed in a slide attached to the ends of the back axle. At A is pivoted the radius rod, which is articulated to the back axle immediately below the spring pad. The radius rod forms the link which conveys the propulsive thrust of the driving wheel to the chassis, and, as will be seen by reference to Fig. 7A, the link is attached to the back axle end by means of a universal joint.

Torque rod C is likewise articulated to the back axle casing, lying parallel with the radius rod. The function of this torque rod is to prevent the tendency the engine has to try and rotate the axle casing against the resistance of the road wheel. The

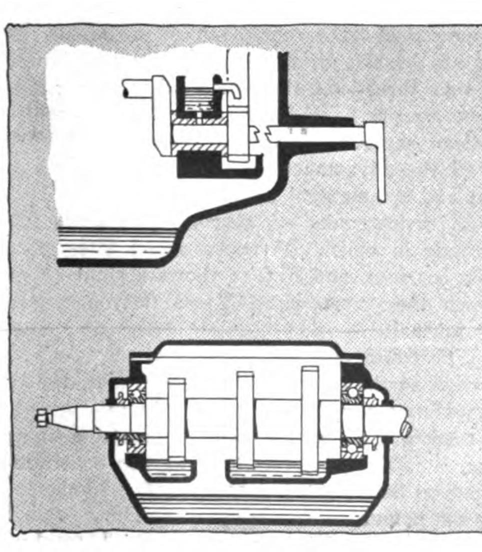


Fig. 8—Wolseley patent for gearbox oiling

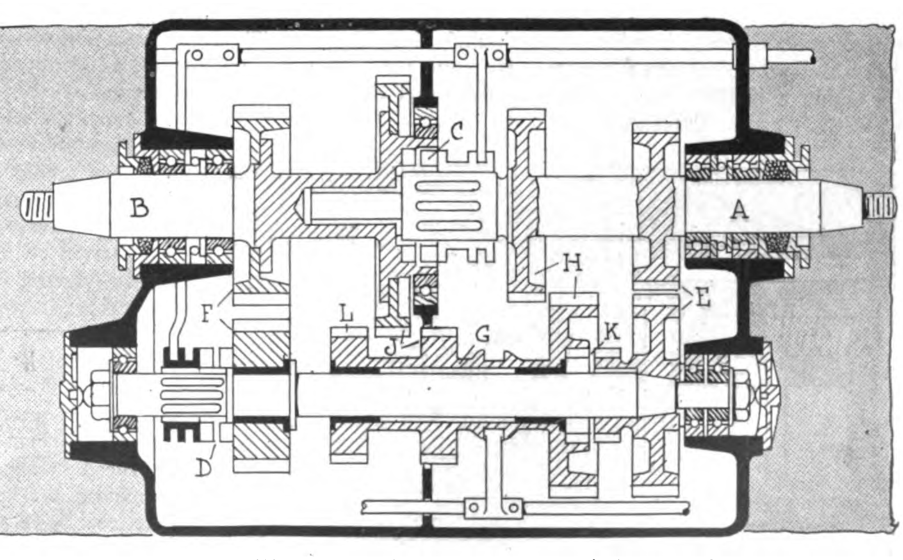


Fig. 9—Wolseley combination gear and chain gearset

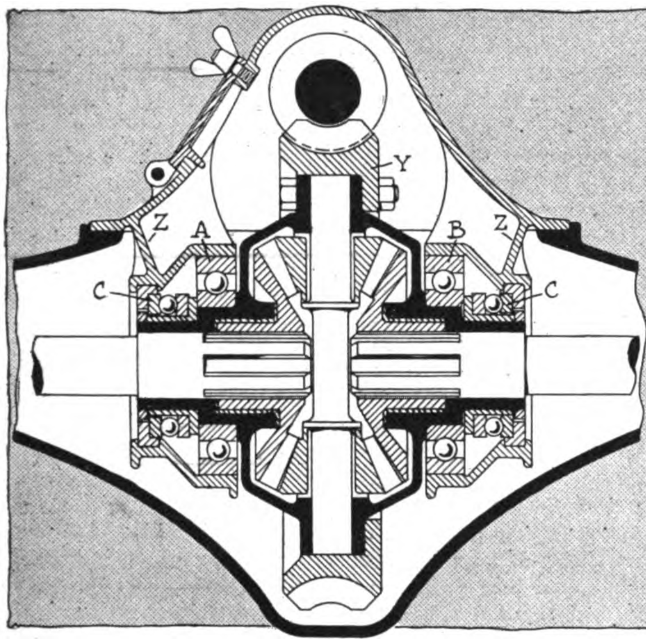


Fig. 10—Worm mounted midway between annular bearings

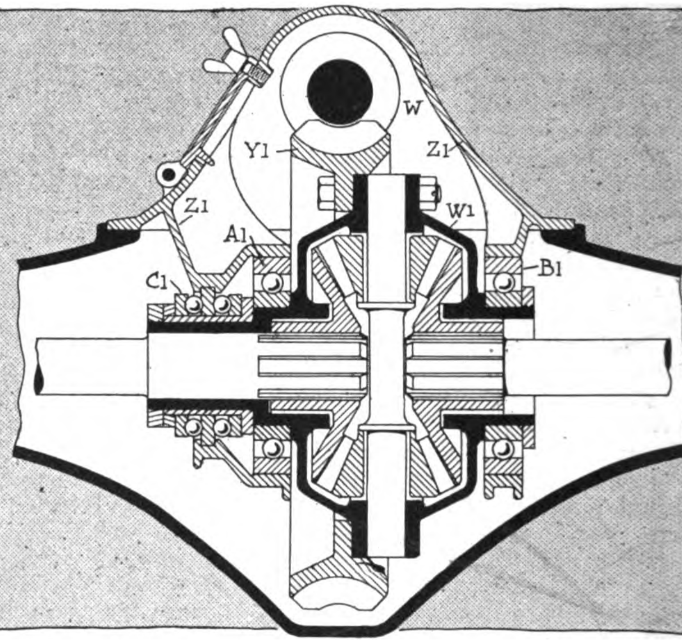


Fig. 11—Worm mounted out of center between bearings

rod effectively prevents this action, and in order to avoid any possibility of shock or jar being transmitted through it, it is provided at its rear end with a telescopic joint, in which it works against the action of spring buffers. All the moving parts throughout this mechanism are fitted with efficient means for its lubrication and is thoroughly waterproof. The suspension on each side of the axle is quite independent; the illustration shows the detachable wheel removed for the sake of clearance.

Another spring suspension off the ordinary lines is the Austin, Fig. 7B. In this arrangement to take the live axle torque and also the strains of driving and braking effect, the axle casing A is connected by parallel rods B and C to a rigid hanger D which is connected by struts E to the frame. By means of the parallel link system B C the axle is prevented from twisting as it moves in relation to the frame when so permitted by the springs. As will be gathered, the ends of the axle are not restrained by means of the rods C from moving backward and forward, As it is desirable to check such movement, the front ends of the springs at F are fixed to the frame, so that this movement of the axle is resiliently resisted.

The worm drives do not appear to be making any marked progress. Taking 131 models in 1912, forty-eight were fitted with the worm drive, equal approximately to 36 per cent. of the total. Compared with 128 models in 1913 forty-seven are fitted with worm drives, or approximately 37 per cent. This year Sunbeam discarded the worm drive, and for 1913 Maudslay is taking a like action, returning to the bevel drive. In each case there are local reasons.

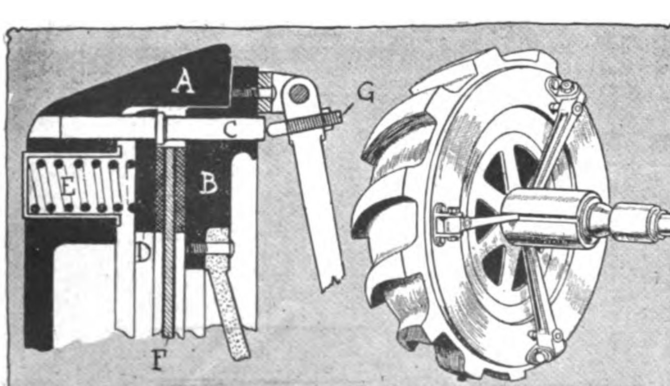


Fig. 14—Deasy clutch in section and perspective

Daimler, Argyll, Armstrong-Whitworth, Deasy, Lanchester, Vulcan, Dennis and Thornycroft continue worm drive. Several makers, however, appear to be undecided, and supply either bevel or worm at the purchaser's option. This does not appear to be a very satisfactory method of dealing with the proposition, and it must entail considerably larger works costs.

The best position for the worm, that is, either overhead or below, is still a debatable proposition, but undoubtedly the greatest number of cars employ the underneath position, and only about 25 per cent. of the total number are found to be of the overhead type. The relative merits of the concave or parallel worm are still far from settlement, and at least 50 per cent. of the worms employed are of the parallel type.

A well-designed worm drive is that made by David Brown & Sons, of Huddersfield, a firm supplying worms and back axles for many British cars.

The more usual method of mounting a worm wheel midway between its bearings, although presenting a symmetrical design throws an unequal load on the journals due to the side thrust on the worm wheel caused by the angularity of the thread. These unequal loads can only be counteracted by placing the worm wheel out of center, and exact distance being dependent upon the angle of inclination of the worm thread and the pressure angle of the teeth.

Where the worm wheel is so placed out of center, the design presents an unsymmetrical appearance, but if a double ball thrust is arranged on the side of the journal remote from the direction of the side thrust on the wheel, then the correct position of the wheel to give equal loads on the bearings will be approximately midway between the two extreme points of the unit, thus giving all the advantages of increased efficiency together with a neat and symmetrical appearance.

Fig. 10 shows an arrangement of gearing as applied to a worm-driven rear axle in which the worm wheel Y is placed midway between its bearings, and Fig. 11 shows a similar form of gearing in which the worm wheel Y1 is unsymmetrically placed between its journals.

In Fig. 10 the differential gearing is mounted on two bearings, A and B, carried on the case Z and on either side of these journals are mounted two thrust washers C. In this arrangement of gearing, assuming the power to be transmitted on the low speed is approximately 30 horsepower at 300 revolutions per minute, the load on bearing A is 7,530 pounds and the load on bearing B is 4,350 pounds.

Referring now to Fig. 11, W is a worm which transmits motion to the worm wheel Y1 mounted on the differential casing W1 which contains the usual differential gear and is set out of center. The differential gearing is mounted on two journal bearings A1 and B1 carried by the case Z1. In this arrangement of gearing an equal load is obtained on each bearing.

The Brown improvement consists in applying a double-acting thrust bearing. C1 located on one side of the worm or spiral gear wheel whereby a symmetrical design and increased efficiency of the gearing is obtained, the thrust in both directions being taken up by said bearings.

The worm arrangement of the Thornycroft car is typical of many others. Fig. 12 shows a longitudinal section through the axle and Fig. 13 a transverse section. The worm is of the type having a concave face and it is not solid upon its shaft, but is driven on to four splines on solid keys formed upon the shaft. Presumably this is done to facilitate, or in any case to cheapen, the replacement of the worm should such replacement become necessary. A double ball thrust bearing is fixed on the back end of the axle. The dome-shaped cover on the top of the casing, which can be readily removed, permits great accessibility to the internal parts, and it will be seen that the driving axles have fluted ends that engage with the bevel pinions of the differential gear; thus these axles may be pulled out to permit withdrawal of the worm wheel, differential casing, bearings, etc.

The leather-faced cone clutch is still the most popular type. In 1912 58 per cent. of the British cars were fitted with this type, while the proportion for 1913 works out at 59 per cent. The multiple-disk clutch takes second place, and the figures for 1912 are 25 per cent and for 1913 27 per cent. The figures for the single type for 1912 are 13 per cent. and for 1913 11 per cent., the balance being accounted for by other types, such as the metal expanding.

The Deasy clutch, Fig. 14, is completely inclosed within the flywheel. A diagrammatic section of part of it indicates the manner in which the clutch is arranged. A is the rim of the flywheel, to which is screwed a disk B carrying a dished aluminum center, spoked as shown. Supported in these two members are three sliding pins C, the shoulders of which abut against a flat ring D, which is in turn supported by the pins C, and is pressed into engagement by six spiral springs arranged circumferentially, one of which is shown at E. These springs are carried in the web of the flywheel in brass thimbles.

Between the ring D and the inner edge of the rim B is interposed a disk F carried in the aluminum center, within which it is free to rotate. Mounted on B and D are rings of asbestos fabric. The effect of the springs E is to grip the center plate F

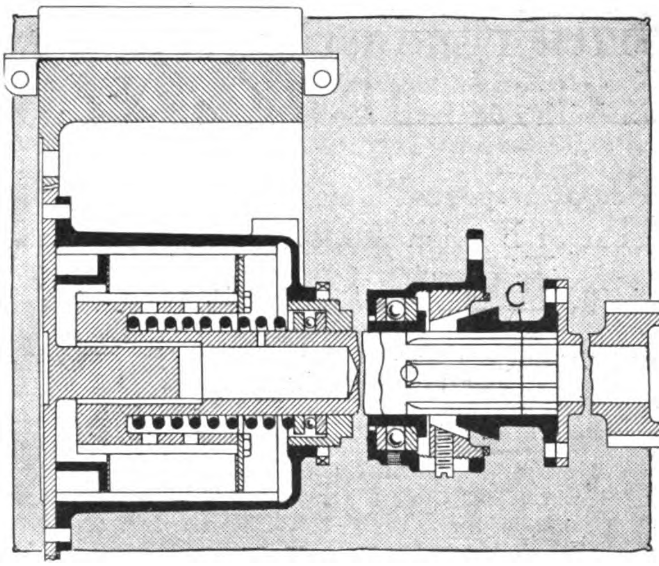


Fig. 15—Section through Thornycroft plate clutch

between the fabric-lined surfaces of D and B, and as the friction thereby produced is very large, owing to the nature of surfaces, only comparatively light springs are necessary.

A thrust ring carried concentrically with the clutchshaft and actuated by the clutch pedal operates three rocking levers pivoted to the rim of the flywheel. These levers carry thrust pins G which press against the outside ends of the pins C, and pressure upon the clutch pedal therefore throws D clear of F and allows the clutch members to run free of one another. A small additional spring is introduced on the clutch shaft to allow the disk F, when the pedal is depressed, to run clear of the surface of B.

In the Thornycroft plate clutch, Fig. 15, the piece which transmits the drive from the plates is one piece with the shaft and this shaft is drilled from its front end so as to take the supporting tail shaft as well as for the sake of lightness; this same shaft is fluted at the rearward end into the coupling C. The whole constitutes perhaps a somewhat expensive piece, a point worthy of consideration if renewals are likely to be necessary. The ball thrust bearing that comes into play on the withdrawal of the clutch is a heavy one and certainly, having in view the comparatively light clutch spring, would not appear to be overloaded.

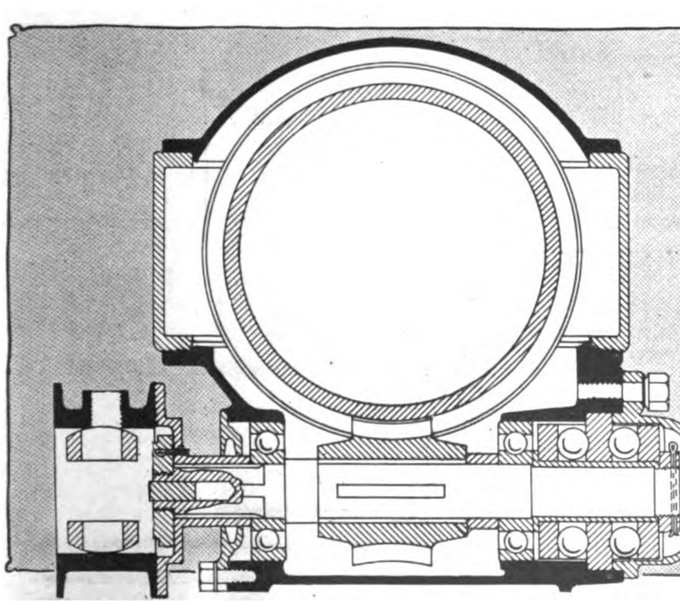


Fig. 12—Longitudinal section through Thornycroft rear axle adapted for worm drive

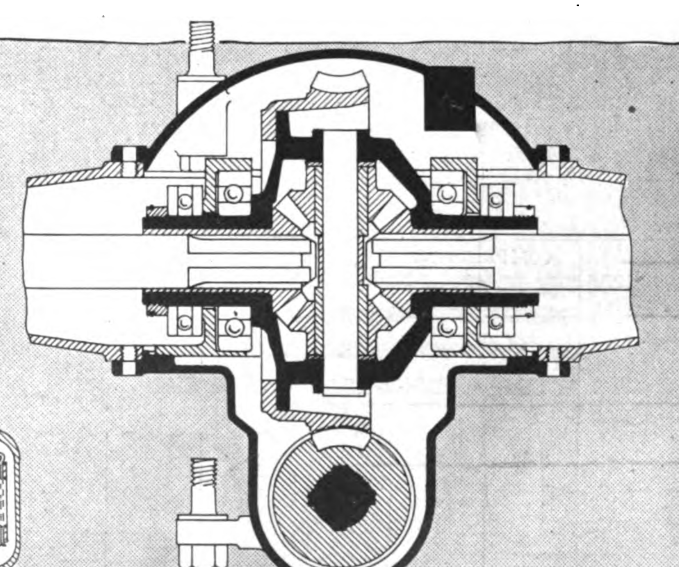


Fig. 13—Transverse section through rear axle of the Thornycroft car for worm drive

British Industry from Critical Point of View

Price of Imported Cars Has Fallen While That of English Automobiles Has Been Raised, Cutting Out Cheap Grades

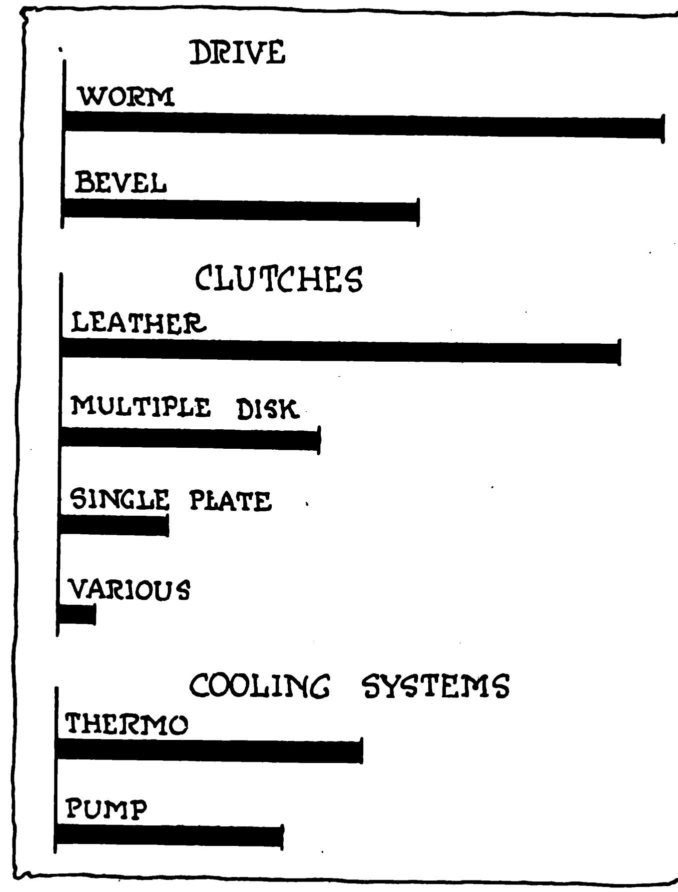
Practice of Making Many Models in Small Factories Eliminates Competition on a Strict Basis of Price

AFTER reviewing the mechanical features of the exhibits which are being installed at the Olympia Hall on November 8, it will be interesting to consider the present state of the British motor industry. Great Britain has no tariff or import duty, and therefore the world's productions can be offered for sale on an equality with the home made constructions. The pros and cons of the fiscal policy of the British Government are not within the scope of this review. The question of tariff reform must be left to the political arena, and the only connection free imports have with the general aspects of the automobile industry is in regard to the means which the British manufacturer has, or may adopt, to keep out foreign competition.

Upon reflection it appears somewhat strange that the British manufacturer has only been roused, or perhaps to be more correct, the British public, in this direction, by the comparatively recent importation of cheap American cars. For years past, ever since the automobile industry became a live one, the imports of cars, chassis and parts from the Continent of Europe has each year assumed large and increasing proportions, in fact, as the popularity and usefulness of the motor has developed, so have the imports increased.

There is good excuse for the purchase of the cheap high-powered American car by the British user, for the reason that hitherto neither the Continental, nor the British makers have provided that type of vehicle, that is a powerful four-cylinder car, light in weight, and not exceeding £200 in price.

While constructors on this side have been making expensive cars for the wealthy buyer, the American constructors have been working out the proposition of supplying a lower grade article, cheap in first cost, and cheap to renew, which is within the range of a man of moderate means, and there is distinct evidence that the importation is having an effect on the British productions with those makers who have attempted in a feeble manner to produce a low-priced car. Importation, however, is having an effect which is proving beneficial to the manufacturer of higher class cars here. The American car has been the means of educating a large number of people in the use of motors who have since learned to enjoy the pleasures which the



Graph showing ratios of constructive features as shown on British automobiles for 1913

ownership of an automobile brings with it. Once a motorist always a motorist is a truism, and many who have commenced their motoring experience with a cheap car are now owners of more expensive types of vehicles.

It will be of interest to give some particulars of the importation of cars into this country, and the accompanying table gives the imports from 1908 to 1911.

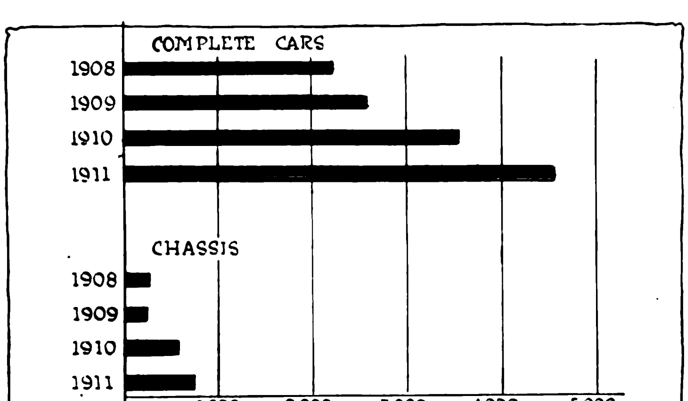
For the 9 months ending September 30, 1912, the value of imports was as follows:

Cars, 6218, value	£1,478,397
Chassis, 6906, "	1,490,726
Parts, "	2,483,562
Total	£5,452,685

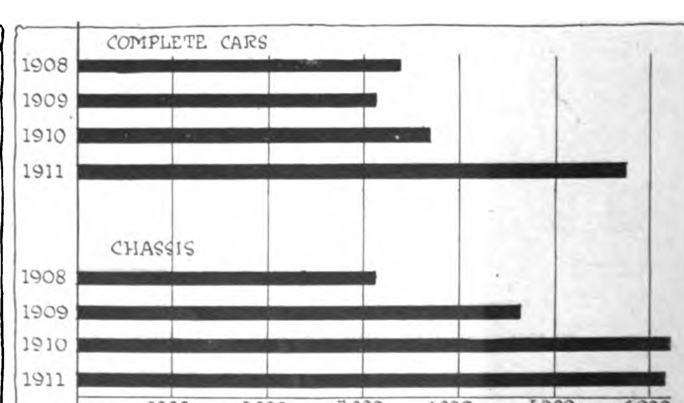
In 1911 the corresponding figures were:

Cars, 4927, value	£1,286,351
Chassis, 5198, "	1,353,568
Parts, "	1,925,274
Total	£4,565,193

The value of imports from the United States has been ap-



Showing number of automobiles and chassis exported by Great Britain during the last 4 years



Foreign automobiles and chassis imported into Great Britain for each year since 1908

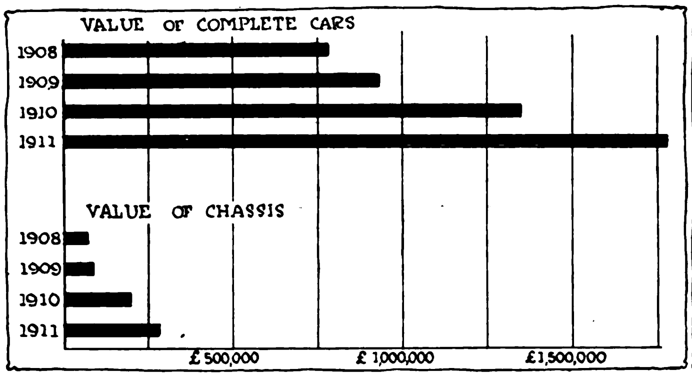
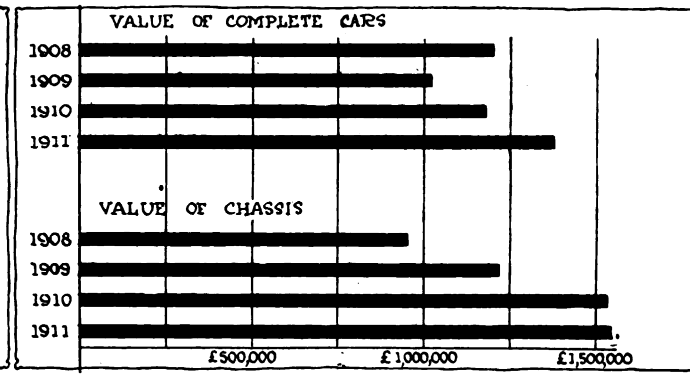


Diagram illustrating total values of British automobile exports for the last 4 years



Respective values of Great Britain's automobile and chassis imports since 1908

proximately as follows: Complete cars, chassis and parts, 1910, £495,383; 1911, £676,053; and for the first 9 months of 1912 £631,318.

From these figures it will be seen that the figures for 1912 will considerably exceed the figures of 1911, for on September 30 the figures showed an increase of £135,935 over the figures for the 12 months of 1911. From the figures relating to the American productions one finds that 4,001 vehicles were imported from the United States in 1911, and 2,340 for the first 5 months of this year, while there is evidence that the numbers imported are increasing at a rapid rate, so much so, that very shortly the United States will be the greatest exporter of complete cars and chassis into this country, both in numbers and total value.

While the imports rise it is encouraging to see the exports also rise, the figures relating to which are set out in the accompanying table.

For the 9 months ending September 30, 1912, the total exports amounted to £2,532,573 as against £2,126,602 for the year 1911.

In view of the many records achieved by British cars it is obvious that the importations are not due to their inferior quality. Looking at the average prices during the past years of the imports and exports, it will be seen that the price of the imported cars has steadily decreased, while the average price of the British-built exports has increased. In 1908, the average price of cars imported was £363, falling to £253 in 1911, whereas the average price of exported cars has risen, from £361 in 1908 to £397 in 1911. It therefore appears evident that the manufacturers of Great Britain intend to increase the price of their constructions, and that they do not trouble themselves to set about the production of cheap automobiles. What is the reason of this attitude, and why is Great Britain content to allow this large proportion of its purchases to go to the foreigner, and, further, what is the British manufacturer doing to meet the situation? First, the manufacturer of repute has no inducement to do otherwise than he is doing at the present time. With the capital he has at his disposal he is getting all the trade he is able to cope with, and therefore has no desire to reduce either quality or price. As regards output and profit he is quite content, and every year one sees the gradual increase of plant and buildings, paid for mostly out of profit.

Great Britain Can Build Cheaply

Some 2 years ago the writer went most carefully into the cost of manufacturing automobiles in Great Britain, with the head of one of the largest automobile factories in the United States, and the conclusion arrived at after a most careful and elaborate study in connection with the conditions of labor, cost of materials both in England and America, and also in Europe, was that in no country in the world could automobiles be built more cheaply than in Great Britain.

However, the British constructor has little initiative. He wants his market sure at the outset, and is not running any risk of setting out to make goods of which there is an element of doubt as regards their disposal. In other words, he has no confidence in his selling organization, and he therefore runs his business on safe and sure lines.

There is abundant evidence that cheap cars for the multitude can be built here at competitive prices, and such cars would, now that the motoring fever has not only developed to the fullest extent, but is rapidly extending to our Colonies, sell in large numbers, yet no financier or financiers are yet forthcoming to provide the necessary capital.

Another factor in connection with the British motor industry which does not tend toward cheap production is the policy adopted by the majority of manufacturers in making a large range of models, and trying to satisfy every inquiry that comes along. Even the smallest firms are constructors of three, and, in many cases, four models.

It does not appear likely that any of the well-established firms will in any way modify their existing policy in producing only expensive models, in fact, it would be prejudicial to their best interests to do so. As an example, some 2 years ago, one of the largest firms made a substantial reduction in its prices. Did it sell more cars? On the contrary, the public at once said that the firm had reduced quality, and the sales actually fell, only to be recovered by a substantial increase in the following year.

Foreign Vehicles, Chassis and Parts Imported to Great Britain

	1908	1909	1910	1911
Complete cars	3,830	3,666	4,516	6,778
Re-exports	434	550	822	1,047
	3,396	3,116	3,694	5,731
Chassis	3,370	4,855	6,553	6,672
Re-exports	236	224	332	494
	3,134	4,631	6,221	6,178
Value of complete cars	£1,389,552	£1,223,053	£1,439,962	£1,717,983
Value of re-exports	161,561	177,064	234,458	308,569
	£1,227,991	£1,045,989	£1,205,504	£1,409,414
Value of chassis	£1,063,077	£1,321,596	£1,671,593	£1,723.889
Value of re-exports	88,446	78,271	104,842	152,735
	£974,631	£1,243,325	£1,566,751	£1,571,154
Total net value	£2,202,622	£2,289,314	£2,772,255	£2,980,568
Average price per car	£363	£333	£319	£253
Average price per chassis	£315	£272	£255	£258
Value of parts less re-exports	£1,550,518	£1,633,467	£1,840,401	£2,336,182
Total value of all imports	£3,753,140	£3,922,781	£4,612,656	£5,316,750

British Vehicles, Chassis and Parts Exported to Foreign Countries

	1908	1909	1910	1911
Complete cars	2,216	2,580	3,555	4,539
Chassis	225	221	564	733
Value of complete cars	£800,636	£952,431	£1,376,886	£1,805,025
Value of chassis	£75,984	£85,356	£213,536	£295,289
Total value cars and chassis	£876,620	£1,037,787	£1,590,422	£2,100,314
Average price per car	£361	£369	£387	£397
Average price per chassis	£337	£386	£378	£403
Value of parts	£381,939	£525,818	£1,015,105	£1,085,403
Value of all exports	£1,258,558	£1,563,605	£2,605,527	£3,185,717

Automobiles, like other commodities, are not sold solely on their merits. In fact, other influences in many cases count for more than merit.

The American importation has already had this effect on the British trade. It has entirely killed the one and two-cylinder cars. No less than fourteen models of the one and two-cylinder type have been discarded. The Rover Company has discontinued four models of the one and two-cylinder type, and will construct for 1913 only two four-cylinder models, namely 12 horsepower, 75 by 130 millimeters at a chassis price of £275 and a larger 20-horsepower model, 90 by 130 millimeters, the chassis of which is listed at £375. Last season this firm listed a one-cylinder car complete at £135.

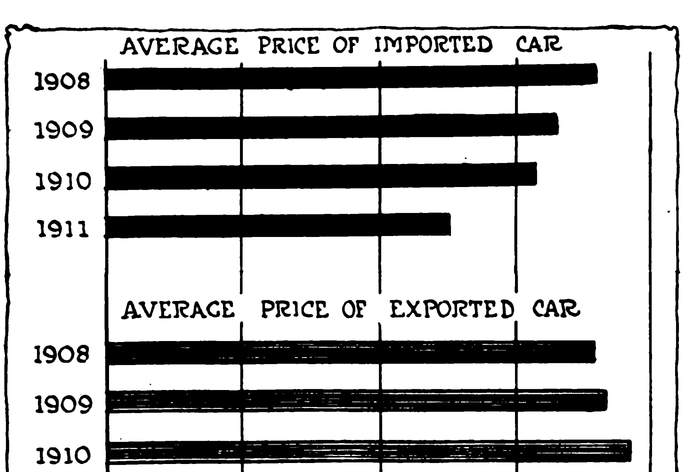
The Swift Motor Company is also discarding its one and two-cylinder types, and will in future only construct four-cylinder models. The smallest size is a 10-horsepower, 65 by 100 millimeters, chassis listed at £175, or with body, £195. This latter model is an attempt to compete with the American cars. In comparison, this British car has roughly only half the horsepower and is considerably more expensive than some of the importations.

The decease of the one-cylinder car will be regretted by none, and it is amazing that it has been permitted to exist for so long a time.

A new type of car, termed the cycle car, is being introduced by more than one firm. The Humber and Singer, among others, are in the market with a light four-cylinder machine selling for about £125. This class of vehicle is very light, built on cycle lines, and has been allotted a special class by the R.A.C., weight being the basis of the class. The cycle car, as termed by the R.A.C., is a car, the weight of which does not exceed 6 hundredweight, and such cars are not permitted to compete with so-called motor cars in any contest under R.A.C. rules. These vehicles are designed to run at a cost not exceeding 1 penny per mile for tires and gasoline. It is doubtful if this type of car will in any way meet the foreign competition, but it will certainly replace in a number of instances the cycle and side car, the use of which has, during the past 12 months, reached enormous proportions. With this light type of car a two-cylinder engine is usually employed.

Hoosier Trade Decides on Show

INDIANAPOLIS, IND., Nov. 11—The annual motor car show of the Indianapolis Automobile Trade Association will be held March 24-29 and probably will be held at the Coliseum at the state fair grounds, north of Indianapolis. At an election held recently the club elected a new board of directors.



Average price per car of Great Britain's automobile imports and exports

Manx Race for Next Year

Announcement of British Classic for 1913 At Olympia Show Meets Hearty Approval of the Automobile Industry

Attendance at Exhibition Sets New Mark and Affair Is Called Best Body Show World Has Seen

LONDON, Nov. 12—*Special Cable*—Announcement was made at the banquet held on the evening before the Olympia show opened that the Royal Automobile Club had decided to organize a race to be held on the Isle of Man in 1913.

The announcement was received with the utmost enthusiasm. The object of the race is to give the British manufacturer an opportunity to show that he can produce a car at moderate price of such quality that it can stand the severe test of a road race lasting 2 days.

There is a distinct spirit of optimism prevalent throughout the whole industry. The show attendance is a record so far. No less than 34,672 persons visited the show on Saturday last, which is 30 per cent. above last year's figures. Many makers have sold their output before the doors were opened.

There is little that is actually novel in chassis construction but improvements in details abound. The attractions chiefly center around the superb examples of carriage work. All the most renowned carriage builders of Europe are represented. The automobile body construction shows more advance than any other section of the industry and the present exhibition will take rank internationally as the finest exhibition of carriage building ever held. Large enclosed cars predominate and the ordinary landaulet is almost entirely superseded by the limousine-landaulet. Great inerest is being shown in self-starters. The feeling generally is in favor of the electric combined with a lighting outfit. Several experimental plants of this type are on view but no makers are yet adopting any as a standard equipment.

Detroit Dealers to Draw for Show

DETROIT, MICH., Nov. 11—A meeting of the entire membership of the Detroit Automobile Dealers' Association will be held on November 23 at which the first drawing for the annual show at the Wayne Gardens will take place. All applications for space must be in hand by November 20 to participate in this drawing, which will be conducted by Walter Wilmot, who will again be in charge of the affair.

Many applications have already been received and Mr. Wilmot predicts the largest show yet held in this city and the largest possible with the space and facilities available. This year's show will be on the National show circuit, hence greater importance will attach to it than to similar events held here in the past. Many of the Madison Square Garden exhibits will be brought here before being sent to Chicago for the annual gathering at the Coliseum.

At the meeting various details as to allotment will be decided. This first drawing will be for the members of the association. Space allotment for non-members will take place November 25.

Dealers to Finance Toledo Show

TOLEDO, O., Nov. 9—The members of the Automobile Dealers' Association held a meeting early this week at the Commerce Club and voted to form an exhibition company to float an automobile show in January. Incorporation papers have been sent to the secretary of state at Columbus. Automobile dealers and accessory men only will be permitted to subscribe for shares of stock in the company, the capital of which will be $10,000.

3-Liter Race the Feature

Grand Prix May Be Abandoned for Lack of Interest and Chance Exists for Small Cars to Compete in It

Savannah Again Seeks Vanderbilt Cup and Grand Prize if Entry List Is Guaranteed to Local Club

PARIS, Nov. 6—At the moment the entry lists for the French Grand Prix were closed with a total of sixteen out of the minimum of forty cars required—thus probably entailing the abandonment of the race—the rules were made public for the Coupe de l'Auto, or 3-liter race to be managed by the newspaper *L'Auto*. In all probability this will be the only race of the year, for *L'Auto* is opposed to allowing the big cars to join in with the 3-liters, as was done at Dieppe this year, and the national club cannot hold its race independently with only sixteen cars. There is a possibility that the club, having failed to get the required number of entries for its own event, may ask to be allowed to join *L'Auto* in the organization of the 3-liter event, thus giving an official character if not adding to the importance of this race.

It is now certain that the 3-liter race to be held on Sunday, June 29, over a course yet to be selected, will be the most important European speed contest of the 1913 season. Races have been run under these rules in 1911 and 1912, and next season will see their last application, the organizers being of the opinion that full advantage will have been got out of them after 3 successive years' experience. Though the same in principle, there are a number of important detail changes in the regulations. Feeding the cylinders by any mixture at more than atmospheric pressure is forbidden.

Last year Hispano-Suiza built a set of cars with a couple of additional cylinders acting as compressors of the explosive charge. These cars were not entered for the race, but it was feared that similar attempts might be made to pump a charge into the cylinders and thus falsify the results of the race. The new rule says that at the moment of introduction to the cylinders the mixture must not be at higher than atmospheric pressure at 760 millimeters of mercury.

It is no longer necessary that the driver and mechanic should sit side by side. The latter may be behind the former, and probably will be in most cases, with a substantial decrease of head resistance. It is argued that stream line forms are to the final benefit of the car owner and should be encouraged and not discouraged in all races.

A return has been made to the conditions prevailing prior to 1906 by allowing work to be done on the cars by attendants and authorizing the establishment of depots at any point around the course. It was the experience of the late David Bruce Brown and the Peugeot driver Goux, both disqualified for taking gasoline on the course at Dieppe that has led the organizers to make this change. So far as tires are concerned, the difference will not be enormous, for with the general use of detachable wheels big tire changing staffs are not required.

Instead of a minimum chassis weight of 1,763 pounds, a maximum of 1,984 pounds has been imposed. It is believed that in the last two races manufacturers did not sufficiently study the problem of weight reduction, for while there were a few cars which held to the road perfectly although remaining very close to the minimum mark of 1,763 pounds, many of them were built up to nearly 2,000 pounds under the belief that lower weight cars would not stick to the road. The weight is taken without water, gasoline, oil, spares, tools, etc. The two men must scale 308 pounds, any deficit being made up by ballast. Entries for the race close on December 31, and at double fees on March 31. For a single car the ordinary fee is $200; for two cars, $360; for three cars, $500, and for a full team of four cars, $600. The place of the race has not yet been decided.

The sixteen cars which sent in their engagement for the Grand Prix of the Automobile Club of France (14 miles to the gallon) represent the firms Sunbeam, Peugeot, Delage, Mathis, Itala (with valveless type), Opel, and Schneider. The sporting committee of the A. C. F. will unite in a few days to decide what shall be done. There appears to be but two courses, either abandon the race altogether or allow entries to be received at ordinary fees until January 1. Probably the formeer course will be preferred, for the manufacturers object to being kept in doubt as to the holding of the race until such a late date as January.

The charge is made in certain quarters that the club is not at all enthusiastic over its own race, or it would have announced the event as certain whatever the number of cars received and fixed the closing of the lists after the European motor shows. From private sources it is learned that the French firms Peugeot, Delage and Schneider, as well as the English Sunbeam Company, will transfer their Grand Prix entry to the 3-liter or 183 cubic inches race. It is probable that Mathis, Itala and Opel will do the same. A big field for the 3-liter race is practically assured.

Colonels Enjoy Sociability Run

LOUISVILLE, KY., Nov. 11—Participants in the sociability run of the Louisville Automobile Club to Lexington returned home to-night. About 100 persons made the trip, over splendid roads and without mishap. The route to Lexington was via of Shelbyville, Frankfort and Versailles, with the entrants in the contest running in a bunch at the finish and with the average time of 4 hours, 23 minutes and 56 seconds. The winners, in order, are: A. J. Senf, Mrs. C. S. Gibson, Mrs. W. R. Nisbet, F. E. Van Patton, Dr. C. W. Karraker, A. B. Patterson, T. Trammel, Miss Virginia Weikel, Miss Lois Reid, Mrs. Ethel C. Standiford, H. W. Cooper, H. L. Lewman, E. C. Jacobson.

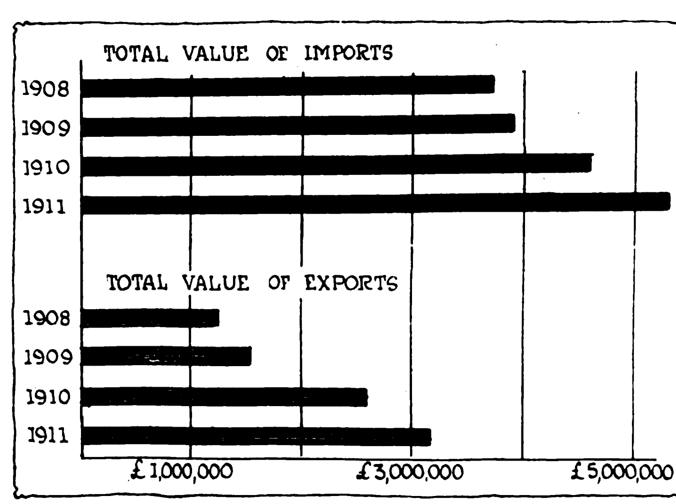
Savannah Wants Big Races Again

SAVANNAH, GA., Nov. 13—*Special Telegram*—Providing a sufficient number of entries are guaranteed, the Savannah Automobile Club wants the 1913 Vanderbilt Cup and Grand Prize races.

At a meeting of the club last night it was decided to apply for both races conditioned upon a minimum number of participants.

By Way of Correction

The description of the 1913 Stearns car, issue of October 31, should have stated that the Vesta generator is used in the lighting plant of these cars instead of the system named.



Values of Great Britain's total automobile imports and exports, including parts

Flanders—U. S. Motor Merger After Sale

Walter E. Flanders Will Assume Presidency—In Court, Interference by Minority Interests Is Checked and Order Issued To Frame Decree of Sale Providing for Virtual Auction in Six Parcels or as an Entirety—January Date Probable

DETROIT, MICH., Nov. 12—(*Special Telegram*)—Absolute confirmation of the reported merger of the Flanders Motor Company of this city and the United States Motor Company was given out last night following the decision of Judge Hough, of the United States District Court in New York in which he denied the petition of some of the stockholders of the United States Motor Company for intervention in its reorganization plans.

Walter E. Flanders will head the enlarged corporation and the headquarters of all the plants except that of the Stoddard-Dayton at Dayton, Ohio, will be moved to this city.

The plans as now formulated contemplate the purchase of the Flanders Motor Company for $3,750,000 of which $1,000,000 will be paid in cash and the remainder in stock.

It is stated that while W. E. Metzger and B. F. Everett will withdraw from active participation they still retain stock interests.

The bringing of the executive offices of the various United States Motors subsidiaries to Detroit means much to the city. The Sampson and Brush plants will probably be reopened, giving employment to some 500 additional workmen, while it will also mean the location of various manufacturers of parts here, so that in the end some 10,000 new workers will be added to the already great array of industrial operators now engaged in the many automobile lines in this city.

Officers of the Flanders organization could not be reached today so that it is impossible to get at details of the transaction other than those given.

Winding Up Legal Affairs in Court

What in effect is practically an auction sale has been ordered by Judge Charles M. Hough with regard to the assets of the United States Motor Company. Of course, there will be no "Going, Going—Gone" feature such as mark regular auction sales, but in the essential particulars the disposition of the property will be by an auction sale.

Next Monday the court has signified its intention to sign a final decree of sale and while the time for its consummation has not yet been fixed, it is certain that it will take place some time in January.

Under the form of order prepared Monday in the United States District Court the bidders will have the opportunity to bid on the assets divided into six parcels or on the whole as a single lot. A certain qualifying amount of cash or certified check will be required from each bidder and the deposits together with the formal bids may be placed in the custody of the court between the hours of 11 o'clock in the morning and 3 o'clock in the afternoon of the day fixed for the sale.

The auction feature arises from the fact that bidders will be allowed, under the tentative form of the final order, to increase their offerings at any time prior to the hour set for the closing of the sale.

The division of the assets will be along these lines:

Parcel No. 1 shall consist of all the property of the United States Motor Company.

Parcel 2, all the property of the Alden-Sampson Manufacturing Company; No 3, Brush Runabout Company; No. 4, Columbia Motor Car Company; No. 5, Dayton Motor Car Company, and No. 6 Maxwell-Briscoe Motor Company. The parcels will be offered in the order of their numbering. Immediately after the bids have been concluded for the various parcels, the whole property will be offered as an entirety.

There was little comfort in the proceedings for the elements that have made objection to the immediate settlement of the company's affairs. They were on hand in court, but the rulings from the bench were against them. The three-headed demurrer which was informally filed on behalf of certain stockholders was dismissed. The demurrer alleged that the court had no jurisdiction; that insufficient facts were set out on the bill of complaint and took up other technical grounds. Judge Hough held adversely to the demurrer on the ground that the court did have jurisdiction; that sufficient facts were stated in the bill and that the affirmative action of the officers of the various defendant concerns bound the stockholders in the absence of allegations of fraud.

It was stated by one of the objecting attorneys that the court ought to name a referee to investigate the alleged shrinkage of assets between the time of the last annual report when it was shown that they footed up to over $23,000,000, while at the time the receivers completed their work there was a nominal loss of over $12,000,000. It was explained that the apparent shrinkage was due to the elimination of all items not directly representing some tangible assets from the report of the receivers and further that the last annual report of the company represented the assets in the light of the seller, while that of the receiver looked at the case from the buyer's point of view.

In referring to the future of the company, the court and attorneys informally considered the plan of reorganization. Judge Hough prefaced his remarks with a statement that the reorganization plan was not before him in his judicial capacity, but that it was a matter of common notoriety. He said: "Reading between the lines of the bill of complaint it is apparent that the creditors having assumed control of the company's affairs in June and having administered them up to the time of the receivership, found them in worse condition than they expected. The creditors should not assume the attitude of mortgage holders foreclosing upon the property of the debtor. The character of their claims is not of mortgage degree."

Mr. Curtis, representing a large amount of preferred stock, said that the creditors who were represented to the extent of $10,000,000 of claims by Joline, Larkin & Rathbone, were the only parties in position to bid on the assets when it came time for the legal sale. This, he explained, was due to the fact that they could put in their claims with the bids submitted, while all others would have to bid actual cash. Thus the situation resolved itself into a contest between paper and cash with all the advantage on the side of the paper.

A suggestion was made by James N. Rosenberg that an offer had been submitted to lease the Brush and Sampson plants in Detroit during the receivership. He said that if such a lease could be consummated it might help the whole property at the sale.

At the session it was not stated who the prospective tenant might be, but after adjournment it was announced that it might be the Flanders Motor Car Company, although the definite statement was not made.

It was stated that the Flanders company required extensive manufacturing facilities and that as both the Brush and Sampson plants were practically closed down, the deal would be an excellent one from every point of view. The court gave assent to leasing the plants, but limited the term to the receivership.

Mr. Rathbone, of Joline, Larkin & Rathbone, said that the merger between the United States Motor Company and the Flanders Motor Car Company had been tentatively arranged on the best possible terms and that Walter Flanders would be the next president of the United States Motor Company, in all probability. He said that it would be impossible to make a more definite statement pending the action of the court. The proposed contract must be ratified by both sides, but it is said that it has been prepared in final form.

Mr. Rathbone said that the Flanders company would be taken over free from all but its current indebtedness, dealers' deposits and current accounts.

Fully 91 per cent. of the claims against the United States Motor Company have been deposited under the plan of reorganization and a considerable fraction of the remainder, consisting of about $1,000,000, would be deposited within a week.

The stock deposits are coming in at a slower rate. About $4,000,000 par value of both issues have been turned in, but the amount so deposited is of relatively small importance to the reestablishment of the company. It is estimated that the total deposits of stock under the plan will reach at least $15,000,000 out of a total of $23,000,000 outstanding. If that develops to be true, the burden to be carried by the underwriting syndicate will be only $1,920,000.

It developed at the hearing that one of the main elements in the problem of the receivers was to finance not only the 1913 manufacturing campaign, plans for which have been outlined and financed by the order of court, but the importance of the experimental campaign for 1914 was referred to as the principal hope of the stockholders.

Hartz to Manage R. C. H. Company

DETROIT, MICH., Nov. 11—At a meeting of the directors of the R-C-H Corporation November 8, J. F. Hartz, president of the J. F. Hartz Company and officer and director of various other leading Detroit business concerns, was chosen general manager and treasurer of the corporation. Other officers for the coming year are: President, R. C. Hupp; vice-president, C. P. Sieder; secretary, L. G. Hupp and assistant general manager, F. R. Hupp.

The directors are G. W. Rogers and J. G. Robertson of Akron, C. G. McCutchin of Jackson, Mich., J. F. Hartz, John Kelsey, C. P. Sieder, F. M. Randall, J. H. Clarke and R. C. Hupp of Detroit.

The active management rests with an executive committee of five composed of Messrs. Hartz, Kelsey, Randall and R. C. Hupp of Detroit.

In entrusting the affairs of the corporation to Mr. Hartz, one of Detroit's most successful business men is brought actively into the industry. He is president of the J F. Hartz Co., Ltd., of Toronto, Canada, and the H. H. Hester Co. of Cleveland, allied firms of the local concern. Mr. Hartz became actively associated with the automobile business 4 years ago when he organized the C. M. Hall Lamp Co. He is also vice-president of the Williams Brothers Company, director of the C. W. Warren Co., publisher of the Detroit Medical Journal and director of the Detroit Times Company.

F. R. Bump becomes assistant general manager.

As stated in these columns last week, 16,500 R-C-H cars have been contracted for by dealers in American and foreign countries for delivery during the season.

Export business for the year was exceedingly good, over 1,000 cars having been sold abroad in 41 foreign countries. From contracts already entered into abroad it is believed that between 3,000 and 4,000 cars will be required for export alone during the next 12 months.

The R-C-H plant consists of a completely equipped foundry, forge, machine shop, paint shop, assembly buildings, large power house, administration and other buildings. It has a capacity of 60 cars per day and during the heavy output season gives employment to 1,600 men.

The corporation maintains branches in New York, Philadelphia, Boston, Buffalo, Cleveland, Atlanta, Chicago, Minneapolis, Kansas City, Denver, Los Angeles, San Francisco, Detroit and Walkerville, Canada.

Offer Made for W. C. P. Assets

The creditors' committee of Wyckoff, Church & Partridge, Inc., which corporation is now in the hands of John S. Sheppard, Jr., as receiver, have notified all creditors that an offer has been made by Howard C. Dickinson, of the firm fo Kearney & Dickinson; George A. Ellis, of the firm of Booth & Ellis, and Chester Griswold, of the Motors Engineering Company, for the assets of Wyckoff, Church & Partridge, Inc.

Should the creditors approve of this offer it is probable that Messrs. Dickinson, Ellis and Griswold will form a company to continue the manufacture of the Vaughan car and Commer truck. Mr. Dickinson and Mr. Ellis represent banking interests and Mr. Griswold in joining these gentlemen will act as the consulting engineer for the new company.

It is reported that both C. F. Wyckoff and E. S. Partridge are likely to be identified with the new interests should plans for rehabilitation be consummated.

H. B. Hollins & Company, bankers, are behind the committee. The amount of the offer is $150,000 in cash to be paid in instalments of $50,000 each, respectively 4, 8 and 12 months from the date of transfer.

The property included in the offer includes all the real and personal property of the bankrupt company except what is in possession of the Driggs-Seabury Ordnance Company or claims against that company. It consists of two New York leaseholds; furniture and fixtures; twenty-six Commer trucks; several Vaughan cars, bodies, etc., together with accessories; the factory building at Kingston, with its contents. Against the property are mortgages and bank liens of approximately $270,000.

John S. Sheppard, Jr., receiver, in a supplemental report to the United States District Court shows that according to his estimate there is the sum of $39,304 either in his possession or due to him and collectible as of November 1, thus making the total amount subject to division under the offer, $189,304.

The unsecured claims of the estate amount to $575,000. The appraised value of the property covered by the offer, adjusted to November 1 by deducting property sold, is about $171,000. This would mean, according to the calculation of Mr. Sheppard, a dividend of 25 cents to 27 cents on the dollar to the unsecured creditors.

Colwell-Ideal Merger Accomplished

DETROIT, MICH., Nov. 9—The Colwell Lead Company of New York City has purchased the Ideal Manufacturing Company of Detroit, large manufacturer and jobber of plumbers' supplies and articles such as pet cocks, piping, joints, etc., for the automobile trade. The deal is one which involves considerable capital, and is perhaps among the largest to be consummated in this city in some time.

Both the purchaser and the Ideal company are old established firms, the former having been begun in 1866, while the latter has been doing business in Detroit since 1887. The consolidation will increase the capitalization of the greater organization to about $2,000,000 and it is stated that it will bring to Detroit additional capital and business and increased opportunity for the employment of labor.

Adams Patent Is Upheld

Injunction Against Hartford Rubber Works—Phillips Patent Does Not Cover Use of Anti-Skid Wire

A. A. A. to Have Chicago Meeting in December—M. A. M. Fixes Date for Annual Meetings

OVERTURNING the judgment of the United States District Court, District of Connecticut, the United States Circuit Court of Appeals has reversed the findings of Judge Platt in the suit of the Metallic Rubber Tire Company against the Hartford Rubber Works involving the Adams and Midgely treads. In the lower court Judge Platt dismissed the bill and found in favor of the Hartford company. The upper court sustains the Adams patent, decrees an injunction against the Hartford company and orders an accounting as between the parties and gives a decree for costs against the defendant.

The suit was instituted by the Metallic Rubber Tire Company alleging that the Hartford company infringed its patent rights under the Adams patent, as outlined in a former issue of THE AUTOMOBILE. The Hartford company responded by setting up defenses of invalidity, non-infringement, abandonment and want of equity and Judge Platt found for the defense, dismissing the bill in the first instance.

Appeal was taken by the complainant to the Circuit Court of Appeals and the full bench consisting of Judges Lacombe, Coxe and Noyes heard the arguments which were presented by Alfred Wilkinson for the complainant and E. W. Vaill for the defense.

Judge Noyes wrote the opinion, the more pertinent parts of which are as follows:

"Concededly the nearest approach to the patent in question is the Phillips English patent, and the question of anticipation may well be determined by examining that patent and comparing it with the one in suit.

"The principal object of the Phillips patent was to protect and strengthen pneumatic tires. It illustrates numerous ways for stiffening and protecting tires, and among others, points out that the tread or wearing portion may be reinforced or strengthened by stitching the rubber with metal wire, threads, cord and the like. Some of the drawings of the patent are very similar to those of the patent in suit. The prevention of slipping, however, is not stated to be either an object of the Phillips patent or a result of the use of its structure. Moreover, it is not clear that the non-skidding effect would be obtained by following the teachings and drawings of the Phillips patent.

Phillips Patent Points to Covering Wires

"Wire sewed into a tire to reinforce the rubber would naturally be flexible wire, while only stiff wire would furnish the hard bearings, required to prevent slipping, especially after the wearing off of the loops. The Phillips patent shows that rubber tires may be stiffened and protected by wire stitching but, in our opinion, does not teach that exposed wire stitching will make hard bearings to prevent skidding. Indeed, many things in the Phillips patent point in the direction of covering the wires and it is never essential that the stitches should be flush with the surface of the tread."

The court then dismisses the objection raised as to the validity of the Adams patent by commenting on the fact that the Hartford company has had a license to manufacture under a patent and upon the expiration of the license has put out a product which, even if not infringing, closely simulates the patented structure.

In conclusion Judge Noyes says:

"In our opinion, the defendant's structure infringes. The claim covers the combination of the wire and rubber as a result and we think that the defendant should not be permitted to escape the charge of infringement by combining its wire and rubber in a different way from the stitching or weaving illustrated in the specification.

"The decree of the District Court is reversed with costs and the cause is remanded with instructions to enter a decree for the complainant for an injunction, an accounting and costs."

A. A. A. To Meet and Dine in Chicago

The annual meeting of the American Automobile Association has been scheduled for December 2-3 at Chicago. The banquet, which is always a feature of the meeting, will be held at the Auditorium on the evening of December 2. It is expected that the attendance will be very large at all the sessions as well as at the banquet.

M. A. M. Schedules Annual Meetings

The Motor and Accessory Manufacturers will have a lively session during the annual show. The association will probably hold the only formal banquet of the 1913 show season and the program that has just been outlined includes numerous activities.

During the week that preceded January 15, all the committees will hold conferences either at headquarters, 17 West 42nd street, or at the Waldorf. These committee meetings have not been definitely scheduled, but will be held nevertheless. On January 14, the Board of Directors will assemble at headquarters to clean up the fag-end of the 1912 business. The following evening at 6 o'clock the annual meeting will be called to order at the Waldorf. The chief business to be transacted will be the presentation

Automobile Securities Quotations

THE whole list of automobile securities advanced during the past week with the exception of a few stocks. The greatest bulge was in Goodyear common which shot up to $400 a share bid with no sellers in sight. This is a net gain of $32 a share since last week and is due to the prospective character of the annual report, due next month. The skyrocketing of the stock may have been accomplished in some degree by a small panic among shorts but the basic reason for it is the expected melon. At this level Goodyear is worth $175 a share more than it was a year ago and its holders say it is cheap at that. The table:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	175	190
Ajax-Grieb Rubber Co., pfd	..	..	98	102
Aluminum Castings Co., pfd	..	..	100	102
American Locomotive, com	36½	37	44	44⅛
American Locomotive, pfd	103½	104	106	106½
Chalmers Motor Company	..	..	145	152
Consolidated Rubber Tire, com	7	10	10	15
Consolidated Rubber Tire, pfd	10	20	50	55
Firestone Tire & Rubber, com	170	175	278	285
Firestone Tire & Rubber, pfd	106	108	105½	107
Garford Company, preferred	..	..	99	100
General Motors Company, com	38½	39½	33	35¼
General Motors Company, pfd	78½	79½	77	78
B. F. Goodrich Company, com	234	239	70	71
B. F. Goodrich Company, pfd	118	120	107	107½
Goodyear Tire & Rubber, com	225	235	400	410
Goodyear Tire & Rubber, pfd	104	106½	104½	105½
Hayes Manufacturing Company	..	..	..	90
International Motor Co., com	..	..	18	20
International Motor Co., pfd	..	..	74	76
Lozier Motor Company	..	..	40	50
Miller Rubber Company	..	..	143	147
Packard Motor Company, pfd	104½	106	105½	107
Peerless Motor Company	..	..	115	120
Pope Manufacturing Co., com	40	47	26	28
Pope Manufacturing Co., pfd	65	70	70½	72
Reo Motor Truck Company	8	10	8½	9½
Reo Motor Car Company	23	25	20	22
Studebaker Company, common	..	..	41	43½
Studebaker Company, preferred	..	..	94½	97
Swinehart Tire Company	..	..	99	101
Rubber Goods Mfg. Company, com	85	95	100	..
Rubber Goods Mfg. Company, pfd	100	105	104	108
U. S. Motor Company, com	23	25	⅛	¼
U. S. Motor Company, pfd	67	68	½	1
White Company, preferred	..	..	105	108

of annual reports and the election of four directors. The annual session of the association is always very brief and at 8 o'clock the members will move over to the College Room, where the annual banquet will be spread.

The directors will assemble on January 16 to choose officers for the ensuing year. No slate has been proposed so far, and following the usual course the selection of the new officers will be accomplished with as little formality as possible.

The following members were elected to the Motor and Accessory Manufacturers at the last meeting of that organization: John W. Blackledge Manufacturing Company, Chicago; James L. Gibney Rubber Company, Philadelphia, and the Westinghouse Electric & Manufacturing Company, East Pittsburgh.

S.A.E. Committees to Hold Meetings

The regular monthly meeting of Council of the Society of Automobile Engineers was scheduled for Wednesday morning. The program consisted of hearing the treasurer's report; considering about forty applications for membership; transfers in the various classes of membership; settling the details of the winter meeting of the society which is scheduled for January 16-18 at the Hotel McAlpin with the annual banquet on January 17.

The society is arranging to receive the visit of the British engineers next summer. The party, according to latest estimates will consist of from thirty to forty members and will be somewhat in the nature of an official repayment of the visit of the S.A.E. to England last year.

A revision of the by-laws is also in contemplation.

The Truck Wheel division will hold a meeting Wednesday afternoon to take up and consider a number of minor changes in the recommended standards.

Market Changes for the Week

DURING the past week the market has experienced its usual variance in prices. Open-hearth, for instance, rose $1.00, due to heavy trading, while tin declined $.02 from lack of trade. Bessemer steel remained at its old price of $28.00 per ton. Rubber rose $.02 due to London influences, as did copper electric and copper lake, both increasing $.00 1-8 per pound, closing Tuesday at $.17 3-8 and $.17 1-2 respectively. Lead, antimony, gasoline and beams and channels, were constant throughout the week. The chemical market experienced no change, cyanide potash and sulphuric acid both closing at their old prices of $.19 and $.99 respectively.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb..	.09¼	.09¼	.09¼	.09¼	.09¼	.09¼	....
Beams & Channels, 100 lbs...	1.61	1.61	1.61	1.61	1.61	1.61	....
Bessemer Steel, ton	28.00	28.00	28.00	28.00	28.00	28.00	....
Copper, Elec., lb.....	.17¼	.17 7/20	.17 7/20	.17 7/20	.17⅜	.17⅜	+ .00⅛
Copper, Lake, lb.......	.17⅜	.17½	.17½	.17½	.17½	.17½	+ .00⅛
Cottonseed Oil, Nov., bbl......	5.82	5.86	5.78	5.83	5.86	5.86	+ .04
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	....
Fish Oil (Menhaden) ...	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @....	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime...	.90	.90	.90	.90	.90	.90	....
Lead, 100 lbs.....	4.75	4.75	4.75	4.75	4.75	4.75	....
Linseed Oil.......	.58	.58	.58	.58	.58	.58	....
Open-Hearth Steel, ton......	29.00	29.00	29.00	29.00	28.00	28.00	—1.00
Petroleum, bbl., Kansas crude...	.70	.70	.73	.73	.73	.73	+ .03
Petroleum, bbl., Pa., crude......	1.65	1.65	1.70	1.70	1.70	1.70	+ .05
Rapeseed Oil, refined	.69	.69	.69	.69	.69	.69	....
Rubber, Fine Up-river Para..	1.02	1.04	1.04	1.04	1.04	1.04	.02
Silk, raw Ital.....	....	4.40	....	....	4.40	....	....
Silk, raw Japan...	....	3.95	....	....	3.92½	....	— .02½
Sulphuric Acid, 60 Beaumé	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs......	5.00	5.02	5.00	5.01	4.98	4.98	— .02
Tire Scrap.......	.09¾	.09¾	.09¾	.09¾	.09¾	.09¾	....

Marvin on Car Shortage

Explains That Limited Number of Railroad Freight Cars Are Useful for Automobile Transportation

Local Dealers Should Co-operate with Factories for Prompt Return of Freight Cars

IN the belief that a full understanding of the question on the part of the several thousand automobile dealers in the West and South will be of value in helping the car situation at automobile factories and inducing the return of automobile freight cars to the manufacturing territory, J. S. Marvin, General Traffic Manager of the National Association of Automobile Manufacturers, Inc., has outlined the situation as follows:

"There is a certain limited number of freight cars having wide side doors or end doors into which automobiles can be loaded. There are twenty times as many box cars into which automobiles cannot be loaded because they have doors too small. The automobile cars are scattered all over the country. They are being used for other freight in the West and South instead of being returned to the territory where automobiles are manufactured. The result is that even thus early in the season it is impossible to secure automobile cars fast enough at the factories to get out the shipments of finished machines.

"The situation is therefore going to become critical unless those automobile cars that are being held in the South and West are located and sent back to the automobile manufacturing territory.

"Therefore, each dealer should take this matter up with his local freight people as follows:

"First—The important point is the disposition made of an automobile car after you unload it. If the local freight agent or superintendent permits some shipper to load it farther South or farther West, the car is lost to the automobile industry for weeks or months.

"Second—Your local freight agent or superintendent would not permit this abuse of automobile equipment if he realized how serious a matter it is and that you are interested in what becomes of that automobile car after you have unloaded it.

"Third—Your patronage is valuable to your local freight agent and the railroad he represents. You can exact, in return for this patronage, their cooperation in solving this problem which faces the automobile industry and the railroads in the manufacturing territory upon which the burden of supplying these cars to the factories rests.

"Fourth—The cooperation that you should exact is that they confine the loading of automobile cars to points in the automobile manufacturing territory; this applies to cars that you unload and also any other automobile cars that may happen to come to your station loaded with other goods and thus be under local control when made empty; request your freight agent to report to you the disposition made by him of cars which you unload.

"Fifth—You should advise the factory of every instance wherein your local freight agent or superintendent fails or refuses to comply with this request.

"You can readily see what a great help it is going to be if every dealer in the West and South follows this matter up; they are in close touch with the situation where the trouble exists. If these cars are not sent back it is going to be impossible to ship machines from the factories."

It will be remembered that during the past few weeks, as during the corresponding period of 1911, the limited supply of freight cars presented a serious obstacle to the business of hundreds of dealers.

Exports for 9 Months Increase 55 Per Cent.

From January 1 to October 1, 1912, American-Made Automobiles Sold Abroad Totaled $21,859,709

American Automobile Imports of France Increase—Gain Is 78 Per Cent., or $285,420, to September

WASHINGTON, D. C., Nov. 12—The summary on commerce and finance issued by the Bureau of Statistics shows that the total imports of automobiles and parts for September were $42,000 more than they were during the corresponding period of 1911. The comparison is as follows:

September, 1912	$189,901
September, 1911	147,295

The showing for the first 9 months of the calendar year, however, indicates a decrease in the total imports of $60,000. The figures are:

First 9 months 1912	$1,625,908
First 9 months 1911	1,685,816
First 9 months 1910	2,214,920

These figures show that there has been a steady decrease in the use of foreign made automobiles in the United States.

In the matter of exports a material increase is shown for the month and for the first 9 months of the calendar year. The following export figures tell the story:

September, 1912	$1,720,815
September, 1911	1,336,822

For the 9 months ending with September the showing is as follows:

1912	$21,859,709
1911	13,988,293
1910	10,419,999

Canada again takes first rank as a purchaser of exported automobiles, taking $473,465 during September, 1912.

Crude Rubber Steady in New York

Despite some weakness in the market for crude rubber in London, the New York trading was on a steady foundation based upon about $1.04 for up-river fine. The British downward movement amounted to about 2 cents a pound, but the response locally was small. The demand was largely of a jobbing character and there were some bids for the better grades just under the market. This condition did not have its usual effect of checking the volume of offerings and as a result trade was of satisfactory scope.

Benjamin Briscoe, retiring president of the United States Motor Company, was the guest of honor at a banquet given by officers and employees of the United States Motor Company in the Hotel Astor. The banquet was intended as an expression of the esteem in which Mr. Briscoe is held by the members of the organization, and their tribute to him not only included the well wishes of the employes but was manifested by the gift of a handsome Tiffany watch and fob from the men and a large bank of chrysanthemums from the young women of the company.

Crops Greater than First Reports

WASHINGTON, D. C., Nov. 11—Predictions made in the past few months of bumper crops in the big agricultural sections are being justified by bulletins just issued by the Department of Agriculture in which comparisons are made, not only with the 1911 crops, but, also with the average yield of recent years. Not only in the real agricultural centers but in practically every section of the country the story is the same, a decided percentage of increase over 1911, and over the average yields of recent years. In the grain states such as Illinois, Wisconsin, Iowa, Missouri, Kansas, Colorado, the Dakotas, Nebraska, Wyoming, Texas, etc., the percentage of increase in production is so great as to insure a year of exceptional prosperity for the people of these sections. In the estimates made by the department, as above suggested, the crops of all kinds are combined, and only the states specified.

Preliminary estimates, however, of certain crops, taking the production as a whole, and not specifying the localities, tell the same story. As compared with 1910 and 1911 the year 1912 will produce the following:

	Production		
Crops	1912	1911	1910
Corn, bushels	3,169,137	2,531,488	2,886,260
Wheat, bushels	720,333	621,338	635,121
Oats, bushels	1,417,172	922,298	1,186,341
Barley, bushels	224,619	160,240	173,832
Rye, bushels	35,422	33,119	34,897
Buckwheat, bushels	19,124	17,549	17,598
Flaxseed, bushels	29,755	19,370	12,718
Potatoes, bushels	414,289	292,737	349,032
Hay, tons	72,425	54,916	69,378
Tobacco, lbs	959,437	905,109	1,103,415

Some 1913 Factory Expansions

KENOSHA, WIS., Nov. 11—The Thomas B. Jeffery Company, Kenosha, Wis., manufacturing the Rambler, is at this time more than 700 cars behind its orders for immediate delivery and has on its books contracts for 40 per cent. more cars than were produced by the works throughout the 1912 season. The new and sole Rambler model for 1913 was announced only 73 days before November 1, and this condition is due in a large measure to intensive sales methods evolved by the Jeffery forces in marketing the 1913 Rambler Cross-Country, with unit gasoline-electric power plant, as its sole model. During the period from July 15 to October 15, fifty salesmen engaged in a contest. Ten prizes were awarded. This contest greatly increased the number of orders in all sections of the country.

HARTFORD, WIS., Nov. 11—The Kissel Motor Car Company, of Hartford, Wis., intends to continue its building and expansion activity throughout the cold months, more as a matter of necessity than convenience. Work has just been started on a large addition to the woodworking plant and another core oven is being built in the foundry department. As soon as these improvements are well along, attention will be turned to the work of providing more facilities for the commercial vehicle division, which is now cramped for room.

SYRACUSE, N. Y., Nov. 9—The H. H. Franklin Manufacturing Company announces that it will make this season 1,800 cars. The only changes will include some features of refinement and but one car will be added to the line, a victoria phaeton on the Little Six chassis with a 30 horsepower motor. Forty per cent. of Franklin sales the past year have been on the Little Six model.

French Imports from U. S. Increase

PARIS, Nov. 1—Out of a total imports of automobiles into France during the first 8 months of 1912 valued at $1,765,860, the United States sent cars to the value of $578,340. The total shows an increase, for during the same period of 1911 France imported $1,692,420 worth of foreign automobiles, of which $338,580 came from America. It will thus be seen that the American increase is high. The total French exports for the period January 1-August 31, 1912, shows an increase of $6,066,060 compared with the corresponding period of 1911. The increased business was done with Great Britain, Germany, Belgium, Switzerland, Spain, United States, Brazil, Argentine, and

Algeria. The following are the official figures of French exports for the first 8 months of 1911 and 1912:

	1911	1912
England	$7,301,040	$7,883,400
Belgium	3,777,480	6,041,880
Algeria	1,404,540	2,228,040
Germany	1,748,160	2,203,380
Argentine	1,184,700	1,873,200
Brazil	801,240	1,213,920
Switzerland	656,400	683,220
Spain	360,000	656,580
United States	368,460	653,880
Italy	548,180	328,860
Russia	382,560	236,100
Austria-Hungary	355,140	148,680
Turkey	255,600	96,000
Other countries	2,060,940	3,024,360
	$21,205,440	$27,271,500

Hoosiers Invading Illinois Field

INDIANAPOLIS, IND., Nov. 11—About 150 members of the Indianapolis Trade Association will leave on a special train tomorrow for a 3 days' trade extension trip through Illinois. Several tons of advertising matter will be carried and the Indianapolis News Newsboys' Band will give a band concert in each city and town where a stop is made. The association is made up of about 250 manufacturing, jobbing and wholesale concerns of the city, including all lines of trade. Practically all of the motor car manufacturers of the city are members of the association.

The itinerary tomorrow will include stops at Danville, Muncie, Fithian, Ogden, St. Joseph, Urbana, Champaign, Mahomet, Mansfield, Farmer City, Leroy, Downs and Bloomington, where the party will spend the night.

On Wednesday stops will be made at Heyworth, Wapella, Clinton, Maroa, Decatur, Harristown, Niantic, Illinopolis, Buffalo, Dawson, Riverton and Springfield, where the night will be spent.

The itinerary for the third day will include stops at Rochester, Breckenridge, Edinburg, Taylorville, Owaneco, Pana, Tower Hill, Shelbyville, Windsor, Gays, Mattoon, Charleston, Ashmore and Kansas.

Box Ball Concern to Make Automobiles

INDIANAPOLIS, IND., Nov. 11—The American Box Ball Company of this city, of which the chief owners are J. I. Holcomb and Fred Hoke, is about to embark in the automobile business and expect to put out a six-cylinder car to sell in the neighborhood of $2,750. No details of the new car have yet been announced.

Mr. Holcomb is not by any means new to the automobile trade, having been one of the partners in the Willis, Holcomb & Haywood Company a few years ago, who controlled the local agency for the Packard and several other cars.

Receiver Named for Dayton Company

DAYTON, O., Nov. 11—William Miller, formerly bookkeeper for the Dayton Automobile Company, Dayton, O., has been appointed receiver for the concern by Judge O. B. Brown. The application was made by T. J. Weakley, vice-president of the concern, and other stockholders. The suit is an amicable agreement between the stockholders and officers, and the business will be continued for several weeks, pending the dissolution of the firm and the sale of is assets. The officers of the company are: J. E. Sudebaker, president; T. J. Weakley, vice-president; A. S. Iddings, secretary, and Dr. I. N. Agenbroad, treasurer.

BUFFALO, N. Y., Nov. 12—The Frey Auto Supply Company, filed a petition in voluntary bankruptcy yesterday afternoon with the clerk of the United States District Court. Total liabilities are said to be $18,500.87 with assets of $22,344.55, most of the creditors being Buffalo firms. The largest creditor, however, is Lockwood, Luelkenger, Henry Company, of Cleveland, O., which claim amounts to $981.60.

Imperial Club Rules Motordom in Russia

Injured Personal Feelings of American Dealer Tend to Bring About Faction in Exhibition Work

American Business Man in Czar's Capital Says That the Opportunities for American Automobiles Are Great

THE AUTOMOBILE has received a communication from Charles L. Preston, an American business man stationed in St. Petersburg, Russia, outlining the conditions that surround the automobile industry and annual shows held in the Russian capital. Mr. Preston makes a special plea to the American industry to take part in the Russian show.

"ST. PETERSBURG, Oct. 29—As an American, having resided in Russia for the last 9 years as the manager of the Walk-Over Shoe Company's Russian business and as resident buyer for eight large American tanners, I naturally interest myself in American business in Russia, and wish to call the attention of every automobile dealer and manufacturer to the following facts:

"The Imperial Automobile Club, of Russia, located in St. Petersburg, practically controls the automobile and motor life of Russia, having as a patron and supporter his Imperial Majesty, the Emperor. The club gives every year one or more endurance contests and an exposition for the exhibiting of all kinds of motors with their accessories. This exhibit is open to all the automobile dealers and manufacturers of the world without reservation or discrimination; even the spaces for exhibiting purposes are drawn by lot, so that every exhibitor has an equal chance with his competitor. The club has even made arrangements possible in order to attract exhibitors.

"Russia has no automobile factories of her own, consequently the Imperial Club must look for foreign exhibitors, so it is naturally a foregone conclusion that the club will offer all the inducements possible in order to attract exhibitors and to make each exposition more successful than the previous one.

"Unfortunately for all concerned the Imperial Automobile Club was recently forced, by the demands of the other manufacturers and dealers selling automobiles in Russia, to publicly deny in the interest of accuracy and fair play certain statements and representations, made by the Russian agent of one American company doing business in Russia. By doing this the Imperial Automobile Club has incurred the enmity of this agent to such an extent, that the latter as a measure of revenge is endeavoring to organize a rival show to take place at the same time as the official exposition. This is certainly a very foolish move as the Imperial Club has a tremendous influence on the motor future of Russia and any manufacturer or dealer who exhibits at this proposed rival show forfeits all chance of taking part in any government trials or receiving prizes or awards.

"This agent is at the present time in America and is without doubt trying to discourage manufacturers or dealers who have intentions of sending exhibits to Russia from sending them to the official exposition.

"Personally, I dislike to be involved in any controversy, but in the first place as an American, with American interests at heart, and in the second place as a member of the Imperial Automobile Club, I wish to correct any false impressions which may have been caused by the above unpleasant incident and wish to assure any and every American manufacturer and dealer who has any wish or idea of exhibiting at the coming exposition in St. Petersburg next May that he will be heartily welcomed and will be treated with the greatest courtesy and consideration."

Digest of the Leading Foreign Journals

Two Methods for Perfecting All Grades of Steel in the Ingot—Gear Speed Matters Illustrated—The Variations in Brinell Tests—Lead Battery Negative Plates Improved by Inert Admixture—Easier Steering of Heavy Trucks

SOUND Steel Ingots—The constant temptation at steel works and rolling mills to make the discard from steel ingots shorter than it should be has resulted in many fatal flaws in the steel shapes rolled from the top end of an ingot or from a billet of the defective material. In the case of expensive steels, compressive molds have been used to some extent to squeeze the pipe and the blowholes out of the ingot while it is still in the fluid state and to concentrate the segregation of impurities in a small upper layer. Two new methods have now been perfected which are much cheaper and more effective. Sir Robert Hadfield, of the Hecla Works at Sheffield, England, has developed one of these and Dr. Hans Goldschmidt, of Essen, Germany, the other. Both are in the very front rank as practical and successful metallurgists, and the new methods therefore warrant the hope that in the near future defects will be a rarity in the very large bars of steel from which crankshafts and some other automobile parts are forged, although such bars are necessarily rolled from those large-sized ingots in which the defects have been most commonly encountered. The Hadfield method is indicated in Fig. 1. It consists in heating the fluid steel in the upper part of the ingot, or other mold which may be used, and maintaining it in a liquid condition, while the rest of the ingot is cooling, by playing a blast of air into charcoal heaped on top of the molten metal. To prevent loss of heat by radiation from the metal a layer of cupola slag is placed between it and the coal. The general result is that the fluid top-portion of the ingot sinks and fills the pipe as fast as it is formed. Pipes in the lower portions of the ingots are obviated at the same time, as these are also caused by irregularities in the cooling and the molecular flow in the metal and the top-heating regulates this factor to some extent throughout the mass. It is figured from the experience of the past few years, applying to a production of many thousands of tons, that the discard may be reduced from an average of about 20 per cent. to about 7 per cent. with an all-around gain in the quality of the product and that the saving on a large output may amount to from 8 to 12 shillings per ton, the value of the discard metal for remelting being fully considered.

The Goldschmidt method consists in an important modification of a similar method which had been previously tried without definite success. As generally known, Goldschmidt is the discoverer of the thermit material by means of which local fusion of metals may be readily effected, and his system for producing sound ingots consisted at first in sinking a can of this material into the top of the ingot after a crust had already been formed thereon. This caused the remelting of the portions surrounding the already formed pipe, and as soon as the remelting was effected the hole was filled by pouring in fresh liquid steel from the ladle. But the results were not satisfactory. Now the method consists in plunging the sheet-metal cartridge filled with thermit down to the bottom of the ingot before solidification has set in and before any of the defects have been developed. Fig. 2 shows the form of the cartridge and the rod used for pushing it through the fluid ingot. Owing to the action of the thermit, the method is mainly of advantage in the case of steel to which no silicon has been added either in the furnace or in the ladle, while, on the other hand, according to Dr. Goldschmidt, any method which depends upon top-heating is inapplicable unless the steel is siliconized. The effect of the new thermit process is to cause a strong ebullition of the liquid contents of the ingot mold with violent expulsion of the gases which are just beginning to separate from the mass. This drives the segregation upward. Another effect of great value is that the metal in the mold sinks down more than a hand's-breadth and that the density of the material is increased in proportion to the reduction of its volume. In the case of plates made from slabs treated in this manner it was found that only 0.3 per cent. of the plates had to be rejected on the ground of faults traceable to the ingots, while the rejection at many works amounts to 15 per cent. This applied to the production from 4,000 ingots varying in size from 1 to 8 tons. In all 17,891 ingots from 1,436 different heats were treated by the new thermit process at the Schultz-Knaudt steel works from November, 1911, to July, 1912.—From papers reprinted in *Engineering* of October 4 with many illustrations.

FOUR or Three Gear Speeds in Trucks—To show the advantages obtained by having four gear speeds rather than three in heavy motor trucks Captain Renaud of the French army, who was associated with the one-month trials of army motor trucks held this year within a 30 mile radius of Versailles, sets forth the points at which there will be a difference in the operation of two trucks, both weighing 6 tons with load and both developing a power of 1235 kilogrammeters at the wheel rims, but one equipped with four gear speeds and the other only with three. With the power mentioned both will be able to climb a 15 per cent. grade at a speed of 1.20 meter per second on the low gear and both can reach a speed of 5 meters per second on a 2 per cent. grade on the high gear.

IN THE CASE OF FOUR GEAR SPEEDS

With a gear scale arranged in geometric progression, the quotient being 1.6, the four vehicle speeds of the truck when the motor turns at its normal speed are:

1.20 meter....1.92 meter....3.07 meters....5 meters.

and from the number of kilogrammeters available at the wheel rims it may be deduced that the road grades which may be climbed at these speeds are in round figures, respectively: 15 per cent., 9 per cent., 5 per cent. and 2 per cent.

The diagram, Fig. 3, may be drawn on this basis, the grades being marked on the abscissa axis ox in number of centimeters of rise for each meter of distance and the vehicle speeds in meters per second on the ordinate axis oy. In considering what will take place at the various combinations of speeds, it should of course be remembered that poor road conditions may be equivalent to grades in necessitating the use of the lower gears.

The curve A represents approximately the progressive variation of the truck speed for all grades from level to 17 per cent. on the low gear. On the same plan the curves B, C and D may be drawn, corresponding to second, third and high speed gears. The limit curve drawn tangentially to A, B, C and D at *a, b, c* and *d* represents the vehicle speed which the motor should be capable of imparting, according to the grade to be climbed, while developing continuously its maximum power, and provided the gear speed could be changed gradually instead of step-wise. The triangles ***dpc, cnb*** and ***bma*** indicate the imperfection of a step-wise gear system. The most obvious practical conclusion from the diagram is, however, that for all speeds other than those corresponding exactly to the points *a, b, c* and *d* it is impossible to utilize the motor at exactly its most economical speed, and that this shortcoming will be so much more onerous as the points *m, n* and *p* are farther removed from the theoretical curve *abcd.*

IN THE CASE OF THREE GEAR SPEEDS

The two extreme speeds are the same as before and the intermediate gear may be chosen so as to give, for example, a vehicle speed of 2.4 meters per second, or twice as high as on low gear. [To get the best possible results it should be lower, however, and the disproportion in the selection made is indicated plainly in diagram Fig. 4 by the great difference in the areas of the two triangles $a_1m_1b_1$ and $b_1n_1c_1$. Through this disproportion the showing made by the author against the three-speed gear has been somewhat aggravated.—ED.]

Under these conditions the grades which the truck may climb at normal motor speed are in round figures: 15 per cent., 7 per cent. and 2 per cent.

The diagram may now be drawn as before and Fig. 4 shows by the larger areas of the shaded triangles the larger variations from the best and most economical motor speed which it is necessary to submit to.

A numerical example brings out more sharply the advantage of the four-speed gear for trucks. Suppose that a day's trip of 100 kilometers includes 15 kilometers of 4 per cent. grade, 1 kilometer of 7 per cent. and 2 kilometers of 9 per cent. With four gear speeds the 4 per cent. grade can be taken on third at 3.5 meters per second, and the 15 kilometers will be traversed in 1 hour 11 minutes 25 seconds. The 1 kilometer of 7 per cent. grade will require the second gear giving a vehicle speed of 2.3 meters and an elapsed time of 7 minutes 14 seconds. The 2 kilometers of 9 per cent. grade will be covered on second gear, giving 1.9 meter vehicle speed and an elapsed time of 17 minutes 32 seconds. The total time spent on the grades will thus be 1 hour 36 minutes 11 seconds.

With three gear speeds only, the same grades will be climbed as follows: The 15 kilometers on second gear, working up to 3.1 meters vehicle speed per second, in 1 hour 20 minutes 38 seconds; the 7 per cent. kilometer also on second but at a reduced vehicle speed of 2.4 meters, making the time 6 minutes 57 seconds; the 2 kilometers of 9 per cent. grade on low at 1.6

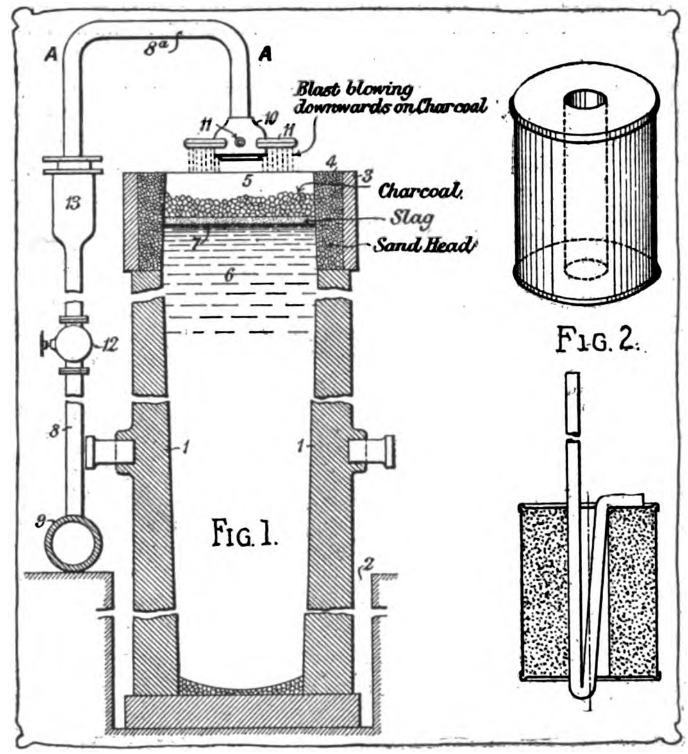


Fig. 1—Hadfield method for producing sound steel ingots. Fig. 2—Thermit cartridge used by Goldschmidt

meters and in 20 minutes 50 seconds. The total time spent on the grades will thus in this case be 1 hour 48 minutes 25 seconds. The time loss as compared with the four-speed truck is for the day 12 minutes 14 seconds. If the motor consumes 0.4 liter of gasoline per horsepower-hour or 9.6 liters per hour, the four-speed gear box results in an economy of about 2 liters for the day.—From *La Technique Automobile*, September.

BRINELL Test Probed—Despite the very general adoption of the Brinell method for testing the hardness or density of a metal by measuring the impression made in it by a steel ball of given diameter and under a given pressure, and of deciding the tensile strength in a rough and ready manner by multiplying the density number on the Brinell scale by a constant, there has been a suspicion in many quarters that this convenient testing method should be accepted only with many reservations. It has been conceded from the start by its author that the figures obtained by means of it have mainly a relative value and that only those derived from tests made with balls of the same diameter and under the same pressure should

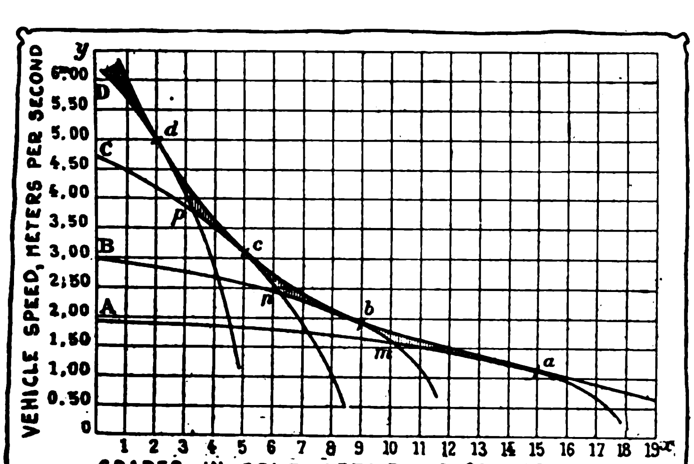


Fig. 3—Utilization of motor with four gear speeds

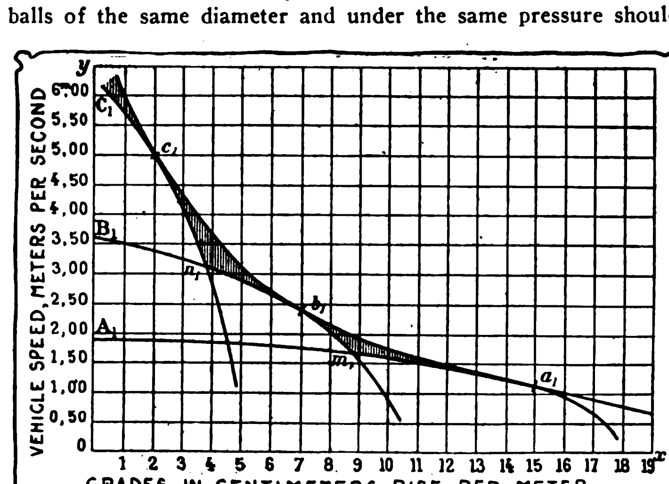


Fig. 4—Utilization of motor with three gear speeds

be compared. With this limitation in view the testing machines have been standardized in two sizes and the hardness number is tabulated from a conversion formula in which the diameter of the ball and the pressure are both considered; see details in THE AUTOMOBILE of July 4. It has, however, been found by Prof. Prandtl that the method is entirely inapplicable to cast iron.

Now the results of a searching analysis of the method, conducted by Mr. Hanriot, have been presented to the *Académie des Sciences* by Mr. Henry Le Chatelier, and while the facts mentioned by the investigator confirm the suspicions by which the research was prompted they also point out a corrective to the method lending it a greater scientific value while not detracting from its industrial convenience.

Hanriot shows first that aluminum bronze gives a density of 95 when a pressure of 1,000 kilograms and a ball of 10 millimeters diameter is used and only 67 with a pressure of 30 kilograms and a ball of 3 millimeters diameter; that nickel likewise gives 80 under the first condition and 60 under the other and coin silver 68 and 55. [Mr. Hanriot does not use the approved conversion formula, however, but obtains his density number by simply dividing the pressure figure by the figure expressing the area of the impression of the ball. His investigation is purely scientific.—ED.]

Lead is found to give the same density number whether the ball and the pressure are large or small, and from this the author inferred at first that the variation in the results with harder metals is due to the *écrouissage*—molecular upsetting—of the metallic structure of the latter. To test this inference he measured the density of a plate of nickel, getting 80 under a pressure of 1,000 kilograms and 61 under a pressure of 30 kilograms. He then filed away the imprints and measured the metal immediately under each of them by means of the small ball and small pressure alone. This gave the figures 117 and 67, showing that the metal had been affected by the very pressure of the balls previously used, and naturally more by the heavy than by the light pressure. It then occurred to him to see if annealing would remove the upsetting and make the reading alike for different pressures and ball diameters, but it was found that while repeated annealings gradually reduced the density figure very considerably, it did so in almost exactly equal degree for the heavy test as for the light one. The relation between two corresponding figures was a constant for all conditions, showing that molecular upsetting does not invalidate a test, although it had been shown previously, as referred to, that a test cannot be repeated in the same place of the metal where another test has been made without recording the structural effect of that test. Numerous experiments with different metals showed that the relation between the figures obtained with heavy and with light pressures was always a constant for any one material in the same structural condition and that therefore, once this constant is known, the density may be determined with any chosen ball diameter and pressure whose effects have been recorded [thus confirming the principle of the Brinell conversion formula and the tables based on it.—ED.] The constant was found to be 1.45 for aluminum bronze, 1.33 for nickel, 1.18 for coin silver, 1.02 for gold and 1.00 for lead.

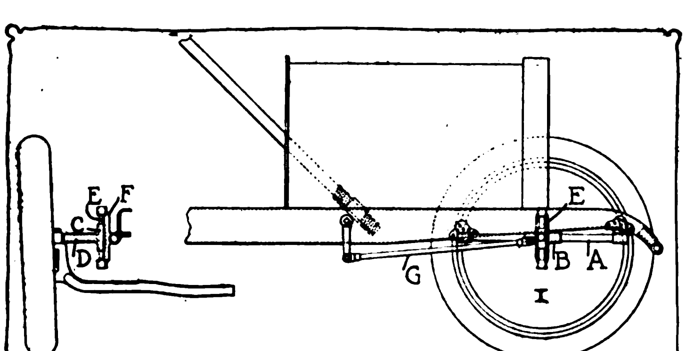


Fig. 5—Heilmann truck steering system applied to car

Another conclusion drawn by the experimenter from the facts ascertained by him is that the Brinell method gives far too high figures for annealed metals, as, for example, the hardness of aluminum bronze is much inferior to 24, which is the figure obtained after many repeated annealings and after obtaining 94 from the first test of the unannealed metal. The test seems to give a complex figure in which the hardness or density and also the facility with which the structure may be upset are combinedly recorded.

It is seen, he continues, that the results of the experiments are insufficient to explain the different readings obtained with different pressures. There is a source of error whose importance it is difficult to estimate. This is the elasticity of the metal. In reality, the imprint which should be measured is that existing at the moment the pressure is applied. The imprint which is actually measured is smaller, as the metal comes back resiliently when the pressure ceases. This exception to the method is confirmed by the fact that it is the relatively inelastic metals, such as lead, gold and silver alloy, which give the smallest difference in the direct readings under different pressures. The Brinell method gives thus only a gross idea of the density of metals, but even so its practical importance remains unimpaired, provided the figures obtained from it are used only for comparative estimates and are not supposed to possess absolute intrinsic value.—From *Génie Civil*, October 26.

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LIFE of Storage Battery Plates—Two experimenters, Messrs. Askenasy and Putnoky, obtained from the factory of Gottfried Hagen, near Cologne, Germany, battery plates which had been prepared with chemically pure materials, and some of the negative plates were subsequently immersed in a solution of barium salt and sulphuric acid, so as to cause a deposit of inert sulfate of barium in their active material. They then proceeded to determine the effect of these deposits upon the capacity and life of the plates. In order to reduce the duration of the test they subjected them to successive charges and discharges lasting one-half hour each and produced by currents much stronger than normally used. After 500 to 750 discharges they restored the material of these plates by a fundamental charge in opposite direction. It was then established by the tests that the capacity of the plates at first increased slowly, in all of them, up to about 500 discharges. Thereafter it dropped rapidly, but less rapidly in the plates containing inert matter than in the other ones. The general result of the investigation was thus that the addition of inert matter is without influence until the capacity of the negative plates has been developed to its maximum and begins to decrease, and it was also ascertained that the total life of the plates is notably increased by the admixture.—From *Zeitschrift für Electrochemie*, June 15.

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PROPOSED Steering System—In connection with the Heilmann truck wheel, which was illustrated and described in part in THE AUTOMOBILE of October 31, a steering system has been proposed which has the advantage over the customary method that the leverage with which force is applied grows larger instead of smaller the more the wheels are turned. Also, the steering rod moves in one plane, so that ball joints become unnecessary. A guide rod, A in Fig. 5, is secured to the frame reach. The sleeve B is mounted to slide upon it and forms a part of the knuckle F with pin E, upon which there is mounted the sleeve C with hollow lever arm D adapted to telescope upon a pin integral with the steering pivot and wheel spindle. Sleeve C can slide up and down on pin E in conformity with the action of the vehicle springs. The steering gear control is the usual one and the steering rod G attacks the sleeve B, moving it forward or backward on the rod A. The usual tie-rod connection from one wheel to the other is contemplated but is not shown in the drawing. The type of truck for which this steering system was specially designed has the spring suspension built into the wheels.—From *Bulletin Officiel*, September.

Overheating the Engine

What Causes a Lasting Rise in the Temperature of the Water Circulated To Cool the Motor Cylinders

The Evil May Be Due to Any One of a Number of Reasons—How the Nuisance May Be Prevented

PERHAPS few problems in the earlier days of gas engine manufacture puzzled the designer more than cylinder cooling. This is, perhaps, not surprising when it is remembered that the earlier internal combustion engineers gained their professional knowledge in the steam engine school, where the object aimed at was the retention of heat by inclosing the cylinder in a jacket of exhaust steam, which naturally had the reverse effect to that desired in a gas engine.

Although various cooling systems have been brought to a high state of perfection. doubtless finality has not yet been reached, and it is very questionable whether the ordinary motor user—both master and servant—has given that attention which he should to the cause and effect of undue cylinder heating. It is an acknowledged fact that over-cooling is undesirable, but the cases when it occurs must form a very small percentage of the whole, as the natural cylinder surroundings and conditions all tend in the opposite direction.

It is, however, with the problem of overheating that we are dealing, and before diagnosing the causes we will first study the effects. The space occupied by gases of all kinds is determined by their temperature, and as vaporized petrol is no exception to the rule, this has a very important bearing when considering motor-driven vehicles. The cubical capacity of the cylinder, other things being equal, determines its horsepower; such space must be charged with the correct quantity of fuel, which in turn must receive the treatment that enables it to give the best results.

If the water circulating system is in any way defective the cylinder becomes overheated and the incoming charge expanded beyond its usual dimensions, so that a full quantity is not drawn into the confined area.

Other things invariably follow overheating, such as pre-ignition and want of compression, the lubrication is all upset, as an oil that may be an excellent anti-friction element when subjected to a certain heat naturally has its limit, and when this is exceeded, fusion takes place, the lubricating properties are lost, and, instead of the piston rings taking an easy sliding gas-tight travel up the cylinder sides, a grinding frictional movement follows. In this way more heat is generated, until perhaps seizure takes place, or, if events take another course, a broken connecting-rod or crankshaft may result.

The fact of a little steam escaping from the radiator is not a sure sign that there is anything materially the matter. This remark applies even with greater force in hot climates in summer time, or where continuous long runs have to be encountered with steep gradients.

Cheap oils are false economy; one should only use a lubricant that carries entire confidence. The writer had an instance recently with a car which when running slowly and using a low-grade oil showed loss of power, and, though a careful examination of the circulation and lubrication systems proved all was in order, the trouble still continued. The oil was tested and found to be quite good for low temperatures but almost valueless in high ones such as those met with in the class of engine we are considering, as almost the moment it entered the cylinder it was burnt up so that part of the piston traveled in unlubricated ground. Deposits of carbon are much more likely to accumulate under the adverse conditions named, and eventually the carbon becomes an incandescent substance, giving rise to what is known as pre-ignition. Whether this is taking place may be easily proved by switching off the spark; if pre-ignition is taking place the engine will continue to run so long as there is a vestige of life left in the carbon deposits referred to. As such action takes place before full compression has been reached, it will readily be understood that an engine running under these conditions is extravagant in fuel and wear, and weak as a tractive agent.

Having mentioned some of the evil effects of overheating we will pass on to the causes. **The choking up of the radiator and circulating pipes is a very common source of trouble. When such is the case much depends upon the water that has been used; if only dirty, washing out is all that will be necessary; if water of a hard and brackish nature is employed, the hotter it becomes the quicker the solids are deposited on the pipes and furring follows.** The writer was in charge of some engines and boilers where surface condensers were in use, and where a 9-inch pipe carried the water off from the condenser tanks. In less than 3 years the pipe was so clogged with a hard lime deposit that only a 2-inch stream of water could pass by. This is mentioned to bring home to motor users how important it is with the small-bore tubes at their disposal to take every precaution against sediment.

If a circulating pump is the medium for water circulation it is not an uncommon error to assume that so long as this part of the engine is working the water is moving along the prearranged lines. This is not necessarily so, as an air lock may have been set up. Nearly all radiators are fitted with a draw-off tap, and if trouble is suspected from the direction suggested this should be opened and the air released; when there is not a tap, it is better to break a joint than to allow the trouble to continue. **One frequently sees exhaust pipes that have been subjected to intense heat, and many users at once attach blame to a sooted-up silencer, and are much puzzled, when taking it down, to find such is not the case. As often as not the seat of trouble is in the water-circulating system or action.**

Improper driving will produce overheating, particularly in hilly districts, by hanging on to the third or fourth speeds when ascending inclines and so causing the engine to labor; the effect of such action is equivalent to overloading. Unduly-heated bearings or broken balls are active agents as friction producers, and bring about much the same result.

In dry weather any leakage from the radiator or connecting pipes is soon seen, but in wet, damp or foggy times it is not so apparent, and an insufficient water suply is much more readily produced from loss of water by leaking than boiling. A dirty car oftentimes shows a tendency to cause overheating troubles. This is not surprising, for there are few better non-conductors of heat—and, consequently, are excellent heat retainers—than road mud.

When an engine has been lying unused for some time rust will often accumulate in the cylinder jackets, and, being heavy, it falls to the bottom, collecting any other particles with it and forming into a solid mass, thus preventing the cooling element from getting to the lower portion of the exterior walls. Some, and even experienced users, recommend softening agencies that do not easily dissolve absolutely, but the writer strongly deprecates the introduction of any substance that does not form a saturated solution. **There is nothing better or cheaper than common washing soda, which has the advantage that it can be obtained at any village store. It is best to dissolve the soda in warm water before pouring it into the radiator, otherwise the crystals drop to the bottom and it may be some time before a proper solution is obtained.** —From the *Motor-Car Journal*, September 28.

Carburetion

Part I

Subject Digest

Carburetion is more or less perfect according to how air is mixed with the molecules of liquid fuel.

Fuel mixing may be accomplished in three ways—passing air through liquid fuel, spraying liquid fuel, and evaporation by applied heat.

Heat is required to convert a liquid fuel into a gas, and the amount of heat so needed is in proportion to the latent heat of the fuel.

The latent heat of gasoline is difficult to state, but it approaches 320 British Thermal Units per pound evaporated.

The temperature at which a mixture of gasoline and air will remain stable is important, and varies with the richness.

To obtain carburetion and maintain it with low temperatures it is necessary to either make the mixture abnormally rich or to carburet only with light fuels.

by Robert W. A. Brewer

BY the use of the word carburetion in the following article, it must be understood that this word will designate **the art of mechanically mixing or blending a liquid fuel with a certain amount of air, and that whether this art is carried out to the limits of perfection or not is an indication of whether the carburetion is good or bad, and carburetion will be considered to be more or less perfect according to how the air is mixed with the molecules of the liquid fuel and to whether the fuel is divided into its finest possible particles, and every particle of fuel is surrounded by a certain quantity of air to the limit of homogeneity of the mixture.**

Fuel may be mixed with air in at least two ways: The first and the oldest form of carburetion is by passing the air through a volume of liquid fuel; on the other hand, the volume of air can be treated by spraying into it a certain quantity of fuel in a more or less finely divided state.

There is still what might be another form of carburetion which is virtually distillation or evaporation by means of applied heat, and it is quite conceivable that if a volume of air is passed over a liquid, and a higher temperature than the normal is applied to this liquid, the evaporation of the liquid will be accelerated above what it is under ordinary atmospheric conditions, and assuming that the rate of evaporation of the fuel is in proportion to the amount of air passing, and that the air is brought sufficiently near to the surface of the fuel, a satisfactory form of carburetion will follow.

It is naturally somewhat difficult, when dealing either with air or with fuel in quantities, to obtain a homogeneous result in the mixture, and for this reason it is preferable to treat small quantities as desired. Furthermore, when small quantities of air and fuel are dealt with, there is not so much risk of any involuntary ignition of the explosive mixture in the generating chamber as is the case where a larger volume is dealt with in a chamber of considerable capacity.

An engine such as is used in the modern automobile is not running under constant demand, and therefore, it is preferable to create an explosive mixture in accordance with the demands of the motor, rather than to store up any quantity of explosive mixture to meet any sudden demand which may come upon the engine. In this practice we are more nearly approaching the modern trend in stationary gas-engine practice, where a suction producer is fitted, and the suction producer in that case corresponds to the carbureter of an engine, rather than to the gas holder which was previously used when coal gas was employed as the fuel for large stationary internal combustion engines. We find in a gas set, where the engine sucks directly upon the coal carbureter, the amount of carbureted air which is drawn in is in direct response to the demands of the engine.

Now it is very obvious from general principles obtaining in nature, where a body is converted from one state into another, that is either from a solid to a liquid state, or from a liquid to a gaseous state, **a certain amount of interchange of heat must take place in order to effect this change of state, and the amount of heat absorbed is,** of course, in **proportion to the latent heat of the body.**

In the case of a liquid such as gasoline, which is of a complex nature, one cannot exactly state what its latent heat of evaporation is, but it is of the order of 160 calories per kilogram, equal to 320 British Thermal Units per pound of fuel evaporated. **That means to say that every pound of gasoline which is passed through the carbureter requires an addition of heat equal to 320 British Thermal Units in order to evaporate it, so that the resulting mixture shall remain at the same temperature as the incoming air.**

This heat can, as we know, be applied in two ways, either by raising the temperature of the incoming air by drawing that air over, say the exhaust pipe, or by heating the induction pipe between the mixing chamber of the carbureter and the engine valves. **It does not really signify how the heat is added so long as the temperature of the resulting mixture remains as desired.**

Now by this latter expression, of course a great deal depends upon the locality and the duty which the car has to perform, and theoretically it is more suitable for the temperature of the incoming mixture to be as low as possible consistent with the liquid remaining in the evaporated or suspended state without precipitation. Supposing we predetermine what the final temperature of the incoming charge of carbureted air should be, it is a fairly simple matter to calculate what temperature the air should be which enters the carbureter inlet, knowing the specific heat of the air. If we take this figure as 0.259, which means to say that 1 pound of air heated through 1 degree Fahrenheit requires 0.259 British Thermal Unit, it will be obvious that in cooling this 1 pound of air through 1 degree Fahrenheit we abstract 0.259 Thermal Unit.

Taking for example a ratio of air to fuel, by weight, of 15, a final temperature of the mixture of 60 degrees Fahrenheit, we find that 15 pounds of air will give up 15 pounds $\times$ $0.259 = 3.9$ British Thermal Units per 1 degree fall of temperature. Now, as we mentioned, the latent heat of the evaporation of the fuel is 320 British Thermal Units, we find that the temperature drop, assuming that there is no other heat interchange, is $320 \div 3.9 = 82$ degrees Fahrenheit.

Now if we consider the temperatures at which mixtures of gasoline and air will remain stable, we find that for a correct mixture the minimum temperature is 3.6 degrees Centigrade, but if the mixture is enriched with 20 per cent. of fuel, the temperature can be reduced to practically 0 Centigrade, that is, 32 degrees Fahrenheit. The richer the mixture the lower the temperature, but we may take it that at the freezing point of water we have practically the limit at which a carbureter will work. **It is therefore obvious, if we have a drop of 82 degrees in the carbureting system, the temperature of the air must be at least 82 degrees Fahrenheit above the freezing point, in order to satisfactorily carburete the air without precipitation taking place.**

Next we come to the explanation of a fact which is not generally understood, that is, why it is that a fixed carbureter, or carbureter in which the relations between the air flow and the fuel flow are predetermined, does not always work well until it is warmed up, and that it is sometimes necessary to flood the carbureter before the engine will start. This is entirely due to the complex nature of the fuel and to the absence of sufficient heat supply to effect carburetion.

From the previous figures, in which it was pointed out carburetion would not remain stable unless the mixture was abnormally rich, it will be obvious that **in order to obtain carburetion and maintain it when the temperature is low, it is necessary to do one of two things, either to make the mixture abnormally rich or to ignore the heavier functions of the fuel and carburete only with the lighter ones, allowing the heavier ones in the first instance to be carried through the engine and consumed.**

It is often pointed out that the so-called automatic carbureters are difficult to start, and will not work until properly warmed, and that it is essential for their working that they be either water-jacketed or heat-jacketed in some way. This is perfectly true, as in a properly designed carbureter of that type the fuel is correctly proportioned for running under normal conditions, and at other times the air supply must be shut down or the fuel supply temporarily increased.

It may occur to the reader that there is one other way of adding heat to affect carburetion, that is, adding it to the liquid before it is mixed with the air; but on consideration it will be obvious that as the relative weight of liquid to air is small, of the order of 1 to 15, that although the specific heat of the liquid is very considerable as compared with that of air, it would be impossible to add sufficient heat to the liquid in order to supply the necessary thermal units required for the latent heat of evaporation.

The specific heat of the liquid is only about three times that of the air, and as there is about fifteen times as much air as fuel by weight it is quite obvious that it would be necessary to raise the temperature of the liquid to say five times the range that it is necessary when dealing with the air, and of course this is quite impossible as the lighter factions of the fuel begin to come off at a fairly low temperature. Some carbureters certainly do heat the liquid fuel, but not to the extent here indicated, and furthermore, it must always be borne in mind that in those types in which the fuel is heated, there is another effect, that is, that of altering the viscosity of the fuel so that a greater quantity passes through the same orifice under similar conditions than would be the case were the fuel used cold.

A hot-water jacket in a carbureter, in addition to heating the fuel, does, of course, heat the incoming air, but it has been found in modern practice that an extension of the hot-water jacket is really necessary and the jacket is, therefore, carried some distance along the induction pipe.

Change in Carbureter Adjustment Needed for Winter

PERHAPS the owner of an otherwise well-behaved car will be surprised to find that his motor has developed an appreciable miss seemingly overnight, when he starts to take it out on one of the cold, frosty mornings that have now become common throughout the more northerly states of our country. If he is motor wise he will know that the time has come when he must readjust his carbureter.

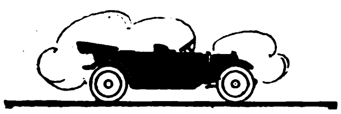
The reasons for this are many, and, after a moment's reflection, obvious. The assistance of a certain amount of heat is necessary in vaporizing the gasoline. In some motors this heat is applied by taking the air from a tube surrounding the exhaust pipe, while in others a hot water jacket is used for the same purpose as is explained in the above article. When the temperature of the outside air drops to a considerable extent the means provided for heating the air do not raise the temperature as far as is required by the carbureter adjustment that was satisfactory for summer. The air, being colder, does not evaporate the gasoline and as a result a misfire will develop.

There are two cures for this trouble. One is the taking of extra precautions to secure a warm supply of air and the other is to make a change in the carbureter adjustment. The first is that generally adopted by the carbureter makers who provide fittings to be attached to the carbureter when the cold weather sets in. The second method is the step that the owners of carbureters not having the hot-air attachment are compelled to take. **The adjustment consists simply in supplying a greater quantity of gasoline for a given weight of air.**

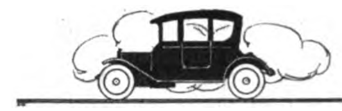
For the more progressive owners who desire to get away from the change of carbureter adjustment, which means the supplying of a richer mixture and hence a drop in the economy of the car, **the use of the dash control has been suggested.** In European practice and on many of the more expensive American cars this attachment has been fitted, although many have left it off with the idea of reducing complication. The driver with this attachment is able to take care of a climatic change without making any delicate needle valve adjustments. The dash control merely takes care of the amount of air supplied and does not interfere with the gasoline adjustments in the least. **When the misfire occurs in cold weather it is merely necessary to shut off the supply of air slightly and thereby allow the motor to draw in a richer charge.** After the motor has been run long enough to allow it to warm up the amount of air supplied in proportion to the charge can be increased.

With many carbureters, the problem is merely one of starting. After the motor has been running a few minutes there is no trouble whatever. Flooding the carbureter and priming are common means of starting in cold weather, as is also the shutting of the air passage, allowing the full suction of the motor to fall upon the spray nozzle. These should not fail with a motor that has been running well up to that time. With a cold and stiff motor, however, even priming will fail at times and the other methods produce no effect whatever. **In such instances five drops of ether to each cylinder of the motor have been found efficacious by many physicians and others who know of this method. Another trick that has been tried with success is the placing of about a tablespoonful of carbide in a small tin having a friction top.** A hole is then cut through the cover and the cover placed on the tin. Through the hole in the cover is run a small rubber tube or a piece of hose into the air intake of the carbureter. Through another opening in the tin is poured a half glass of water. After waiting for about a half minute the motor is cranked.

Roustabout and Coupé for 1912 Cole



Regular Runabout Model May Be Easily Converted Into a Closed Car for Winter



By George G. Mercer

THE individual owner of a model B 1912 Cole chassis with runabout body has little to fear of winter's sternness because he can, at a limited expense, have it converted into a winter roustabout or a coupé design, either transformation calling for practically no change, other than the positions of the gear-change and brake levers. The roustabout style, Fig. 5, can be had for $300 and the coupé body, Figs. 1 and 6, will approximate $1,000.

The roustabout is a most economical and novel method of transforming on open body into a winter one without adding any appreciable extra weight and giving a flexible type as the top can be lowered and the glass tops of the doors hidden, giving an open runabout with a stationary windshield. Such a body is ideal for the early spring and fall. It has an interior height of 38 inches from the cushion to the top bow. The coupé body, Fig. 6, seats two persons with space for one emergency seat and adds a load of approximately 450 pounds as compared with the open runabout.

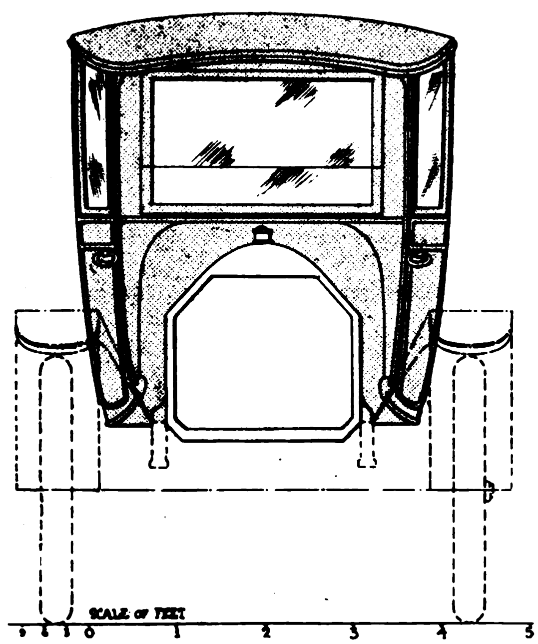


Fig. 1—Front view of Cole coupé design

The model B Cole chassis has a 122-inch wheelbase, four-cylinder motor with cylinders 4.5 inches square and wheels carrying 36 by 4-inch tires. Fig. 5 shows the roustabout body, consisting of the runabout body with a collapsible top, higher doors with upper glass halves and a stationary windshield.

All the conditions at the rear of the body remain unchanged. The coupé is roomier, because it is wider than the runabout and the doors are wider. The body design is similar to the old Sedan chair in appearance and is well adapted to carry out an altogether harmonious effect.

Considering the two designs, the winter roustabout, Fig. 5, has been made by adding to the original body. In other words, Figs. 4 and 5 are identical up to the line where the new parts forming the top and glass front have been added, with one exception, namely, the location of the change gear and brake levers. In the original car, Fig. 4, these levers are located so that they are operated outside of the body, whereas in the roustabout body, the levers are brought farther in so as to permit of their being operated on the inside of the body. The Cole cars are made with the levers located for either inside or outside driving, hence it cannot be much of a problem to make the shift on an old car, the parts being manufactured and consequently readily accessible.

Having made the shift in the position of the levers, the car is now ready for the body changes. All the parts that are added to make the roustabout are intended to be fastened so that they can be removed in the spring and the original body attached.

The windshield is made with two uprights, fastened to the body posts at the front of the door. There are cross members at the top of the posts and across a line where the cowl intersects the front of the windshield framing. The cowl is fastened at the front to the cowl of the body and serves as a brace to the windshield. A divided glass is used with the upper part made to swing outward and serves as a storm visor.

The doors are of the regular type with a wood panel added to the top to make the sides higher. To the new top line of the door A, Fig. 5, a glass frame B is attached by hinges and when locked in the position illustrated, it forms an integral part of

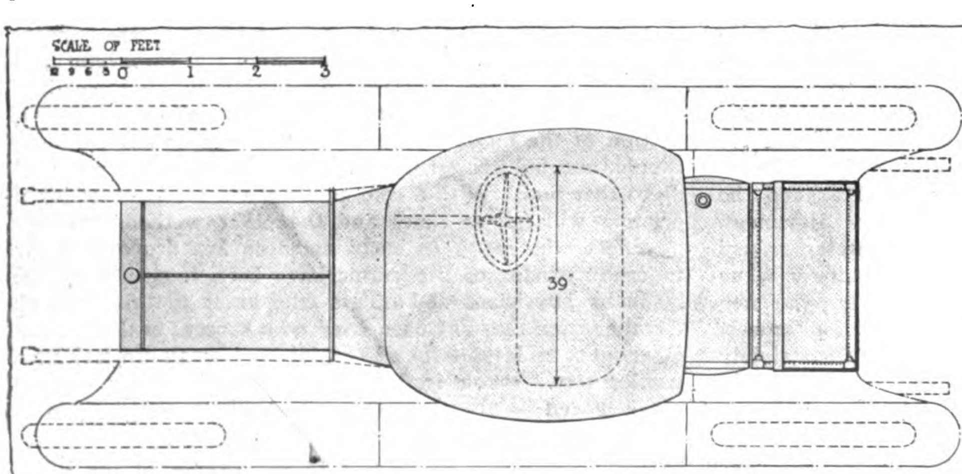


Fig. 2—Plan view of suggested coupé for 1912 Cole runabout chassis

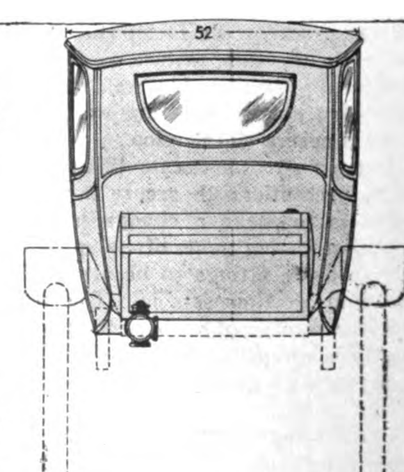


Fig. 3—Rear elevation of coupé

the door, when the latter is opened and closed. It fits against the door posts at the front and back and effectively shuts out the draft, and, with the top down, this glass frame is made to disappear by revolving on its hinges and lying flat against the inside of the door. Dotted lines B1 show the frame in this position.

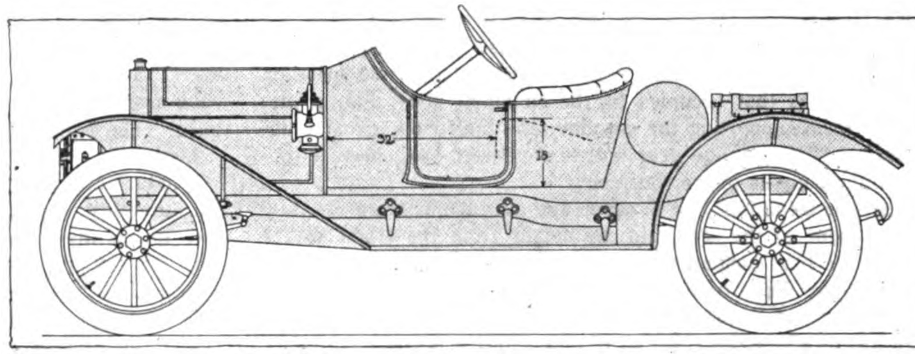


Fig. 4—Cole 1912 runabout type which may be adapted for either coupé or roustabout

A bow C extends from the body line on one side to the corresponding point on the other side, and is made wider to a height level with the top of the door glass frame. This is to provide a stop for the latter as well as to serve as a wind-break. The cut D is the point at which the top breaks when in the down position and the hinge is indicated on the back of the bow. The two rear bows travel with the bow C, but the horizontal bow E is lifted out of the connection F and fitted into F1. This bow E, when in the horizontal position and with the top raised, is fastened at the front end by a strap on each side to the windshield post. To make it an easier proposition to remove the top in the spring, a shifting rail is used, top irons being placed in the body to receive them. The lower edge of the top material is stitched to this rail and there is also a lug projecting on each side of the car to receive the lower end of the side joint.

The top material fastens to the back edge of the bow C by a metal molding extending from the bottom to the top of the door glass, or approximately up to F. On the bow E it is similarly fastened at the front, beginning from the windshield post. From this point back to F the material is loose from the bow and is reinforced and stitched forming a flap which covers the top edge of the door glass frame. This flap is lifted by the frame when the door opens.

The size of materials used to construct this top is so well understood by the trade that it would be superfluous to make mention in detail here. The bows are a standard commercial article, as are the joints. The shifting rail is made from .75- by .375-inch oval machine of C. R. steel and the cowl from aluminum sheet, No. 16 gauge. The wood frame of the door glass is heavier than usual at the bottom to give room for fastening the lockcatch. As the frame is unsupported by any framework other than itself above the door, a wider bearing is necessary.

The top material would preferably be English Burbank, a material with a heavy texture and well adapted to keep out the cold. To insure greater comfort, the top should be lined with light-weight broadcloth. One small celluloid window is placed each side between the two last bows and in the rear curtain a similar light of generous proportions is placed.

The cost of the changes from Fig. 4 to Fig. 5, but not including the change of the levers, will be approximately $300. This will cover specifications for the best English Burbank top material, a fair quality American broadcloth for inside top lining, the ironing of the pillars and the putting in of the new top iron supports, adding to the door height, making the door-glass frames and the front windshield and adjusting with suitable fastenings. Straps are used to keep the top steady when it is lowered and between the two last bows a small block or buffer is used to keep them apart, and thus protect the celluloid side light from being broken when the top is strapped down.

Fig. 6 illustrates a totally different way of providing for winter service with the Cole car. The plan is more elaborate and more expensive, and for the majority of people it will be proportionately more satisfactory, provided the winter service required will warrant the increased expenditure. The most satisfactory body to use for extremely cold weather is one with a permanent upper structure. Any form of collapsible top will deteriorate more rapidly than the former and the more numerous openings or joints indicate a greater likelihood of wind and rain forcing their way through.

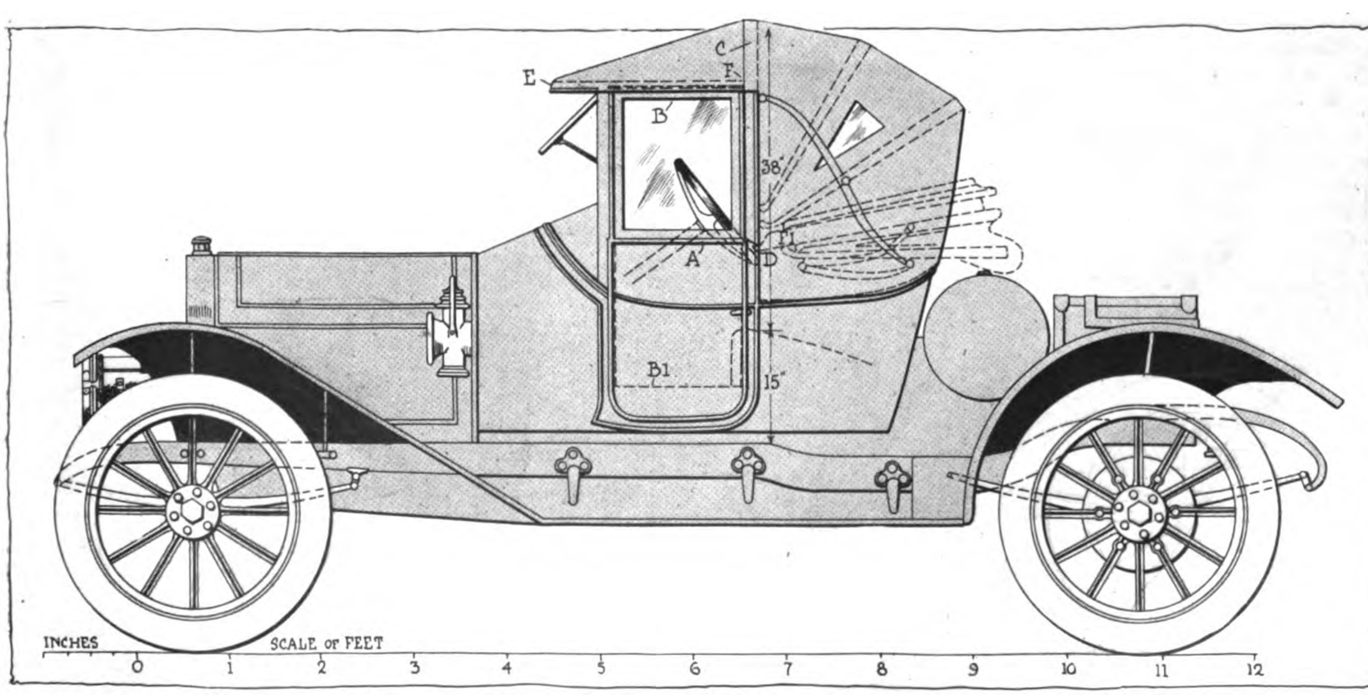


Fig. 5—Side elevation of suggested roustabout body suitable for 1912 Cole runabout chassis

The coupé body, Figs. 1, 2, 3 and 6, is fashioned from the old-time Sedan chair and for the purpose here used it seems extremely applicable. It has been installed in the same space on the chassis as that occupied by the runabout body, Fig. 4, and the platform supporting the gasoline tank and trunk remains undisturbed. The change gear and brake levers have been moved inside the body as in the roustabout.

The side elevation, Fig. 6, shows the dimensions from the dash to the front of the seat, and the height from the frame to the top of the seat cushion to be the same as in the regular body, Fig. 4. The depth of the cushion to the back, approximately 18 inches, gives 15 inches between the back and the steering wheel. The height above the cushion to under roof is 40 inches and the width of the cushion in the plan view, Fig. 2, is 39 inches. The seating capacity affords luxurious accommodation for two people, with space for one emergency seat.

Provision for extra tire carriers has not been installed, the idea in the mind of the designer being to retain the chassis intact as in Fig. 4, with the single exception of changing the levers. In the spring the coupé body can be removed and the former body substituted.

The doors are 23 inches wide over the moldings and as the seat cushions are rounded at the front corners, the change gear and brake levers have been placed in from the side so that the entrance through the right door is posssible.

One noticeable feature with a coupé that is not possessed by a collapsible body is the possibility of having plenty of window space. The windows have the regulation wood frame for the glass. The windows in the doors are made to drop their full length and those at the rear of the doors will drop three-quarters their length. The rear window is stationary. The front glass is divided, the upper part forming a storm visor.

The dash, integral with the body, permits of the body being taken off as a unit, not disturbing the old dash, which in turn is built into the cowl of the runabout body.

The specifications call for an all-metal panel body, the panels of 16-gauge aluminum. Metal moldings are used throughout except the heavy ones on the door and hinge pillars. These are of wood and are worked solid on the framing.

The interior dimensions should be as indicated in Fig. 6 and the width and length of the body outside to be as indicated on Figs. 3 and 6, respectively. The body should be made so as to occupy the same space on the chassis as that occupied by the former body, and without any alteration to the chassis other than the change in the location of the gear change and brake levers. The windows should be as previously described and the wood frames of same to be of American walnut in the natural finish. The body framing should be of good ash and the roof of laminated whitewood.

Specifications for colors bring out the question of good taste and durability. Consideration must also be given to the fact that next spring the coupé body will be removed and the runabout body substituted. Consequently it is wise to use a color for the chassis that will harmonize with either body design and so avoid having to repaint the chassis every time the bodies alternate. The present color is gray; therefore, it would be wise to retain the standard color for the under parts, and for the door and body lower panels of the coupé use a gray of the same shade or slightly darker. For the upper panels black will harmonize well, using black striping for the gray parts.

The body cowl and the short panel below the molding will match the chassis color. This color combination, besides being in good taste and advisable from an economical standpoint, is a combination that will wear well.

The trimming specifications will cover electric dome light in the roof and the suggestion for trimming material would be a combination gray and black Bedford cord of the best quality and trimming lace to match, this cloth to be used on the cushion, sides and back and roof; gray silk for curtains with tassels to match; Wilton carpet for the floor to be gray with small black flecks. Toilet case and card case should have silver mountings and should be covered with gray morocco. All metal parts in the interior to be silver or nickel finish, all visible wood parts to be black walnut finish.

The flat cost of a body, built according to the above specifications and finished according to same and mounted on the chassis ready to run, will be approximately $1,000 exclusive of the charge for changing the levers from outside to inside. The work of the designer is to a large extent suggestive. These two designs are suggestive possibilities and the car owner is the final link in the chain that leads from these possibilities. These designs are applicable to a number of different cars, and applicable to a greater or less extent, according as they are similar or dissimilar to the car used as a model. They are especially applicable, however, to Cole runabout bodies and have been designed with this end in view.

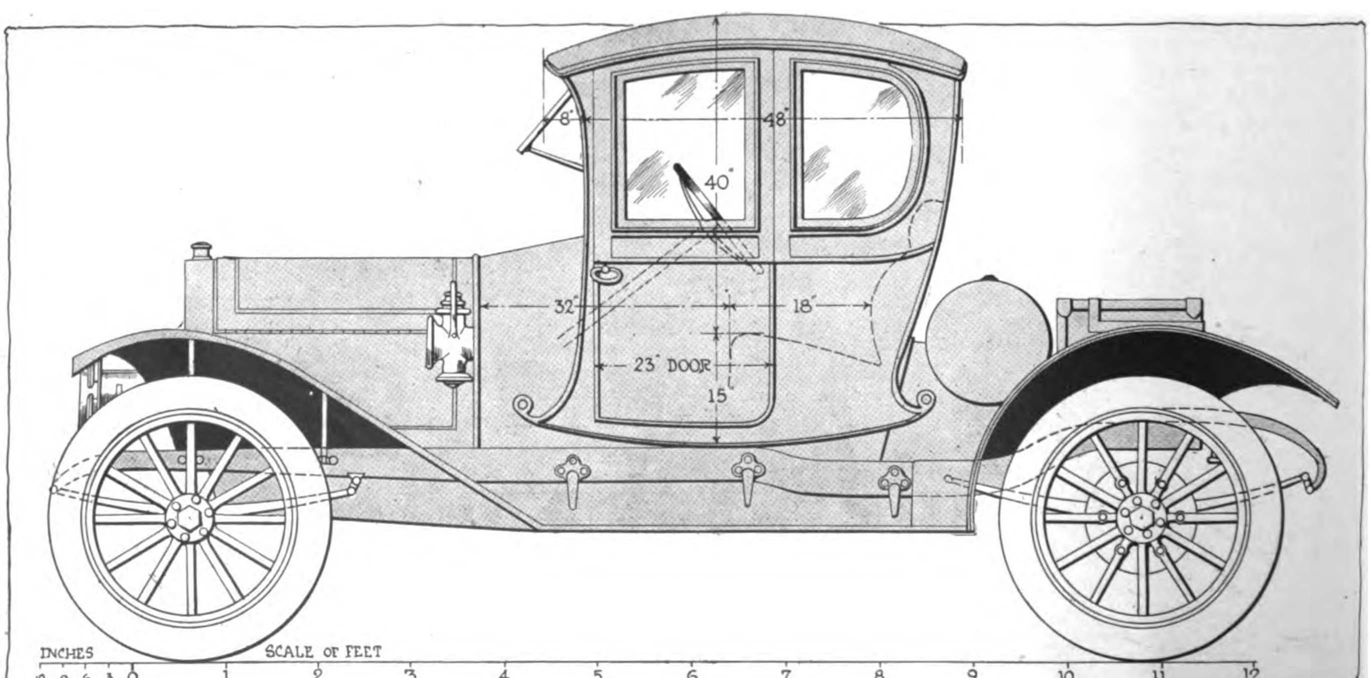


Fig. 6—Side elevation of coupé suggested for winter use on 1912 runabout frame

Good Materials Indispensable for Painter's Success

Red Lead Should Be Used Sparingly, as It Is a Heavy Pigment—Natural Oxide Paints Have Many Points in Their Favor, Especially Durability—Roughstuff, Like Paints, Should Be Very Pure

A READER of THE AUTOMOBILE writes to say that inasmuch as the black paints are coming to be largely used in structural metal painting, and are giving great satisfaction in this capacity, **why not use such pigments upon the metal automobile surface?** He cites the fact that lampblack will absorb 35 per cent. more oil than the light-colored pigments, and as oil is the life of the paint to a large extent, the **lampblack should be nearly unsurpassed as a first coater for the metal surface.**

There is no question concerning the durable properties of lampblack, but it is at the same time doubtful if this pigment will render as good service as red lead on the metal surface. Red lead and pure raw linseed oil, thoroughly mixed, as applied over new metal, either aluminum or sheet steel, will stick with great tenacity to the surface if applied rather thinly and well brushed out. The average mixture of red lead ready for application is 30 pounds of pigment to one gallon of oil. **Never mix red lead ahead of requirements. It is a very heavy pigment and settles quickly.** To retard the settling propensity of the lead, add to every 20 pounds of red lead 2 pounds asbestine pulp (magnesium silicate) and stir this mass into a gallon of linseed oil. Cut this mixture with a little turpentine to give it fluidity and permit only an expert brush hand to apply the pigment.

Natural oxide paints, that is to say, pigments having a mineral base, are likewise coming into favor as priming materials for new work. These oxides have good covering power and durability, and when prepared with plenty of good, raw linseed oil and let down a little with turpentine, they constitute excellent coatings at a saving of from 8 to 10 per cent. over the use of red lead.

The natural oxide paints here spoken of are composed in greater part of oxide of iron and in the family of reds they embrace Indian red, Venetian red, red oxide, etc. In connection with these oxide pigments red ochre, yellow ochre, umber, etc., owe their color to oxide of iron, but these ochres contain numerous other substances. **These pigments, under anything like reasonable conditions, are as nearly perfectly permanent as any pigment can possibly be.** They unite and mix well with all other pigments without in any way affecting them or being affected by them.

In laying coats of surfacing material directly over any of these red lead or natural oxide paints, the pigment used should be chosen with reference to its natural durability and its qualifications as a bodying up and surfacing material. **For this purpose white lead ground in linseed oil has long since demonstrated its value and usefulness.** White oil-ground keg lead is a soft, pliable, elastic, grain-filling and pore-sealing material when properly ground and prepared. Its remarkably soft, fine, elastic texture, unusual adhesiveness, exceptional surface filling and leveling-up properties, all unite in making lead a pigment of nation-wide importance in the automobile industry. And with reference to the use of this pigment the car owner or prospective has well-established reasons for insisting upon the use of a pure lead, or one approximately pure. **Moreover, he should insist upon high-class grinding and preparation of the lead.** A lead need not be chemically pure in order to establish its value and usefulness. But, above all things, it should be ground fine and washed free from foreign substances of every kind. With a lead ground as fine and smooth and soft of texture as good mills will grind it, first-class linseed oil being incorporated in its composition during the grinding, we have a surfacing pigment adapted to go immediately over the lead or other metal primer quite unsurpassed for the qualities which count for most in motor car paint shop work.

A couple of excellent coats of lead laid over the primer of oxide paint, red lead, or over any one of less known pigments, will suffice to give the surface sufficient body of pigment to support what is technically known as filler or roughstuff coats.

Into the roughstuff should go nothing but good materials. The day when scraps and drippings and left over material in general may be safely mixed into a paint, or into roughstuff particularly, has disappeared. The call is fairly, if not quite, universal for a surfacing material that will hold strong and fine upon the car and support to the maximum limit the coats of color and the foundation of varnish used over it. **It has been demonstrated that nothing short of the best paints, surfacing stock, colors and varnishes, will suffice to furnish service and good appearance.**

During the past two seasons the gray colors—automobile gray, French gray, battleship gray—have become exceedingly popular, and very properly so, for, above everything else, they have proved durable. The gray color, whatever its particular designation, is an easy keeper. **It is neutral in effect, shows usage and dirt less than almost any other color, and looks well.** There is one thing, however, to be guarded against in connection with the use of this family of pigments, namely, a tendency to streak out and disclose a glimmer of some one or more of the pigments entering into the composition of the gray. Only recently the writer had his attention called to a case of this streaking. It appears that a gray made up from a white lead base, this base being saturated with ultramarine blue and lampblack, developed dark streaks.

In the event of mixing these colors in large quantities and by a certain prescribed formula, as practiced by color manufacturers, a more intimate mixture is obtained, and the likelihood of the color washing out, streaking, and doing other freakish things, need not be considered seriously.

In previous issues of THE AUTOMOBILE allusion has been made to the practice of using colors ground in japan for automobile work. Such colors, thinned simply with turpentine, as generally advised by the manufacturer, are naturally brittle, and in this condition are ill-suited to the vibration and oscillation strains to which the car is exposed in road service. To overcome this property the use of raw linseed oil is urged. **For colors to be applied over an old paint foundation in itself somewhat brittle and parched, the pigment should carry at least one part pure raw linseed to every four or five parts turpentine.** For the second coat of color increase the quantity of turpentine to the extent of using nine parts of the thinner to one part of oil. Thus establish a safe measure of elasticity for the paint and color fabric.—M. C. HILLICK.

The Engineers' Forum

3-Point vs. 4-Point

Leading American Engineers Discuss the Relative Merits of Two Systems of Motor Suspension

Advantages and Disadvantages of Flexible and Rigid Motor and Gearbox Support Outlined

Part I

Eugene P. Batzell Analyzes Both Systems

Wm. G. Wall Is Against Three-Point System

Charles E. Duryea Favors Three-Point Scheme

Frank Nutt Wants Flexible Four-Point Support

DETROIT, MICH.—Editor THE AUTOMOBILE:—Hardly any doubt can be entertained that a correct engineering principle is embodied in such a suspension of the automobile motors, gearsets, etc., which maintains them free from distortion originated in the vehicle frame structure due to the unevenness of the ground, when the vehicle is either in motion or stationary. The theoretical three-point suspension similar as disclosed in the Huber patent, providing a swivel joint at one end of the suspended party, gives a good example of such a correct suspension, and it serves its intended purpose as well as can be desired in practice. Other kinds of so-called three-point suspensions have no swivel joint but depend on the flexibility of supporting bolts, arms, cross-members, etc., to give the necessary deflection at the third point of support. Though this suspension is not as perfect as the first, nevertheless it is used frequently, giving satisfaction in some cases and causing trouble in others.

In three-point suspension, apparently good results, in the matter of protecting the power plant from stresses due to the frame deflection, are obtained when equipping the supporting points with springs, etc., so that there is an elastic medium between the frame and the power plant. Not only will this construction relieve the power plant from the frame distortion but, as in heavy commercial cars with the front springs calculated to carry a considerable portion of the useful load and offering but little deflection for absorbing road shocks when the vehicle is running empty, the springs interposed between the power plant and the frame should be of great benefit for the life and condition of the former, inasmuch as they carry it, absorbing the road shocks in a manner practically independent of the vehicle load.

This kind of four-point, etc., suspension is less valuable for application to pleasure cars than it is for heavy commercial cars, because the former have a much more uniform load over their front springs, consequently here the rate of protection of the power plant from road shocks also remains more or less uniform and not influenced by the carried useful loads. Nevertheless, this suspension would fulfill the purpose of relieving the parts from the frame distortion in the pleasure cars as well as in the commercial cars. However, there are many constructive reasons why this suspension does not meet with popularity in application to pleasure cars of the existing type, there being fewer reasons against it in commercial car practice.

The supporting of motor transmissions, etc., on rigid subframes is apparently losing in the number of its followers. This suspension cannot entirely relieve the vital automobile drive parts from external frame stresses, though it modifies them considerably and helps to preserve a more or less true alignment between the parts. The first part of this statement can be easily proven by locating an assembled chassis on uneven ground so that the frame is somewhat distorted. Loosening of a motor leg fastenings almost always will leave a gap between this leg and the sub-frame member, which gap is not noticeable when the chassis is on level ground, provided it was properly assembled. The gap indicates that some of the main frame twist is transmitted to the motor crankcase through the sub-frame. The extent of harm which is apt to be caused by this twist can be judged by trying to crank the motor with the chassis on uneven ground once with one motor leg loose and then with this leg drawn tightly to the sub-frame. The motor leg in question should be the furthest from any of the sub-frame braces or supports.

Generally the crankcase of the motor is not stiff enough to prevent one from noticing, that a three or more bearing crankshaft is tighter in its bearings when the motor leg is fastened to the sub-frame. A big advantage of a sub-frame construction is often found in the easier locating and supporting of the different details like steering gear, pedal control, etc., especially when the car is to be assembled from ready bought parts.

The absolutely rigid suspension of the motor, etc., directly on the main frame no doubt presents disadvantages in the more noticeable effects of its distortion by the frame twist than is possible with any of the foregoing kinds of suspension, other conditions being equal. On the other hand, this rigid suspension on four or more points is often made to act as the frame cross members act, that is, assisting to preserve the relative location of the two main frame side members. Of course, this necessitates an extra strong construction of the motor legs and base, but it puts much added strength also into the front part of the main frame, which is generally the weakest part of the whole frame. With increased length of the motor and distance between its supporting legs, the successful construction of a rigid suspension becomes more difficult.

On the other hand, a frame combining great strength and flexibility permits a lighter rigid four-point suspension, which latter can be used here to great satisfaction. Extra rigid frame side members, like those in vogue in commercial cars, particularly frames of rolled channel sections, render a stiff four-point suspension very impractical, because the cases of the suspended parts have to be exceedingly strong. They must withstand the whole frame twist, as no deflection of the side members can be relied upon to partly relieve them from it. A flexible suspension similarly as mentioned before, when the mechanism parts are mounted on a sub-frame which is suspended on springs to the main frame, or when the parts proper are suspended on springs, offers a much better solution of a four-point suspension in the foregoing instance.

The sub-frame on springs or on pivots is best when in addition to other advantages it would help the alignment of parts mounted on it separately in succeeding order: motor-clutch, transmission-jackshaft, etc.

When only a few separate units of parts are used, like power plant, transmission and jackshaft, then their individual suspension on springs or on three points is just as satisfactory in functioning and somewhat simpler in construction than a flexible sub-frame for them.

The correct proportioning of parts and of the frame for a rigid four (or more) point suspension takes considerable study of the subject, which includes practical experimenting besides the mere theoretical figuring based on logical consideration of the matter. Of course, in any case, it is much less troublesome to adopt one of those suspensions, which will wholly or partially protect the vital parts of the vehicle mechanism from the frame distortion. This would decrease the chance for trouble on account of the suspension, but, on the other hand, the rigid bracing of the front part of the frame by a more or less short and stiff motor base construction may have its advantages. At any rate, the existance of a successful rigid four-point motor suspension speaks well for the engineer, who constructed and proportioned it.

The few advantages of a rigid four-point motor suspension cannot be perceived in a four-point suspension of gearsets, jackshafts, etc. These latter parts are better suspended in a different manner, which actually is being followed in practice with but few exceptions.—Eugene P. Batzell, Hudson Motor Car Company.

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Three-Point System's Disadvantages

Indianapolis, Ind.—Editor The Automobile:—As to the respective advantages of the three-point versus four-point suspension for motors, gearsets, etc., on cars, it appears at first sight as if the argument was in favor of three-point and, theoretically, a great many things can be shown in its favor. I do not believe that these advantages, however, work out in practice, which, together with the disadvantages, makes it questionable as to the utility of this method of suspension.

The three-point arrangement eliminates to quite an extent the twisting due to outside influences, such as road inequalities, but not the shocks due to wheels hitting obstructions in road, and at the same time, by having only three points, considerable more strain is placed upon the material composing these parts, due to the lack of a sufficient number of supports. Also there is considerable strain due to the momentum of these parts, caused by quick stopping and starting and centrifugal force on corners. I do not believe in an absolutely rigid support, though even this has its advantages in preventing the giving of the frame to too great an extent. In other words, without injuring or throwing the motor or transmission bearings out of line, the cases of these parts which have to be rather rigid to hold bearings in line, lend a certain rigidity to the frame which is a great help to the body work, for a frame which twists very easily is very detrimental to the proper working of doors of body and also to the paint, and causes a squeaking noise which it is almost impossible to eliminate.

The National for several years past has used a method of suspending its motor and also transmission by which arms bolted on to these parts have rested in sockets attached to sides of frame and held to these sockets by horizontal bolts, so that there is a hinged action at the end of each of these arms, thus allowing for most of the movement of side members of frame without putting any great strain on the suspended parts, and at the same time lending quite an amount of rigidity to the frame lengthwise and crosswise.

In regard to the Huber patent, while it is of considerable interest, I believe it does not concern a great many manufacturers, as the sub-frame has gone out of use to a great extent and the three-point suspension of sub-frame has been used very little.

Of course, it is up to the courts to decide whether a combination engine and transmission built in one consists of a sub-frame in itself. If this should be decided to be the case, there are a certain number of manufacturers of cars who would be affected by this patent.

I do not see any great advantage of this method of suspension, as it is not practical to make it rigid enough to do away with the flexible coupling between engine and transmission unless it is built into the castings of these parts, in which case it has the objections just mentioned of the three-point suspension. —William G. Wall, National Motor Vehicle Company.

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Cites Three-Point Merits

Saginaw, Mich.—Editor The Automobile:—Regarding the subject of three-point or four-point suspension for motors and other parts in automobiles, I have but little to say. The thing seems so one-sided that no discussion is possible. As early as 1896 I wasted good time trying to convince mechanical engineers that an automobile must be flexible enough to meet road conditions, and that mounting the various units of machinery on a rigid frame was wholly out of the question. Later I tried to persuade the people that American bad roads required three-wheeled vehicles, because even though one does get mechanism mounted for long life, the body of the vehicle and the passengers will properly suffer more or less, unless they also are three-point supported. For a number of years I built vehicles which were identical, except as to their front wheels, and I have had people especially anxious to secure easy riding try alternately one and the other, and decide in favor of the three-wheeler. I am sure that their decision is right. I can supply from my files testimony showing the durability of carriage bodies of three-wheelers, which, being free from the twisting strains of the four-wheeler do not open at the joints in time.

So far as the mechanism itself is concerned, modern practice breaks this up into separate units, which are usually more or less flexibly connected, and which units are quite often three-point supported, or if more than three-point supported, these supporting points are quite close together. My own practice consists of a three-point frame having the two rear wheels as two points, and a ball-and-socket near the center of the vehicle as the third. Such a frame can get over all kinds of rough roads without being twisted, but on this frame I mount another three-point frame which is the whole power plant, and I can only say that it is the most successful arrangement I have ever tried. It permits delivering out to the wheels a larger proportion of the motive power than any other arrangements I have ever found. I employed this three-point frame as early as 1892, but other considerations caused me to cease using it for some years.

It will interest your readers to know that this double three-point suspension also is arranged to be separated by sliding apart so that the inner frame carrying the power plant can be dropped out of the outer one in about 5 minutes' time. Such accessibility has never been seen in a motor vehicle, and is the solution of the repair bill problem.—Charles E. Duryea, Duryea Motor Company.

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Three-Point Creates Vibration

Kokomo, Ind.—Editor The Automobile:—In reference to three-point suspension, this construction looks ideal in several ways, but the biggest objection to it that I have is that it seems to bring out motor vibration very noticeably, due to the torque action of the motor, while with the rigid four-point suspension the torque action is very well taken care of, although the twist of the frame is no doubt very hard on the crankcase and motor bearings. We use what is called the flexible four-point support, which, I think, eliminates the objection of both the flexible three-point and the rigid four-point.—Frank Nutt, Haynes Automobile Company.

(To be continued)

Foreign Constructions Designs and Practices

Features of French Truck Design—Steel Bands Replace Rubber Tires—Lubricating the Spring Bolts

Novel Spring Shackle—German Device for Tight Clips—Engineering Observations from Europe

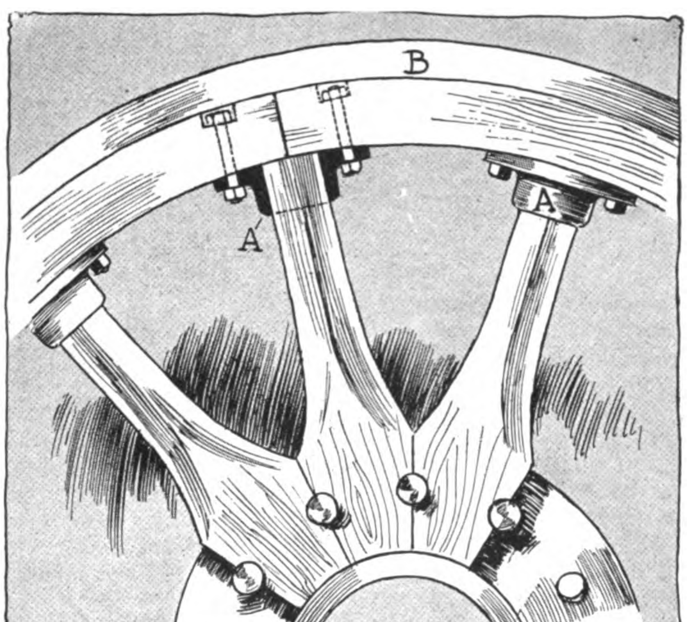

Fig. 1—Section of truck wheel fitted with solid steel band instead of rubber tire, the band measuring 8 inches wide and 1.75 inches thick. The hub takes plain bearings

OBSERVATION tells that a large number of the thoughts which have found lodgment in automobile construction work were borrowed from other arts. But experience has proven that the plagiarists were not always skilled in the art of transplanting. As a rule the simple contrivances of other arts were improved out of recognition and they were rendered so complex in the process that their actual value for the newer purpose became a question; **at all events, so far as Europe is concerned, a decided attempt is being made in the direction of simplifying mechanisms for automobile use.** That some mistakes are being made it is believed, but the field is so broad and the need so urgent that these steps are being taken as a necessity.

As an indication of just what is being done along this line take road wheels for motor trucks, which are being fitted with quills to the exclusion of ball-bearings. The quills are long—about 14 inches—and means for retaining grease, serving also to exclude dirt, are being provided. On a truck seen on the street of Vienna, Austria, the felloe was attached to the spokes as in Fig. 1. The steel band B, shrunk over the felloes, served in place of solid rubber tires, the latter being excluded from use. In this example of wheel work th spokes are about half the width of the felloe and the fastening to the spokes to the felloe, both of wood, is done by means of a metal accommodation piece A and bolts secured by radial bolts through the felloes.

Fig. 2 is of a truck spring, showing the method of fastening the shackle. This is common practice in German railway locomotive spring work and on some of the West Shore equipment. The point is that this railway idea is being used to a limited extent in truck construction in Europe.

Spring shackle bolts are now being supplied with grease cups with means for forcing the grease to the spring-eye bearing. This practice is quite general in Europe. Considerable trouble is being experienced in truck work, however. It seems to be extremely difficult to get the grease to pass out through the holes. Fig. 3 shows, in section, one of these bolts. It will be seen that, if the bushing rotates, it will cover the holes, where appearance, as on a truck, may not be the first consideration.

Lubricating the Spring Bolt

Fig. 4 offers relief from the trouble complained of as above referred to. The pin B should be of cementing steel, case hardened and ground to size. The idea is to get a good bearing surface for the bushings and great strength of the pin. The bushings E should have thin walls; 1-16 inch thickness of walls is enough. The heads on the bushings serve the dual purpose of providing a spacer as a washer and preventing the bushings from working endwise. Oil grooves or grease channels should be made in the bushings for one-half the distance out from the center. The shackles S should be drop-forged steel with a carbon content between 20 and 25 points, but the sulphur and phosphorus constituents should be under 0.03 per cent. on account of the nature of the work. To anneal the shackles after forging is a necessity also.

In freight automobile work, to use a trailer is frequently considered an advantage, but the average truck is not designed to accept a drawbar pull. Quite a number of trailers are to be seen in service in Europe, especially in Germany and Austria. It is worthy of note that provision is made in each of these cases for the drawbar pull of the trailer, the idea being to save the tractor from the consequences of a longitudinal as well as a vertical load. There are several detailed methods of accomplishing the end. In Fig. 5 the principle is shown. The pull comes on the rear axle at two points close to the wheels, but a spring bumper member is interposed in order not to impart too much of the shock of starting to the rear axle.

Drawbar Design for Trailer

Referring to Fig. 5, showing the axle X cut away at the center for purposes of clearness, the backarm A takes its support at two points between the spring perches and the road wheels—the space usually given up exclusively to distance or radius rods. The drawbar B has a bearing in this backarm and a second bearing in the inner support C, as it is called. The buffer spring S presses against the backarm and puts thrust upon the drawbar in the forward direction

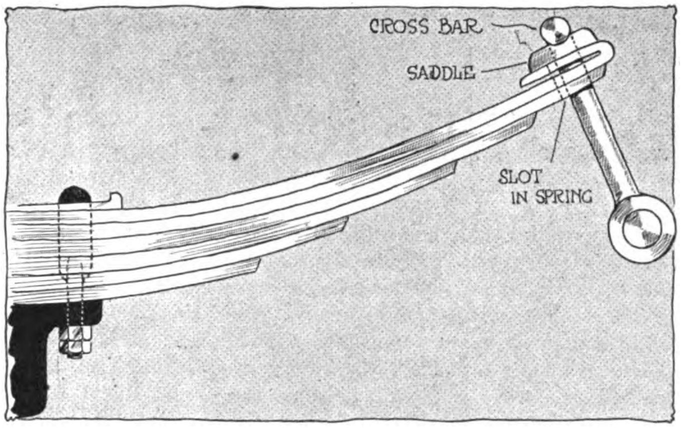

Fig. 2—European spring suspension for trucks, which has its origin in locomotive practice, and which is again in favor with truck makers

through an integral collar on the drawbar. A second stout spring S1, with a few coils, fills the space on the drawbar between the collar and the inner support. The drawbar passes under the axle. When the drawbar pull of the trailer comes on, it compresses the buffer spring until the pull is overcome. If the trailer overhauls the tractor the reaction spring S1 takes the load. Proper clearance of the drawbar must be allowed at all points. The tongue of the trailer is shackled at the universal joint and should have its weight supported at the trailer. The details of the radius-rod connections to the axle would have to be worked out with the details of the backarm. There is very little room to spare on the back axle of a truck, and this fact will influence the design.

German Wedge Spring Clip Tightener

Spring making in Germany is reduced to the level of a fine art. Good material for springs is regarded as necessary to entire success. But if the springs are not properly clamped to the perch, it is more than a superstition here that good material, excellence of workmanship of the spring maker, and proper proportioning of the springs will do very little good. It is said of springs that, unless they are firmly clamped to the perch, they will fail in exacting service.

The German Railway Engineers, having much experience with springs, clamp them somewhat after the fashion illustrated in Fig. 6. Some of the advanced automobile engineers are following along these lines also. Between the axle and spring are three members: First, a box A resting on the axle as secured thereto by a center bolt passing through the axle vertically; second, a plate with a curved contour bearing against the bottom leaf of the spring, and, third, a wedge or way between these two parts, so designed that by tapping with a hammer the fit of the spring within its clips can be tightened and held at any tension by the set screw C.

The above points are of special interest in view of the trouble that has been found in some of the American cars from breaking springs due to the condition that the spring pad did not have the same curvature as the spring. The fact that the curved spring rested upon the flat pad gave rise to the situation that a mere line contact was obtained in place of the flat seat. It is impossible to keep the clips tight where such a condition exists and, as a result, the springs work the clips loose and at the first heavy rebound they break. Some makers have placed a fiber block curved to the shape of the spring beneath the lower leaf and have obviated the difficulty in this way. Spring clips are especially apt to come loose in new cars.

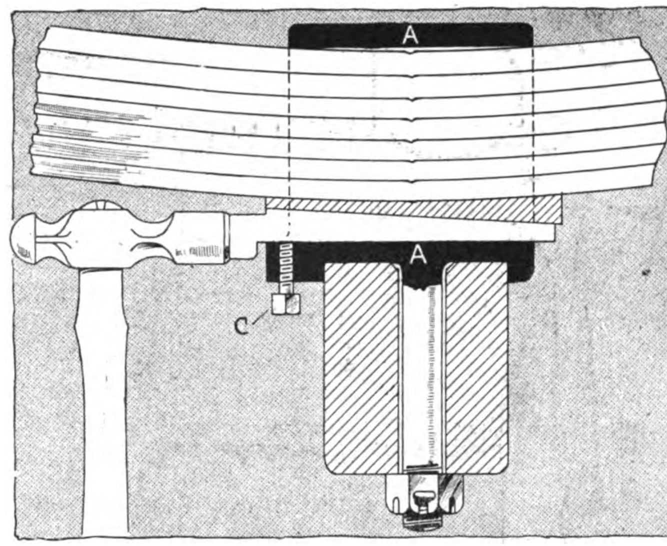

Fig. 6—German method of using wedge to insure tight spring clips, which is considered essential to good spring action and endurance

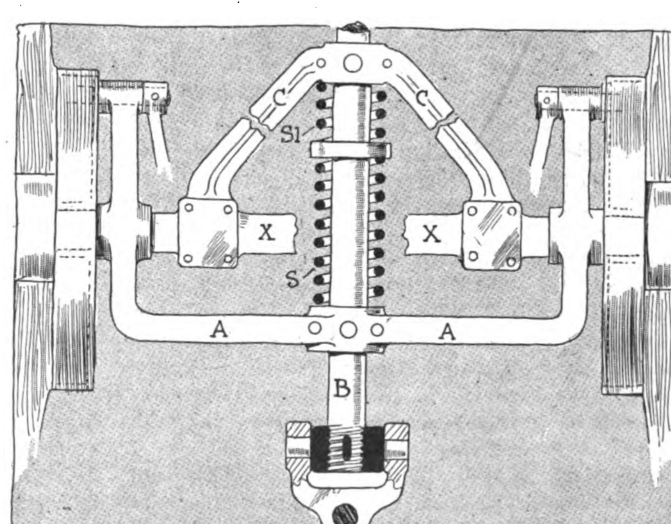

Fig. 5—Diagram of device for tractor-trailer use, showing the principle of taking care of drawbar pull of the trailer. Parts are: Axle X; drawbar B; buffer spring S; reactive spring S1; backarm A; inner support C

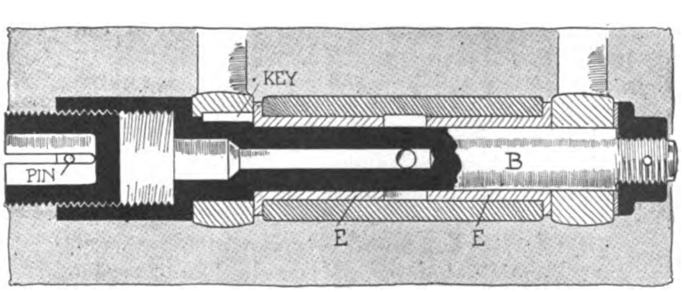

Fig. 4—New European form of spring shackle for motor trucks, showing two bushings E with clearance space for grease between their opposite ends, also means for using a long, powerful screwdriver to place the necessary pressure on the grease

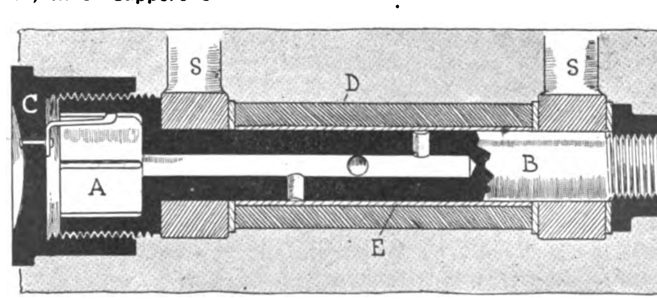

Fig. 3—Section of spring bolt for motor truck in which bolt B has a grease-cup head with screw cover and means for locking. The grease flows through the central channel and through holes H to the thin bronze bushing E in the spring eye D

The Chemistry of Cylinder Oils

Resinous Elements in Oil Give Acid Reaction Tending to Corrode Iron Surfaces in Contact

Part III

Being the third of a series of articles on cylinder oils which will appear from week to week. Discussions are invited and the columns of THE AUTOMOBILE *are open to pertinent criticisms.*

By W. Jones

ONCE more referring to the list of twenty analyses of oils, which we again publish in extended form (Table A1), showing the viscosities at high temperatures already mentioned, and also the acidity of the oils, their corrosive action on the metal of the cylinder, and the percentage of sulphuric acid in the three oils in which it was found.

We will first call attention to the acids in the oils. **We find in these oils two classes of acids: First, we have an organic acid, which is produced from the oil itself; and second, we have the mineral, sulphuric acid, which has been added in the refining of the oil, and has not been wholly removed.**

The organic acids in the oils can be, and probably are, produced from the oxidation of the oil itself. This we have found to be the case even with the kerosene oil which is sometimes used in steam boilers for the purpose of softening the scale. In the heat of the steam, which is above 300 degrees Fahrenheit, the oil is readily oxidized to an acid resinous substance, which we can obtain from the water of the boiler. We can also produce this action by other means in the laboratory.

In a publication of the Bureau of Standards it is shown that pure mineral oil, under certain conditions, such as raising the temperature for 5 hours to 250 degrees Fahrenheit, or by exposure to the action of sunlight and air for about 30 days, is readily oxidized to a substance insoluble in petroleum with 'er, but it is not stated what the nature of this substance long—abo than that it is melted at a heat above 95 degrees ing also to e. This would indicate that it is the same resinous seen on the stree have obtained and that we find has not to the spokes as in Fig. 1. ' has a corrosive effect upon iron. th qes, served in place of substance that gives the acid reaction to the oil when sulphuric acid is not present and that this substance has the effect of corroding, to a slight extent, the inside of the cylinder.

The amount of iron taken up by these acids, as shown in Table A1, must be more or less approximate, as it is very difficult to keep a circulation in the oil without continued heating, especially if the oil is at all thick, and this heating is likely to produce the acid effect if continued any length of time. Therefore, the only use of determining the amount of iron corroded is to show that the acidity of the oil does have this effect upon the iron, and that oils of low acidity would be preferable.

We now come to the sulphuric acid, present in three of the oils under consideration. This, we think, is much more important, as it will be noticed that the amount of iron corroded is much more in each case. However, this sulphuric acid may, and undoubtedly does, exist in two forms, free and combined. We have in No. 1911b enough sulphuric acid to show an acidity of .0324 per cent, regardless of any acidity due to the oxidized oil, while the total acidity in the oil is only .01029, one-half of which is probably due to the oxidized oil, leaving only the balance due to free sulphuric acid. The excess of sulphuric acid beyond this figure must be considered combined, most likely, as sulphate of soda that has not been entirely washed out. This sulphate of soda should have no effect upon the metal of the cylinder. This is borne out further by the fact that if this acid were all in the free state, and capable of acting upon metal, we would find the oil to take up very much more iron than it has in either of the cases presented.

In taking up the flash and fire points, we notice the close relationship between these figures and the viscosity, and that, as a rule, **the higher the viscosity, the higher is the fire point.**

We do not, however, consider that these figures have any great bearing upon the value of an oil for use in the gas engine cylinder, however much it may be desired to have a high fire test for other purposes. The oil No. 1867 with a fire test of 358 degrees Fahrenheit seems fully as satisfactory as those having a fire test of 500 degrees Fahrenheit, and when we consider the high temperature of the cylinder, which is far above the burning point of any of these oils, and that any of these oils will be more or less burned, and would be practically all burned if there was air enough in the cylinder for their combustion, we cannot imagine any difference as far as the lubrication is concerned. But when we come to think of the products of combustion, or what we might better say, the partial combustion of these oils, we would consider that the heavier oils, those of a high fire point, would be somewhat more difficult to burn, and in the excessive heat these heavy oils would, to a certain extent, be decomposed into a lighter and more easily vaporized oil and solid carbon, and that this is the source of the carbon deposit in the cylinder, although a large part of it is carried away in the exhaust as smoke.

We have seen the statement that the whiter the oil is the less carbon it contains, and that the only way to get rid of this carbon in the oil is by very careful filtration. By this one would think that the oil contained the carbon in suspension in fine particles, which could be taken out by filtering. This, of course, is not the case. **The carbon deposited in the cylinder is not from suspended carbon in the oil, but from carbon produced from the decomposition of the oil by**

the heat of the cylinder. The lighter products are consumed, while solid carbon is deposited on the cooler parts of the metal. For this reason we notice that those oils which contain the most carbon, not in suspension, but in their chemical constitution, or those more easily decomposed by heat, give more carbon under the same conditions favoring decomposition, and this is the carbon that gives the trouble in the cylinder.

To determine the amount of carbon any oil will produce in the cylinder would not be possible, for many reasons; but by adopting conditions as nearly like the engine as can be had in the laboratory, and maintaining the same conditions for each oil, we can very readily determine the relative value of the different oils tested.

We have now taken up each item in the analysis, and have shown its bearing upon the value of the oil for lubrication in the gas engine cylinder. We have yet to examine these different brands of oil, obtained from different sources, so as to be able to show what variation we may expect in oils of the same brand, if any; also if it would be safe to purchase oil by the brand name, or if it would be better to purchase on a specification as to what the oil shall show by analysis. This we expect to do in our next article.

Old Oil Must Be Drained Off

Just about this time of the year the automobilist is seriously thinking over the problem of whether he shall keep his car in commission all winter or whether he shall put it in dead storage until a more favorable season for motoring shall again come around. **For those who have decided to keep their cars running it would be well for them to clean out the oiling system if this has not been done during the summer season.**

On cars that use a circulating oiling system this is especially important as it will not suffice to simply renew the oil that is burnt up or that leaks away. The old oil that gathers in the bottom of the crankcase will become waxy and dirty. It will lose the very features which render it desirable as a cylinder oil and will cause trouble by gumming up the piston rings and carbonizing. If the course of the oil that is led through a circulating system be followed it will readily be seen by the most inexperienced amateur that this cleaning out is a necessity and that its omission will entail undesirable consequences.

Take the average splash system that is used to a large degree upon the average priced American car. The oil supply is carried in a reservoir which forms the lower part of the crankcase casting. From this reservoir a copper tube or lead takes the oil to the suction side of a gear or plunger pump. This pump in most of the splash systems does not take the oil to any special bearing but allows it to flow into the crankcase. When it reaches this it is picked up by spoons on the bottoms of the rapidly revolving connecting rods and thrown up into the cylinders and over the other bearings within the crankcase. Where the leads from the oil pump go to some of the bearings the method is generally the same. After the oil leaves the bearing it flows into the splash troughs and is picked up by the bottom of the connecting rods in the same manner. After this oil has been used for lubricating the moving parts of the motor it drains to the bottom of the crankcase and is again mingled with the fresh oil in the reservoir. Before flowing again to the pump, the oil is passed through a fine wire mesh screen which is supposed to rid it of all the harmful impurities it may have picked up on its former course through the system.

After a time the oil becomes so impure that the addition of the fresh oil has little cleansing effect and the motor starts to become fouled. Long before this time has arrived the careful automobilist will have drained out every bit of oil in the crankcase and poured in a gallon of kerosene after closing the drain plugs. After the kerosene has remained in the crankcase overnight, start the motor and allow it to run for about 30 seconds. Drain out the kerosene and refill with fresh oil.

It is important to see if the screen through which the oil passes from the crankcase to the suction side of the motor is clean. If this should become clogged the supply of oil to the pump will be very seriously diminished and the supply to the splash troughs will not be as great as it should and as a result all the troubles that can accrue from an insufficient supply of lubricant will threaten the motor. Cleaning the oil supply every 1,000 miles is not by any means too much although it is sufficient to clean the screens, etc., once a season. There are many who neglect the renewal of the oil supply for such a length of time that the whole motor becomes worn much more rapidly than would otherwise be the case simply because there is not as much oil reaching the bearings as should be the case.

With force feed oiling systems where the oil does not recirculate an occasional inspection of the speed at which the oil is passing through the sight feed should be made as this is an indicator of the well being of the entire system. There the oil box is carried on the side of the motor and the feed is drop by drop down an independent lead to each bearing, it is not necessary to renew the entire supply but it is important that the sight feeds indicate that the oil is being fed continuously to the motor bearings.

TABLE A1—ANALYSES OF AUTOMOBILE CYLINDER OILS—BY W. JONES

No.	Specific Gravity	Specific Viscosity at 80° F.	Specific Viscosity at 212° F.	Carbon per cent	Flash Point °F.	Fire Point °F.	Specific Viscosity at 350°F.	Acidity	Mgs. Iron Loss per 100cc Oil	Sulphuric Acid%
1867	0.8684	1.7647	1.1428	0.30	325	358	1.0357	.00294	0	0
1868	0.8984	3.2353	1.3214	0.70	384	432	.....	.00441	2.66	0
1869	0.8992	4.1764	1.3571	0.75	404	460	.....	.00588	2.00	0
1870	0.8948	6.1764	1.4285	1.03	422	474	1.0357	.00490	1.33	0
1890/a	0.8755	5.7657	1.4285	0.80	458	504	.....	.....	0	0
1890/b	0.8651	3.8571	1.3035	0.72	448	510	.....	.....	1.33	0
1894/a	0.8985	3.5714	1.2857	0.95	408	454	.....	.....	1.33	0
1894/b	0.9103	4.4643	1.2500	1.70	428	474	.....	.....	2.00	0
1896/a	0.8860	2.2500	1.3214	0.65	420	476	.....	.00249	0	0
1896/b	0.8866	3.6428	1.2500	1.00	424	476	.....	.....	0	0
1896/c	0.8868	4.6071	1.4285	1.10	428	478	.....	.....	2.66	0
1896/d	0.8874	6.3214	1.4285	1.10	428	490	.....	.....	2.66	0
1896/e	0.8976	18.6071	2.0000	2.35	454	526	*1.1071	.00441	0	0
1897	0.8747	3.8571	1.4285	0.44	438	494	.....	.00294	0	0
1914/a	0.8953	5.1428	1.2857	0.52	412	464	.....	.....	1.33	0
1914/b	0.8756	4.1085	1.3571	0.70	434	490	.....	.01029	3.33	.0324
1914/c	0.8801	7.5353	1.5357	0.93	450	506	.....	.....	3.33	.0223
1934	0.8705	3.3928	1.2143	0.55	440	494	.....	.....	0	0
1935	0.8777	3.5714	1.2500	0.78	438	486	.....	.....	0	0
1936	0.8738	3.5714	1.2500	0.53	442	494	.....	.01225	4.00	.0286

*At 400° F., 1.0714; at 500° F., 1.0357.

Curing Faulty Lubrication of Steering Knuckle; Metal Enameling Described; Tip on Adjusting the Schebler; How to Eliminate Rattles; View of Automobilist on Left Drive; Mounting Ball Thrust; Dangers of Using Alcohol Solution

Steering Knuckle Squeaks

EDITOR THE AUTOMOBILE:—The steering knuckle on my car is oiled by a small oiler placed on top. I do not think that the knuckle gets sufficient lubrication as I have traced a squeak which proved troublesome for a long time to the knuckle. The squeak seems to be at the bottom of the knuckle I have used a considerably heavier oil, thinking that if I could get a lubricant with a little more body it would stay in place and would cure the trouble. The improvement was marked, but at the same time the squeak is still there to some extent. How would THE AUTOMOBILE suggest making a permanent cure?

Chicago, Ill. TROUBLED.

—If the trouble is where you state it could no doubt be remedied by fitting a grease cup at the point noted in Fig. 5. The pin should be removed and grooved at the bottom slightly to allow the grease to work its way down into the bottom bearing. A small grease cup should then be purchased and a hole drilled through the spindle of the same size as the opening in the grease cup. As cups of different sizes are sold throughout the country it is best to take this measurement from the cup rather than to give the standard diameter of drill. The hole is then counterbored for a sufficient depth to take the threads on the grease cup. After counterboring to the proper depth, the hole should be tapped and the grease cup can be fitted in place. When the grease cup has been located on the spindle fill it with grease and turn it down as far as it will go, refill and turn down three revolutions. After this a turn before each day's run will be enough.

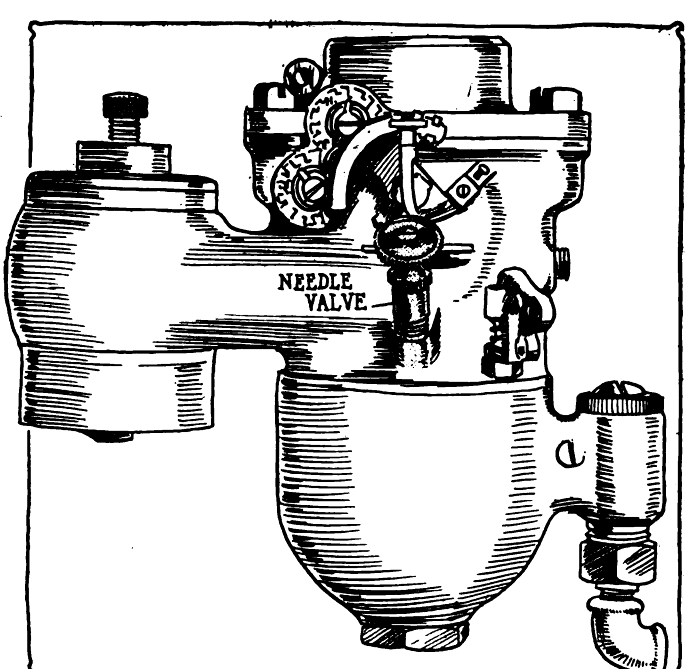

Fig. 1—Location of the needle valve on the Schebler L, Carbureter

Method of Enameling Metal

Editor THE AUTOMOBILE:—Will you please give me detailed information of the most up-to-date methods used for enameling metal? Also please give the formula for finishing metal in aluminum.

Philadelphia, Pa. J. H. ROHRER.

—The processes of metal enameling which are now in vogue vary exceedingly. This variation is not only due to the fact that the enamel which is designed to resist one condition is not satisfactory for another, but is also due to the various methods which are in use in different shops. An up-to-date method which is satisfactory for use on the motor body and especially on the hood and such parts that are exposed to the heat is as follows:

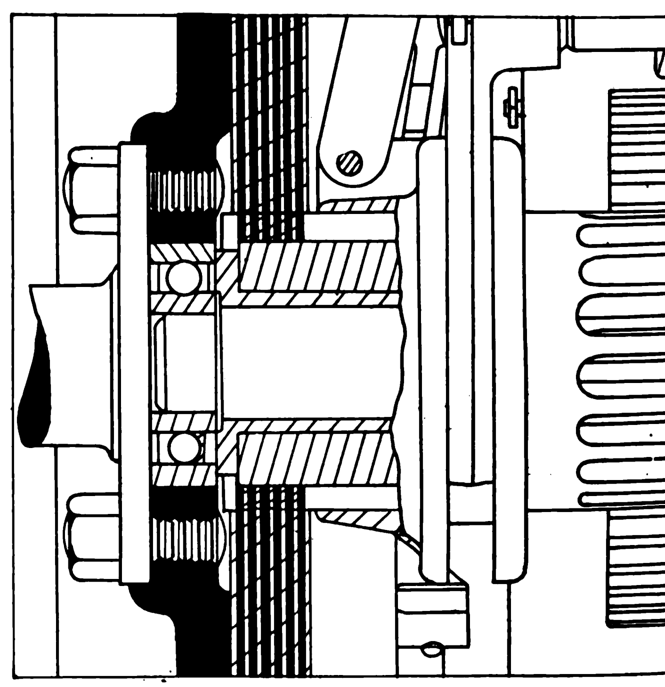
Fig. 2—Where the ball thrust is placed on a multiple disk clutch

The part that is to be enameled is first made free of dust and grease. This is so important that it must be done in the most particular manner. The part to be enameled is then prepared for the enamel. The enamel or japan can usually be secured at any local store and will generally be accompanied by a set of outlined directions which will contain the proper temperature that the enamel is calculated to withstand. Parts such as automobile frames are first rubbed with a rag saturated in spirits of tar until the entire surface is covered and are then placed in an oven at a temperature of 380 degrees Fahrenheit for about 20 minutes. They are then ready to receive the enamel. Larger parts can be rubbed down smooth with emery. This is a tedious operation by hand and any one who is going to do any extensive work should seriously consider the purchase of a special polishing bob. The finishing work is done with pumice or by a cloth and leather polishing bob. The surface is not ready to receive the enamel until it is perfectly smooth. After the japan or enamel is applied to the surface it is heated to a temperature of 290 degrees Fahrenheit for black and about 150 degrees for the lighter colors. The oven in which the heating is carried on should be lined with fire clay as brick gives off gases which absolutely prevent the securing of good results. When the enamel is heated the volatile base is first driven off. This generally consists of turpentine or methylated spirit. After the base has been driven off

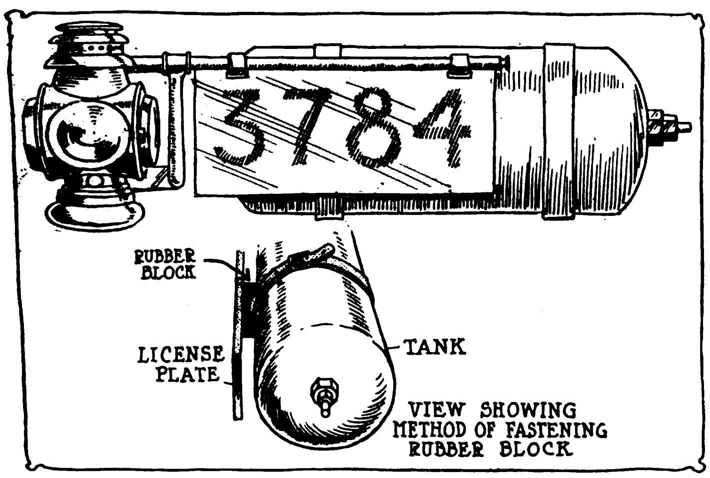

Fig. 3—License plate sometimes strikes acetylene tank. Cure shown

there is a gummy residue remaining. As the temperature is allowed to subside after the heating has been carried on for 1 1-2 hours, this coat will harden. After standing two days another coat may be applied. The third and last coat is a special finishing japan which is designed to provide a polish and is therefore made up largely of varnish. It is applied in the same manner as the previous coats. This is the general method used in the smaller enameling jobs. The details will vary slightly according to the part to be japanned, but if this plan is followed through a finished job can be turned out from the raw material in five or six days without trouble.

Aluminum finish for metals can be applied very satisfactorily by the use of any of the higher priced grades of aluminum paint on the market. These are applied according to the directions to be found on the can and will hold their color for a considerable length of time. When they start to wear off, they can be replaced by the addition of another coat.

Eliminating Noisy Rattles

Editor The Automobile:—While out in a friend's car recently we commenced to talk about the noises which are made by the average car. We were traveling along a road that could not be called bad, although not as smooth as it might have been. After a general discussion on the subject we commenced to listen to determine if we could diagnose the sounds that issued from different parts of the car while we were traveling along. After a time we determined we could hear the carbureter drawing in air, a slight tapping of one of the valves and a general hum that seemed to issue from the entire motor and was no doubt a combination of many small and unimportant noises. We then speeded the car up to 28 miles an hour, slipped the gears to neutral and threw off the switch allowing the car to glide along without a sound from the motor which was, of course, stopped. To our surprise we noticed a rattling sound from the rear of the car which we had not before noticed. After listening carefully we were able after some trouble to determine that the noises issued from two separate and distinct points. One was the

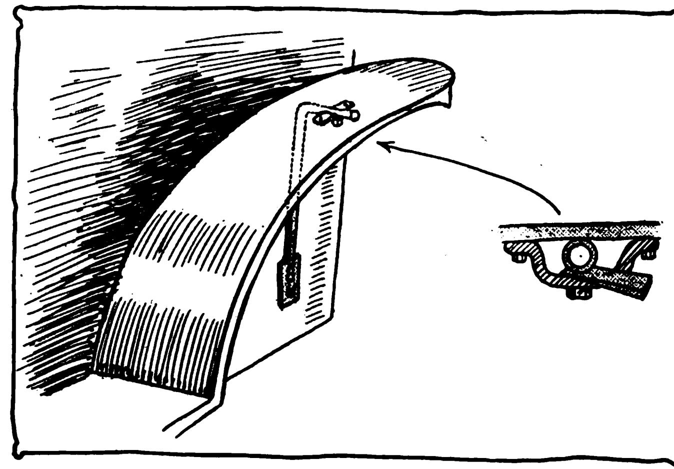

Fig. 4—Wedge will temporarily cure loose fender and stop rattle

license plate striking the Prest-o-Lite tank and the other was the fender over the rear wheel, which was loose.

The position of the license plate in relation to the acetylene tank was as shown in Fig. 3. There was about 1-4 inch space between the two and a road jar was sufficient to cause the license plate to strike the tank quite a hard blow. This was cured by inserting a block of rubber made from an eraser between the license plate and the tank.

The second rattle, that caused by the fender, was found to be due to the fact that the set screw which held the fender in place was too short. As shown in Fig. 4, this set screw fitted against the bracket and by turning it up hard held the fender rigidly in place. That is, it was supposed to do so, but the screw did not have sufficient length to bear tightly against the bracket. It was cured temporarily by the insertion of a wedge and afterwards permanently by the use of a longer screw. I think it would be a good plan for automobilists to state how they have rid their cars of troublesome noises of this nature, and I think that many will find noises which they never expected and which blended in with the motor noises while actually running if they tried the test outlined above.

Augusta, Maine. F. S. Hight.

More Views on Left Drive

Editor The Automobile:—I have read the argument on right and left control with great interest, but am forced even more strongly to the conclusion, based on ample experience with both right and left hand drive cars, that the right hand drive, with center cane handle control and both brakes operated by foot pedals, is the superior of any other form of steering and control arrangement, for both city and country driving. I can best give you the reasons for this belief by taking the points in your articles in series. I have had no experience whatever with motor trucks, and therefore am not in position to express an opinion as to which form of drive is preferable for them. What I shall say applies to pleasure cars of the open type only. It may be that even cars of the limousine type would handle better in traffic with the left hand steer, though I am inclined to doubt this, with the advantages of the right hand steer for other pleasure cars so obviously apparent.

For city driving. In few if any cities are all the streets as wide as they ought to be. A car for the widest range of usefulness with safety should seat the driver where he can watch all the possible danger points; not just some of them. The driver on the left side cannot watch the curb in the narrow street, but can only watch the oncoming car—and guess where the curb is from the look of it out ahead. The driver on the right can watch the curb close-hand (and in some cities the curb is lined with light and telephone poles) and he can also watch the oncoming car, for he is practically on a level with it, and he can judge the distance to the other fellow's fenders practically as close as if he were sitting on the left of his car. Here again

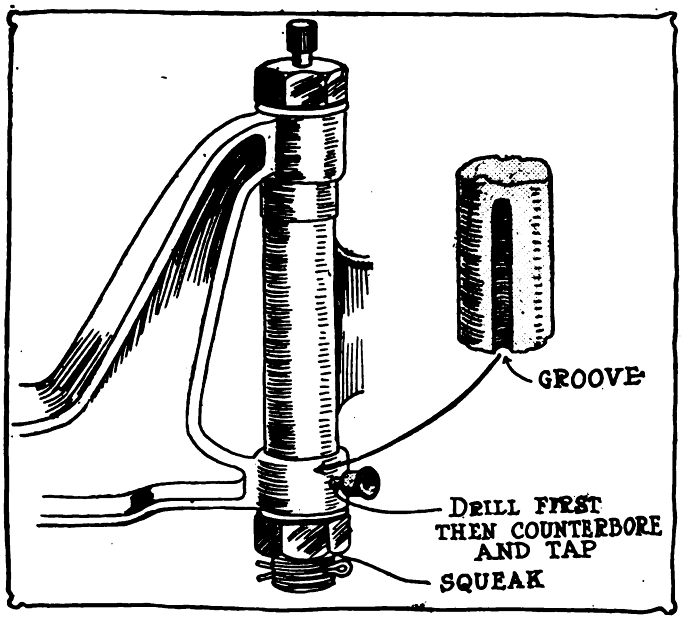

Fig. 5—Where the grease cup on the steering knuckle may be placed

comes in the point I have made before: The other car can move and has a driver to see that it gets through safely too, while the curbing is stationary, with no body to look out for it but the man in the car. There can be no question of the superiority of the right hand drive on country roads. In the anonymous communication on page 269 of your August 8 issue, I note the remark that party would much prefer the ditch to the oncoming car, if meeting on a narrow country road at speed. If such a meeting happened to take place in a narrow but deep cut such as is so often found in our roads, a position where the driver could not watch the drains at the side of the road might easily be the cause of a disaster to both cars.

There are, of course, some advantages in the left drive; if it were not so it would not have come to be adopted by some of the makers. But nearly all of the advantages claimed for the left drive can also be obtained in the right drive by proper construction and placing of control lever, proper clearance of steering wheel from seat, placing of doors, etc. Taking up the advantages claimed for the left drive, left side placing of control levers, as stated on page 210 of August 1 issue:

1. With right hand drive, center one lever control, both front seats are accessible from the curb.

2. The driver can get out more quickly than with any other construction, to open door and assist ladies to alight.

3. Is an advantage only as it concerns street cars or high loaded trucks, for one can always see ahead of a pleasure car which is being overtaken and passed, whether seated on the right or the left side. Also, he can see, before he tries to pass a car on a narrow road, whether he has room enough, whether seated on the right or the left. But if he essays to pass a car on a narrow road, his consideration must be for the car passed, not for his own car, and therefore the right hand drive car has the advantage here. In passing an approaching car, the advantage is all with the right hand drive, for I know from experience that I can accurately judge the distance between the fenders of my car and those of the car I am passing when driving from the right. And I can also see the curb and stationary vehicles, to whom my consideration, as the one in motion, is due.

4. There are few, if any, modern cars in which the weight of the driver on one side or the other can have any effect on the ease of driving or control, so this advantage of the left hand drive may be dismissed as immaterial.

5. Driver has a better view when turning to the left into a side street. Driver also has a poorer view when turning to the right into a side street, so these will balance each other well. It is true that when turning to the right into a side street, one must keep to the right anyway; but drivers on side streets usually drive all over the road and about as much caution is necessary as when turning to the left—and both sides of the street have a curb, on corners, that is easier to miss on one side with the left hand drive and on the other with the right hand drive.

6. It is not plain how and why it is easier to make the signal for the left hand turn from the left hand driver's position. As your writer points out, no signal is necessary when turning to the right, therefore any signal made means a turn to the left, and this is as easily made no matter which side the driver is sitting on.

Discussing the disadvantages of the right hand steer, center control, page 211 of same issue:

1. This, as experienced drivers can testify, does not comprise a disadvantage, as the distance between the fenders of the driven car and the met car can be accurately judged from the right hand driver's seat.

2. Is admitted, but balanced by the same objection to the left hand drive when turning to the right.

3. A driver should not want to pass a car going in the same direction without being sure there is room for such passing; but if he should attempt to pass, his first consideration must be for the car overtaken and not for his own car and the ditch on the left of the road. Therefore, in this item, the right hand drive is superior.

4. It is no difficult matter to design a lap robe that will fit over a center control lever, having a slot long enough to operate the lever through, and thus overcome this objection to the center control. I believe this is but a minor objection.

5. I know from experience that the left hand, after very little practice, is just as efficient as the right for gear shifting. It is a matter of habit.

6. By constructing the clutch and gearset mechanism so that the gears cannot be shifted until the clutch is entirely out, any possibility of the other passenger in the front seat tampering with the gear shift would be obviated.

Discussing the logical and illogical side of the right hand position in this country and abroad. Englsh drivers, before the day of the motor car, and Americans before they were Americans, became accustomed to sitting on the right of the vehicle they drove, and when the motor car came along we naturally put the steering apparatus on the right. That English and Continental laws require that vehicles turn to the left is but an incident; and it appears to this humble owner and driver that, if they would get the full advantage of their right hand drive cars, they should make their laws just opposite to what they are, making vehicles drive to the right, or built their cars with left hand drive—the one or the other.

Personally, I would never again buy a left hand drive car, preferring to buy a foreigner if necessary to get the right hand drive.

Fort Myers, Fla. C. L. Johnson.

How to Adjust the Stromberg

Editor The Automobile:—Would you kindly inform me through Letters Answered and Discussed how to adjust a Stromberg Model B3 carbureter.

New Madison, O. J. W. Coblentz.

—Before proceeding with the actual adjustment it is as well to make sure that no dirt is present at the gasoline connection as this is a not infrequent source of trouble. An examination can be made by removing the coupling C.

The Stromberg B type carbureter has two adjustments, one for high speed and the other for low speed. The two nuts for this purpose are shown at A and B in Fig. 6. In adjusting, first turn the nut A up or down until the spring A1, which it controls, seats the valve V lightly. See that the high speed spring B1 has plenty of play. Start the motor and turn nut A up or down until the motor idles properly. This is the low speed adjustment. Having found the correct position for nut A, advance the spark and open the throttle and if the motor back-fires through the carbureter turn the high speed adjusting nut B up until backfiring ceases. If the mixture is too rich and the motor smokes turn this nut down. This is the high speed adjustment. There should always be at least 1-32 of an inch play between the top of the spring B1 and the nut at the top of the air valve stem when the motor is at rest.

Mounting of Ball Thrust

Editor The Automobile:—In reading a description of a new car which is to be placed on the market I note that special mention is made of the multiple disk clutch with a ball thrust mounted between the end of the crankshaft and the gearset shaft. Will The Automobile show how such a bearing is mounted and what is its real purpose?

Larchmont, N. Y. J. J. Lessing.

—The ball thrust is often mounted as is shown in Fig. 2, which is a part section through the clutch used on the 1913 Marathon cars. The purpose of the ball thrust is exactly what its name would suggest. It is supposed to receive the end thrust which would be caused through the driving and engaging stresses of the clutch and which would cause undue friction if permitted to fall on the other members of the clutch. The use of the balls reduces the friction to a minimum. In every clutch there is some arrangement for providing a special part for receiving the end thrusts and the use of balls for this service has proved a great success.

Thinks Noise a Piston Slap

Editor The Automobile:—Replying to Mr. C. Summers, Baltimore, Md., four-cylinder car, with tapping in one cylinder, I think his trouble is in one of the cylinders. If the tapping (or slapping, as I would call it) is to be heard only after the car has been running for a while or when the engine begins to warm up, then it is due to a loose piston. When the engine is cold the oil is thick and prevents the piston from slapping against the cylinder walls, but when the engine warms up the oil gets thinner and the piston will slap against the cylinder walls and will cause a noise which is called a piston slap.

Chicago, Ill. L. Plein.

Horsepower of Peugeot Racer

Editor The Automobile:—In a recent article in The Automobile describing the Peugeot racer the cylinder dimensions are given as 4.3 x 7.8 and horsepower as 175.

1—How is it possible to get such a H.P. from such a size when ordinary cars with cylinders of about the same size do not claim anything like as much?

2—I understand horsepower equals:

$$\frac{P \times L \times A \times N}{33{,}000}.$$ Is this correct?

3—What are the chief factors in increasing r.p.m. of crankshaft?

4—Will you give comparative figures for two cars of some established make for, say, one 30 horsepower and one of 50 horsepower for:

Size carbureter.
Diameter inlet pipe.
Diameter valve opening.
Valve lift.
Cubic contents of space swept by piston.
Cubic contents of combustion chamber.
Clearance of combustion chamber.
Compression pressure.
Mean explosion pressure.
Power strokes (or crank revolutions per minute).
Weight or size flywheel.

5—Do designers still use 1,000 feet per minute piston speed as a basis in designing?

6—What is meant by the expression heavy duty motor?

New York City, N. Y. David W. Seaver.

1—High compression, high r.p.m., lightness of parts and good design render it possible to get a higher horsepower than would be secured with the average motor. It is possible to include such features in a racing motor while it would be impossible to get them in an ordinary touring car for instance. This is especially true of the high compression and piston speed.

2—This is the correct formula for the indicated or theoretical horsepower.

3—High compression, shorter stroke, larger valves to admit gases more rapidly, advanced ignition and open throttle.

4—

	30 horsepower	50 horsepower
Carbureter, Schebler scale	1 1-4 inches	1 3-4 inches
Diameter inlet port	2 1-8 inches	2 3-4 inches
Diameter valve, mean	1 3-8 inches	1 1-2 inches
Valve lift	5-16 inch	3-8 inch
Piston displacement	226.2	588.6
Clearance	1 inch	1 1-16 inches
Compression	60 pounds	75 pounds
Mean explosive pressure	Unknown	Unknown
Revolutions per minute	1800	1800
Weight of flywheel	75 pounds	90 pounds

These figures really show nothing of value as there are too many other considerations entering into the comparison of two cars of different horsepower. They are given, however, for what they are worth and are taken from two cars actually in existence.

5—No. This is the basis of the S. A. E. horsepower formula

$$\frac{D^2N}{2.48}$$

6—A motor of heavy horsepower but low speed. By the formula under question 2, it is evident that if N, is low, any one or more of the factors P, L or A, will be correspondingly large.

Alcohol Burst into Flame

Editor The Automobile:—Your answer to a question regarding non-freezing solution, page 839, October 24, brings to mind a personal experience with a 40 per cent. wood alcohol solution last December.

While pulling through rather heavy mud on low gear a thick volume of smoke and flame burst from under the hood with a roar. The car was stopped, I crawled under and turned the gasoline off. Opening the hood on the carbureter side everything was found normal. On the other side some oil and rubber connections were still burning, the destruction of the latter being the only damage.

The fire being on the magneto side, I am satisfied its cause was the ignition of gases produced by the overheated and possibly boiling fluid. After this experience I deem the use of wood alcohol in the cooling medium a dangerous practice.

Fulda, Minn. Emil King.

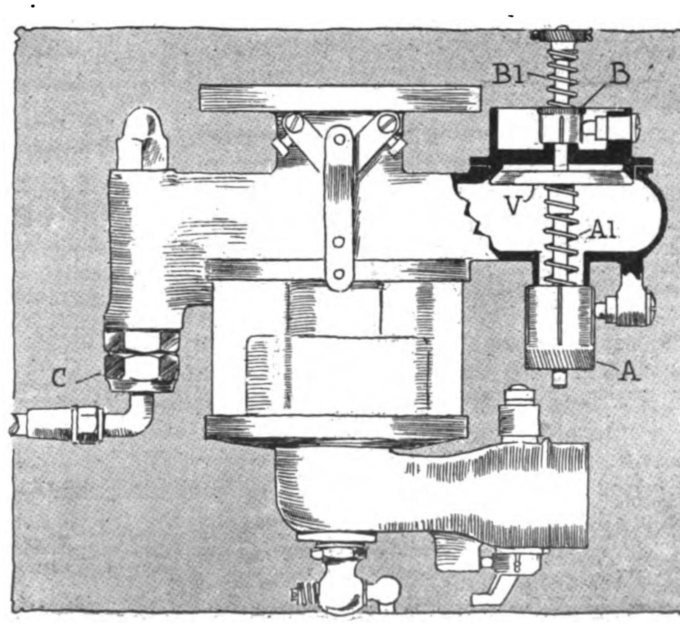

Fig. 6—Adjustment points on the Stromberg Model B3, carbureter

The AUTOMOBILE

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English Tendencies

THE AUTOMOBILE prints this week its first technical review of the European cars as at present exhibited at the annual Olympia Show now in progress in London. This review brings out many important facts in connection with the English design which show the trend of construction. The English engineers were slow in taking up automobile design, and the makers were slow in perfecting the car, both due to a considerable extent to the restrictions on road-racing in the British Isles and also to the unreasonable road regulation laws in the early days of the industry. Since proper government regulation of the motor vehicle on the English highway has been obtained, the makers have taken up the development of the car in a truly determined manner, and have been exhibiting John Bull tenacity for the last few years, their development being such that continental Europe is only now adopting features of design which the English engineer perfected some years ago.

Perhaps nothing could excite more curiosity than the fact that the six-cylinder car, which received its original impetus at the hands of English manufacturers, is diminishing in numbers, the statistics showing that there are fewer six-cylinder models of English production scheduled for 1913 than there have been on the market during 1912. The explanation, to a large extent, rests with the horsepower tax, the gasoline tax and cost of operation. The owner has reached the conclusion that the four, in its present improved form, is giving very desirable service. It consumes little fuel, it gives the flexibility asked for, and has the desired power. Those makers who continue with a large list of sixes are reducing the horsepower or eliminating the high-powered models entirely. By carefully compiled statistics it was shown last year that the horsepower of the European six-cylinder car was over 30 per cent. below the American six, these figures being averages. The same is apparently true for the coming season, although the placing on the market of several lower-powered sixes by American companies will considerably reduce the average horsepower for the American six.

The English manufacturer is at last seeing the commercial phase of the automobile, and is slowly recognizing the fact that to continue existing as a manufacturing factor, he must shape his manufacturing course along economic lines. To explain: There is a general reduction in the number of models listed by the English maker for 1913. In fact, statistics show but one maker who has increased the number of models listed over those of the present year, whereas there are several who have greatly reduced the number. Apparently the days are passing in the insular kingdom when the maker thinks he must build a special model for every half-dozen customers.

One paradox presents itself in the 1913 car program as shown at Olympia, namely, that there is an apparent return to bevel pinion drive in the rear axle over worm drive, which came to the front so spectacularly 2 or 3 years ago. Worm drive was introduced because of its quietness, the demand for the quiet car being greatly accentuated by the non-poppet valve motor campaign throughout Europe. The present slight reversion to bevel drive would seem to show that the efforts of manufacturers in quieting bevel gears have been productive of much good, so that now the bevel is practically noiseless. If this is so, the credit must be given to worm drive, which proved the stimulant for the great activity in better cutting of bevel gears, and better axle design, which insures permanent quietness. It is not expected that the worm drive will show any perceptible decrease, but there is a country-wide feeling that it will more and more come into vogue, and particularly on commercial vehicles.

The progress in ignition has been confined largely to the progress of the magneto makers. This is shown in more compact instruments, which are made more weather-proof, and consequently more trouble-proof. Approximate statistics bring out the fact that nearly 80 per cent. of the European models listed for next year will use the magneto as the only system of ignition. The remaining 20 per cent. will be equipped with the dual system and the double system comprising magneto and battery. The implicit confidence that the maker is placing on the single magneto as a source of current, is an excellent commendation on the progress that magneto builders have been making.

The small motor has made the four-speed gearset practically universal. With large size motors direct drive is generally on the fourth gear, but with smaller-size motors direct is on third, with the indirect fourth of a higher ratio than the direct, giving a vehicle with good speed ability for country travel.

Detroit Section of Automobile Engineers Meets

Three Papers Read—W. H. Barr Treats of Copper Alloys for Motor Car Service—M. Wolf Discusses the B. & L. Caster Front Axle and R. H. Manson Deals with High-Frequency High-Tension Ignition

DETROIT, MICH., Nov. 8, 1912—At last night's regular monthly meeting of the Detroit section of the Society of Automobile Engineers, at which Secretary and Treasurer Alfred A. Greenburg presided in the absence of Chairman E. T. Birdsall, three very interesting papers were presented. The first of these was given by William H. Barr, general manager of the Lumen Bearing Company, Buffalo, and chairman of the Alloys Division of the Society. The subject was **Copper Alloys for Motor Car Service,** and it was treated in a masterful manner by Mr. Barr, who gave a short history of copper. He stated that in the United States **the metal is usually classified in three grades: Lake copper, that brought from the Lake Superior region; Electrolytic copper, that refined by the use of the electric current; and Casting copper, that which is not entirely refined, but carries varying amounts of impurities, and as a result is rapidly disappearing from commercial fields.**

The United States produces more copper than any other country, or about 65 per cent. of the total production of the world, the total amount for 1911 being 1,090,000,000 pounds.

Mr. Barr also touched upon the production, refinement and commercial uses of the various metals which are alloyed with copper to make bearing metals, namely, tin, zinc and lead. Brasses and bronzes were taken up at some length and the action of such chemicals as arsenic, antimony and sulphur on these alloys was explained. These three elements have a detrimental effect upon bronze, but sulphur in proportions which have been carefully determined by metallurgists is a beneficial agent.

The high copper alloys, as related to motor car construction, may be divided into four classes: Soft phosphor bronze; hard phosphor bronze; red brass; yellow brass. The properties, uses and general composition of these were explained.

"From the standpoint of the automobile engineer, it would seem that the same detailed attention should be given to the non-ferrous alloys in motor car construction as is given to steel products and appliances. Too often, the decision as to what brass or bronze may be used is left to the purchasing department, where price alone governs the selection," said Mr. Barr.

In the discussion of the paper which followed it was asked if there would be any value to any means of hardening copper. Mr. Barr stated that no way has been found to harden pure copper. He also brought out that there are two concerns now making copper castings in which it is possible to guarantee an electrical conductivity of 85. Ordinarily a conductivity of from 45 to 60 is considered good.

C. C. Hinkley wanted to know if it were possible to get a combination of low shrinkage and high wear in a babbitt metal. To this Mr. Barr replied that an alloy containing not less than 90 per cent. of tin, 4 per cent. of copper and 6 per cent. of antimony would come as close to these requirements as any. Perhaps a little less tin could be used. The antimony serves to reduce the shrinkage.

When asked if a small percentage of nickel would be of advantage in these alloys, Mr. Barr stated that as a result of many tests he has come to the conclusion that **nickel is of little or no advantage. The effect of cobalt or any other similar element is about the same as that of nickel.** He does not believe in nickel babbitts.

This discussion was followed by a paper by Maurice Wolf, of the Anderson Forge & Machine Company, Detroit, which paper treated upon the **B. & L. Caster front axle, setting forth its construction and the advantages which are claimed for this type over the standard front axle.** A paper which was in the form of a discussion of that of Mr. Wolf was read by Ernest R. Fried, research engineer of the General Motors Company. Mr. Fried did not agree with all the claims made by Mr. Wolf.

A most comprehensive paper by Ray H. Manson, chief engineer of the Dean Electric Company, Elyria, O., entitled **High-Frequency High-Tension Ignition,** was next presented. According to Mr. Manson, the use of high-frequency, high-tension electric spark for ignition in the internal combustion engine introduces several unique and advantageous features. A high frequency discharge is in the form of electrical oscillations, these oscillations rapidly succeeding one another, each succeeding one being of less intensity than the one preceding, and gradually dying down to zero. **This electrical oscillatory action is similar to the mechanical vibration of a strip of metal or a tuning fork,** which is firmly held at one end in a vise and given a blow. Its first vibration is the maximum, those following finally reducing to nil. **The chief advantages Mr. Manson gave for this type of ignition are:**

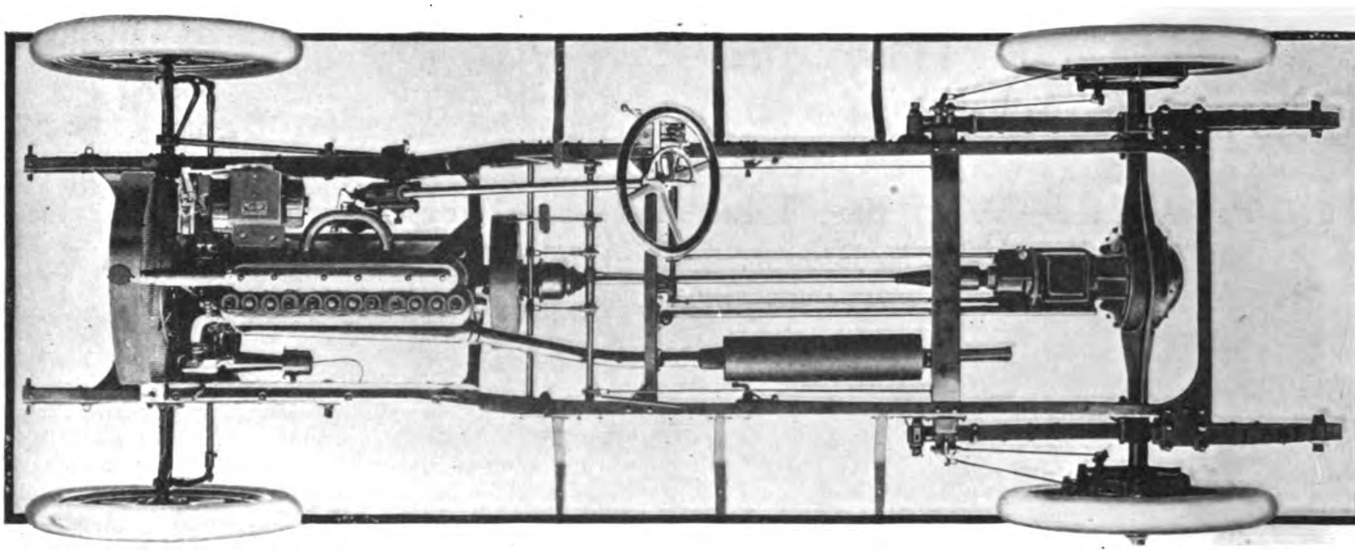
1—Cranking on magneto at very low speeds.
2—Throttling the engine down to extremely low speeds without missing.
3—Positive ignition of poor mixtures.
4—Less heating of engine, due to more rapid and thorough combustion of gases.
5—Fuel economy, due to ability to ignite lean mixtures positively.

The high frequency magneto system consists of a low-tension magneto with breaker box and low-tension distributer, built very similarly to a standard magneto with the exception that the armature is wound with fairly coarse wire and that the condenser is stationary. The latter is located on the front of the distributer.

In the case of the high-frequency system, spare resonators may be carried, if desired, and these may be mounted as readily as spark plugs. On the other hand, the repairing of a broken-down high-tension armature or a common transformer coil is very difficult and requires an expert.

In addition to touching upon the high frequency magneto system, Mr. Manson explained the high-frequency dual system, battery system and double system. The paper was an introduction to this new field of ignition. **Mr. Barr's paper on Copper Alloys for Motor Car Service will be reprinted in full in an early issue of** THE AUTOMOBILE.

Prize poster for the National Automobile Show to be held in New York City January 11-25



New six-cylinder chassis of Studebaker with monobloc motor casting and electric lighting generator

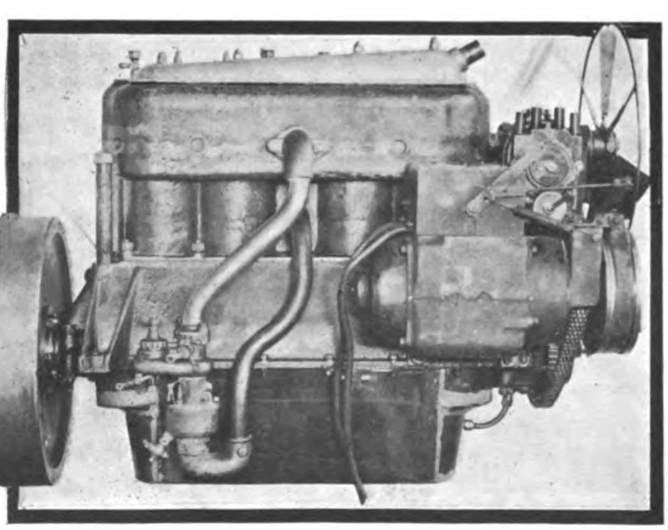
Three New Studebakers

New Motor Designs on Additional Models, Using Monobloc Cylinder Castings—Numerous Other Changes

Six-Cylinder Is One of New Types—Continue the Models 20 and 30 of this Year

THREE entirely new models have been added to the line of automobiles manufactured by the Studebaker Corporation, Detroit. These consist of two four-cylinder types, designated models 25 and 35, and a six-cylinder machine. They swell the offering of the Studebakers to five distinct chassis, models 20 and 30 being continued with no radical changes whatever, and embodying practically all the essential features which have distinguished them since their inception some 5 years ago. It is interesting to note that during the selling season just passed 42,000 of these two models left the Studebaker shops.

Particular interest centers in the three new models, since they are a brand new series and involve a number of features which are new to Studebaker construction. That this concern should enter the six-cylinder field at this time is but another striking instance of the belief of the big makers in the low-priced six.



Right side of Studebaker model 35 motor

Motors of the newcomers are all of the same design, being of the L-head monobloc type with the valves on the left side. The cylinder dimensions of the six-cylinder engine and of the twenty-five are the same—3.5 inches bore and 5 inches stroke. The larger four, model 35 has the same stroke, 5 inches, but the cylinder bore is 4 1-8 inches. On the block, these motors have shown a brake horsepower considerably in excess of that which the S. A. E. formula would give them. The table below gives some facts about the three new power plants:

Model	Bore Inches	Stroke Inches	B/S Ratio	Brake H.P.	Firing Order	Wheelbase
25	3.5	5.00	1.43	26	1-3-4-2	101
35	4.125	5.00	1.21	35	1-3-4-2	116
Six	3.5	5.00	1.43	45	1-5-3-6-2-4	121

The block cylinder castings present a very clean appearance. Intake and exhaust manifolds are cast integrally, but in somewhat different manner from that usually found in multiple-cylinder castings. The gas enters the intake channel on the side opposite from the valves, being led through the casting to the left side and thence to the intake ports of the various cylinders. In passing through the casting to these ports on the opposite side, the gas is somewhat heated due to the hot water in the adjoining jacket spaces, and to the heat of the neighboring cylinder walls.

This heating of the gas aids materially in its vaporization and amounts to virtually water-jacketing the intake manifold. Even distribution of the gas to all cylinders is provided for by the form of the intake channels. The carbureter is a Studebaker design and is very similar to that used on model 20. It is of the venturi-tube type.

The exhaust manifold on the left is not flush with the outer vertical wall of the waterjacket, but extends beyond it, making for free exhaust. This design has been carried out in other monobloc types, but not exactly in that way.

The pistons have polished, domed heads, that is, their faces are not flat, but are crowned. This construction is an aid in reducing carbon deposits. They are cast from the same grade of gray iron as is used for the cylinders. Four rings are fitted, three above the wristpin and one below. The drop-forged connecting rods are of I-section. Wristpins are fixed to the connecting-rods, the bosses forming the bearing surfaces.

The crankshaft is carried on three main, plain babbitt bearings in the four bearings in the six. The camshafts are similarly mounted in the three engines. The various bearing lengths follow:

Crankshaft Model	Front	Center	Rear
25	2.781	2.500	3.437
35	3.000	2.938	4.500
Six	2.781	2.500	3.437
Camshaft			
25	2.110	1.250	2.500
35	2.079	1.375	1.875
Six	2.110	1.250	2.500

Camshafts have integral cams and oil pump eccentrics for driving the plunger oil pumps. These camshafts are driven from the crankshafts by half-time gears, spirally cut and wider than those used on previous models. All are forgings except the camshaft gears, which are of cast iron. The different material is used to insure silence, since the running of hardened steel against the same material would not be conducive to noiseless operation. The wide faces of the gears and their spiral cut are other factors which aid in this respect.

Valves are of the beveled poppet type, the stems electrically welded to the forged heads. Their lift is 1-4 inch. Push rod guides are cast iron and are pressed into the cylinder castings. Valve springs and rods are completely inclosed by cover plates of pressed steel, which are removed by the taking off of two hand nuts. Valve details follow:

Model	Diameter	Length with Stems
25	1 13-16 inches	6 1-4 inches
35	2 5-32 "	7 13-16 "
Six	1 13-16 "	6 1-4 "

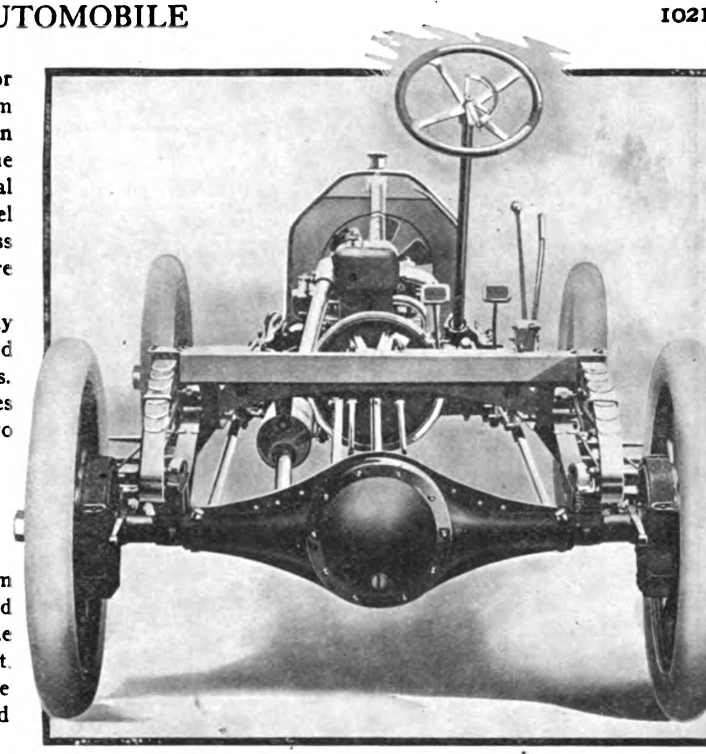
A feature of the motors which is distinctly a departure from previous designs of this concern is the location of the pump and magneto in front of the engines on brackets which bolt to the crankcases. Pump and magneto are driven by a transverse shaft. The magneto is mounted at the right end and the sump at the left. This cross shaft is driven by spiral gearing at its center and from the crankshaft.

The magneto is a Splitdorf. Batteries furnish starting ignition current.

The location of the water pump forward makes it possible to connect its outlet direct to the cylinder casting at the front. Water is forced into the jacket space in line with the valve pockets, insuring cool water around the valves. This is possible on account of the relatively high position of the pump, which is above the crankcase.

Lubrication is accomplished through the use of a circulating oil pump and the conventional connecting-rod splash. The oil is pumped from a reservoir at the bottom of the crankcase up through a sight feed gauge on the dash, and then through a lead to the magneto and pump shaft gear. It flows down over the timing gears and is eventually directed along the inside of the crankcase wall to the troughs which are in the false bottom of the crankcase. There is one of these troughs under each cylinder, and the lower ends of the connecting rods dip into them. The overflow from the troughs and from the bearings finds its way to the reservoir at the extreme bottom of the crankcase, where it is strained before the pump returns it to the sight feed, timing gears and troughs. All of the pipe line joints are fitted with Lavigne solderless pipe couplings.

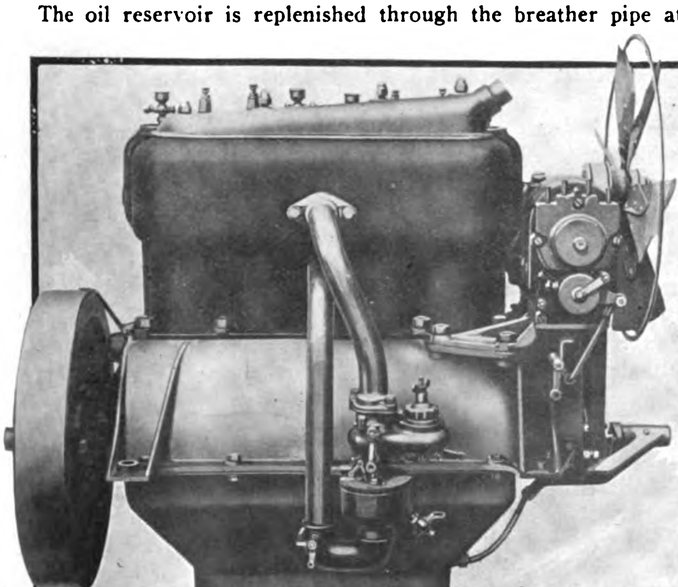
The oil reservoir is replenished through the breather pipe at the left side. Also at the side and extending up from the bottom of the reservoir, is the oil level indicator.



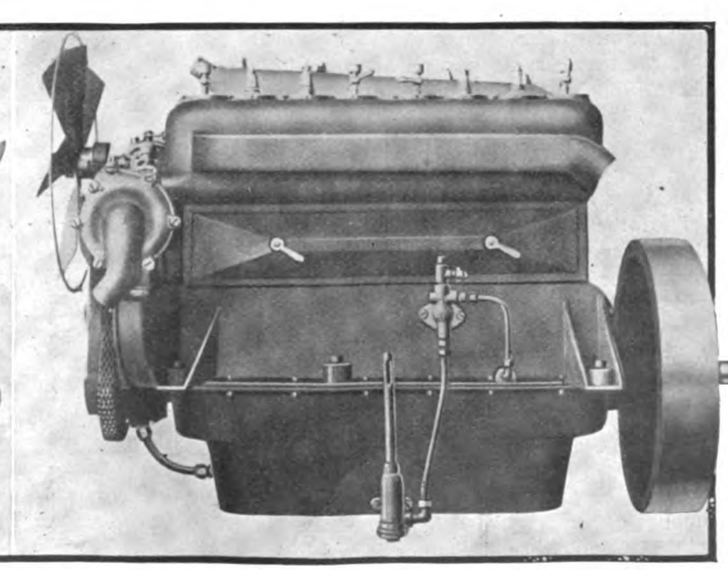
Rear axle construction on Studebaker model 35

The self-starter proposition has not been lost sight of in these new Studebaker offerings. On models 35 and six a combined self-starting and lighting system is installed, which system is manufactured exclusively for the Studebakers by the Wagner Electric Mfg. Company, St. Louis. In fact, the entire electric-starter output of this latter factory has been contracted for by the corporation.

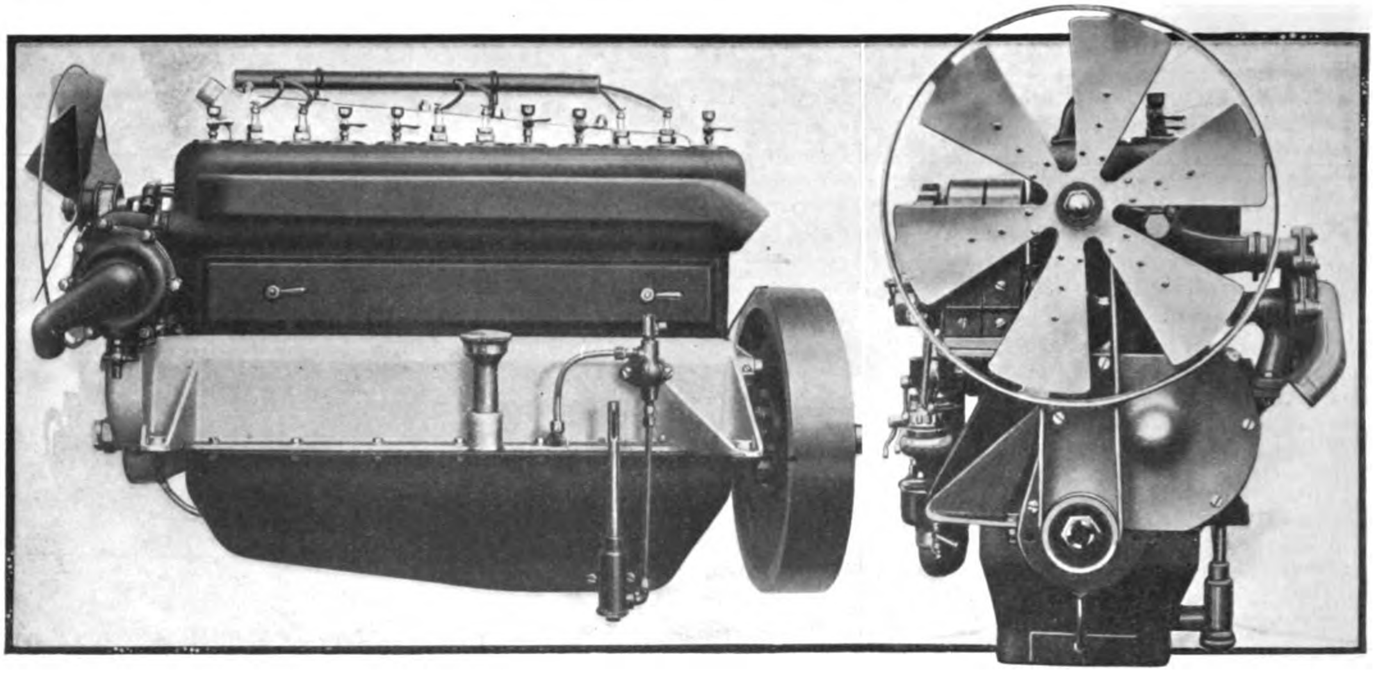
The starter is of the motor-generator type, placed at the right at the forward end, and connected with the crankshaft by silent chain. When used for generating current after the gasoline motor has been started, the generator is driven direct from the crankshaft, the gear ratio being 2.65 to 1. But when the electric motor is called upon to start the engine, a set of transmission gears are brought into play which reduce the driving ratio to 13.2 to 1, increasing the electric motor's torque and causing it to turn the crankshaft at a speed of about 80 revolutions a minute. When driven by the engine as a generator, the electrical unit will furnish current at a crankshaft speed as low at 300 revolutions per minute.



Intake side Studebaker model 25



Exhaust side Studebaker model 35



Exhaust side of Studebaker six-motor and end view of Studebaker design

A six-cell, nine-plate storage battery having a rated capacity of 60 ampere-hours and a voltage of 12 is used in connection with the generator-motor. When acting as a generator, the latter furnishes current to this battery, from which the energy is drawn for lighting the lamps and for driving the electrical unit as a motor when required for starting. The battery, when fully charged, will furnish sufficient energy to the motor-generator to turn over the crankshaft for several minutes continuously, or it will keep the lights burning for 13 hours.

The motor-generator has a self-contained automatic regulating device and by a carefully designed system of field winding and commutation, the current output of the generator is so controlled that it is impossible to overcharge the battery at any time. When the speed has reached 300 revoluions per minute an automatic cut-out mounted under cover on the generator closes the battery circuit. Charging continues until the engine speed drops below 300 revolutions per minute, when the automatic cut-out breaks the circuit again, preventing a discharge of the battery through the generator.

To crank the engine, the driver pulls up on a lever located on the steering column just below the wheel. This shifts a controller drum on the generator to a second position and simultaneously tightens a brake band around the cylindrical gearbox of the apparatus. The controller shift makes the starting connection, and the tightening of the brake band throws into operation the transmission gearing between the motor and the crankshaft, reducing the driving ratio to 13.2 to 1, as already pointed out.

The Studebaker engineers state that the only care necessary for the proper up-keep of this electric starting and lighting system is the addition of a little pure water every 2 weeks to each cell of the battery so as to keep the plates immersed. Acids should never be added. Further, a few drops of oil should occasionally be applied to the ball bearings of the motor generator, and periodically the controller and cut-out contacts should be inspected to see that they are clean and that no dirt or oil has found its way under their cover.

The storage battery is placed on the left running board, and the motor-generator is on the right side. Hence the additional weight of the starting system does not affect the car's balance.

On the 25 there is no starter, but an acetylene gas primer is installed as an aid to starting. This primer allows a certain amount of gas, regulated by a needle valve, to pass into the intake manifold when the motor is cranked.

Except for difference in wheelbase the design of the six-cylinder chassis and of model 35 is the same. Some variations are to be found in that of the smaller four-cylinder model.

The clutches used on these cars are of the cone type similar to that of the present model 30. It requires a force of 31 pounds to press down the clutch pedal of model 25 and engagement of this member on the other two models requires a force of 45 pounds.

It is in the transmission of the power from the clutch to the gearbox that the greatest difference between models 25 and the other two comes. The smaller car has its drive shaft enclosed within a torque tube whereas in the case of the 35 and the six a stamped-steel torque arm extends from a frame cross member back to the gearbox and parallel to the propeller shaft. These drive shafts are properly provided with universal joints one just back of the clutch and the other at the rear axle.

The gearsets of all three models are located at the rear axles, the gearcases bolting to the axle housings. The gearsets provide three forward speeds, operating selectively. On the two larger cars the gearset has two ball bearings in the front of the driveshaft and an extra large roller bearing back of the drive pinion. The countershaft is carried on plain bearings. The gearboxes as on models 35 and six are of aluminum and are cast with extensions forming the bases for the differential bearings, which is a new feature in Studebaker construction.

Model 25 has a semi-floating rear axle and on the other two a floating type. The differential pinion is placed on the shaft by sliding it to a position over the latter's splined end and fastening with a nut. A cover plate at the back of the axle housing provides for easy inspection of the differential gears and the driving pinion. In the floating construction the weight of the car is carried on the housings, the pinions having simply to perform the functions of driving the wheels. The direct drive ratio on all models is 3 1-2 to 1.

The brakes act on the rear wheels. The emergency brakes are internal expanding, while those for service use contract upon the drums. The brake dimensions are given:

Model	Brake drum diameter	Brake drum width
25	9 3-4 inches	2 1-4 inches
35	12 "	2 1-2 "
Six	12 "	2 1-2 "

Frames are constructed from hot-rolled sheet steel. They are narrowed in front to allow for shorter turning radius. Frames of the 35 and six have a rear kick-up. The frames are well braced at three points by cross-members, the rear member having gusset plates at its ends to which the ends of the side frame members fasten as well as the springs.

The turning radius for the smaller chassis is 16.5 feet, while it requires a circle 44 feet in diameter for the larger models.

The springs are outside the frames in the rear. Rear springs are elliptic on the 25 and three-quarter on the other two. Their dimensions follow:

Model	Length—Inches	Width—Inches	Type
25	Front 36 1-2	1 3-4	Half-elliptic
	Rear 35 1-2	1 3-4	Elliptic
35 and Six	Front 38	2	Half-elliptic
	Rear 50	2	Three-quarter elliptic

Right-hand control is found on all models, with brake and clutch pedals, spark and throttle levers, and so on, in standard form. The steering gear is of the worm-and-full-gear type, irreversible.

All wheels are of artillery construction, and on models 35 and six they are fitted with Booth demountable, quick-detachable rims. The rims of model 25 will not have the demountable feature as standard equipment. The felloes are slightly rounded, which adds to the general appearance of the wheels.

Tires on model 25 are 30 by 3.5 inches and on the other models 34 by 4 inches. All are of Goodrich quick-detachable make.

The designs for the bodies of all three cars are alike, in fact, the standard types for both the larger four and the six-cylinder car are identical. The standard model 25 body is a four-passenger type, and the other two machines will carry six. Two seats in the latter are auxiliary and are designed to fold out of the way when not in use.

Fenders on the 35 and the six will be crowned, which makes a pleasing effect. Running boards are of wood, lineoleum-covered with polished moulding around their edges on these two models, and model 25 is provided with pressed-steel running boards. All models are equipped with Dean electric horns mounted under the hoods. Buttons for operating them are placed on one of the spiders of the steering wheels. Equipment is complete in every respect.

Density Not Only Fuel Factor

There is a widespread opinion that gasoline of a certain density, say 68, 70 or 72 degrees Beaumé, is the best to use. The advocates of the theory that specific gravity, in other words, weight per unit volume, of fuel is a positive indication of its fuel value are very much mistaken. A fuel may be concocted to produce any desired density between 68 and 76 degrees, and yet have by no means the fuel properties which automobilists are used to attribute to gasoline of such weights. As a matter of fact, it has happened that gasoline producers have specially prepared inferior fuels of a specific gravity considered especially suitable by automobilists. The taking of specific gravity as the sole criterion in selecting fuel is as fallacious as the establishment of the flash test as exclusive basis in judging the quality of a lubricant. The high flash test of an oil in itself does not necessarily constitute a good lubricant. Likewise, only the chemical analysis of a fuel, which, of course, is out of the question in case of a small user, can show whether he gets what he expects and what he is entitled to, or not. It is the maximum contents of hexane in the gasoline which makes the fuel value, as this hydrocarbon combines high volatility with a fairly high hydrogen percentage, upon which the latent heat of combustion depends to a great extent.

Harking Back a Decade

FROM *The Automobile and Motor Review,* November 8, 1902: The 1903 model of the Stanley steamer has made its appearance at Newton, Mass. The motor has two cylinders and is of the ball-bearing, cross-head type. The engine is suspended horizontally under the boiler and is geared direct to the differential, the usual sprockets being replaced by spur gears.

The new automobile terms garage, meaning a storage warehouse; chauffeur, meaning a person who heats something; control, meaning a place or station where control is exercised and mechanician, meaning mechanic, proved rather confusing to the press at large during the recent reliability run to Boston and return. The words are generally pronounced by the non-French lay public as if spelled gar-aw-ish, with the accent on the middle syllable; sho-ffoor and me-can-i-can, with the accent on the second syllable. The meaning of control apparently escaped everybody but the officials and puzzled a number of them.

The competition of tractors for military purposes, announced some time ago by the War Department of the British government, has been postponed until October, 1903.

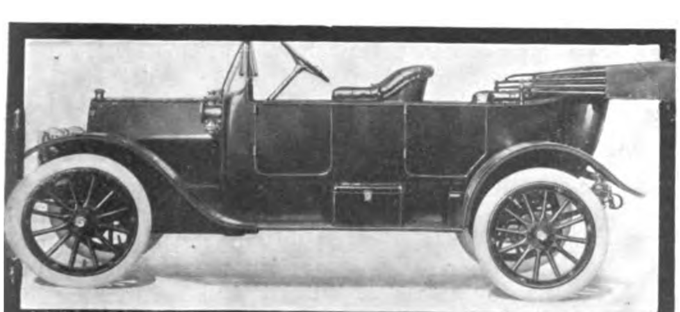
Reports are current in London that the American manufacturers of automobiles are planning an extensive invasion of the British market. The Oldsmobile already has quite a patronage in England and the Rambler is about to be introduced. The British trade take the position that the larger American cars can never have much sale because the British public refuses to buy cars that lack individuality. For instance if Jones has a Rambler and Smith wants one, he will refuse to buy because his car would be identical with that of his neighbor. American manufacturers are warned not to try to sell cars equipped with cross lever steering gear.

The Diamond Rubber Company, of Akron, O., denies that it contemplates the installation of a factory at Glasgow.

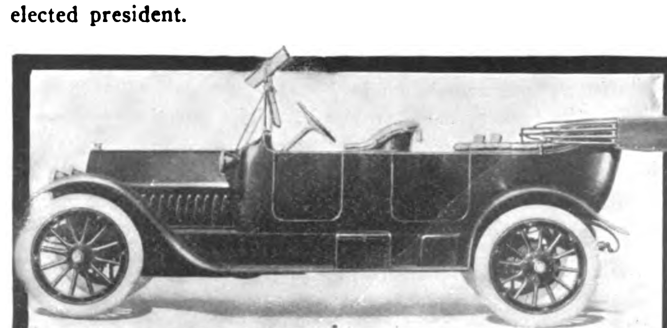
W. Byrd Raymond, a professional driver of New York was sentenced to 6 months in jail without option of fine for alleged negligence in driving his Winton car which figured in a collision with a street car near Yonkers, October 26. Mr. Byrd was sent to the Kings County penitentiary; his hair was clipped and moustache shaved and he was forced to don striped clothing. Twenty-two persons were slightly hurt in the crash. Raymond was released from the penitentiary on a writ of habeas corpus almost immediately on the ground that there was reasonable doubt that the automobile was responsible for the car's derailment.

The Ohio Automobile Company, of Warren, has changed its name to the Packard Motor Car Company and has had plans drawn for two large one-story buildings to be erected at Warren immediately. It is asserted that when these are completed, the company will have one of the largest plants in the country. A circular letter has been sent out that the rumored removal of the plant from Warren to Detroit is in error.

Three of the largest tire companies of the country have consolidated. They are the Hartford Rubber Works Company, Indianapolis Rubber Works and Morgan and Wright. The brands of tires made by the companies include: Hartford, Dunlop, G. and J., and Morgan and Wright. Lewis D. Parker has been elected president.



Studebaker model 25 touring car



Studebaker six-cylinder touring car

Laycock's Motor Uses Dumb-Bell Valves

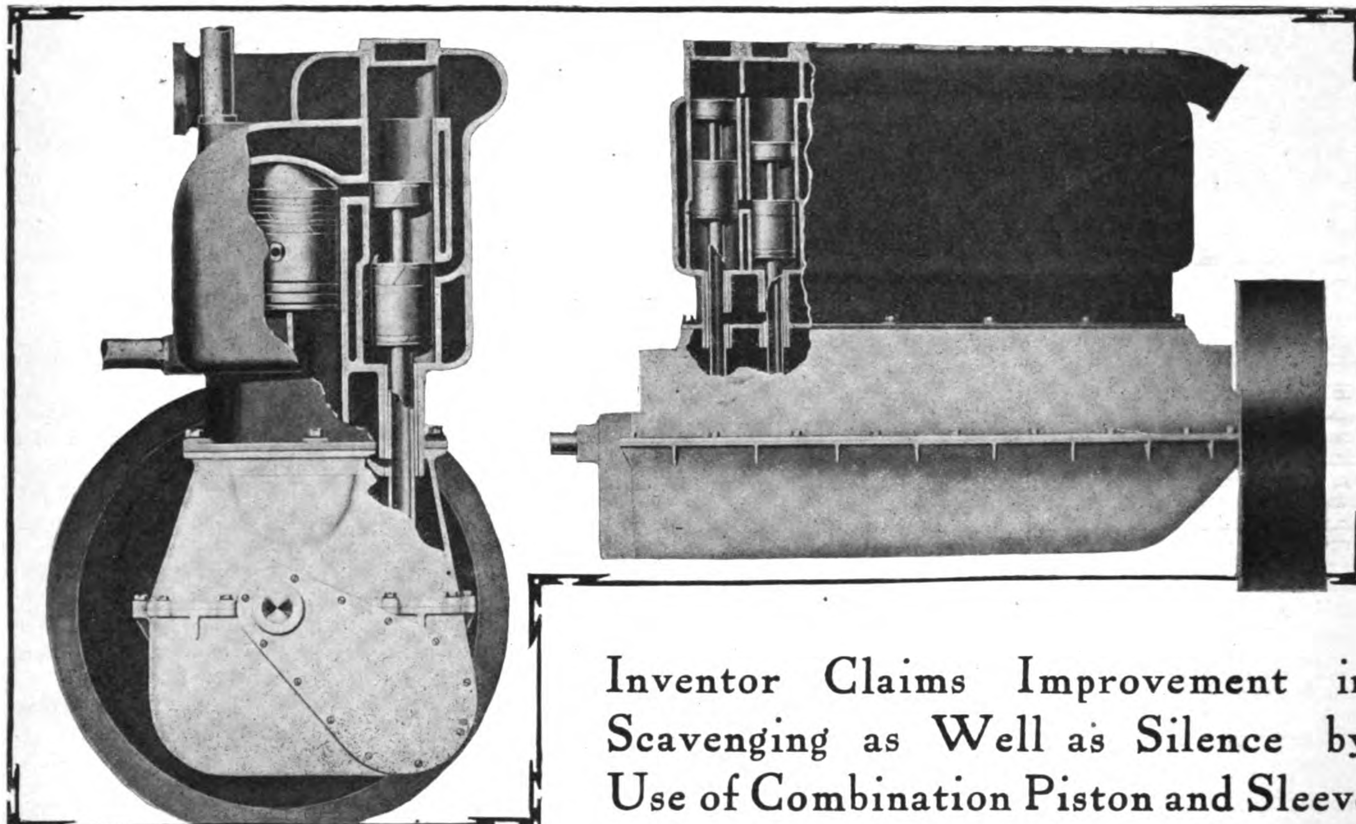


Fig. 1—Transverse section of the Laycock Motor
Fig. 2—Partial section and longitudinal view

Inventor Claims Improvement in Scavenging as Well as Silence by Use of Combination Piston and Sleeve Valve; Small Piston Head Clearance

ARTHUR M. LAYCOCK, of Detroit, has brought out a motor which is attracting considerable attention on account of the novel valve arrangement. As will be seen in the accompanying illustrations there are two separate piston valves used with each cylinder, one for the intake and one for the exhaust. These valves are of the dumb-bell piston type and may be counted on the same or opposite sides of the cylinder.

In exterior appearance the motor does not vary greatly from the regular poppet type. The piston and connecting rod assembly is identical with a motor of the latter type except that, as is shown in Fig. 1, the head of the piston is much closer to the top of the cylinder. According to the inventor the clearance between the cylinder and the piston at the top of the stroke is only about 1-16 inch, or just sufficient to contain enough gas to carry a flame. This will reduce to a minimum the volume that can be occupied by the burnt gases after combustion, and there is consequently a minimum of scavenging work to be done. The waterjackets are made to extend over the cylinder head and around the valve ports in the manner shown in Fig. 1.

The valves are actuated from a camshaft which may be placed in any desired position. In Figs. 3 and 4 the camshaft shown is placed on a level far below the axis of the crankshaft. In this construction the valve passages and the cylinders are parallel with one another and as may be seen the valve mechanism requires a long space. This can be shortened, however, by allowing the axial lines of the cylinders and the valve passages to diverge downwardly.

The valve passages as shown in Fig. 4 are in two parts. The upper part contains the piston valves, while the lower part contains the operating sleeves which are contained in anti-frictional tubes and reciprocate therein. The valve stems are operated at their lower end by connecting rods off the cam-shaft. The manner in which the valves are driven however, is arbitrary and does not alter the principle of the motor in the least. If the camshaft is driven by gearing it is so arranged that the speed of the camshaft is one-half that of the crankshaft.

In Fig. 4, the motor is shown at the end of the scavenging stroke. The piston is about to move downwardly and the exhaust valve is moving up. The crankshaft and the camshaft both turn to the left with the camshaft turning at one-half crankshaft speed. At this part of the cycle the exhaust port is closed by the outer portion of the exhaust valve and the space between the upper and lower part of the exhaust valve is filled with explosive mixture, as will be described. As the piston starts down on the suction stroke, the exhaust valve moves up and prevents any circulation through the exhaust port. While the exhaust valve is going up the intake valve is coming down, as shown by the dotted lines in Fig. 4, the exhaust and intake valve cranks being 90 degrees apart. At the end of the suction stroke the exhaust valve will be at the top of its stroke, while the intake valve will be at the same height as the exhaust valve, as indicated in Fig. 1.

As the exhaust valve was rising a vacuum was created beneath it within the tube containing the hollow valve stem. As will be seen in Fig. 1, there is a port in this valve stem and also one in the tube which contains it, the latter port leading to the intake valve and being connected thereto by a short tube. When the port in the hollow valve stem registers with the port leading to the intake pipe, the explosive gases will rush in and fill the space below the exhaust valve. When the valve descends the gases are compressed in the hollow portion below the valves and at the bottom of the stroke are allowed to pass around the valve into the space between the two parts of the dumb-bell, as shown in Fig. 1. The by-pass will be noted on the left side of the exhaust valve in Fig. 1. These new unburnt gases will force out the remaining dead gases through the upper passages in the same manner that a two-cycle motor is scavenged by the admission of the fresh gases. In case it is desired to scavenge the cylinder with air instead of with the fresh charge it is merely necessary to remove the pipe that connects the intake with the port leading to the hollow valve stem and allow air to pass through in the same manner as described for the fresh charge. In case this is done the carbureter adjustment will have to be altered to take care of the leaner mixture that would result should the charge be allowed to mingle with the air that will fill the valve passages. The scavenging work of the motor will be appreciated with this arrangement in connection with the greatly reduced clearance between the top of the piston and the cylinder head when the piston is on the top of its stroke.

At that point of the cycle when the motor is ready for the explosion stroke the the explosive gases are contained within the small space between the top of the piston and the cylinder head and within the exhaust and inlet valve passages. When the explosion of the gases within the dumb-bells takes place there will be no undue strain on the valves because they will be balanced, the areas of the upper and lower parts being similar. During the entire working or expansion stroke of the piston the valve spaces will be in communication with the cylinders so that the space between the upper and lower portions of the valves are an active part of the expansion or combustion space. At the end of the expansion stroke both the intake and exhaust valves are on the down stroke. The exhaust valve uncovers the exhaust port and leaves it uncovered during the entire scavenging stroke. This completes the cycle and leaves the piston and valves in the position first mentioned. The most important of Mr. Laycock's patent claims are as follows:

Important Claims in Laycock's Patents

1. In an internal-combustion engine, the combination of a cylinder, a piston therein, a valve-chamber adjacent said cylinder and connected thereto by a port, said chamber provided with an inlet port at its lower end for the admission of air, an exhaust port intermediate its ends for the exhaust of the air, and a by-pass in its wall, a valve movable in said chamber and formed of two parts so as to constitute a receptacle for the compressed explosive mixture at the time of the explosion, the lower part of the valve controlling the passage of air through said by-pass and exhaust port of the valve chamber.

2. In an internal-combustion engine, the combination of a cylinder, a piston therein, a valve-chamber adjacent said cylinder and connected thereto by a port, the lower end of said valve-chamber forming a compression chamber having a by-pass in its wall and a port opposite the upper end of the by-pass, a valve in said chamber formed of two cylindrical parts, means to so position the valve that the space between its parts will be opposite the cylinder port during the working stroke of the piston, and to so move the valve that said space will be in line with the upper end of the by-pass and the port opposite the same so said space may be scavenged after each explosion.

3. In an internal-combustion engine, the combination of a cylinder, two cylindrical valve-chambers adjacent thereto and connected thereto by ports, a valve movable in each chamber and comprising two connected pistons, a hollow stem for each valve, a guide therefor having an aperture registering with a port in said stem when at the upper end of said stroke, said stem having a second port which opens into the lower end of the valve chamber when the stem is at the upper end of its stroke, and means to actuate said valves.

4. In an internal-combustion engine, the combination of a cylinder, two cylindrical valve-chambers adjacent thereto and connected thereto by ports, a valve movable in each chamber and comprising two connected pistons, a hollow stem for each valve, a guide therefor having an aperature registering with a port in said stem when at the upper end of said stroke, said stem having a second port which opens into the lower end of the valve chamber when the stem is at the upper end of its stroke, and means to actuate said valves, each valve-chamber having a by-pass in its wall to permit communication around the lower valve-piston when at the lower end of its stroke, and an exhaust passage which is opened by said lower piston when at such lower end of its stroke.

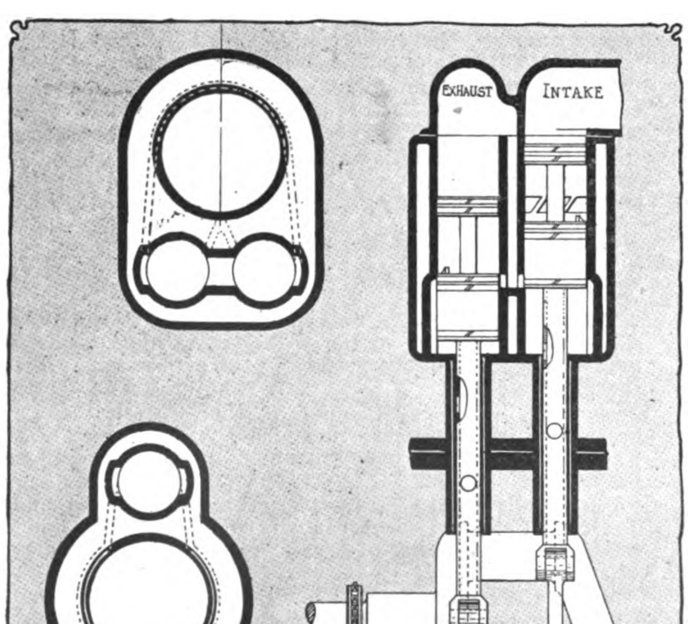


Fig. 3—Plan and elevation of the valve mechanism

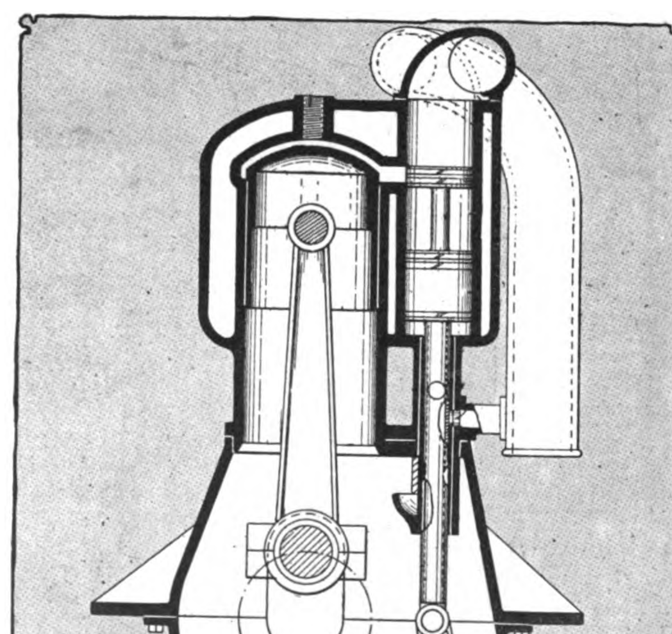
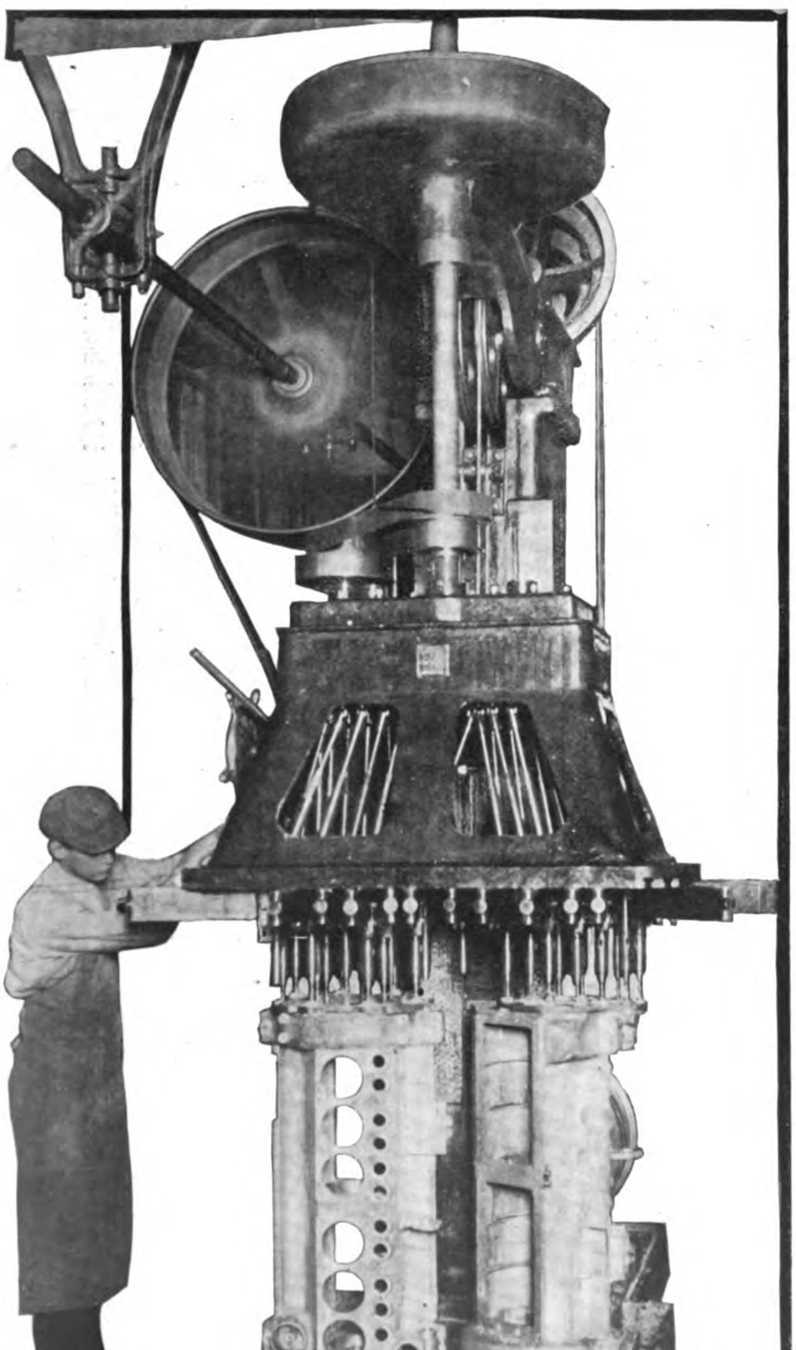


Fig. 4—Complete transverse section through the motor



Giant multiple-spindle drill installed by the Chalmers Motor Company in its Detroit plant. The machine has thirty spindles and works on several crankcases. The drill is more than 12 feet high, including the driving and controlling mechanism

QUANTITY production is a much used expression these days, although but few realize the vast amount of ingenuity required to attain it. Nowhere is this shown better than in some of the tools that are used by the large manufacturers. The accompanying illustration depicts the multiple spindle drill recently installed by the Chalmers Motor Company, Detroit, Mich. It is one of the largest multiple-spindle drills ever built. The Chalmers company uses this machine to drill crankcases. Two crankcases can be operated upon at the same time. The machine in the illustration has twenty-seven spindles working simultaneously, while the total capacity of the machine is thirty spindles. An idea of the size of the machine may be obtained from the fact that the operator is 6 feet tall. Turning out two fully drilled crankcases every 15 minutes this machine can produce eighty finished crankcases per day. It takes but one man to handle it and the saving of time and money over the smaller machines is in the neighborhood of 25 per cent.

PATHFINDER'S FACTORY—The Motor Car Manufacturing Company, Indianapolis, Ind., maker of the Pathfinder car, expect to occupy about December 1 the new factory buildings now being completed in connection with the present Pathfinder plant in West Indianapolis. The accompanying illustration shows the addition under construction.

St. Louis Company's Plant—The St. Louis Tire & Rubber Company, St. Louis, Mo., has secured a site and will build a large factory.

Truck Company Building—The Toledo Motor Truck Company, Toledo, O., is erecting a one-story structural steel building, 54 feet by 236 feet.

Cutting Doubling Capacity—The Cutting Motor Car Company, Jackson, Mich., is making arrangements to double the size of its plant at Jackson.

Lamp Company Adds—The C. M. Hall Lamp Company, Detroit, Mich., maker of automobile lamps, is completing a large addition to its factory.

Three Shifts for Ford—The Ford Motor Company, Detroit, Mich., is considering the adoption of a three-shift day of 24 hours as a regular operating program.

Detroit Company's Factory—The American Auto Trimming Company, Detroit, Mich., has let a contract for a factory on Meldrum and Berlin avenues, that city.

Bulldog Tire May Build—The Bulldog Tire Company, Ltd., Toronto, Ont., has been organized to manufacture automobile tires. Plans for a factory are being considered.

Marathon Doubles Capacity—The Marathon Motor Company, Nashville, Tenn., which has a present capacity of thirty cars a week, is increasing its plant to double this capacity.

Batavia Company Adds—Work was begun this week on the addition to the Batavia Rubber Company's building, Batavia, N. Y., on Robertson street. The structure is to be of brick.

V-Ray Installing Machinery—The V-Ray Company, Marshalltown, Ia., maker of the V-Ray spark-plug, is installing new machinery and augmenting its force, in order to increase the 1913 output.

Nashville Chemical Plant—The Rex Chemical Company has moved its plant from Newport, Ky., to Nashville, Tenn. The Rex company manufactures metal polish and body polish for automobiles.

Chevrolet's $50,000 Plant—The Chevrolet Motor Company, Detroit, Mich., has secured a site at Flint, Mich., and contemplates the erection of $50,000 plant for the manufacture of automobile bodies.

White's Machine Shop—The White Automobile Company, Cleveland, O., has awarded the contract for the erection of a new one-story brick and steel machine shop, 160 feet by 240 feet, to cost $40,000.

Frame Company's Addition—The Parish Manufacturing Company, Detroit, Mich., has awarded the contract for the construction of a brick addition to its plant. The company makes automobile frames.

Sandusky Gets Addition—The completion of the addition to the new plant of the Sandusky Automobile Parts Company, Sandusky, O., manufacturer of trucks, will practically double the capacity of the institution. The new building will be used as an assembly and paint shop.

Lauth-Juergens Doubles Output—The Lauth-Juergens Auto Truck Company, Fremont, O., soon expects to double its present output of one truck a day. It will increase the output by having its engines made by outside parties.

Schultz Opens Factory—C. R. Schultz, inventor of a punctureless tire preparation, has opened a small factory at Harold, S. D., to manufacture his product, which he says does not interfere with the resiliency of tires.

Macomber's Plant—The Macomber Motor Company, Los Angeles, Cal., will erect a plant near Los Angeles for the manufacture of the Macomber gas engine for automobiles. Uri B. Curtis and W. G. Macomber are among the directors.

Auto Parts Company's Plant—Structural steel for the addition to the Auto Parts Company's plant, Pontiac, Mich., has arrived, so that the work of construction can be resumed. The foundations and cement floors have been completed and the steel work and roof will go up rapidly.

Will Build Truck—J. P. Cannon, of Detroit, Mich., has formed a concern to be known as the Cannon Motor Company, which announces that it will build an automobile factory in Des Moines, Iowa. According to the promoters they will from the first build a light truck and a roadster.

Amplex Doubling Capacity—The Amplex Motor Car Company, Mishawaka, Ind., is planning to double its factory capacity so that all parts of its cars will then be made at the Mishawaka factory, including aluminum bodies. The company will in a short time put on a larger force of workmen.

Citizens Want Factory—The citizens of St. Louis, Mo., have succeeded in raising $25,000 for a new automobile factory to be conducted under the management of W. H. Kilto & Son, of Toledo, O. Work on the factory will be started soon. The company will manufacture six-cylinder trucks and touring cars.

Garford's Warehouse—The Garford Company, of Elyria, O., is rushing the erection of a reinforced concrete storage warehouse, 85 feet by 210 feet. The building will house materials and parts, with one section devoted to finished car storage and loading dock. The new structure will add another unit to the big Garford plant.

Renovating Kissel Plant—Work in renovating the recently-acquired auxiliary plant of the Kissel Motor Car Company, Milwaukee, Wis., is reported to be progressing rapidly, and it is expected that it will be ready for occupancy within 2 or 3 weeks. The improvements and additions to the Kissel plant at Hartford, Wis., are nearly completed and already partly in use.

Makes Ford's Tools—The Fox Typewriter Company, Grand Rapids, Mich., has closed a contract with the Ford Motor Car Company, Detroit, Mich., to furnish tools to that concern. Although the Ford company has a force of 100 tool makers in its own shops and 100 more outside it is unable to meet the demands of its 7,000 employees. The Fox company will put on fifteen additional tool makers for the contract.

Adds Workmen—The Wald Manufacturing Company, of Sheboygan, Wis., recently incorporated for $30,000, has increased its capacity and added a large number of workmen to its force. The company specializes in the manufacture of a tire tool, pedal grips, luggage carriers and mud guards. Considerable new equipment has been installed and a 4,000-pound stamping press and complete nickel-plating outfit purchased. The company formerly was known as The Wald Company.

Brown Erects Addition—The John W. Brown Manufacturing Company, located at Center avenue and West Broad street, Columbus, O., will soon award a contract for the erection of a large addition to its plant. The company has a contract to furnish the Ford company with all lamps for the season of 1913. The erection will be completed by January and will be the third large addition erected in the past year and a half.

Henderson Plant Busy—One of the busiest automobile plants in Indianapolis, Ind., is that of the Henderson Motor Car Company. Pending the occupancy of the new addition to its factory, which will be ready November 1, it has leased 13,000 square feet of space in the Industrial building at Tenth street and the Canal. The paint shop was moved from the factory the first of the week and all the painting will be done in the Industrial building until the busy season has passed. The floor in the present factory that housed the paint shop has been turned into a final assembly department.

The Automobile Calendar

Shows, Conventions, Etc.

Nov. 16-25	Atlanta, Ga., Annual Show, Auditorium-Armory, Atlanta Automobile and Accessory Association.
Jan. 2-10	New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11	Cleveland, O., Annual Automobile Show.
Jan. 4-11	Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-25	New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25	Philadelphia, Pa., Annual Automobile Show.
Jan. 22-25	Geneva, N. Y., Annual Automobile Show.
Jan. 25-Feb. 1	Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1	Buffalo, N. Y., Annual Automobile Show.
Jan. 27-Feb. 1	Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1	Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Jan. 30-Feb. 1	Canandaigua, N. Y., Annual Automobile Show.
Feb. 1-8	Chicago, Ill., Annual Automobile Show.
Feb. 10-15	Chicago, Ill., Truck Show.
Feb. 10-15	Minneapolis, Minn., Annual Automobile Show.
Feb. 11-15	Ottawa, Ont., Annual Automobile Show.
Feb. 15-22	Newark, N. J., Annual Automobile Show, First Regiment Armory, New Jersey Automobile Exhibition Company.
Feb. 17-22	Kansas City, Kan., Annual Automobile Show.
Feb. 24-Mar. 1	Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1	Omaha, Neb., Annual Automobile Show.
March 3-8	Pittsburgh, Pa., Annual Automobile Show.
March 8-15	Boston, Mass., Annual Automobile Show.
March 19-26	Boston, Mass., Annual Truck Show.
March 24-29	Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

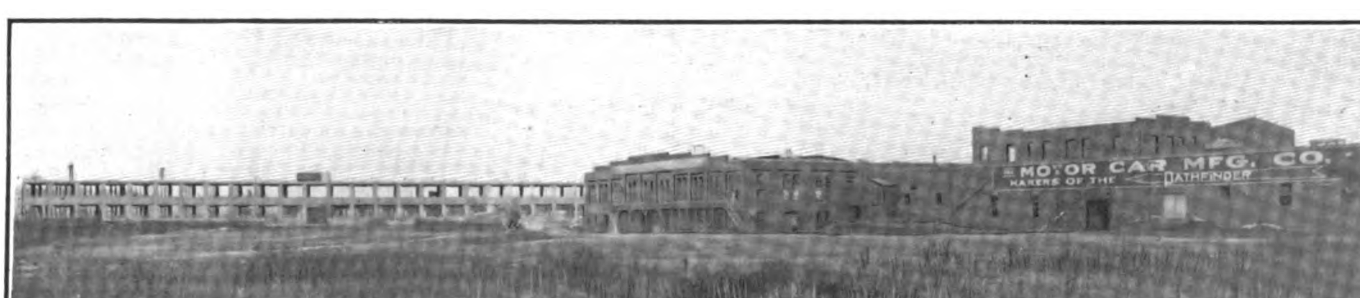
Nov. 29-30	Richmond, Va., Track Races, State Fair Grounds, Richmond Automobile Club.
May 30	Indianapolis, Ind., 500-Mile Race, Speedway.

Proposed Contests

Nov. 15	Hill Climb, Greenville, S. C., Automobile Club.
Nov. 16-17	Track, Sacramento, Cal., Barney Oldfield.
Nov. 23-24	Track, Fresno, Cal., Barney Oldfield.
Nov. 28-29	Track, Richmond, Va., Richmond Automobile Club.
Nov. 28	Road Race, Visalia, Cal., W. H. Lipton.

Foreign

Nov. 8-16	London, England, Olympia Automobile Show.
Dec. 7-22	Paris, France, Paris Automobile Show, Grand Palais.
Jan. 11-22	Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.
March	France, Sealed Bonnet 3000-Mile Run.
April	Barcelona, Spain, International Exhibition.



New factory building in West Indianapolis, Ind., which will be occupied a fortnight hence by the Motor Car Manufacturing Company

Peerless 3-ton truck used by J. Sercombe, a landscape gardener of Toronto, Ont. He has found that the motor truck is practicable for use in fields and on soft ground

PEERLESS ON FARM—That the motor truck can successfully replace the horse for work in the fields and upon the soft ground has been demonstrated by J. Sercombe, of Toronto, Ont., a landscape gardener who has employed a 3-ton Peerless truck at such work with large profit to himself for several months. The accompanying photograph shows the truck in use.

Harris with Hupp—F. A. Harris has taken the position of assistant manager of the Hupp Motor Car Company, Detroit, Mich.

Guston with Velie—E. E. Guston, formerly with the Studebaker corporation, has accepted a position with the Velie Chicago, Ill., branch.

Longstreth Moves—The Longstreth Motor Car Company, Philadelphia, Pa., distributer of the Alco car, has moved to 2126 Market street, that city.

Menefee Anderson Manager—The Anderson Electric Car Company, Detroit, Mich., has appointed S. W. Menefee manager of its New York branch.

Buick in Savannah—The Buick Motor Company, Flint, Mich., has established a branch at Savannah, Ga., and has placed J. E. Finney in charge.

Shelton Branch Manager—T. B. Shelton has been appointed manager of the Fresno, Cal., branch of Don Lee, California distributor of the Cadillac.

Elliott District Manager—The Lippard-Stewart Motor Car Company, Buffalo, N. Y., has appointed J. R. Elliott district manager for Washington, Idaho and British Columbia.

Lu Lu Club's Run—Following out the idea successfully inaugurated last year, the Lu Lu Temple Automobile Club will conduct its second annual turkey run on Thanksgiving.

Ballou & Wright's Store—Ballou & Wright, Portland, Ore., are opening a branch store in Seattle, Wash., which will be in charge of A. H. Jones. They will handle automobile accessories.

Sievert with Grossman—L. J. Sievert, of Toronto, Can., has been engaged by the Emil Grossman Company, New York City, to act as the Canadian representative of that company.

Green Zero 40 Distributor—The A. Hazen Green Company, 1686 Broadway, New York, has been appointed New York City distributor for the Zero 40, a non-freezing fluid for use in radiators.

Combination Electric and Bulb Horn—Comprising a trumpet using one acoustic diaphragm in common with an electric sound exciter.

Large Tire Order—Backdahl & Company, of Stockholm, Sweden, have just contracted to supply 750 sets of United States tires for taxicab service in Norway, Sweden, Denmark and Finland.

Forsyth Sales Manager—R. L. Forsyth was recently secured as wholesale sales manager by the Thomas Flyer Company, which handles the Abbott-Detroit line at San Francisco, Cal.

Walz with McCullough—C. H. Walz has been appointed general manager of J. H. McCullough & Son, dealers in automobile supplies and accessories, 219 North Broad street, Philadelphia, Pa.

Germany Industry Statistics—The German automobile industry shows a steady and material growth. In 1909 and 1911 the German aggregate exports were, respectively, 19,983,000 marks and 49,013,000 marks.

Holly Kelly Manager—A. S. Holly, former manager of the truck department of the Packard company, Detroit, Mich., has been made manager of the New York branch of the Kelly Motor Truck Company.

Parker Represents Pathfinder—Frank R. Parker, of Boston, Mass., is now New England representative of the Motor Car Manufacturing Company of Indianapolis, Ind., maker of the Pathfinder pleasure and commercial cars.

Elmer Leaves Grant—Of interest to the automobile industry in general is the recent resignation of Harry H. Elmer as director and general manager of the Grant Motor Car Company and the Grant-Lees Machine Company, both of Cleveland, O.

Smith in Advertising Firm—Harold Smith has given up his position as advertising manager of the General Motors Truck Company, Pontiac, Mich., entering the Carl M. Green advertising agency, from which concern the advertising of the truck company will be handled in the future.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Allentown, Pa.	Franklin	Luchenback Bros.
Arcato, Cal.	Cole	J. P. Rusthei
Atlantic City, N. J.	Cole	W. B. Thompson
Baltimore, Md.	Abbott-Detroit	Detroiter-Baltimore Co.
Baltimore, Md.	Henderson	Henderson M. Sales Co.
Baltimore, Md.	Havers	Charter Auto Co.
Baltimore, Md.	Norwalk	O. E. Williamson
Bridgeport, Conn.	Kline- Kar	D. & H. Auto. Dis. Co.
Buffalo, N. Y.	Kline	Windsor M. C. Co.
Charleston, Mo.	Moon	Luke Howlett
Cincinnati, O.	Havers	F. H. Berold
Cleveland, O.	Ohio	H. E. Riker & Co.
Columbia, Pa.	Mitchell	Columbia Auto Co.
Columbus, O.	Moon	Murnan Taxicab Co.
Columbus, O.	Studebaker	Twyman M. Co.
Columbus, O.	Warren-Detroit	Warren Sales Co.
Des Moines, Ia.	Moon	Van Vliet-Bradt M. Co.
Elyria, O.	Havers	H. M. Andress & Co.
Franklin, Pa.	Kline	King Auto. Co.
Hammond, N. Y.	Franklin	D. E. Coats
Hannibal, Mo.	Moon	Long Mfg. Co.
Hartford City, Ind.	Cole	A. W. Tindall
Lima, O.	Ford	McLeod & Barr Auto Sales Co.
Lowell, Mass.	Rambler	Joseph Marin
Marcus, Ia.	Moon	Johnson, Petty & Johnson
Melrose, Mass.	Overland	Smith Bros. Garage Co.
Memphis, Tenn.	Buick	Tennessee Motor Co.
Memphis, Tenn.	Stearns	V. L. Gorges
New Haven, Conn.	Moon	J. J. Laverty
New York City	Kline Kar	Gildel Auto. Co.
Norfolk, Va.	Cole	C. L. Young
Orange City, Ia.	Moon	Aerrote Van De Wilt
Providence, R. I.	Henderson	J. B. Higginson
Reno, Nev.	Cole	Reo Nevada Co.
Richmond, Va.	Overland	W. D. Sapp
Rochester, N. Y.	Havers	Beardsley & Gallagher
San Francisco, Cal.	Arbenz	L. S. Johnson
Suffolk, Va.	Cole	B. E. Parker
Springfield, Mass.	Chevrolet	Bunker-Reopwell Co.
Springfield, Mass.	Little	Bunker-Reopwell Co.
Syracuse, N. Y.	Metz	J. M. Watkins
Springfield, Mass.	Rambler	Bunker-Reopwell Co.
Toledo, O.	Flanders	Landman & Griffith
Toledo, O.	Moon	Moon Sales Co.
Vancouver, B. C.	Havers	A. S. French Auto Co.
Wakefield, Nebr.	Moon	Utecht & Eimer
Wall Lake, Ia.	Moon	Hopkins & Herrig
West Point, Nebr.	Cole	Hirkow & Ickman
Yankton, S. D.	Moon	F. J. Nyberg

COMMERCIAL CARS

Place	Car	Agent
Anaheim, Cal.	Federal	P. J. Weisel & Co.
Dallas, Tex.	Federal	Pence Auto Co.
Eugene, Ore.	Federal	J. S. Airheart.
Fall River, Mass.	Federal	Brownell & Burt.
Ft. Wayne, Ind.	Federal	M. N. Plumadore.
Hartford, Conn.	Federal	R. D. & C. O. Britton Co.
Lawrence, Mass.	Federal	W. H. Baxter.
Pasadena, Cal.	Federal	Monroe Motor Co.
Pendleton, Ore.	Federal	M. K. King.
Pittsburgh, Pa.	Federal	Union Motor Car Co.
Seattle, Wash.	Federal	Pacific Car Co.
St. Paul, Minn.	Federal	Smith Bros.
Tillamook, Ore.	Federal	A. H. Harris.
Victoria, Tex.	Federal	Texas Motor Car & Supply Co
Wilmington, Del.	Federal	Pennsylvania, Pa.

Fenner Branch Manager—D. C. Fenner was appointed New York branch manager of the International Motor Company recently.

Waite with Paterson—G. S. Waite has been engaged as sales manager of the W. A. Paterson Company, Flint, Mich., manufacturers of the Paterson line of cars.

Sugden Leaves Thomas—J. L. Sugden has resigned from the E. R. Thomas Company, Buffalo, N. Y., and has joined the Lord & Thomas Advertising Company, Chicago, Ill.

New Frisco Quarters—The Carl Christensen Motor Car Company, San Francisco, Cal., distributers of the Detroiter, has taken new quarters at 561-567 Golden Gate avenue.

Jacoby with Pullman—C. W. Jacoby has resigned the position of eastern sales manager of the Standard Electric Company, to assume the general sales management of the Pullman Motor Car Company, York, Pa.

Conklin Joins Remy—O. F. Conklin has become associated with the Remy Electric Company, Anderson, Ind., in the capacity of consulting engineer of the Remy electrical starting device for application to automobile engines.

Kempton Remy Manager—P. E. Kempton of San Francisco, Cal., has been appointed manager of the San Francisco Remy branch to succeed A. J. Rogers, who becomes manager of the New York branch to succeed F. M. Henkel, resigned.

Smith Production Manager—C. D. Smith has been appointed production manager of the Winton Motor Car Company, Cleveland, O. W. H. Doddridge succeeds Mr. Smith as manager of the company's repair and service departments.

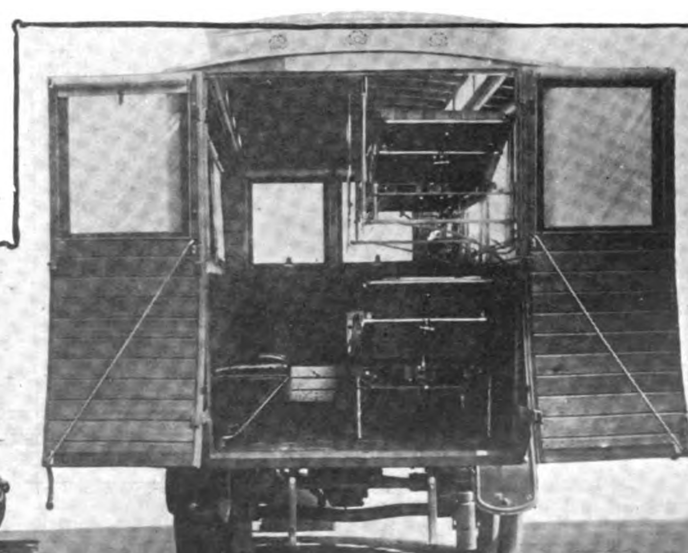
Organizes Engineering Agency—H. L. Croy, formerly mechanical engineer of the Woods Motor Vehicle Company, Chicago, Ill., has organized the Toledo Engineering Agency, Toledo, O. The agency will handle high grade positions in all the engineering fields.

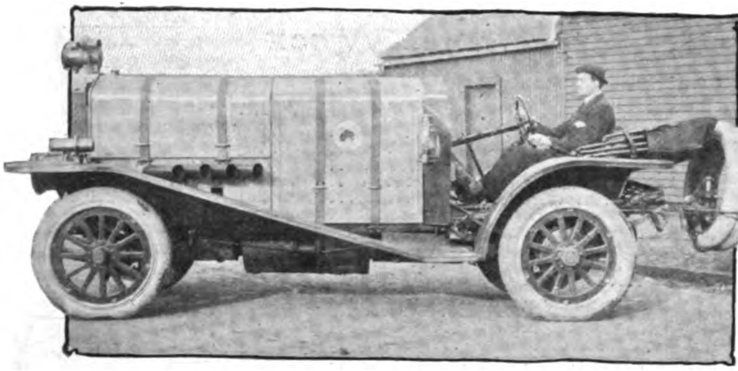
Age Limit Eighteen—No one who is under 18 years of age may operate an automobile in the state of Maryland, even though accompanied by his or her parents, who may be duly licensed, according to an opinion delivered by Judge Frank I. Duncan, in the Circuit Court at Townson, Md.

New Cincinnati Law—Chief of Police Capelan of Cincinnati, O., has just issued an order which forbids automobile owners to leave their cars standing for more than 5 minutes in the district bounded by Elm on the west, Main on the east, and between Fourth and Sixth avenues. The rule applies to all other vehicles.

Columbus Road Doings—At the annual meeting of the Ohio Good Roads Federation, held in Columbus, O., recently, strong resolutions were adopted pledging the members to continue the fight despite the fact that the proposed amendment to the Ohio constitution was defeated at the polls. A number of different plans of action were discussed, and it seemed to be the feeling that the best scheme was to go before the Ohio General Assembly and ask for a direct levy for road purposes.

Exterior and interior views of the new De Dion ambulance recently delivered to the Government of the Philippine Islands. The chassis equipped with a 25-horsepower, four-cylinder motor, giving the car a speed of 30 miles an hour. It is fitted with an air-cushion shock-absorber. Inside the body, which was made by the DuPont Company of Paris, there are two stretchers with an apparatus for hot and cold water and a complete medicine chest. The stretchers may be removed and patrol wagon seats fitted. The apparatus is to be used in Manila and vicinity.





Special racing car built by S. P. Blackiston, of Canton, O. Among the unique features of the car are the two radiators, mirrors arranged for driver to see past the high hood, universal joint on the steering column which is so heavy that it takes two men to lift it and a powerful electric searchlight which illuminates the road for .25 mile

Fire Engine Arrives—The first of the three motor-driven fire engines that were recently ordered by Nashville, Tenn., has arrived.

Baltimore, Md.—Because of increased business the Oakland Motor Car Company, Baltimore, Md., has leased the large warehouse at Biddle Park and Howard street.

Pennsylvania's Road Repairing—The Pennsylvania State Highway Department has repaired approximately 6,000 miles of main state highways, or about 75 per cent. since the department took over the 296 routes covered by the Sproul highway law June 1 last.

Garage Capacity Doubled—Jones & Indra, 149-151 North Broadway, Green Bay, Wis., who erected a large new garage a year ago, have started work on an addition which will double the capacity. Part of the new building will be devoted to repairs and reconstruction.

Fireproof Garage Built—A large new garage is being erected by John L. Snyder on Third street, Newport, Pa. The building will be fireproof, built of cement blocks, with cement floor and steel roof. The Perry Concrete Company has the contract for the erection of the garage.

Overland in Phoenix—Phoenix, Ariz., men have incorporated the Overland Auto Company and opened a new garage on Third avenue. Overland machines are handled exclusively. It has been several years since the Overland was represented in Phoenix. A. S. Earhart is manager of the new company.

Erect Hartford Garage—Charles H. Lohr and Howard Danielson have leased the Hacker, Hartford, Wis., building and remodeled it into a garage and repair shop. The firm has the district agency for the Ford in Dodge and Washington counties. Mr. Danielson has been associated with the factory of the Kissel Motor Car Company at Hartford for several years.

Ohio Plans Two New Laws—The Ohio state association of automobile owners is laying plans to secure two new laws which it is hoped to have enacted at the meeting of the Legislature next winter, which will have a far-reaching effect and which will be of special interest to all owners of motor cars. One of the desired laws will make it a penitentiary offense to steal an automobile.

Beloit Satisfied with Truck—The Common Council of Beloit, Wis., is arranging for the provision of funds in the new budget for the purchase of another combination hose, chemical and squadron motor truck. The Council is enthusiastic over the results obtained from the present motor-driven fire apparatus and has found it to be cheaper to maintain motor-driven apparatus than that pulled by horses.

Wants Better Laws—The Automobile Club of Maryland has started a vigorous campaign for a more sane and just motor vehicle law. With this object in view the club has communicated to each of the 1,000 members to lend their individual help to take before the Legislature of 1913 a sane, just and fair motor vehicle law. Another thing the club will ask the next Legislature is to give reciprocal relations with the motorists of the District of Columbia.

St. Louis Maxwell Changes—In the future the Maxwell line will be handled in St. Louis, Mo., by an agency instead of a branch house as in the past. The agency will be known as the Maxwell Motor Sales Company and will occupy the quarters formerly occupied by the branch house. B. R. Ford will be at the head of the new agency. Frank R. Tate, formerly manager of the branch house, has made connections with the Ford Motor Company.

Omaha Plans Show—The regular annual meeting of the stockholders of the Omaha, Neb., Automobile Show Association was held on Tuesday, October 29. The coming automobile show, from February 24 to March 1, was the topic most generally discussed. It was decided that the expenditures for decorations, lights and other necessities will be materially increased this year, thereby making this year's show the biggest and best that has ever been held in Omaha.

Governs Vehicle Use—The Common Council of Manitowoc, Wis., has passed an ordinance governing the use of vehicles on city streets. The ordinance embodies all of the well-known rules of the road, but adds a provision obliging motorists to use a silencer or muffler and refrain from unnecessary use of gongs, bells, horns or signals of any kind. The Milwaukee ordinance is copied in that it requires drivers of all self-driven vehicles to stop behind any street car which is taking on or discharging passengers.

Wants Fire Truck Estimates—The common council of Beloit, Wis., has authorized the committee on fire and police to begin negotiating for the purchase of a second combination hose, chemical and flying squadron motor truck. The first has now been in use 17 months and shows so large a saving that at this time, when more equipment and apparatus is made imperative, and the choice lay between horses and motor-propelled vehicles, the motor was unanimously chosen. The committee will receive estimates from manufacturers at once.

Club Established Quickly—San Jose, Cal., has established something like a record in the quick organization of a motor club. At the beginning of the present month a number of enthusiasts decided that the Garden City ought to have an automobile organization and a club house. Promptly they got together and organized a country club. Within the next 2 weeks they secured a membership of 275, raised $45,000 in actual cash, bought 90 acres of foothill land near Alum Rock Park, and let a contract for the erection of a handsome clubhouse and the laying out of extensive golf links. There will also be a large and elaborate garage.

Indiana Club Plans—Members of the Indiana Automobile Manufacturers Association, Indianapolis, Ind., will send their exhibits to the New York show in January by special train. This was decided upon at a meeting of the association held in Indianapolis on the evening of October 31. A New York show committee to arrange the plans for the train and for exhibiting at the show was appointed, as follows: J. Guy Monahan, of the Premier Motor Mfg. Company; Harold Hyde, of the Empire Motor Car Company; William Esterly, Firestone Tire Company. Another meeting of the association will be held in Indianapolis on the evening of November 21 to discuss the proposed run to be made to the Pacific coast next summer.

Automobile Incorporations

AUTOMOBILES AND PARTS

Boston, Mass.—Eliot Motor Car Company; capital, $250,000; to deal in automobiles. Incorporators: Roscoe G. Houston, Wm. D. Wallace.

Cleveland, O.—Lozier Sales Company; capital, $30,000; to deal in automobiles and accessories. Incorporators: W. H. Miller, A. H. Weaver, W. B. Anderson, V. C. Erman, J. H. Brown.

Farmington, Me.—Metcalf Automobile Company; capital, $10,000; to deal in automobiles. Incorporators: J. C. Metcalf, John G. Morton, H. W. Barker.

Louisville, Ky.—Rommel Motor Car Company; capital, $15,000; to deal in automobiles. Incorporators: John Rommel, H. E. Rommel, Joseph H. Kaltenbach.

New York City.—Beaver State Motor Company; capital, $300,000; to manufacture automobiles. Incorporators: P. Combs, J. L. Bailey, J. A. Johnson.

New York City, N. Y.—Miller-Brisben Company, Inc.; capital, $25,000; to deal in automobiles, etc. Incorporators: Irving Jaffee, John McNeil Brisben.

New York City, N. Y.—Peets-Homan Corporation; capital, $2,000; to manufacture and sell all kinds of motors, engines, etc. Incorporators: John A. Bolles, Clifford S. Peets, Frank D. Homan.

New Orleans, La.—J. A. Landry Motor Car Company; capital, $25,000; to manufacture automobiles. Incorporators: J. A. Landry, J. B. Avergo, Roger J. Montrose.

Troy, N. Y.—Automobile Salvage Corporation; capital, $2,000; to deal in second hand automobiles. Incorporators: Michael Kennedy, Theodore P. Low, Mark F. Nichols.

Washington, D. C.—Michigan Motor Company; capital, $10,000; to manufacture automobiles. Incorporators: T. Oliver Probey, J. H. Stuart, George R. Stuart, F. C. Sibbald, E. G. Powell.

GARAGES AND ACCESSORIES

Boston, Mass.—Amherst Garage Company; capital, $15,000; to conduct a general garage business. Incorporators: Henry E. Paige, Louis E. Smith, Charles H. Buell.

Five Heinz Trucks Sold—The H. J. Heinz Company has just closed an order for five 3.5-ton G. V. trucks.

New Orleans Uses Sprinkler—A new motor-driven sprinkling wagon has been put in service by the municipal authorities of New Orleans.

Posts Road Signs—The Owego, N. Y., automobile club has just completed its campaign of posting signs on various roads leading to that town.

Gotshall Manages Lozier—N. S. Gotshall, western traveling representative of the Lozier Motor Company, Detroit, Mich., has severed his connection with the Lozier Motor Company to accept the management of the St. Louis Lozier Company.

Luce Leaves Velie—Morton H. Luce, manager of the Chicago, Ill., Velie branch, has resigned that position to become sales manager for the American and Marion Sales Company, New York City.

Set Utica Show Date—December 15 has been set as the day for the annual convention of the New York State Automobile Association, which will be held this year in the Hotel Utica, Utica, N. Y.

Evans Leaves Lozier—J. M. Evans, who for the past year has occupied the position of advertising manager of the Lozier Company, Detroit, Mich., has severed his connection with the Lozier interests.

Gramm Goes to Cuba—Cuba has been found a profitable field of endeavor by the Gramm Motor Truck Company of Lima, O., and contracts were recently signed for the delivery of a half dozen cars to Havana.

Kelly in Seattle—Factory distributing headquarters for the states of Washington, Oregon, California, Idaho and Montana and the province of British Columbia for Kelly motor trucks have been located in Seattle.

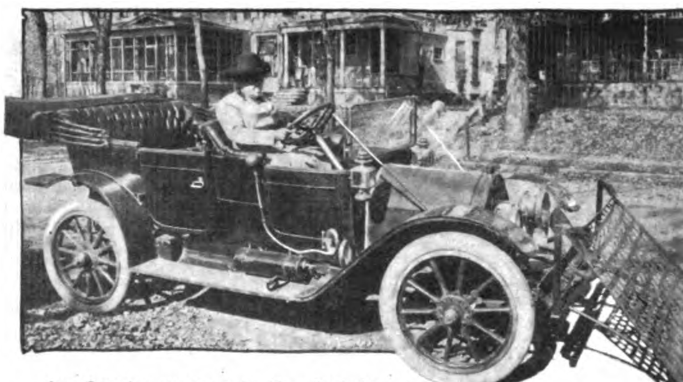
New Oldsmobile Quarters Ready—The new quarters for the Oldsmobile Company on Broad street near Bacon avenue, Providence, R. I., are practically completed, and the company will occupy them in a few days.

Appoint New Manager—B. F. Morris has been appointed manager of the local factory branch of the Republic Rubber Company, of Youngstown, O., which recently took over the interests of the Bison Rubber Company.

Schonacker Leaves Marvel—A. G. Schonacker, general manager of the Marvel Carbureter Company, Flint, Mich., has resigned his position on account of his condition of health, and expects to locate in the West.

Sugden Leaves Thomas—J. L. Sugden, formerly connected with advertising section of the E. R. Thomas Motor Car Company has severed his connection with that concern and is now with Lord & Thomas, of Chicago.

Montreal Supplies Cars—It was resolved by the Montreal Que., Board of Control recently to accede to the request of the three section superintendents of the roads department to supply them with small automobiles costing $2,000 each.



An Omaha woman is the first to use a fender on her automobile. The above illustration shows Mrs. Joseph Weeth in the car which she has had equipped **with a device for scooping up the Nebraskans who would have otherwise been crushed beneath the wheels of the car**

Richardson a Manager—Malcolm B. Richardson, formerly with the Remy Magneto Company, has been appointed district sales manager in the Southern territory for the Franklin Automobile Company. He will make his headquarters at Atlanta, Ga.

Davis in the Field—A. H. Davis, formerly with the Rochester branch of the Franklin Automobile Company and later engaged in selling motor cars in Buffalo, has rejoined the staff of the Franklin Automobile Company and will act as a special field representative.

Fix Age Limit—The city codifying commission of Dayton, O., is planning an action which will exclude boys and girls under 18 years from operating automobiles. There is also some talk of barring women from driving gasoline cars. The matter is now up to the city council.

Ohio's Road Figures—Figures compiled by State Highway Commissioner James Marker show that Ohio has so far this year contracted for the construction of more than 150 miles of road. Between now and January 1 contracts will be let for the construction of about 25 more miles.

To Handle Paige—The combining of the Carpenter Motor Sales Company and the Thomas Motor Car Company, of Los Angeles, Cal., was accomplished last week. New quarters have been secured at Eleventh and Flower streets. This company will distribute the Paige car in California.

Jacobs Goes Into Bankruptcy—Volney J. Jacobs, who has represented various makes of cars in Boston, Mass., for the past few years, has filed a petition in bankruptcy. His liabilities amount to $19,483, of which $13,572 is secured, and there is due about 80 creditors $5,892. His assets are given as $50.

Piggins in Frisco—A branch of the Piggins Motor Truck Company, of Racine, Wis., has been established in San Francisco to serve as a distributing depot for the entire West, Hawaii and the Orient. J. I. McLaughlin is manager. Besides the Piggin truck the Inter-State pleasure cars will be handled.

Railroads Too Slow—The Willys-Overland Company, Toledo, O., has had considerable trouble in shipping its cars to its dealers, due to the inability of the railroads to supply cars for transportation. The dealers have solved the question by going to the factory and driving the cars to the customers.

Responsible for Employee's Injuries—An automobile owner who requires an employee to ride with him in his automobile must be responsible for injuries that may result from such a ride, according to the Supreme Court of Minnesota. A. H. Patterson, chauffeur, received a $4,500 verdict in the lower court. The award is sustained. While driving fast the owner, who was in the car, the machine turned turtle and injuries resulted to the chauffeur.

Novel Use for Motor Truck—Unique among the varied uses the motor vehicle has been put to is the work L. S. Davidson, of Portland, Ore., has applied his 1-ton Little Giant truck. Equipped with a complete motion-picture outfit, the power wagon was piloted out of the city recently to visit towns where electric lights are not used. With the power from the gasoline motor, a 110-volt dynamo generated enough electricity to run the moving picture outfit and one arc light. His equipment weighs 1,500 and the truck is rated at 25 horsepower.

Automobile Incorporations

BROOKLYN, N. Y.—Brooklyn Auto Top & Supply Company; capital, $5,000; to manufacture automobile tops and accessories. Incorporators: Beatrice H. Marron, Jacob Seigel, Edgar E. Chinnock, Jr.

BROOKLYN, N. Y.—H. J. & S., Inc.: capital, $1,000; to manufacture and deal in rubber, rubber articles, etc. Incorporators: Joseph Mattison, Harry Jacobson, Siegfried Glass.

BROOKLYN, N. Y.—Sea Gate Garage & Automobile Corporation; capital, $2,000; to conduct a general garage business. Incorporators: Joseph F. Curtin, H. O. Coughlan, Thomas K. Mallaby.

CHICAGO, ILL. Auto Combination Lock Company; capital, $50,000; to manufacture nut locks and supplies. Incorporators: Howard L. Mason, Harry W. Snow, Francis W. Robinson, William J. Liddy.

CHICAGO, ILL.—Michigan Avenue Garage Company; capital, $5,000: to carry on a general automobile livery business. Incorporators: Edward L. Richter, James D. Donnell, A. J. Moran.

CHICAGO, ILL.—National Oil Gas Generator Company: capital, $5,000; to manufacture and deal in carbureters, generators, metal goods, etc. Incorporators: Walter D. Hawk, Samuel S. Holmes, George E. Dierssen.

NEW YORK CITY, N. Y.—Cahill Auto Works; capital, $6,000; to conduct an automobile repair shop. Incorporators: Andrew J. Cahill, Charles E. Trainor.

NEW YORK CITY, N. Y.—Seager's Garage, Inc.: capital, $1,000; to conduct a general garage business. Incorporators: James H. Seager, Albert Seeley, Henry B. Ecerson.

NEW YORK CITY, N. Y.—Tuxedo Tire Company: capital, $8,000: to manufacture tires. Incorporators: Augusta Hermann, Emilie Waltenberg, Adolph Waltenberg.

CHANGES OF NAME AND CAPITAL

CINCINNATI, O.—Price Hill Garage & Auto Company; increase of capital from $1,000 to $100,000.

DETROIT, MICH. Warren Motor Car Company: increase of capital from $300,000 to $600,000.

MARSHALLTOWN, IA.—Marshalltown Motor Material Manufacturing Company; change of name to V-Ray Company, Inc.

Champion Priming Spark Plug; Brolt Lighting Generator; J. H. Windshield for Tonneau Passengers; Gilmer Pliers and Cleaning-Tool; New Electric Horn; Automobile Turntable for Garage Use

Fig. 1—New Champion priming spark-plug

STARTER plugs which combine the office of sparking with that of a priming cup have become fairly common during the last year, a number of these devices having been announced. It stands to reason that the principal problem in the construction of such a plug is to obtain absolute tightness of the various parts, so that the provision of a priming cup does not bring with it a leak of compression when the engine is in operation. In the Champion priming plug, Fig. 1, this end has been realized by using for the priming cup a brass plug bored as shown, through which the gasoline injected for starting enters; out of the central bore of the cup, the fuel runs down toward the wall of the bored shell in which the cup is fitted. The upper portion of the brass cup is screw-threaded to fit into the steel extension of the sheel, while the lower end is formed as a plain needle which, when screwed down upon its seat, makes a close fit with it. As the engine heats up, the brass cup expands to a greater extent than the steel bore in which it is in position, a tight fit being obtained in this way. The ghost view, Fig. 1, illustrates the simplicity of the construction of this plug, which is composed of very few parts; the latter are manufactured in a standard way and therefore interchangeable. The Champion Spark Plug Company, 132 Upton avenue, Toledo, O., is the maker of this plug. This spark-plug is manufactured in the regular sizes, and may be used without in any way altering the gas and wiring connections to the various cylinders, as compared with other plugs. It must be remembered, however, that the brass cup is designed for priming with liquid fuel only and not for the admission of acetylene.

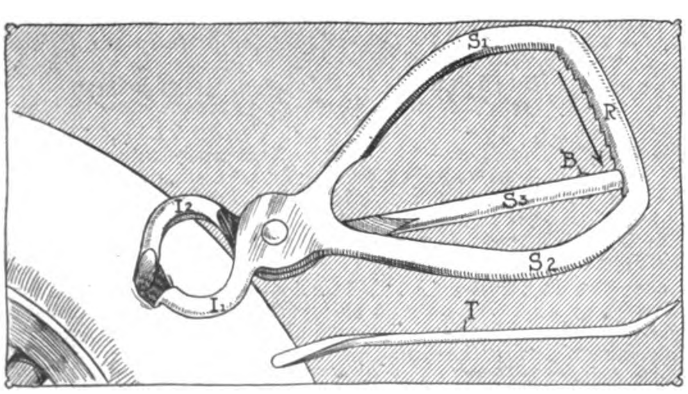


Fig. 2—Gilmer improved repair pliers and cleaning tool

Brolt Electric Lighting Generator

Among the new lighting systems which have made their appearance on the other side is the electric generator outfit sold under the name Brolt by the Brown Brothers Limited, Great Eastern street, London, E. C. This generator is designed to give a constant current output, the regulation being obtained by the use of purely electrical means. Figs. 6 and 7 show the principle on which the device operates. The dynamo is constructed with two main poles N and S which are excited by a shunt winding connected to the brushes, while auxiliary poles N1 and S1 are not wound, but are excited by the cross-magnetization due to the current in the armature. Fig. 7 shows the brushes B which are in a neutral position respective to the main poles and which short-circuit several armature coils during the period of commutation, as shown by the black dots in Fig. 6. When the armature revolves, a voltage induced between the brushes causes current to be delivered to the battery. The armature current induces a cross-magnetizing flux in the poles N1 and S1 which are provided to receive the same. The armature coils short-circuited by the brushes cut the cross flux, and a short-circuit current is induced in them proportionate to the speed of the armature and the cross flux, and tending to demagnetize the main poles. Thereby the main field is demagnetized in just the same degree as the output tends to increase, the latter thereby being kept constant. The dynamo is constructed for sparkless operation and ordinary brushes are used; the generator runs at a speed 1.5 times that of the engine. The generator requires lubrication about as frequently as the magneto, and medium heavy oil is filled in the dynamo bearing cups O. Positive and negative terminals are shown at P and N, respectively, in Fig. 7.

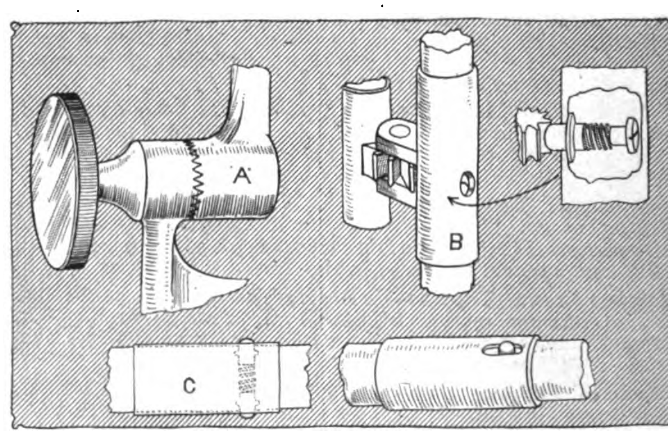


Fig. 3—Details of J. H. tonneau windshield mechanism.

J. H. Tonneau Windshield

The protection of the passengers of a tonneau from the wind, when the driver's shield is not up, is the purpose of the J. H. shield, Fig. 4, which is made by the J. H. Tonneau Windshield Company, 225 West Forty-ninth street, New York City. This figure shows how the shield is carried on two rods the ends of which are hinged to the rear of the driver's seat and on which the tonneau shield proper is slidable. The shield consists of three sections, the central one being of glass and the lateral ones of celluloid, and all are carried in wooden frames of circular section. The whole shield may be turned to any angle, relative to the horizontal, around the lower edge of the central portion, a fulcrum being formed by the two members holding it to the horizontal rods, shown at A, Fig. 3. The angle of the side portions against the central piece is also variable, the shield section being able of remaining in any desired position relative to the central one, by the use of the dog hinges B, Fig. 3. The details of these parts are so clearly illustrated that no explanation is necessary: A consists of two jaw clutches capable of facial engagement and B of a spring-pressed pin which drops into the gear pivoted between the two shield-section frames. C, Fig. 3, serves for keeping the shield in place when it is not in use. The parts A are carried by sleeves sliding on the horizontal rods fixed to the driver's seat; these sleeves are slotted and permit the spring-separated plungers, which are located near the point where the rods are fastened to the body, to drop into them. The sliding fit of the sleeves on the rods permits of pushing either side of the shield toward the driver's seat, when a passenger wants to leave the car on either side. A waterproof curtain shielding the passengers' feet against rain depends from the lower edge of the middle section of the shield.

Mineral Anti-Freezing Water

Now that the cold season is drawing near, various companies prepare anti-freezing solutions for the use of the automobilists. A different course is being adopted by the Automobile Equipment Company, 225 Jefferson avenue, Detroit, Mich., which sells what is called Natural Mineral water for the radiator. This solution is added to the radiator water as the latter is evaporated and does not freeze above a temperature of 40 degrees below zero.

Gilmer Improved Repair Pliers

G. Walker Gilmer, Jr., 51 North Seventh street, Philadelphia, Pa., has just brought out a new and improved type of his tire repair pliers which come in very handy in the making of speedy cures on tire casings. Since it is necessary for the efficacy of a cement repair on a casing, that the wound be absolutely clean before the cement is applied, lest the fabric rots, the pliers have been so designed that by their use the wound of the casing may be spread sufficiently wide to permit of thorough cleaning of it. The pliers sonsists of a triangular shank which carries at one end the jaw I_1, Fig. 2, while pivoted to it is the shank S_3 which

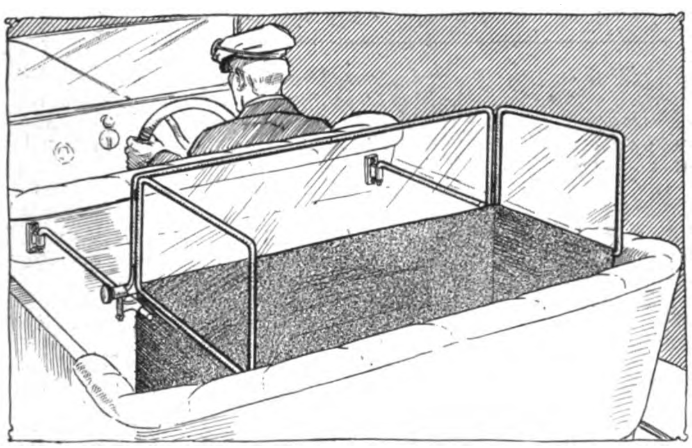


Fig. 4—J. H. tonneau windshield in place on touring car

is formed with a jaw I_2. The triangular shank consists of two side-members S_1 and S_2 which are held together by a rack-shaped connecting piece R, all being made of one piece of metal. A rod pivoted in the under side of S_3 drops into the teeth of the rack, as S_3 is moved in the direction indicated by the arrow, so that two jaws may be held in any relative position within the their limit of movement. To release the hold of the jaws, the button B is pressed toward S_3, whereby the hold of the inner rod of this shank on the rack R is relieved. The shape of the jaws

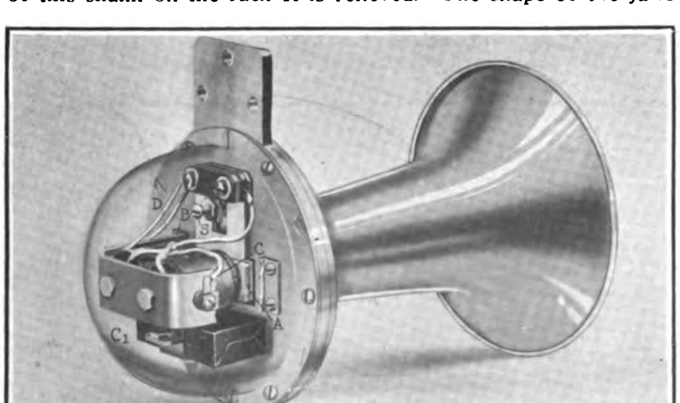
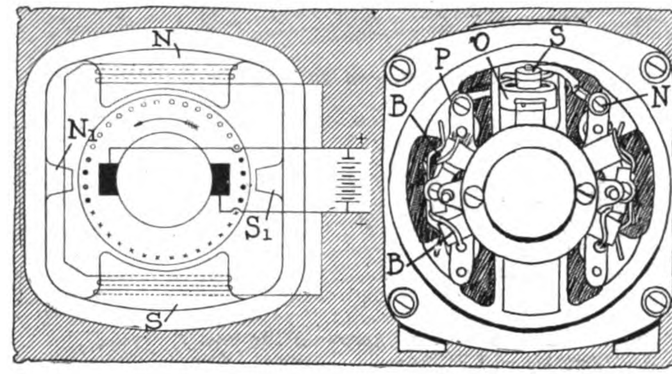


Fig. 5—Ghost view of Holtzer-Cabot automobile horn

is clearly seen in the illustration, as in the form of the cleaning tool, which serves for the removal of foreign matter out of the wound. The pointed end of the tool serves for this purpose, while the flat end is designed for the pressing of the repair cement into the wound. The entire outfit is nicely finished in nickel.

Holtzer-Cabot Electric Horn

Another electric-vibrator horn has made its appearance on the market of Holtzer-Cabot Electric Company, Brookline, Mass. Fig. 5 shows this product, which operates on the same principle which has been repeatedly described in connection with various



Figs. 6 and 7—Details of Broit car-lighting dynamo

vibrator horns shown in these pages of late. A vibrator coil C and an armature A serve for actuating the acoustic diaphragm D, the vibration of which produces the signaling sound. The coil is mounted on a base B insulated from the other metal parts of the horn, and the armature which has a flat steel-spring part permitting it if reciprocating toward and away from the coil, serves as current breaker between the screw S and the metal casing C, through which the current returns to the battery. A push-button is used for actuating the horn.

Portland Automobile Turntable

Garage owners should find the automobile turntable made by the Portland Garage Company, Portland, Me., of interest. This table, Fig. 8, is distinguished by the cantilever principle applied in its construction, as well as by the ease of installing it in a garage. The table plate is carried by a cylindrical drum, which is concentrically mounted on a center pin, being carried by a baseplate mounted in the same manner, but resting upon the foundation. The table plate, which is of 10.25-inch steel, has a cast-iron center and its periphery runs within an outside ring, a clearance of .25 inch being provided between it and the ring. As the weight of the turntable does not rest on the central pivot itself, the latter permits of easy rotation of the table, and a minimum of friction is insured by the use of case-hardened rollers which run on the base carrying the weight of the table. The table may be installed in either of two ways, depending upon whether it is put on the ground floor or not. If there is a floor below that on which the table is placed, the latter must be set upon I-beams resting on the floor; whereas, when the ground floor is used, a single I-beam is buried and cemented in the ground, and the table placed upon it. This turntable is made in four sizes, having 10, 12, 13.5 and 15 inches diameter respectively, and having a maximum capacity of 106, 132, 151, 171-inch wheelbase cars respectively.

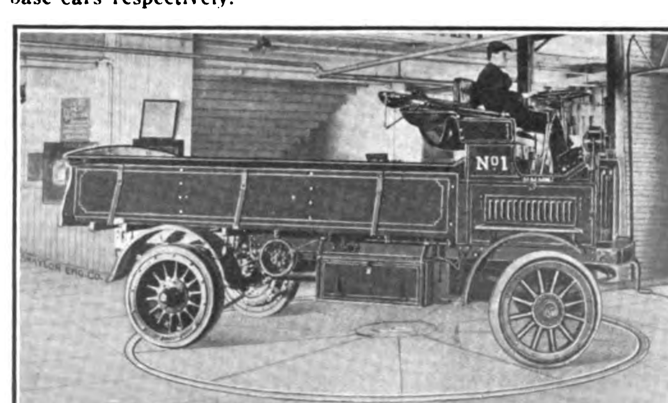


Fig. 8—Portable Garage Company's automobile turntable

AUTOMOBILE MOTOR ATTACHMENT—Comprising a chamber connected to the cylinder head, through which the mixture enters and where it is fired.

This patent has reference to an engine attachment, Fig. 1, which consists of a hollow, elongated body which forms an auxiliary chamber communicating with the combustion space of a motor cylinder through a passage P. The attachment has an enlarged portion E at one end and a reduced one R at the other. In one end of the attachment chamber an inlet vent I is formed which is separate from the interior of that chamber, but which contains a valve V opening into the reduced portion R of the attachment. This valve serves for regulating the admission of fuel mixture to the combustion space of the cylinder, through the attachment; a spark-plug P_1 is mounted in R and in alignment with V, so that it is in a convenient position for exploding the entire charge.

No. 1,043,643—to William H. Tatman, Wann, Okla. Granted November 5, 1912; filed September 16, 1911.

Check Valve for Tire Tube—Which contains a perforated stop for the stem to limit its movement during inflation.

The subject matter of this patent is a tire valve, Fig. 2, comprising a valve stem S to the outside of which a valve casing C is coupled, the latter being provided with a valve seat S_1. A valve V is normally forced against the seat by the air pressure inside the tube. To arrest the movement of the valve stem during inflation a perforated stop is the valve casing is provided; this stop is located some distance away from the valve seat, and a washer is in position between the stop and the end of the valve stem and compressed between them.

No. 1,043,224—to Cyrus A. Haas, St. Louis, Mo. Granted November 5, 1912; filed July 24, 1909.

Resilient Automobile Tire—In which a series of coiled springs inside of arched springs supplant the inflated tube.

Fig. 3 illustrates the tire described in this patent in place on a rim R. This rim has lateral inward side flanges forming a pair of bead-engaging rings on it. The tire consists of a number of separate, resilient units R_1, each of which is composed of an arched spring having inwardly turned ends at its base. A base-plate P composed of two members carried respectively by the inturned base ends of each arched spring is secured to the outer end of the latter. The projecting portions of the base-plate members engage under the rim flanges, their inner ends being rabbeted. By the use of means S a number of the base-plates are secured to the rim, so as to prevent the tire from creeping on it. Resiliency is obtained by a transverse series of coiled springs C, positioned in each arched spring and secured to the same at their outer ends; the outermost spring C seats upon and is fastened to the inturned ends of the arched spring, while the others are fastened to the base-plate members. T is the tread fastened at F.

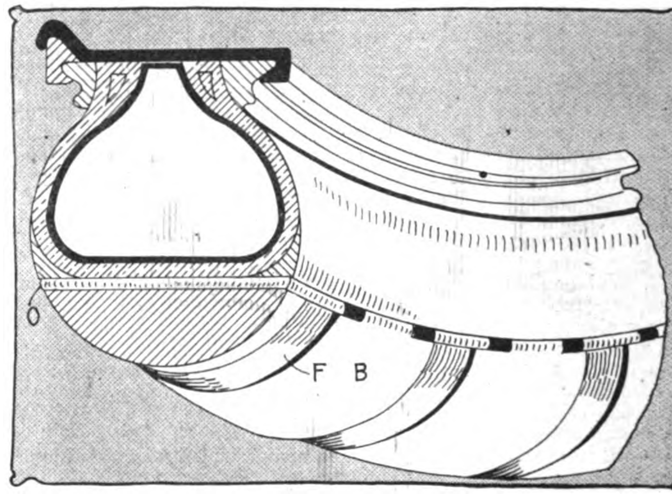


Fig. 5—Dennis pneumatic tire with block-type tread

No. 1,043,642—to Horace A. Stoneham and Carl T. Schwarze, South Orange, N. J. Granted November 5, 1912; filed January 16, 1912.

Demountable Rim Construction—Consisting of three segments which are hinged together in a suitable manner.

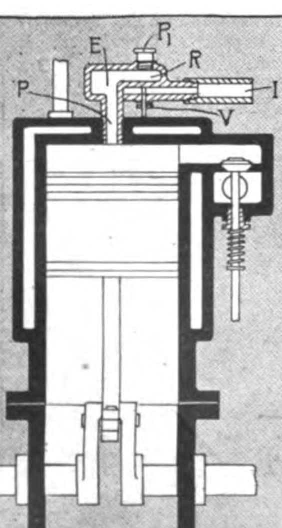
The demountable rim described in this patent is seen in Fig. 4. It consists of a pair of main segmental sections M which are connected by a hinge H. A relatively short segmental section S is designed to fit between the ends of M which are not hinged together and is connected to M by means of hinges K. The hinges K include link members which permit of a slight inward movement of the short section, as shown in Fig. 4, when the tire is taken off the rim.

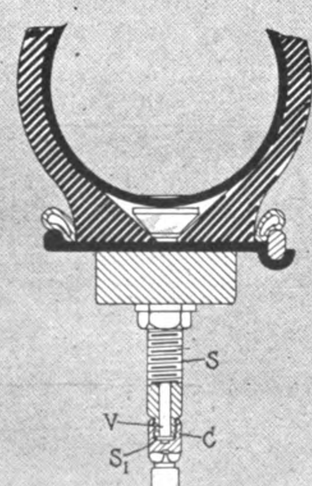
No. 1,043,714—to André Jules Michelin, Paris, France. Granted November 5, 1912; filed May 2, 1911.

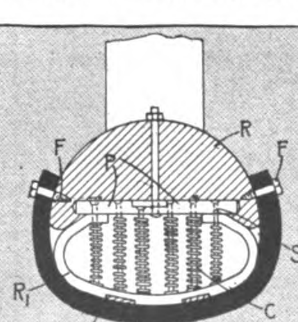
Pneumatic Tire Construction—Having a chordlike wall to its casing and a set of tread blocks attached to the same.

This patent relates to a tire having an outer casing O, Fig. 5, formed with a chordlike periphery. A number of blocks B spaced around the circumference of that chordlike part of the tire and individually attached to it form the tread surface. Each block has its surfaces shaped to fit the outer wall O, and to hold the blocks in the proper spaced relation, filling pieces F are in place between adjacent blocks and attached to O.

No. 1,043,407—to Alfred A. Dennis, Grand Rapids, Mich. Granted November 5, 1912; filed February 24, 1912.







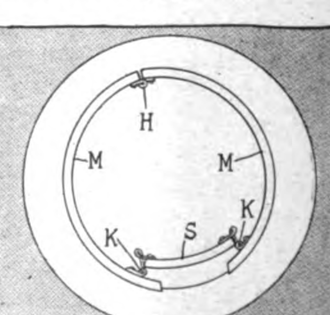


Fig. 1—Tatman motor attachment. Fig. 2—Haas tire valve. Fig. 3—Stoneham-Schwarze tire. Fig. 4—Michelin rim

VOL. XXVII NEW YORK—THURSDAY, NOVEMBER 21, 1912—CHICAGO NO. 21

The AUTOMOBILE

British Designers Aim at Increased Motor Efficiency

Parts Lightened by Using Better Materials Giving Greater Economy—Carbureters Improved—Cone Clutch Gaining—Worm Drive Falling Off

Engineers Are Giving More Attention to Accessibility, Silence and the Bodily Comforts of the Passenger—Easy Brake, Oil, Carbureter and Fuel Adjustments Featured

LONDON, Nov. 13—*Special to* THE AUTOMOBILE—British tendencies for the 1913 season as brought out at the Olympia show illustrate the fact that design has become more standardized during the past year than ever before. Almost without exception refinements are minor in detail. A close study of the trend shows that with very few exceptions the makers are confining their efforts to one or two models.

Refinements in materials and workmanship have brought the motors up to a high state of economy. Lighter materials are used for the piston and connecting-rods in some of the cheaper motors. The use of two and three-ring pistons has increased. Passing back to the chassis features it will be seen that the cone clutch is gaining in popularity torque members are fitted with better connections, several makers have abandoned worm drive for the carefully made bevel drive. Worm and sector steering holds its supremity, while front-wheel brakes are on the decline, although one prominent firm has interconnected the front and rear brakes.

British Tendencies Revealed at the Olympia Show

1—An increase of small chassis
2—Decrease in the six-cylinder cars
3—Wire wheels holding their own
4—Cone clutch gaining in popularity
5—Four-speed gearsets on 60 per cent. of cars
6—Sleeve-valve motors have not increased
7—Average horsepower remains the same
8—Worm drive abandoned by some makers
9—Splash oiling used in cheaper motors
10—Front-wheel brakes declining
11—Use of silent chain for magneto drive
12—Underslung rear spring in use
13—50 per cent. of cars have thermo-cooling

Although there is probably less change in motor design this year than in any other previous year as is evidenced by the fact that the average horsepower for both four and six-cylinder cars remains practically the same and the Knight and other sleeve-valve motors have made no prominent advance, a study of some of the more prominent types will be of interest.

The Swift Motor Company, Ltd., Coventry, is confining its attention for 1913 to the output of three new four-cylinder types of the popular R. A. C. ratings, 10.5, 12.0, and 20.1 horsepower. In the new 10 horsepower model, the bore and stroke of which are 65 by 100 millimeters, respectively. The cylinders are formed in a single casting, with the valves on one side, actuated by adjustable tappets, and inclosed by an aluminum cover. The ignition is by magneto only, while on the left-hand side of the engine an oil tank is cast integral with the crank chamber, this oil tank being large enough to hold sufficient oil for 400 or 500 miles. Lubrication is by splash, the feed to the crank chamber being automatic without the use of pumps or any other moving devices. As soon as the level in the crank chamber falls below a certain point, oil automatically starts to feed, stopping when the proper level is reached.

There is a commodious dome for conveying the thermo-syphoned water from the cylinder jacket to the radiator. Above the oil is the exhaust manifold. This takes the form of a ribbed casting having a rectangular section passage. Eight studs hold it upon the cylinder casting. The aluminum door enclosing the valve stems, etc., is a flat plate and assists well in silencing the motor.

The 12-horsepower model which the Swift company introduced during the 1912 season has chiefly been altered in regard to chassis dimensions, that is to say, the tread is wider, the wheelbase longer, while the body itself has been made proportionally larger. The engine has a bore and stroke of 75 millimeters by 110 millimeters, R. A. C. rating, 13.9. The cylinders are cast in pairs mounted on an aluminum crank chamber. The valves are on the left side and thoroughly inclosed. Adjustable tappets with hardened steel rollers are actuated by a chain-driven cam-

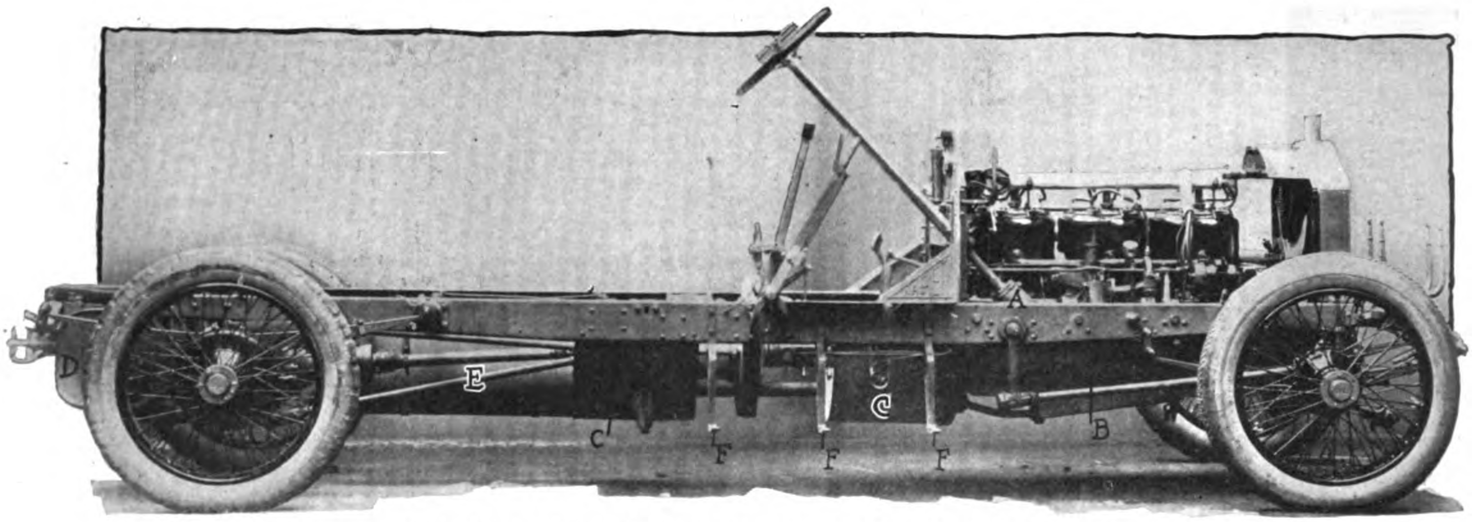


Fig. 1—45-horsepower, six-cylinder Napier chassis. A, steering adjustment; B, reach rod; C, oil pans; F, step hangers; E, torque member

shaft, the chain in question being fitted with a type of adjustment adapted to allow of any back lash being taken up automatically. Ignition is by Bosch high-tension magneto mounted in a very accessible position on the right side of the engine. Cooling is of the thermo-syphon type, the inlet and outlet pipes being of large dimensions and again the cylinders and valve pockets are most generously water-jacketed. Honeycomb type of radiator is supplied, while the fan behind the latter is driven by means of a flat belt off the camshaft.

The means of automatically oiling the engines has been carefully thought out so as to combine reliability with simplicity of detail. The oil is transmitted through the oil sump by means of a centrifugal pump driven vertically from spiral gears off the camshaft and circulated by pressure to the main crankshaft bearings. A by-pass from the delivery pipe is extended to the dashboard where a sight-feed indicates the working of the pump. The oil delivered through the sight-feed above mentioned being then distributed to an oil bath in the timing cover. It should be stated that the timing chain is kept constantly lubricated by running through the oil bath in question. A gauze filter is fitted between the base chamber and sump and an outside pocket is cast to the latter which contains another filter easily detached for cleaning purposes. A gauge cock for indicating the normal level of the oil in crank chamber is supplied.

The Adams Manufacturing Company is confining itself to a single chassis for 1913, the motor of this chassis being of 16-20 horsepower. It has four cylinders 88 millimeters diameter by 120 millimeters stroke, which closely represents average English practice. The cylinders are cast in pairs and the valves are upon one side of the engine. Three bearings only are employed for the crankshaft. The crankpins are 60 millimeters long. A noticeable feature is that no rollers are provided for the tappets, which have, however, a large diameter. The water jackets are very ample providing for the thermo-syphon cooling system. There is a certain amount of water space between the cylinder pairs and the cylinder top ends are spherical and to provide additional strength are ribbed as well. Light detachable doors cover in the valve mechanism.

The oil pump is driven from the same vertical shaft as the air starting distributer. It is placed low and its wheels have wide teeth. Noticeable features are the extra large scoops on the connecting-rods which dip at each crankshaft revolution into the troughs below the cylinders.

Bosch high-tension magneto ignition is in use and the magneto is located at the forward end of the engine close to the air compressor.

The new B. S. A. chassis possesses some points of interest, but confining our attention to the motor, it will be observed that the Daimler-Knight type of engine is employed. The bore is 75 millimeters and the stroke 114 millimeters.

It is of some interest to notice that the cylinders are off-set, a practice that is not very usual with sleeve-valve engines owing to the very low position periodically taken up by the inner sleeve which must consequently be considerably cut away for connecting-rod clearance. In this case it will be noticed that the inner sleeve has a groove to clear the connecting-rod when at extreme angular position, though the cylinders are not more than 12 millimeters out of center.

The pistons which are fairly light have concave tops, which, though perfectly usual in engines of this or similar construction, are objectionable on the grounds of the possible collection of lubricant. The aim of the designer is doubtless to get a spherical or nearly spherical explosive chamber at or shortly after the commencement of the stroke when the temperatures are highest, and there can be no doubt that from a thermal efficiency point of view the aim is a very excellent one.

The trough system of lubrication is in use, the troughs being pivoted

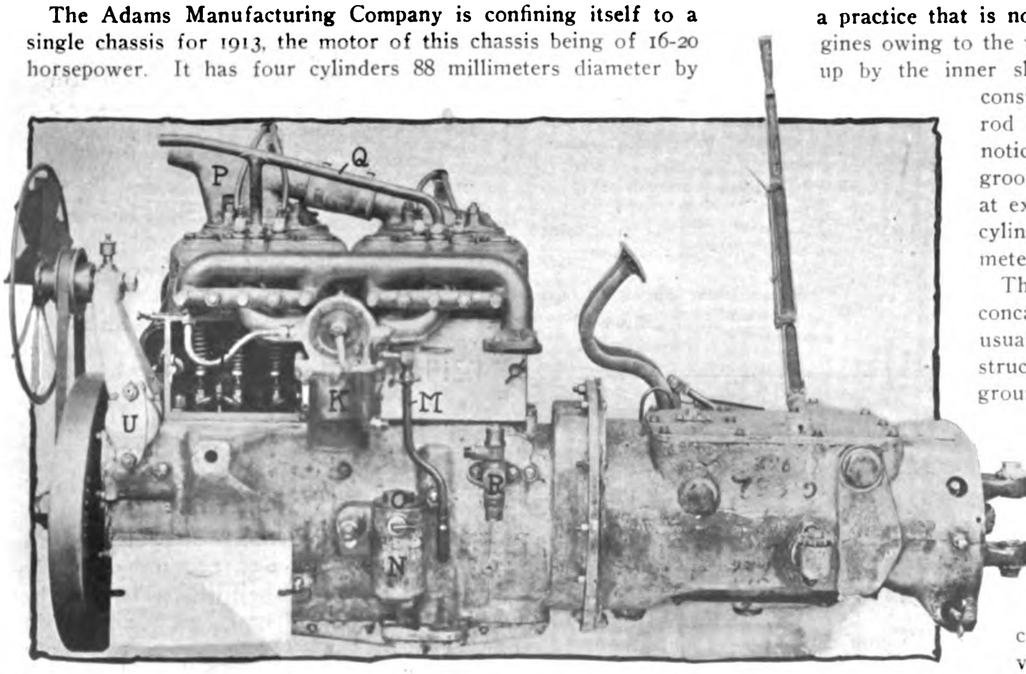


Fig. 2—Napier motor. U, cover plate; K, carbureter; N, O, oil pump; M, oil by-pass; P, Q, water outlets

to the caps of the main bearings and are connected up to the throttle lever so that the oil supply may be in proportion to the work done. A small plunger pump is provided for filling the trough with oil. The plunger has a diameter of 8 millimeters. Immediately behind the pump connecting-rod is a rod which oscillates a small cylindrical valve for mechanically regulating the flow of oil into and out of the pump.

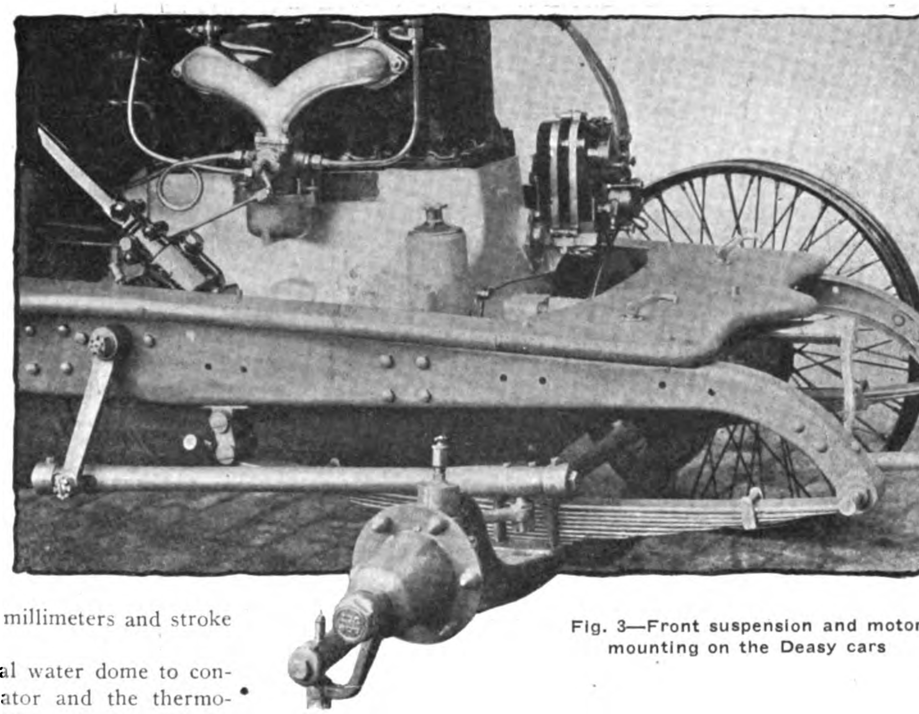


Fig. 3—Front suspension and motor mounting on the Deasy cars

The Belsize 15.9-horsepower motor is an attempt to compete with the American low-priced car. The cylinders are cast en bloc, with ample water jacket between each pair. The casting is, however, very much simplified by the fact that the cylinder heads form another casting which is studded in one piece onto the top of the cylinders. The two castings have their faces machined and copper asbestos washers are interposed. The cylinder dimensions are: diameter 69 millimeters and stroke 130 millimeters.

The cylinder head casting has an integral water dome to conduct the water into the top of the radiator and the thermo-syphon system has been depended upon. The cylinder walls are 6 millimeters thick, and the top of the combustion chamber is 7 millimeters thick and is slightly convex to assist strength.

The pistons are very light and have convex ribbed tops. The length of the piston is 85 millimeters and the lower or skirt part is drilled out to effect a further saving in weight. Two rings only are provided, so that the gudgeon pin can be positioned rather high, and this has the effect of slightly reducing the overall height of the engine. The gudgeon pins have a diameter of 19 millimeters and have 14 millimeter holes drilled through them.

The connecting-rods have a length of 293 millimeters and are very light stampings indeed, the central web being only 3 millimeters thick. The crankshaft journals as well as the crankpins have a diameter of 38 millimeters and the crankpins are 50 millimeters long. The crankshaft journals from the forward end have lengths of 44, 60 and 60 respectively, and the bushes are lined with white metal. The crankwebs have a thickness of 18 and 19 millimeters. Owing to the fact that the cylinders have good water spaces between them and that the crankshaft bearings have a distance between them from bush to bush of only 156 millimeters it has been necessary to overhang the connecting-rod big ends to an extent which is not in accordance with the best practice. The center line of the rod corresponding with the center of thrust pressure is two-sevenths of the crankpin length from one end of the pin—and five-sevenths of course from the other. While a symmetrical bearing is doubtless preferable, it is quite usual to find even twice as much bearing surface on one side of the connecting rod center than the other, but seldom is there so much overhang as that just mentioned. The good length of the connecting rod will to some extent compensate.

Large oil troughs are arranged over the crankshaft bearings, and troughs for the dippers on the connecting rods to draw a supply from. Attention should be drawn to the oil pump; this is of the gear-wheel type and works in a horizontal position at the extreme bottom of the crankcase, and it has a vertical driving shaft which takes its motion from the camshaft. The driving shaft is square at both ends so that the pump can be withdrawn without releasing any coupling bolts or other fastenings. In the center of the tray that supports the connecting rod troughs there is a very commodious filler through which all the oil must pass before it can again enter the pump and be distributed to the troughs. This filler can, moreover, be withdrawn bodily from the bottom of the case or the foul oil may be removed by means of the screw-plug shown. The connecting-rod dippers are large and present a good surface to the oil in

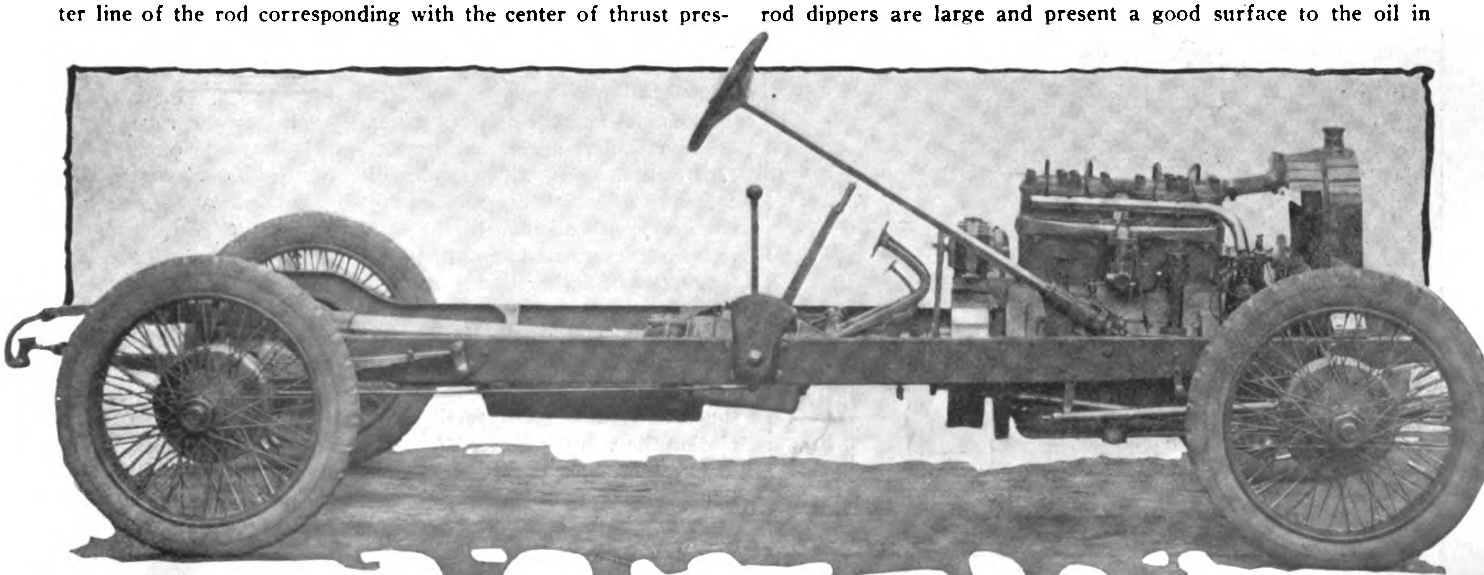


Fig. 4—Chassis of the 25-horsepower Argyle. Note the simple exterior of motor given by sleeve valve construction

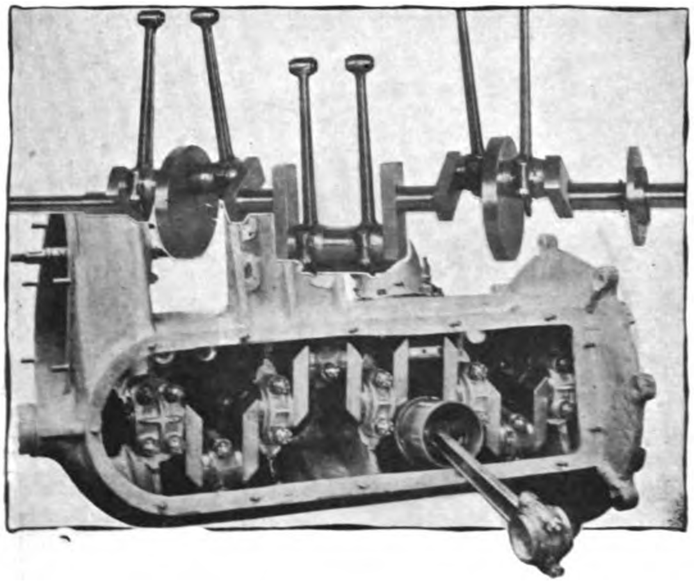


Fig. 5—Six-cylinder crankshaft in use on the Talbot cars and the 15-horsepower Crossley crankcase

the troughs at each revolution, and from the results obtained with the Daimler-Knight adjustable trough system, with its knife-edge dippers, one would expect a great quantity of oil to be thrown up and in view of the fact that the piston skirts are perforated some of this oil may well reach the combustion chamber. It may be for this reason that the ignition plugs are screwed into the valve-caps so that their electrodes lie back in a comparatively deep recess.

The valves, which are all upon one side of the engine, are no more than 28 millimeters in diameter, and this must be considered small at a time when a few good engines have valves with diameters below the seat equal to about half the cylinder diameter. However, there is no doubt that many engines with comparatively small valves do give good power and are capable of running at high speeds. The valve stems have a diameter of 9 millimeters and the guides are long ones.

In discussing the valves the length of the valve springs should be noted. These are, from end to end when in position, nearly, 2.75 inches long. The valve tappets are of very simple construction; there are no rollers, the tappets having merely rounded ends

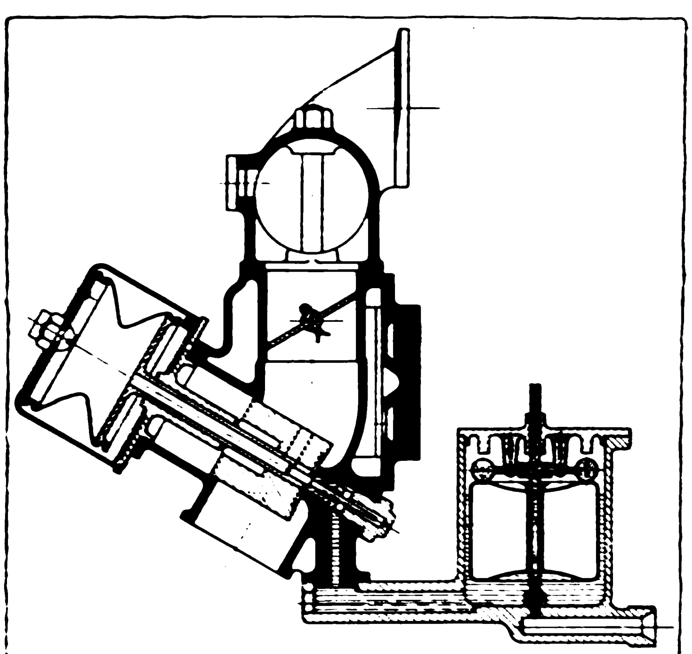


Fig. 6—The C-W. carbureter used on the Wolseley cars. Gasoline connection to the right

and being furnished at the top with hard steel caps. There is perhaps some advantage in the no-roller tappet in that the guide can be brought down very close to the cam—it need, in fact, only just clear the top of the cam—so that there is little bending action on the tappet and a lesser tendency to wear the guide than would otherwise be the case. The length of the tappet guide is 70 millimeters.

The camshaft has a diameter of 19 millimeters and has three bearings, one of which is divided into two, to make place for the chain-drive wheel. The cams are cast solid upon the shaft and have a width of 13 millimeters. It will be gathered from the small width of the chain wheels that they are intended for roller chains in place of the more usual silent pattern chain. The chain wheels are of steel and are solid disks in each case. A small spring-controlled jockey pulley serves to maintain the

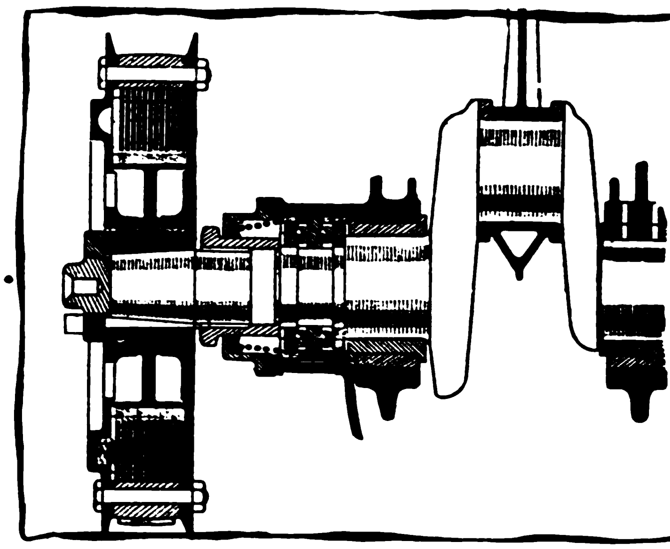


Fig. 7—Lanchester vibration damper to eliminate synchronizing of vibration periods on six-cylinder motors

correct degree of tension. The chain is of course completely enclosed and compares quite favorably with the silent pattern of chain from the point of view of silent running. The valve springs, tappets, etc., are enclosed, light steel metal doors being fitted over them, the doors being held in place by thumb nuts.

The fan runs on ball-journal bearings placed 95 millimeters apart and has a diameter over the blades of 305 millimeters. The exhaust manifold is ribbed and has a jacket to provide warm air from the carbureter.

The carbureter employed is the Claudel-Hobson automatic type, and so economical is the running of the engine with this that 30 miles to the gallon is claimed.

In place of the Darracq 14 horsepower a 16 horsepower has been substituted; the bore and stroke are 85 by 130 millimeters. This model and the 12-horsepower have the rotary valve.

The cylinders are cast monobloc, which is typical of all Darracq constructions, with the exception of the 22 horsepower, the cylinders of which are cast in pairs. The Zenith carbureter is employed with all models, the Darracq company evidently finding it advantageous to fall in with the general system of leaving the matter of carburetion to specialists. The rotary valve (Henriod system) is driven by chain, also the magneto and pump, on the opposite side to the rotary valve.

Probably the point of success in this engine is due to the masking of the valve by the piston. At the top of the stroke the piston entirely covers the port so that at the time of explosion the valve is protected from the effect of combustion. The Darracq firm are evidently quite satisfied with the results obtained during the past year inasmuch as they are applying this valve mechanism to two types. It is claimed that over one hundred parts are discarded by the use of this valve as against the ordinary poppet valve. The rotary distributer is mounted on ball bearings.

Both Humber models have monobloc cylinder castings, and they are very perfect examples of intricate and difficult core work. The inlet and induction pipe are cast together in the form of a cover plate which fastens on to the cylinders with eight studs. These castings also form a water-jacket cover plate.

With the Humber cars careful attention has been paid to lubrication. The pump is situated in the oil sump itself, and is driven by spiral gear from the camshaft, and arranged at the flywheel end of the engine. A conduit is cast in the crankcase from which the oil flows to the main bearings, and the big ends are lubricated through the crankshaft. Instead of the usual pressure gauge an indicator of the plug type is fitted to the dashboard. As long as the plug is projecting from its socket the oil circulation is active.

The Maudslay motor has undergone but little alteration for the coming year. The bore is 90 by 130, and is the only British motor which is fitted with overhead valves. The cylinders are cast in pairs, but united, forming a continuous waterjacket. Both pairs are cast to one pattern. The front end waterjacket coverplate is utilized to carry a bracket within which is formed a bearing for the vertical shaft, and also supports the fan spindle bracket. The vertical shaft is driven from the crankshaft by worm gear which again transmits the motion to the horizontal camshaft over the cylinder by similar gearing.

The camshaft and valve stems are totally enclosed, but free access is obtained to the valves by the cover being hinged, a universal joint applied to the vertical shaft, making it possible to hinge over the cover with the camshaft and its bearings. Between the cover and the valve stems a thrust lever is interposed in which feltpads are so arranged that a film of oil is brought between the cam and the lever. The bearings of the camshaft are provided with ring oilers.

The magneto is driven by means of a chain, and the oil pump is driven from a lower extension of the vertical shaft. The pump is of the rotary type, and forces oil to the main bearings, and thence through the drilled crankshaft.

A feature in connection with the Maudslay engine is that the pistons can be removed through the base chamber, the circular doors being provided for this purpose.

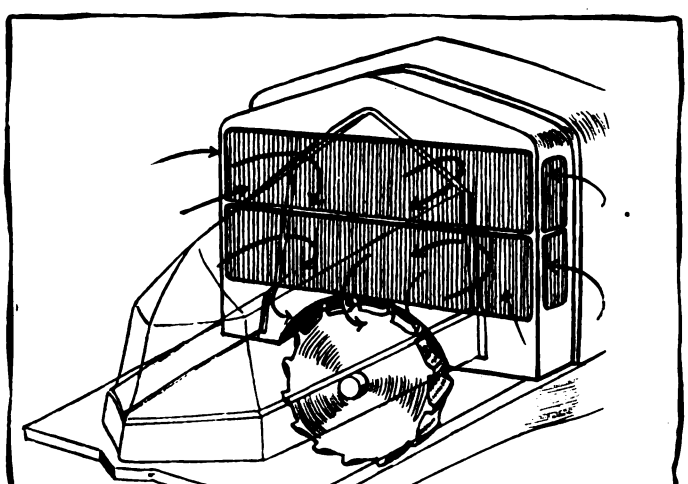


Fig. 9—Diagrammatic view of the cooling system in use on the Deasy cars

The design of the engine readily lends itself to the construction of a six-cylinder, by the addition of another pair bolted to the end flange. The crankshaft has five bearings on the four-cylinder model.

The dimensions of the cylinders on the Bell motor are 3.5625-inch bore by 4.75 stroke. Helical gearing is employed for driving the camshaft, magneto and water pump. All valves are set in line. The crankshaft is set in three bearings, and has a diameter of 1 5-8 inch. The crank bearing at flywheel end is 3.625 inches long, the center bearing 2.625 inches and the starting end 3.125 inches. The pins are 2.125 inches in length.

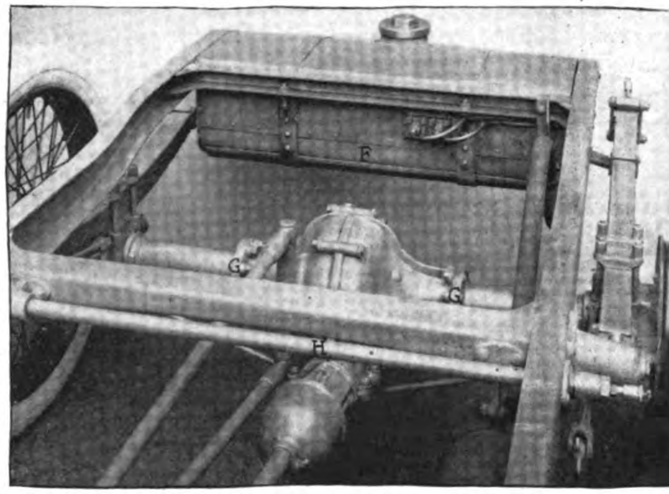


Fig. 8—End view of the Napier 15-horsepower chassis. Note mounting of tank F, crosspiece H and torque connection G

The crankcase is made in three parts. The two main castings are bolted on the center line of the crankshaft, the lower half of the bearing being supported by the lower casting. The third portion of the case forms the bottom and carries the oil troughs and sump.

The lubrication system of the Bell cars is interesting by reason of the arrangement devised for giving a varying amount of oil to the connecting-rods. The rotary oil pump is fixed to the upper half of the base chamber and driven by spiral gear from the camshaft. The oil is first pumped to an indicator on the dashboard, and then feeds the oil continuously to pockets situated over each main bearing, and also to troughs under each connecting-rod. A foot valve is fitted at the end of the suction pipe and a priming fitting to ensure satisfactory working. On the dashboard is fixed a lever working in a quadrant which is coupled to a rod operating a lever coupled to sluice gates fixed to the side of each dripping trough. By operating the lever on the dashboard the sluice gates can be raised or lowered, thus alternating the level of the oil in the troughs. This arrangement is similar to that employed by the Daimler company, except that in the case of the Daimler arrangement the troughs are hinged, and are raised or lowered by a connection to the throttle of the carbureter.

The Vauxhall program comprises two models so far as the main features are concerned, a four-cylinder car having cylinders 90 by 120 millimeters and a six-cylinder car having cylinders of the same dimensions. In the case of the four-cylinder engine the cylinders are cast en bloc. This construction is par-

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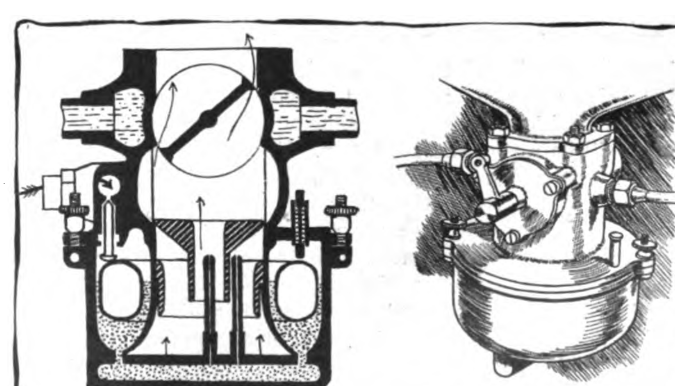

Fig. 10—Sectional and exterior views of the 1913 Deasy carbureter

Equity Rules Hit at Patent Law Abuses

Supreme Court Eliminates Waste of Time in Pleadings and Saves Millions of Dollars to Litigants in Costs by Simplifying Procedure in Chancery so that Comparatively Poor Patentees Can Establish Rights—In Force February 1

PATENT litigation, and in fact recourse to the courts of equity on broader lines, has become so extremely expensive through the cumbersome system in effect that litigants without long purses and the ability to wait have been at a real disadvantage. In fact, the adjudication of many a valuable patent has been abandoned when the patentee learned something of the necessary costs and interminable delays that have been associated with patent litigation. **Therefore, the Supreme Court of the United States has just issued a new set of equity rules that is pronounced by the bar to be the most revolutionary document of the American republic since the Emancipation Proclamation.**

The operation of the new rules will serve to shorten patent litigation fully 50 per cent. on the average and will reduce the costs to a mere fraction of what has been usual. **Under the new rules, according to William A. Redding, chief patent counsel for the Automobile Board of Trade, the great Selden suit could have been disposed of in 6 months instead of 5 years, and that the testimony that filled thirty-six volumes, at a minimum cost of $1 a page for publication alone, could have been contained in one volume.**

The new rules will require more actual ability and much more energy on the part of counsel because of the strict provisions limiting the scope and time for pleadings. Even more important is the rule that requires the bulk of the testimony to be taken in open court under the strict rules of evidence. This rule will eliminate a tremendous amount of irrelevant, incompetent and immaterial testimony.

At the time the final decree in the Dick Mimeograph suit was handed down by the Supreme Court, last summer, THE AUTOMOBILE treated on some of the ideas outlined in the dissenting opinion of Chief Justice White. It was in the form of a symposium specially written by William A. Redding, S. O. Edmonds and John R. Taylor. These gentlemen made certain suggestions about equity procedure in general and specifically pointed at patent practice, and the new rules cover the various points suggested with remarkable accuracy. Of course, they cannot affect procedure in the patent office itself which must be covered by Federal statute, but they do reform court actions along the most radical and progressive lines.

The least fee charged for prosecuting a simple patent suit through the United States District Court is $2,000. From that price the scale runs up to $100,000. As the costs are reckoned with the fee, the saving to litigants under the new rules will be a very material item. The net revenue of counsel will not suffer, for while the attorneys will have to move faster, with the result that they will spend fewer days on a given case, they will have more time to devote to litigation.

Comparatively poor men, owners of valuable patented ideas, will have a better chance to enforce their rights, no matter what the power and wealth of their adversaries.

The new rules are astonishingly brief, numbering eighty-one all told. Patent procedure under them will be reduced, as briefly outlined below. **Upon the actual filing of the bill of complaint, the clerk shall issue the process of subpoena thereon. There is notice contained in the subpoena that the defendant shall file his answer in court, on or before the expiration of 20 days after service. If service is accomplished and the answer is not filed, the complainant is entitled to a decree pro confesso.**

Final decree may be entered at anytime after 30 days subsequent to default.

Save where the existing statutes provide for certain technical forms of pleading, all such technical forms are abolished in equity. As to amendments the rules state that the court, at every stage of the proceedings, must disregard any error or defect in the proceeding which does not affect the substantial rights of the parties.

Exceptions to bills of complaint for scandal, impertinence or redundance are barred but the court upon its own initiative or upon motion may strike out such extraneous matter upon its own terms.

Lack of equity has always been a standard plea where, entirely aside from the facts and law involved, the party advancing that plea wished to be given more time. The usual procedure was to allege that while the opposite party might have an action at law, the facts showed that the suit should have been brought on the law side rather than in equity. The Supreme Court adjusts this difficulty by providing for the peremptory transfer of cases brought in equity that should have been brought in law and orders that only essential changes shall be made in the forms of pleadings and provides that matters ordinarily determinable in law, incident to a suit in equity, shall be determined according to the principles applicable to the case without sending it to the law side of the court.

This might seem to the layman to be an unimportant detail, but the facts of the case are that this rule may prevent delays of as much as a year in a given suit and expenses running into real money.

The form of the bill of complaint is much simplified. The new form will have five sections; the caption; brief statement to give the court jurisdiction; the facts relied upon by the plaintiff, omitting all matters of evidence; exceptions in joinder in the action and a prayer for relief.

Under rule 29, demurrers and pleas are abolished. This means that one of the chief sources of delay in equity is eliminated. All the defenses that are now presented by way of demurrer or plea must be included in the answer instead of being pleaded in succession at intervals of at least 30 days. The effect of the rule will be to make the drafting of bills of complaint much more careful because some technical mistake might lead to the dismissal of the suit by reason of demurrable fault.

The rule provides for hearing of motions to dismiss on the part of the defendant but specifies that if the motion is not successful, answer must be filed in 5 days on pain of a decree pro confesso.

The issue is joined on the defendant's answer, which must be short, omitting matters of evidence. The answer may state as many defenses as are deemed essential, regardless of consistency. General denials must be avoided. Averments except as to value, if not denied shall be deemed confessed.

Matter that heretofore has been used as the basis of cross-bills, must be pleaded in the answer. Unless some counterclaim is set up in the answer, no further pleadings are required. If such counterclaim is alleged, the plaintiff must reply to it within 10 days.

Exceptions for insufficiency of an answer are abolished; thus eliminating another source of delay. Such objections in the future will be handled as part of the suit itself.

The most important change in the rules is the substance of rule 46, which reads:

"In all trials in equity the testimony of witnesses shall be taken orally in open court, except as otherwise provided by statute or these rules. The court shall pass upon the admissibility of all evidence offered as in actions at law. When evidence is offered and excluded, and the party against whom the ruling is made excepts thereto at the time, the court shall take and report so much thereof, or make such statement respecting it, as will clearly show the character of the evidence, the form in which it was offered, the objection made, the ruling and the exception. If the appellate court shall be of the opinion that the evidence should have been admitted, it shall not reverse the decree unless it be clearly of the opinion that material prejudice will result from an affirmance, in which event it shall direct such further steps as justice may require."

Where depositions are allowed in exceptional cases or ordered by statute in patent cases, those of the plaintiff must be filed in 40 days; those of the defense in 20 days more and rebutting depositions within 15 days thereafter. Cross-examinations are ordered to be held in open court where the opposite party desires such a right.

When the time for taking depositions has expired the case goes on the calendar automatically. Postponement of the hearing may be had on application of counsel, but the adjournment of the hearing may not go beyond the end of the trial term.

Save in matters of accounting, reference to masters in chancery shall be the exception and not the rule.

The form of decrees is much shortened and simplified, the Supreme Court ruling that the pleadings, reports of masters and other prior proceedings shall not be recited.

On appeal to the United States Circuit Court of Appeals, the rules require brevity and relevance on pain of having the costs of irrelevant and redundant matter taxed against the party at fault in order to discourage such practice. The rule places the attorneys within its scope and the court is ordered to issue rules against offending members of the bar even when their clients are not held to be amenable.

The old rules of equity are abrogated and the new set effective as of February 1, 1913.

The rule as to the taking of testimony in open court, the omission of printing voluminous records and the simplification of appeal procedure will undoubtedly save millions of dollars a year to litigants.

Under the new rules, the owner of a patent enters suit against an alleged infringer. He files his bill; subpoena issues and service is had. This may occupy a day or a week, rarely the latter. When 20 days have expired the defendant must answer and the suit will be at issue. In patent cases the plaintiff has 40 days to file depositions; the defendant 20 days to answer with another contingent delay of 15 days where rebutting depositions are required. The case is then ready for trial and may be heard within 30 days after the time for filing depositions has expired. **The operation of the new rules would seem to limit a patent action wherein there are no unusual features to 125 days from the time of filing until the trial. In many instances it would appear that cases might be finally heard in 50 days and that 6 months would be about the maximum limit unless something exceptional developed.**

Under the present rules, the answer may be reached in 80 days after the filing of suit, but it may be delayed almost indefinitely by the interposition of dilatory pleas, demurrers and other pleadings upon which issue of the merits of the case can not be joined. The taking of testimony may occupy almost any reasonable amount of time and the rebuttal testimony may still further delay the hearing. The witness to be examined gives his testimony before a master, who has no discretion as to its admissibility. He must transcribe it for the court's use and it becomes a part of the record. As such it is printed at high cost.

The testimony put up to the trial judge is generally an appalling mass. If he is to do his full duty he is obliged to wade through reams of inconsequential stuff. When he has heard the arguments, he must take the briefs of opposing counsel and the testimony of both sides and mull them over until the equity involved becomes clear to his mind.

For that reason alone many cases are reversed in the upper court. There are so many irrelevant documents imposed upon the court and such a terrific mass of conflicting data is developed at the ordinary trial of even the simplest patent litigation that the chance of disordered proportion is always present.

It is almost axiomatic that skillful counsel can delay action in a patent case almost indefinitely, but such will not be the case under the new rules. The limits are clearly defined and in future it will be a remarkable patent case indeed that will linger in the courts pending a hearing for so much as 1 year.

Of course, the new equity rules will not affect the operation of the Patent Office. That must be done by Federal statute. The Oldfield revision of the patent laws died an unmourned death when the late session of Congress adjourned. The measure may be revived next fall, but those nearest to the project are least optimistic.

Unless consideration of it is included in the call that may be issued for an extra session of Congress after President Wilson is inaugurated, it is not likely that the measure will come up until the regular session convenes, if then.

In fact, future action on the subject of revising the patent laws is in the hands of the President's Commission on Economy and Efficiency.

This commission has issued forms containing twenty-four pertinent questions as to prospective changes in the law and all over the country members of the leading associations of lawyers are considering the queries. The New York County Lawyers' Association, which includes many of the leading patent attorneys of the country; the American Bar Association and the aggregations of patent lawyers here and elsewhere have been busy with research work which will probably form the basis of revision when it actually takes place.

Such revolutionary measures as the Oldfield bill are not favored by the majority of the associations. They state that they favor unanimously the enactment of patent laws that will make for speed, certainty and efficiency. The methods by which these three elements shall be joined are the subjects under discussion.

The whole subject of patent law making is extremely technical and patent rights are so firmly founded upon the Constitution that a radical law might have the effect of raising the basic constitutional question every time a patent suit is presented. The careful consideration of proposed laws by the bar associations will probably result in the elimination of a lot of waste, so far as the time of legislators is concerned.

The question of competent examiners; of one or two appeals within the Patent Office itself; of the limitation of the life of a patent to 19 years from the time of filing application; of the whole subject of interferences; of the Constitutional provision awarding exclusive rights to the patentee and the limitation of those rights; the use of unpatented materials and the resale price feature are all subjects of deep interest—too deep, in fact, to run the chance of hasty action by partisan law makers.

U.S. Motor Sale Date Set

Court Orders Property To Be Sold January 8 and Reorganization Plans Have Progressed to Final Form

Grabowsky Power Wagon Company in Receivers' Hands, But No Order of Adjudication Has Been Entered

UNDER decree of the United States District Court, the United States Motor Company will be sold January 8 in New York. Judge Charles M. Hough signed an order to that effect on Monday when the final form of the decree of sale was submitted to him. This form was not substantially different from what was outlined in these columns last week, the changes being of a trifling character.

Under the decree, formal bids for any one or more of the six parcels into which the assets have been divided may be submitted, accompanied by an earnest of good faith in the shape of cash or certified check. The bids thus submitted may be revised upward at the option of the bidder at any time before the closing of the sale at 3 o'clock of the day set.

The action of the creditors appears to be practically unanimous as to the acceptance of the proposed plan of reorganization. On Monday, November 18, 94 per cent. of the claims, based upon the total amount, had been filed with the official depositary, the Central Trust Company. It was announced that at least 4 per cent. more would probably be filed by December 9, which day has been set as a limit for deposit.

This means that of a total of over $11,000,000 of claims, the reorganization committee now has all but $660,000, and has prospects of getting the co-operation of about $450,000 before the expiration of the deposit period.

The Flanders project is reported to be progressing favorably, although no official word of its consummation has been given out. The contract has not been signed but there is a thorough understanding between the parties. This agreement is substantially the contract outlined in these columns last week. The precise details have not been disclosed but it may be said with certainty that the deal is conditioned upon the acceptance of the presidency of the prospective company by Walter E. Flanders as well as the merger of the Flanders company.

It is likely that the situation will be sufficiently developed within 3 weeks to make the official announcement, despite the fact that the date of sale is still 7 weeks in the future.

The deposits of stock are now estimated at over 47 per cent. and according to the prevailing opinion, the total percentage that will come in on the assessement plan will be somewhat more than a majority, considering both issues as a whole.

Oliver Reorganization Consummated

DETROIT, MICH., Nov. 18—All the property of the defunct Oliver Motor Car Company has been purchased from the receiver by a recently organized company known as the Oliver Motor Truck Company. G. A. Meyer is president: F. J. Meyer is treasurer; and R. F. Beach will have charge of the sales. It is the intention of the new company to manufacture the Oliver 1,500-pound light delivery car and the 3,000-pound type, with a few changes made for the betterment of these machines.

Receiver Named for Grabowsky

DETROIT, MICH., Nov. 19—Despite any statements to the contrary the Grabowsky Power Wagon Company has not yet been adjudicated a bankrupt, although a petition recently filed by several of the creditors of the concern in the Federal Court in Detroit will probably result in such action. Judge Tuttle appointed the Federal Trust Company receiver.

It is the intention of the receiver to conduct the business temporarily and in the event the court orders a sale it is hoped that it can be made as a going business. This order may be given the latter part of this week.

Several concerns have shown an interest in the matter and are preparing to make a bid on the business. Rumor has it that the Alco people have an eye on the proposition and in other quarters it is stated that the General Motors Company is also looking it over. It is impossible to verify these reports.

Federal Truck Had a Good Year

DETROIT, MICH., Nov. 16—The Federal Motor Truck Company passed a stock dividend of $100,000 and declared a cash dividend of 10 per cent. on November 14. This company was incorporated 3 years ago for $100,000, and has enjoyed a prosperous business since that time. Its output has increased from fifty trucks during its first year to 135 the second, and 750 for 1912. For the coming season, it is expected that about 1,500 will be sold. The officers of the company are: T. E. Reeder, president; Edwin Denby, vice-president; Garvin Denby, treasurer, and M. L. Pulcher, general manager.

Body Company in Receiver's Hands

LAPORTE, IND., Nov. 18—John C. Richter has been appointed receiver of the Laporte Carriage Company, of this city, giving bond of $10,000. The receiver was appointed in the federal

Automobile Securities Quotations

AUTOMOBILE securities were strong during the past week. Sales were not large because buyers declined to advance bids sufficiently to bring out the stock in material quantities. United States Motor issues were quoted regularly for the first time since the reorganization plan was formulated, although the issues have been dealt in irregularly for some time. The bids were 8 for the common; 32 for the second preferred and 65 for the first preferred. The trading was not brisk. Goodyear was again the spectacular feature of the trading, advancing 12 points on a few bids and making a new high record of 412. Chalmers broke 20 points on two small trades. This stock is very closely held, little of it being on the market, and consequently the usual supporting orders are not present. The table:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	180	200
Ajax-Grieb Rubber Co., pfd	..	..	98	102
Aluminum Castings Co., pfd	..	..	100	102
American Locomotive, com	36¼	36¾	47	47½
American Locomotive, pfd	102½	103	106⅜	108
Chalmers Motor Company	..	..	125	145
Consolidated Rubber Tire Co., com	7	10	11	14
Consolidated Rubber Tire Co., pfd	10	20	50	60
Firestone Tire & Rubber Co., com	175	180	285	288
Firestone Tire & Rubber Co., pfd	107	109	105½	107
Garford Company, preferred	..	..	99	100
General Motors Company, com	37½	38½	35	36
General Motors Company, pfd	77	79	76¾	78
B. F. Godrich Company, com	240	245	71	72
B. F. Goodrich Company, pfd	118½	119½	107	107¾
Goodyear Tire & Rubber Co., com	230	240	412	415
Goodyear Tire & Rubber Co., pfd	104	106½	104½	105½
Hayes Manufacturing Company	..	..	..	90
International Motor Co., com	..	..	20½	22½
International Motor Co., pfd	..	..	74	78
Lozier Motor Company	..	..	..	45
Miller Rubber Company	..	..	143	147
Packard Motor Company, pfd	104½	106	105½	107½
Peerless Motor Company	..	..	115	120
Pope Manufacturing Co., com	40	45	26	29
Pope Manufacturing Co., pfd	66	70	71	73
Reo Motor Truck Company	8	10	8¼	9½
Reo Motor Car Company	23	25	19	21½
Studebaker Company, common	..	..	42	44
Studebaker Company, preferred	..	..	94½	96½
Swinehart Tire Company	..	..	99	101
Rubber Goods Mfg. Company, com	85	95	100	..
Rubber Goods Mfg. Company, pfd	100	105	105	108
U. S. Motor Company, com	*18	*19	†8	‡10
U. S. Motor Company, pfd	*62	*64	§32	‡38
	..	..	¶65	‡70
White Company, preferred	.	..	105	108

*Old. †Common. ‡New. §2nd preferred. ¶1st preferred.

court by Judge Albert B. Anderson at Indianapolis. The receivership was created on the application of the Lackawanna Leather Company, of Chicago; the Hackettstown National Bank, of New Jersey, and M. M. Kates, of Chicago.

In addition to the application for a receiver a petition was filed asking that the carriage company be declared a bankrupt. The company manufactures automobile bodies and buggies. According to the complaint the company became embarrassed by losing a large contract it had with the Mitchell Motor Company. It was pointed out in court that the company's profits in 1910 aggregated $28,000, but in 1911 it lost $15,000 and up to the present time in 1912 its losses have been $35,000.

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Henry Hess Sells to D. W. F. Company

Announcement has just been made that the D. W. F. Ball Bearing Company, of Germany, has purchased the interests of Henry Hess in the Hess-Bright Company, of Philadelphia. Mr. Bright will continue with the company and will direct its policy. He has been elected president. The new secretary of the concern will be A. T. Bruegel and the treasurer, C. L. McCalla.

The Hess-Bright Company has been the American representative of the D. W. F. concern for a long time, importing the German bearings and manufacturing a number of domestic products.

The sale indicates still closer relations with the American trade by the German manufacturers, but is in nowise a revolutionary move. The interests have been closely allied in the past. The domestic manufacturing program has not been announced.

Market Changes for the Week

THE past week saw quite a few changes. The chief topic in the crude rubber trade on Tuesday was the auction sale of plantation rubber in London. This went off at higher prices, fine up-river Para closing at $1.07 per pound, a gain of $.03. The market for linseed oil was easy owing to the decline of late in seed at Duluth, where prices again weakened on Tuesday, closing at $.52, a loss of $.06. Lard oil increased $.06; petroleum, Pennsylvania, crude, rose $.10, while cottonseed oil also rose $.16. Tin lost $.02, owing to poor trade, and lead also experienced a decline, closing at $4.60 for a loss of $.15. Antimony remained at $.09 1-4 until Tuesday, when it dropped $.00 1-4. Beams and channels, Bessemer steel and open-hearth steel remained constant throughout the week.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.......	.09¼	.09¼	.09¼	.09¼	.09¼	.09	—.00¼
Beams & Channels, 100 lbs...	1.61	1.61	1.61	1.61	1.61	1.61	....
Bessemer Steel, ton	28.00	28.00	28.00	28.00	28.00	28.00	....
Copper Elec., lb......	.17⅜	.17 9/20	.17 9/20	.17 9/20	.17½	.17½	+.00 1/10
Copper, Lake, lb.......	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	....
Cottonseed Oil, Nov., bbl.....	5.87	5.87	5.87	5.85	5.87	6.03	+.16
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	....
Fish Oil Menhaden)	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @..	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime.	.90	.90	.90	.90	.90	.96	+.06
Lead, 100 lbs...	4.75	4.72½	4.72½	4.72½	4.72½	4.60	—.15
Linseed Oil....	.58	.55	.55	.55	.55	.52	—.06
Open-Hearth Steel, ton.....	28.00	28.00	28.00	28.00	28.00	28.00	....
Petroleum, bbl., Kansas, crude....	.73	.73	.73	.73	.73	.73	....
Petroleum, bbl., Pa., crude ...	1.70	1.75	1.75	1.75	1.80	1.80	+.10
Rapeseed Oil, refined	.69	.69	.72	.72	.73	.70	+.01
Rubber, Fine Up-river, Para.	1.04	1.04	1.04	1.04	1.06	1.07	+.03
Silk, raw Ital...	....	4.40	....	....	4.40	....	....
Silk, raw Japan.	....	3.85	....	....	3.92½	....	+.07½
Sulphuric Acid, 60 Beaumé....	.99	.99	.99	.99	.99	.99	....
Tin, 100 lbs....	5.00	5.04	5.00	5.00	5.00	4.98	—.02
Tire Scrap.....	.09¾	.09¾	.09¾	.09¾	.09¾	.09¾	....

Nash G. M. President

Buick Executive Succeeds Thomas Neal as Head of Giant Company—Latter To Be Chief of the Board of Finance

Neal's Administration Remarkably Successful in Rehabilitating Property and Establishing Firm Footing

DETROIT, MICH., Nov. 19—Thomas Neal, who for the past 2 years has been president of the General Motors Company, has relinquished that office and will become chairman of the board of directors. C. W. Nash, manager of the Buick plant and one of the vice-presidents of the company, will succeed Mr. Neal as president. Mr. Neal's retirement is in accordance with an understanding at the time he took office.

In the fall of 1910, according to a statement given out by the company today, when the concern was re-financed and the executive offices moved from New York to Detroit, the financial interests supporting the company realized the necessity of securing as president a man of very broad business experience, capable not only of exercising the abilities of an organizer and the judgment of an experienced manufacturer, but also of inspiring confidence among investors and financiers. Mr. Neal was urged to take the office and accepted with some hesitancy. Although he was attracted by the great possibilities offered to one interested in large business enterprises, his acceptance necessitated close application to executive work at a time when he was desirous of being rid of such burdens.

Mr. Neal took the office with the understanding that he would be permitted to retire as soon as the business was re-established on a satisfactory basis. The financial report of the company recently issued to stockholders shows that this time is ripe and that the business is in splendid financial condition with a net earning of 17 per cent. on the common stock during the last year.

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At the meeting of the stockholders of the General Motors Company held Tuesday in Jersey City all the old directors were re-elected, save in the case of J. N. Wallace, who retired and was succeeded by Charles W. Nash. The annual report as already published in these columns was presented. The board will meet again to choose officers for the coming year.

The directorate consists of the following: Joseph Boyer, Anthony N. Brady, Emery W. Clark, W. C. Durant, Andrew H. Green, Jr., J. H. McClement, Edwin D. Metcalf, M. J. Murphy, C. W. Nash, Thomas Neal, James J. Storrow, Albert Strauss, Nicholas L. Tilney and Jacob Wertheim.

The board contains the same representatives of the financial interests that took hold of the company after 1910.

Charles W. Nash was elected president of the corporation at the subsequent meeting of the directors.

Mr. Nash succeeded W. C. Durant as general manager of the Buick after the reorganization and will continue in that special capacity. Thomas Neal, retiring president, will remain on the board and will continue as head of the finance committee.

The various changes signify that the affairs of General Motors are progressing regularly and that the pressing need for a financial and industrial specialist at its head has abated. Mr. Neal made a wonderful success of his administration. Mr. Nash is a manufacturer of pre-eminent rank and is highly regarded as an executive.

W. C. Durant, who was re-elected to the board was not present at the meeting as he had been called to Detroit on business connected with his new manufacturing project. The attendance at the meeting of the stockholders was small in numbers but represented practically all of the capital stock issues.

Ward Heads King Co.

Buyer of Plant Is Chosen President—Bayerline, Bollinger, Chase and Day Are Members of His Staff

Freight Car Shortage Situation Improves as Peak of the Load Approaches—Only 1200 Increase

DETROIT, MICH., Nov. 16—Following the visit of Artemus Ward to this city to look over his new property, the King Motor Car Company, which he purchased for $40,000, it is announced that the reorganized concern will be a close corporation, all of its stock to be held by Mr. Ward and those actively engaged with him in the enterprise.

Artemus Ward, Jr., son of the new owner of the King company, will spend much of his time here. His father is to be president of the company. The personnel of the concern in addition to Mr. Ward is: J. G. Bayerline, manager; T. A. Bollinger, factory manager; T. P. Chase, engineer; J. B. Siegfried, purchasing agent; W. L. Daly, sales manager; J. Mohardt, superintendent; F. A. Vollbrecht, chief accountant and Geo. Gurney, manager service department.

The present line of four-cylinder cars will be continued, in addition to which another model will soon be placed on the market to sell at a figure close to $1,200. This latter machine is really the one which Mr. Bayerline, who was formerly connected with the Warren Motor Car Company, built last summer. It was designed by Mr. Chase under direction of Mr. Bayerline.

The new King company has shipped forty-three cars since it was taken over 5 weeks ago by Mr. Ward. A production of about three cars a day is now being maintained. A show room will be opened at the factory on Jefferson avenue within a short time.

Frontier Company's Annual Report

BUFFALO, N. Y., Nov. 18—At the annual meeting held here Friday of the stockholders of the Frontier Tire & Rubber Company, officers were elected for the ensuing year. Orson E. Yeager being chosen president, while Frank V. E. Bardel and John W. Gibbs were chosen first and second vice-presidents respectively. George T. Roberts was elected treasurer, while M. F. Dirnberger, Jr., was elected secretary with A. R. Robertson as assistant secretary and treasurer. W. R. Price was selected as general manager for the coming year. During the past 6 months the business of the Frontier Tire & Rubber Company was reported to have increased 140 per cent. About $600,000 worth of business already has been closed up for next year according to the report.

Freight Car Shortage Less Severe

Net shortage of automobile freight cars only increased about 1,200 during the fortnightly period just reported by the American Railway Association which ended November 7. The total net shortage at that time was 51,259. Compared with what was predicted, this is a smaller shortage than expected by at least 8,000 cars and indicates that the peak of the load is being passed right now. The next report covering the period ending November 21 is expected to show a decrease to about 40,000 cars net shortage and by the first report in December the traffic men believe that there will be demand for only about 20,000 more cars than can be supplied. By the second report in December the operating departments of the roads will probably have a few idle cars over and above the full quota in use.

The reduction of the shortage in coal cars represents most of the improvement in the situation so far as the grain from the Northwest is moving in still larger volume than heretofore. It has been shown that fully 100,000,000 bushels of grain in excess of the shipments of 1911 up to this time has been moved to primary markets. The visible supply of wheat alone is placed at 22,000,000 bushels, a record that will stand for a few days anyway. Reckoning 1,000 bushels to the car, the extra grain shipments so far this year have been 100,000 cars. As a matter of fact, the average car will not carry 1,000 bushels, so the actual excess total is even larger.

There has been little congestion, considering the immense volume of freight handled, as the weather has been good for shipping all over the land.

Compared with last year, when there was a net surplus of freight cars totalling 26,514, present conditions indicate an increase of freight for shipment of about 79,000 cars.

Among the railroads that placed rush orders for cars last week were the Northwestern, Omaha, Lackawanna and Ontario and Western. The orders amount to 3,000 cars. The total number of cars ordered during the week is estimated at 13,400, while about 30,000 are included in inquiries made by the Pennsylvania. New York Central lines and smaller systems, orders for which have not been placed as yet.

The grain movement of the past week was about double that of last year for the corresponding period.

Warren Creditors Extend Notes

DETROIT, MICH., Nov. 20—(*Special Telegram*)—At the request of the directors of the Warren Motor Car Company, creditors and officers of the company held a joint conference at the Pontchartrain hotel on November 19, at which it was decided to extend all notes and other obligations until about June 1. The creditors were unanimous in their opinion that the Warren company is in healthy enough condition to continue business. On November 12 another joint meeting was held at which the exact condition of the company's affairs was gone over.

The liquid assets are about $375,000, under the new arrangements, while liabilities total $350,000, of which $50,000 is a stationary liability against the plant, leaving sufficient margin for conducting business.

Although the plant has not been operated at its full capacity of late, it is expected that within 2 weeks it will be turning out its maximum output again.

Cars to take care of 2 months' business are ready for shipment at once, while the entire 1913 output of 1,500 machines have been sold, which will take care of the business up to July 1 of next year. The various models will be continued as planned.

At yesterday's meeting six were added to the directorate from among the creditors, which number added to the present officers will bring the board up to nine. The enlarged board is made up as follows: Harry Bassett, Weston Mott Company; H. J. Mallory, Weston Mott Company; F. H. Lewis, Lewis Spring and Axle Company; M. R. Jencks, Port Huron Engine Company; J. W. Mowe, Firthstone Tire & Rubber Company; G. Jahn, Bosch Magneto Company; Homer Warren, C. R. Wilson and C. H. Wilson.

On Thursday afternoon, November 21, a meeting of the directors will be held at which the resignation of several of the present officers will be accepted and new ones elected.

Postmaster Prepares for Parcels Post

Postmaster Morgan, of New York, is preparing his department for the prospective rush of mail matter under the new parcels post law which goes into effect January 1. The parcels business is handled at present by the express companies and with the transference of this business to the postoffice vast additions to the present transportation facilities of the departments will be required.

Just how much it will amount to is a matter of guesswork and the department will probably await the event itself before entering into hard and fast contracts for transportation. The package mail during the holidays is always large even at the present high rates of postage, and Mr. Morgan intends to try out the parcels system beforehand by handling the Christmas parcels. The method to be used will be to hire automobile trucks and horse-drawn wagons for the occasion.

The aggregate mail under the parcels post law probably will not be much larger than it was last year, during the first few weeks of the law's operation, but any increase will be felt almost instantly in New York and the department figures that an accurate gauge of the situation can be had from noting local conditions.

The general department has not yet contracted for automobile trucks to be used in the outlying sections where it is expected that the new law will make rural deliveries much more laborious than they have been in the past.

The bids asked by the government to furnish certain types of automobile trucks specified several sizes that would be useful for this purpose, but, on the surface at least, the specifications were not aimed at mail delivery cars.

Finger Prints on Drivers' Licenses

BUFFALO, N. Y., Nov. 18—Superintendent of Police, Regan, of Buffalo, is heartily in favor of the plan recently outlined by State Secretary Lazansky, of recording finger prints of all chauffeurs and automobile owners to prevent gangsters and gunmen from securing licenses. "Of course, many owners might object to giving their finger prints," said Chief Regan, "but after the advantage of the plan is shown I believe the majority would be willing." There are no two finger prints alike while many faces look so similar that identification is difficult.

Bathtub Case as Limit to Patents

WASHINGTON, D. C., Nov. 18—A decision of the Supreme Court of the United States which marks an epoch in connection with efforts to violate the Sherman anti-trust law by concealing the violation behind the patent laws of the country, handed down on Monday, in the "Bathtub" case from the United States District Court of Maryland, was a victory for the government throughout. The opinion, which was delivered by Justice McKenna, was unanimous. The government, in originating the case, attacked the enameled ware manufacturers on the grounds that the fifty defendants named had entered into a combination to restrain interstate trade in sanitary enameled ironware, and had attempted to monopolize that trade. The prosecution was based on an agreement between the defendants and Edwin L. Wayman, who had patented a dredger, a tool employed to sprinkle enamel over the red hot iron ware, which agreement, it was alleged, constituted an illegal agreement.

The lower court held that the agreement destroyed competition and fixed prices in violation of the Sherman law, and, furthermore, that the patent on the dredger did not make the agreements lawful. Justice McKenna said the combination of the manufacturers became effective through Wayman's plan to grant license on his patent. The agreements clearly therefore he continued, "transcended what was necessary to protect the use of the patent or the monopoly which the law conferred upon it. They passed to the purpose and accomplished a restraint of trade condemned by the Sherman law. The added element of the patent in the case at bar cannot confer immunity."

Justice McKenna said there was nothing in the "mimeograph case" of last year which contravened the views he was expressing. He said:

"Rights conferred by patents are indeed very definite and extensive, but they do not give any more than other rights to universal license against positive prohibitions. The Sherman law is a limitation of rights which may be pushed to evil consequences and therefore restrained."

A. C. A. Must Pay Debt

U. S. Supreme Court Holds That Unregistered-Corporation Defense Is Not Valid in Lupton Suit

Opinion Gives Jurisdiction to Federal Courts Even Where It Is Specifically Denied Under Statute

THE status of the foreign corporation which fails to register under the laws of the State of New York has been further outlined by the recent decision of the United States Supreme Court in the suit of D. Lupton Sons & Company against the Automobile Club of America for damages under a contract by the former to funish a large bill of goods and labor to the club. This consisted of metal window frames and other merchandise and the labor necessary to install the material.

The matter was tried in the United States District Court before a master, who decided that the complaint was not duly founded because the Lupton company was a Pennsylvania corporation which had not complied with the New York statute providing for registration with the Secretary of State.

The matter was then taken to the United States Supreme Court on revision, and that court reversed the finding of the master, sending the cause back to the district court with a mandate to enter a judgment in favor of the complainant for about $3,000.

The constitutionality of the whole statute was not covered by the opinion, but the rule was sufficiently outlined so that it has been established that while the statute is valid and in effect within the jurisdiction of the state courts it has no force in the Federal tribunals. While it is optional with a foreign corporation whether it shall prosecute a suit in the state of Federal courts, the rules of Federal procedure provide that the United States courts shall not take jurisdiction of any matter in which lass than $2,000 is involved. Thus, if the foreign corporation, unregistered in New York, wishes to enforce a claim of less than $2,000 it is powerless to do so. If it is over $2,000 it may do so in the Federal courts. Of course, if the corporation is registered it can proceed under the jurisdiction of the state courts. Scott, Upton & Newcomb argued the matter for the Luptons.

Court Again Defines Joy-Riding

MILWAUKEE, WIS., Nov. 18—A point of law was established in a case tried at Milwaukee last week which will make it possible to collect damages from the persons or person responsible for taking a car without the owner's consent for joy-riding or other purposes. The W. E. Allen Company, state agent for the McFarlan and Marathon, brought suit against Robert Leonard and five others for damages due to the misuse of a car. Leonard was employed in the Allen garage and took out a touring car, a demonstrator, and invited five friends to go riding, and in the early hours of the morning landed the car against a pole.

Allen's attorneys proceeded against both driver and passengers on the ground that concerted use was made of the car and that all were guilty of conversion. Not only was claim made for repair cost, but for depreciation of the car's value brought about by such repairs.

The court decided that the driver alone could be held liable, excusing the four defendants who were passengers. However, the fifth passenger, who did not appear at the trial and was not represented by counsel, was held jointly responsible for this error of omission, with the driver. Judgment was rendered against both. Had the fifth defendant appeared he would have been excused from liability.

Atlanta's Show Opens

Prospects Promise Well with Cotton High and Plentiful and Finances of South in Fine Shape

Machine Tools To Be a Feature of the New York Automobile Show—Boston Electric Club Reorganized

ATLANTA, GA., Nov. 16—The Atlanta show, third in the Gate City of the South, and the second under dealers' auspices, was opened tonight. Thirty-two branches and agencies are exhibiting cars and accessories. The exhibit was divided as follows: gasoline pleasure cars, seventy-eight; electrics, seven; commercial cars, six; polished chassis, four; accessory exhibits, eight; oil exhibits, one and motorcycles, five.

Considerably more space was available than last year 30,000 square feet as against 18,080. This increase of space in the local Auditorium-Armory was accomplished by raising the floor to the level of the stage, by tearing out the wings of the stage and by utilizing to the fullest extent the space under the seat banks.

The showing of automobiles is comprehensive and representative. Fifteen of the most important automobile manufacturers in America are represented in Atlanta with branches and as many more are represented by agents, with the result that the Atlanta show each year usually offers a good assortment of standard cars.

The cars are better displayed than usual this year. The tendency to overcrowding has been avoided and the display is excellent.

Atlanta's position in the South is shown by the number of factory representatives who are here for the show. Included in the list are the following notables: H. O. Smith, president Premier Motor Manufacturing Company; C. P. Henderson, president Henderson Motor Company; Jas. G. Haislet, chief engineer, Studebaker Corporation; Leo A. Peil, general sales manager, Mitchell Motor Car Company; E. W. Morse, sales manager Hudson Company; J. H. Newmark, advertising manager, Oakland Company; Guy Monahan, advertising manager, Premier Motor Manufacturing Company; W. C. Leslie, general manager Firestone-Columbus; Henry Haven, assistant sales manager, Flanders Electric; R. W. Chapman, assistant sales manager, National Motor Vehicle Company; H. C. Beavers, assistant to the president, Stevens-Duryea; R. H. Collins, general sales manager, Buick Motor Company; James T. Roach, sales manager, Locomobile Company, of America; W. J. Slater, assistant sales manager, Michigan; in addition to practically every southern division manager in the field.

Little can be told of the volume of business which will be transacted during the show, but there is every reason why it should be large. The South is most prosperous this fall—and in that respect a different Dixie from last fall, when pauper prices for cotton put the entire section to the bad. This year cotton is plentiful, the price is vastly higher than a year ago and in every respect there is ample reason why Southerners should have money. Unless the opinion of the show optimists is wrong, more cars will be sold this year at the show than at both previous shows put together.

Machine Tools at National Show

Machine tools will be featured at the coming national automobile show in New York, special emphasis being laid on commercial vehicle week, when the intense crowding of pleasure car week has passed. The Automobile Board of Trade conferred last week with the National Machine Tool Builders' Association and an agreement was reached.

The Society of Automobile Engineers favors the addition of machine tools to the big show and according to the plans now being formed the examination of the prospective exhibits by members of that organization will be one of the attractions of the annual meeting's program.

Secretary M. L. Downs is now in Cleveland arranging some of the essentials of the added attraction. According to tentative plans the machine tool exhibit will be housed in the Palace and efforts are being made to have it as complete as possible, considering the comparatively short time that remains between now and show time.

The show will be the first ever given by this section of the industry and as the national show always brings together the cream of the mechanical staffs of the various automobile factories, its importance to the manufacturers is great.

Without giving out any definite data it has been announced that the total exhibits already signed up for the New York show during both weeks is 9 per cent. greater by number than actually showed in both buildings last year.

Boston Electric Club Reorganized

BOSTON, MASS., Nov. 18—Boston electric automobile dealers and allied interests changed the name of their organization from the Electric Vehicle Club of Boston to the Electric Motor Car Club, of Boston, at a meeting held at the Hotel Marliave, November 14. The committee on reorganizing through its chairman, F. J. Stone, reported a new constitution and by-laws which were adopted after discussion.

The principal feature of the new constitution is the division of membership into three classes, namely:

Those who derive an income resulting from the sale of electric automobiles and accessories.

Private owners and operators and their representatives.

Representatives of the trade or daily journals.

The constitution also provides a financial basis for making the club self-supporting. Provision is made for the appointment of standing and working committees to advance the interests of the organization.

Following the evening's business, John A. Voodry delivered an address on "Salesmanship" in which he outlined his opinions of the cardinal points in selling electric cars. F. D. Stidham spoke of the need of a complete list of charging stations for the Boston territory.

The advisory committee of the club was directed to confer with representatives of the Bay State A. A., Massachusetts A. C. and other bodies of motorists relative to the present stringent enforcement of the ordinances regarding the leaving of cars on public streets. It was suggested that a petition of motor car owners be prepared for presentation to the proper authorities to protest against these regulations.

The officers of the reorganized club are as follows: President, Day Baker; vice-president, E. S. Mansfield; secretary, H. F. Thomson; treasurer, J. S. Codman.

Savannah Negotiating for Races

With regard to the reports originating in Savannah, Ga., that application will be made for the 1913 running of the Vanderbilt Cup and Grand Prize road races, William K. Vanderbilt, Jr., of the Motor Cups Holding Company, has announced that nothing definite has been decided about the running of the races.

The terms proposed by the Savannah Automobile Club contemplates full entry lists for both events as a condition precedent to accepting them. Under the tentative plan suggested, the club asks for half the net proceeds, the rest going to the military organizations that guard the course.

RICHMOND, VA., Nov. 16—The Richmond Automobile Club has completed arrangements for 2 days' racing meet to be held at the State Fair Grounds on November 29-30, following the Virginia-Carolina football game on Thanksgiving Day.

Foreign Cloth In Discard

American Makers of Trimmings and Upholstery Coverings Now Rival Product of French and German Factories

Minor Details of Workmanship Still To Be Perfected at Home Before Supremacy Is Established

THE American car buyer has every reason to feel gratified that he is now able to obtain direct from manufacturers in this country quite what he desires of medium priced upholstery goods for his car. And should the manufacture of automobile cloth and laces continue to progress during the next few years as it has unmistakably progressed during the past 5 years **there will be scarcely any class of upholstery fabrics which cannot be obtained from the American manufacturer, except perhaps the trimming designed for an exclusive line of limousines.**

Not a few domestic manufacturers are now supplying the market with automobile upholstery fabrics of a particularly varied line which in tastefulness and real elegance of effect fairly rival the most popular French designs.

American cloth manufacturers and lace producers are working in cordial co-operation in an effort to equal, if not to surpass, the product of the foreign manufacturer. These home manufacturers expect to show—indeed, they are even now showing—samples of cloth and lace harmonious and luxurious in design and effect. In this matter, up to a comparatively recent period, the foreign manufacturer has been clearly in the lead of his American competitor. **No longer need we to look to the French and German cloth and lace makers' products for those seemingly matchless cloth and lace effects.** The manufacturers of our own country are now producing cloths and laces which in design and quality, and in those other fine points of distinction, are nothing short of what the European manufacturer is able to bring forth.

What the American car, when upholstered, chiefly fails in is the proper proportion of upholstery design, in those infinite minor details of workmanship, and in the variety, extent and quality of the essential furnishings.

The Paris samples of upholstery workmanship bear the stamp of an artistic touch combined with a thorough appreciation of all the little niceties, both of workmanship and material, which enter into the finished car. In this respect, and only in this respect, do the Frenchmen excel the artificers and designers on this side of the Atlantic. Practically every French craftsman is a master in arranging and providing for the pleasure and comfort of the car occupants in the matter of interior conveniences ordinarily overlooked by the American artisan. This is a part of automobile construction and finish that the craftsmen in this country must be permitted by their employers to learn fully.

But, after all, these are minor issues compared with the supreme one of providing a car interior furnished with cloth and laces, and a style and design of upholstering, sufficient to meet the demands of the most fastidious traveler.

The French cloth and lace makers were first to introduce the practice of matching laces with standard colors of cloth. This method of making fabrics enabled the carriage and automobile manufacturer to decide upon any color of cloth and feel assured that he could easily obtain a lace to harmonize with it. Upon this side of the water no such method of manufacture prevailed, and as a result the vehicle manufacturer was put to great disadvantage.

The French manufacturer, moreover, was the first to introduce the sample book system as it is known today.

At one time the impression prevailed that the superiority of the French manufacturer's products was due to the fact that Australian long fiber wool was principally employed in the making of cloth and lace fabrics, whereas in this country only the short fibered wool was used, and, as a matter of fact, continues to be used. However, experience has taught a different lesson and today both the long and the short fibered fleece are being used with equal success.

We now have in this country manufacturing plants devoted to cloth and lace making of much larger and more imposing proportions than any to be found abroad. The American car manufacturer and owner have cause for satisfaction in this condition of a great industry inasmuch as it provides a fine selection of fabrics to choose from at a cost less than what one might expect to pay for the same grade of goods with a foreign label attached.

At the approaching Madison Square Garden Automobile Show, as perhaps never before, the public will have an opportunity to judge of the variety and magnificence of upholstery fabrics as made up in a great display of cars of both medium and high-priced design. And it may be suggested that the prospective buyer go over the cloths and laces made up into beautiful works of art, and study at close hand, and for himself, what creations of luxury they afford.

Paint and finish and upholstering are both selling and buying factors, and they are at the present time figuring more largely in the sales department than ever before. Sales are known to rise and fall by these issues alone.

Among the novelties in finish applied to automobile body work for exhibition at the Madison Square Garden Show is **the cane or basket-work effect brought up under a very high state of finish.** This basket-work imitation comes in the form of paper with a muslin back, the cane or basket-work imitation being stamped out on this. The material is imported, coming in rolls 20 inches by 80 inches. The fabric is cut to fit the panels, these panels being painted in any desired shade or color. The material is pasted securely to the surface and over it is then placed the high finish.

At the coming New York shows novelties in lake pigments will be displayed to an extent hitherto quite unknown. An automobile body with two or three shades of lake graduated from light to dark constitutes a daring exhibition of color work, and when well done never fails to elicit admiration. For example, in the treatment of scarlet lake, starting at the top of the panel with the deepest shade, the color is then graduated in gently softened tones until the light shade is reached, with the result that when the blending is artistically executed the effect is something splendid to see.

All the lakes running along through from rose lake, crimson lake, carmine lake, Munich lake, English scarlet lake, and purple lake, to chatemuc lake, are susceptible to the magic of brush work to an extent perhaps greater than any other colors, and this doubtless explains their increasing popularity in automobile work. On the wide and flowing fields of the big cars these pigments of rare beauty and brilliancy are made to display their real magnificence and serve the pleasure of delighted car owners the world over.

Lakes Call for High-Class Process

Generally speaking, it doesn't pay to cheapen the process of developing the lake or transpartnet color finish. A purple or crimson lake that costs $6 a pound should be brought to the surface by a strictly high-class process, or not at all. To use expensive lake pigments over cheap, inadequate grounds, by cheap methods, is only an ill devised method of throing money away. For cheap, inexpensive methods stick to the solid colors.—From *The Carriage Monthly* for November.

Principal Types of Thermometers and Pyrometers Briefly Explained with Reference to Their Best Ranges of Temperature and Their Value in the Manufacture of Automobiles and Accessories—New Tendency in Meter Implements

THERMOMETERS and Optical Pyrometers—Rapid and accurate determination of temperatures plays such an important part in the manufacture of automobiles that the measuring instruments used for this purpose more and more crave the attention of manufacturers wherever quality of the output and economy in production are considered equally indispensable. In the quenching bath of water or oil the desirable temperatures range from 0 to 200 degrees C., according to circumstances. For the drying room, the color-baking ovens and for the temper colors the required heats range up to 400 degrees; in the annealing ovens from 300 to 690; at the forge and in gas or oil furnaces from about 600 to 1100 degrees C.; and for electric or oxy-acetylene welding much higher. In all cases the exact temperature is of greater or lesser importance for obtaining the best possible results. The steel industry, the electric furnace and the automobile are probably the factors in modern industrial life which are most directly responsible for the rapid progress which has been made of late years in developing practical measuring instruments from scientific laboratory apparatus. One of the most important of all the advance steps, however, has been evolved, in the form of optical pyrometers, by a scientific combination of the common blacksmith's method of judging heat by colors with the no less common practice of judging colors by matching them.

The development which has taken place has gone in several directions. Old-style thermometers have been perfected so as to give readings from minus 200 deg. C. to plus 750 degrees and to record the readings. Electric-resistance thermometers cover the range from minus 200 degrees to plus 900 degrees, while of especial industrial convenience from 300 to 600 degrees. Thermo-electric thermometers, which are frequently termed pyrometers, are especially useful from 700 to 1000 degrees. By combining the electric-resistance and the thermo-electric types, readings from minus 100 to plus 1,000 degrees may be reliably recorded. The optical or sight pyrometers are particularly adapted for measuring temperatures above 1,000 degrees and up to 7,000 degrees, although special constructions in this class of instruments cover a more limited range. It is by means of the optical pyrometer that the temperature of the sun, as seen through a clear atmosphere, has been recorded as about 6,000 degrees.

During all this progress the means for establishing and correcting a heat scale has nevertheless remained unchanged. The old gas thermometer, which is described in nearly every textbook on physics, is still the highest authority by reference to which the dials of all other instruments are verified. In its first form it was based on the expansion of air, but now hydrogen is the gas used for measuring temperatures from minus 200 degrees up to plus 1,000 degrees, and the receptacle which is exposed to heat or cold is of platinum. At higher temperatures hydrogen shows an inconvenient tendency to pass through a large number of substances, platinum included, and nitrogen is used instead. The bulb or receptacle for the gas which until lately was made of refractory procelain is now blown from molten quartz. Richard *Frères* and Wiborgh have turned out thermometers of this type intended for industrial uses, but they have not found wide application.

IMPROVEMENTS IN OLD TYPES

Glass thermometers depending upon the expansion of a liquid, such as mercury, alcohol, toluene, spirit of gasoline or pentane, have been limited to small ranges of temperature by the freezing and boiling points of the fluids and by the softening of glass under a relatively moderate heat. By replacing the air over a mercury column by nitrogen or carbonic gas and using Iena glass, in which borates are added to the silicates, the range can be raised to 550 degrees C., but there is still the need of guarding against sudden changes and mechanical shock. Siebert & Kühn, of Cassel, have lately made thermometers of quartz which can be used up to 700 deg. C. and, being provided with a scale traced on a strip of quartz, these instruments are reliable even with prolonged exposure to the heat and they are completely indifferent, mechanically, to sudden changes. But at 700 degrees the inert gas over the mercury column reaches a pressure of 60 atmospheres, and the mechanical fragility remains an undesirable feature.

More robust thermometers depending upon the expansion of a fluid are made by Richard *Frères*, Steinle & Hartung, C. J. Eckardt and others. The type is shown digrammatically in Fig. 1. The steel bulb *a* is connected by a capillary tube *b*, whose outside diameter is 5 millimeters and inside diameter 0.5 millimeter, to a hollow and flat spring *c* whose cross-section is shown at *d*. The air is driven out (presumably by mercury vapor), and the apparatus is filled with mercury through a small hole afterwards closed with solder. Now, when bulb *a* is heated, mercury is driven into the hollow spring *c* which is thereby extended, so as to assume a shape giving more room for the mercury, and its free end is made to move the hand *e* over the graduated scale *f*. These thermometers are used for locomotives, being in that case equipped with a compensating device which is practically a duplicate hollow spring in which the mercury is actuated from the same bulb and acts upon the same dial axis, thereby quieting the hand and obviating the disturbing effects of wind, speed and vibrations. Similar thermometers are provided with electric sound signals indicating desired maximum and minimum temperatures.

The recording of temperatures is usually accomplished by a stylus tracing a curve on a roll of paper which turns around once in 24 hours and may be set to turn at different speeds if desired. The Eckardt system for this purpose is indicated in Fig. 2. A flat disk may be used instead of a roll, and photographic methods of recording have also been employed.

To transmit the readings at a distance—the office of a technical manager, for example—electric connections are established operating a second indicator hand at the distant place of observation, either continuously or intermittently; or, if it is only desired that the temperature may be ascertained at any chosen time, a press-button system is arranged. These devices are expensive, however, and are disappearing because the transmission of readings at a distance, wherever it is essential, justifies the installation of electric-resistance or thermo-electric thermometers by means of which it may be accomplished much more conveniently, since the electric or thermo-electric current is with them the direct means for measuring the heat variations.

INDISPENSABLE FOR ANNEALING WORK

The electric-resistance method is used especially in England, where it was first perfected through the research work of Callendar. Between the limits of minus 200 deg. C. and plus 700 deg. C. the thermometer of this type seems to be more sensitive than the Le Chatelier thermo-electric pyrometer, while the latter excels above 700 degrees. For temperatures between 300 and 600 degrees it is in practice an indispensable guide, as this range is not covered well by other types. It is based on the fact that the electric resistance of a metallic conductor grows about 4/1,000 for each degree of increased heat, in the case of pure metals. Once introduced in industrial form upon the European continent by William Siemens, several models of this type have been manufactured. The latest are those made by Hartmann & Braun, of Frankfurt, and by Heraeus, of Hanau. The active part is a platinum wire coiled upon a quartz core 3 to 4 millimeters in diameter and 60 millimeters long. The coil is inserted in the slightly larger bore of a very thin quartz tube. The air is then expelled while the external tube is softened in an oxy-hydric flame until the platinum wire becomes completely imbedded in quartz. By a somewhat elaborate method, too long to describe, the resistance of the platinum wire is made exactly 50 ohms at 0 deg. C., and this feature is alike for all thermometers of this kind. The element produced in this manner corresponds to the mercury bulb of an ordinary thermometer, and in continuation of it there is a quartz sheath containing the transmission wires which are of silver, gold or platinum. The whole of this is then enclosed in a steel tube for protection against mechanical and chemical actions. As electric source, either a storage battery or a light current with a suitable auto-converter may be used.

In order to measure the variable resistance, which gives the temperature, there is used a post comprising a Wheatstone bridge and an Arsonval galvanometer (as made by Siemens & Halske) with a graduated scale. The resistance of the three branches I, II and III of the bridge (Fig. 3) is equal to that of the thermometer at zero of the thermometric scale; at this temperature it passes no current. If the temperature varies, and thereby the resistance, the hand of the galvanometer is deflected. A simple reading gives at once the temperature. The essential condition for getting an exact measurement is that the resistance of the bridge remains constant. To control and, if need be, regulate this factor, a variable resistance A is used which may be modified at will. By switching in the control resistance P by means of commutator C the hand should at a certain temperature take a certain position marked in red on the dial. If the hand covers this mark the apparatus is in order. Otherwise the variable resistance A is changed until this result is obtained.

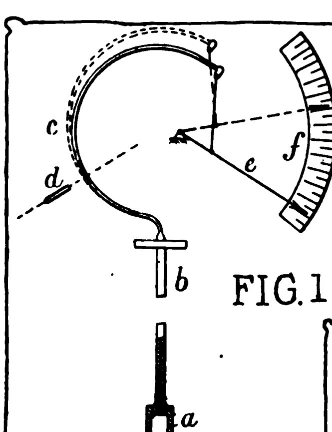


FIG. 1

Fig. 1—Diagram of mercury thermometer made without use of glass

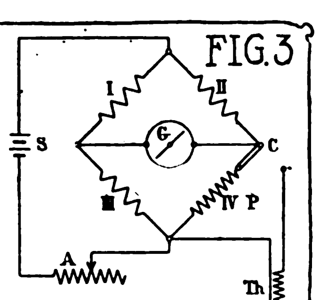


FIG. 3

Fig. 3—Installation of Heræus electric-resistance thermometer with fixed control-resistance for verifying the adjustment of rheostat—S battery, G galvanometer, Th thermometer, A rheostat, P control resistance, C commutator, I, II, III, IV Wheatstone bridge

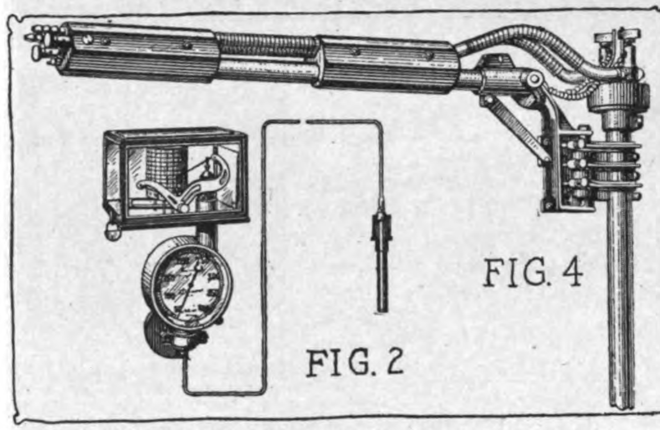


FIG. 4

FIG. 2

Fig. 2—Recording with steel bulb mercury thermometers
Fig. 4—Thermo-electric pyrometer with water-cooled terminals

The control may also be effected by switching in a voltmeter between the two conduits connecting the battery and the Wheatstone bridge, and afterwards the resistance A. By the control resistance P, which is equal to that of the thermometer at a certain temperature, the tension of the current is verified, as before, and it is corrected, if necessary, by varying A. A simple reading of the galvanometer then gives the temperature. This method is especially advisable where many thermometers are controlled and read by means of a single galvanometer.

WIDELY PREFERRED FOR HEAT TREATMENT OF STEEL

Becquerel first conceived the thermo-electric instrument, and the industrial form given it by Le Chatelier is widely known. Though its price is high—about $80 in France—the Heraeus firm alone has made and sold 2,000 of its kind. The thermo-electric element comprises a platinum wire, 1 1-2 meters long and 0.6 millimeter in diameter, fused by an oxy-hydric flame to another wire of the same dimensions but composed of 90 parts of platinum and 10 parts of rhodium. Insulation is provided by porcelain tubes, and the whole is placed inside of a steel tube, if the temperatures to be determined range below 1,000 deg. C.; otherwise in a sheath of quartz glass or fire clay.

The tension of the thermo-electric current which is produced when the element is placed in the fire is a function of the difference in temperature at and around the element and at the terminals of the apparatus. The current is transmitted to a galvanometer with two scales, one giving the electromotive force in millivolts and the other the temperature. The calibration is done by comparison with a gas thermometer. The means for registering the readings at a distance are well known and simple, consisting in mechanical provisions for causing an indicator point to travel over an inked or smoked paper roll or disk. By means of different-colored inks the readings from 6 pyrometers may be recorded on one roll.

For temperatures lower than 800 deg. C. and with a view to reducing the cost of the thermo-electric element, Keiser & Schmidt, of Berlin, and Hartmann & Braun, of Frankfurt, use iron and copper-nickel or silver and copper-nickel instead of platinum and platinum-rhodium, and the indications furnished by these instruments are sufficiently accurate for ordinary purposes, while their lower price permits the installation of more thermometers at any one plant.

It is a drawback to thermo-electric thermometers that they must be exposed somewhat long to the heat which is to be measured before reaching an equilibrium of temperature. The time can be shortened by baring the element to the heat, but

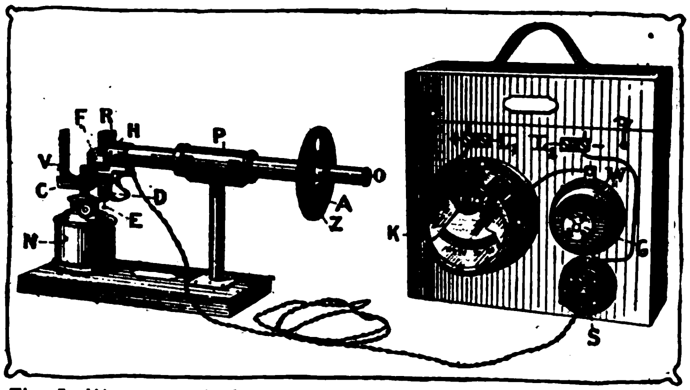


Fig. 5—Wanner optical pyrometer arranged with auxiliary lamp N for verifying or correcting its readings

when this is done the platinum easily becomes brittle. As the thermo-electric apparatus measure only the difference of temperature between the element and the terminals and are calibrated for a certain temperature of these terminals—usually 20 deg. C.—it is necessary for accuracy to keep the terminals cool by a water circulation, as in the Le Chatelier pyrometer shown in Fig. 4, or else to displace the graduate scale of the galvanometer by means of an adjustment screw to compensate for the discrepancy between 20 degrees and the actual temperature of the terminals. Some instrument makers who use an iron and copper-nickel element, notably Keiser & Schmidt, add a compensating device, which is practically a prolongation of the element and renders it unnecessary to make any correction of the terminal temperature. With this construction it is also practicable to use the instrument for the middle range of temperatures, such as, for example, for telling the heat of superheated steam.

INSTRUMENTS DEPENDING ON HEAT RADIATION OR LIGHT RAYS

Féry's pyrometric telescope was the first industrial application of Stefan's scientific experiments of 1880, subsequently confirmed by Boltzman and others. Féry's instrument is based on the law that: The amount of heat radiated by a black body (as defined by Kirchhoff) or from an opening in a furnace at high temperature is proportional to the fourth power of the absolute temperature of the black body or of the furnace.

The heat radiations from the heated piece act on an iron and copper-nickel element, and the current produced is measured by a galvanometer. The recording may be done as with a Le Chatelier instrument. The advantage of the pyrometric telescope, as of the optical pyrometers which are replacing it in industrial practice, is that it permits the determination of heat at a distance without necessity for exposing either the instrument or the observer to its ordinary effects.

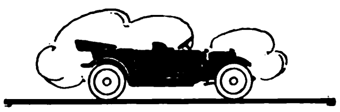
Optical pyrometers are distinguished from the Féry instrument by being based on the measurement of light and not on that of radiated heat. They therefore serve for the measure of temperature only when this is so high that light is emitted. As visible light rays from metals begin at 500 deg. C., the optical pyrometer method becomes practicable only from 600 degrees up and preferably should not be used until 900 degrees is reached. The principle of all optical pyrometers is to match the light emitted from the object whose temperature is sought with another light whose temperature value is known. The best-known pyrometers of this type are the Le Chatelier pyrometric telescope, the Mesuri & Noel, the Holborn & Kurlbaum, the Moise and the Féry & Millochau. To calibrate these instruments it is necessary to know the law of relations between the intensity of light emitted by the heated material and its temperature. These laws have been studied by Paschen, Wanner, Lummer and Pringsheim and have been mathematically established by Wien and Planck. It is on the basis of the work of these men that Mr. Wanner has constructed an optical pyrometer—manufactured by B. Hase at Hannover—which certainly at the present moment is the one most extensively used in Germany and which now begins to be employed in France also.

The Wanner pyrometer is a telescope of about 0.30 meter in length which in its interior contains a spectroscope combined with a photometer. By means of two slits situated in a vertical plane, within the telescope, two bundles of light rays are directed. One comes from the incandescent body whose temperature is to be determined; the other from a little incandescent lamp which serves as a means for comparison. The rays first pass through a prism where they are decomposed by refraction, then through a Nicol polarizer of Iceland spar and, before reaching the ocular, through a Nicol analyzer.

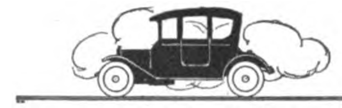
The instrument is so constructed that the observer receives only the red light corresponding to a wave length of 656 millimeters (the red line C in the spectrum of hydrogene). What he sees is two red spots of different light value. The lower one corresponds to the temperature to be measured and the upper one to that of the electric control lamp. The Nicol analyzer is now turned until the two spots are equally luminous. A wheel, Z in Fig. 5, with a graduated scale A measures the angle which the analyzer must be turned in order to produce this result, and Messrs. Wien and Planck have established the law by which the temperature is obtained as a function of the sine of this angle. It is important that the light source is of constant intensity, and as the source actually is a storage battery it is necessary to determine the resistance to be placed between it and the electric bulb—whose location is inferiorly at H in Fig. 5. This is done by means of a lamp burning acetate of amylic alcohol giving a fixed intensity of light to which the electric bulb light is made to correspond. Fig. 5 shows the apparatus as arranged for making this control. L_1, L_2 are the terminals of the battery, W the resistance rheostat adjustable by the button G. K is the galvanometer indicating the constancy of the light current, S the contacts, P the pyrometric telescope, N the control lamp in position for comparing the two lights, VFR the visor for placing this lamp correctly, EDC the contacts for the electric lamp, O the ocular. When all the precautions are taken, the results from this pyrometer are satisfactory, but its price is high, running from $150 to $200 in Germany. Though apparatus of this order date back only to 1902 nearly a thousand of these instruments have been sold, mostly to steel producers. They are made in several models, for heats ranging from 840 deg. C. to respectively 2,000, 4,000 and 7,000 degrees, and in some of the models the temperature may be read directly from a scale while with others one or more tabulations must be consulted. Recently a model has been made which measures heats as low as 600 degrees, and in this all the luminous rays—not only the red ones—can be gathered into the luminous spots which are compared.—From article by Eugène Grandmougin, Professor of Chemistry at Mulhouse, in *Le Génie Civil*, September 7 and 14. [Popular "pyroscopes" have also appeared in the German market in which the heat colors of steel are reproduced by a kerosene flame and differently colored films. These are turned into view until the heat color of the work is matched, and a scale then shows the temperature.—Ed.]

MOTOR Implements—It is noticed from accounts of public tests of motor-powered agricultural machinery recently held in France that the blades and wire tools used for cutting and loosening the soil in the machines made by the *Motoculture Française* company are not now so thin and resilient as first planned by Mr. de Meyenburg, who is identified with this company and was the first to conceive and realize the need for elastic soil cutters and the abandonment of the traditional ploughshare. In the new machines the cutting tools have some resiliency, but most of their ability to avoid breakage and violent shocks to the whole mechanism of the machine, when stones or other obstructions in the soil are encountered, is obtained by mounting them on springs which permit the cutting tool in its entirety to be deflected from the obstruction.—From illustrations in foreign exchanges.

Two Closed Bodies for Overland 59-R



Coupé Design and Special Collapsible Top Adapted for Runabout Chassis



By George G. Mercer

A SUITABLE car to which a closed body can be adapted is the Overland 1912 model 59-R. Two designs are presented here for this purpose, one a new body of coupé form and the other a combination body or roustabout.

Of the two alternatives the coupé body would cost approximately $800, no alteration being necessary on the chassis, while the second design, which is really an addition to the body, and one, moreover, that easily permits of a return to the original runabout form, requires an outlay of only $300.

The stock Overland 59-R runabout is shown in Fig. 4 and the general appearance of the coupé and roustabout adaptations is given in Figs. 5 and 7.

The coupé body is a light-weight design suitable for the small chassis of this car, the wheelbase of which is 106 inches, the tires being 32 by 3.5 inches; the springs, 1.75 inches, and the four-cylinder motor 4 by 4.5 inches. It is installed in exactly the same space lengthwise as that occupied by its predecessor and the increase in weight over the runabout body will not exceed 400 pounds.

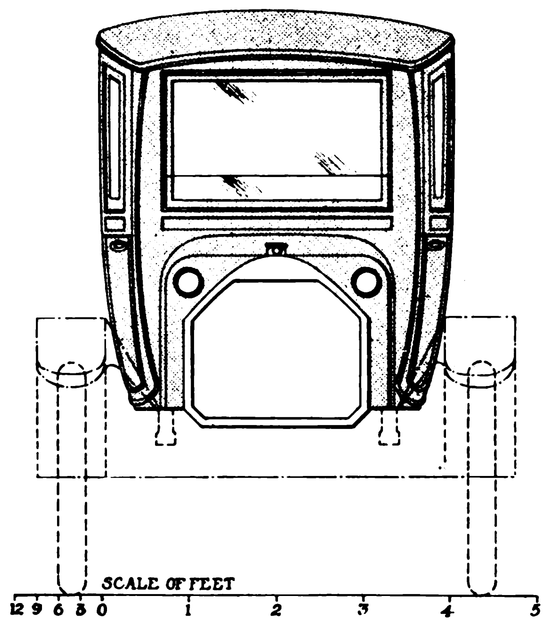


Fig. 1—Front view of Overland coupé design

No new parts, such as mud guards, etc., are required, with the single exception of the dash lamps, and these are included in the body specifications. The rear tire carriers remain on the tool box as with the runabout design.

Though the suggested body is small in its plan dimensions, the height over the cushion to the roof is of standard measurement, and the size of the cushion being the same as that of the runabout there is ample accommodation for two people. The size of the door opening and length and width of the body are given in Figs. 2, 3 and 5. As overloading the chassis is a point of some importance in small cars of the type in question, the construction work is of light design, the greatest saving of weight being effected by forming the upper rear quarter and the back panel of cloth instead of the usual wood or metal paneling.

The cloth used is heavy enameled duck, finished with a surface that imitates the grain of leather. This material is capable of withstanding hard wear and when used in the manner shown is impervious to water. A single piece is used, extending from the hinge pillar on one side to the corresponding pillar on the opposite side. It is fastened under small metal mouldings at the front and along the bottom edge, and at the top it is fastened under the wood drip moulding. The framing inside to support the roof and to form the openings for the windows is of very light construction. An oval window is inserted in each side and two smaller windows of circular form at the rear. All are finished with metal mouldings that serve to fasten the cloth and also to form a flange to hold the glass.

Although the sides of the body are made of flexible material, the roof does not fold down, but is a permanent structure of .25-inch pine sheathing. Over this is stretched the same material as that used for the panels, but of lighter weight, and the edges are nailed under the drip moulding also.

Ordinary practice is followed throughout the remainder of the body construction. The lower panels and the cowl are

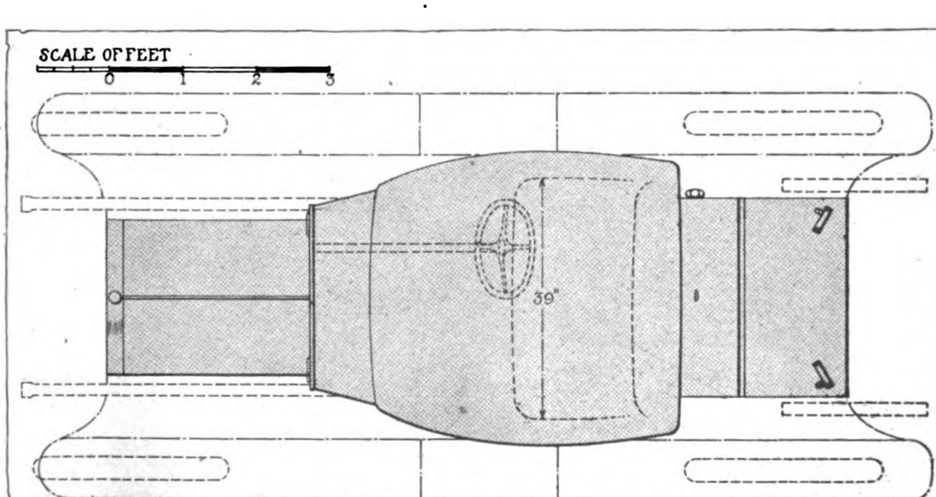


Fig. 2—Plan of suggested Overland coupé

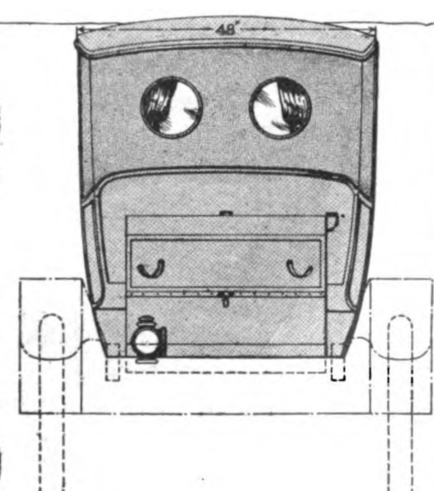


Fig. 3—Rear view of Overland coupé

.0625-inch aluminum, with aluminum mouldings; the door handles and locks are of the regular pattern, and outside butt hinges are used on the doors to save weight in the framing.

Mahogany frames are used for the door windows and these are made to drop their full length. The frames of the front windshield are of the same wood and the cut in the shield for the visor is shown in Figs. 1 and 5. The oval side panes and the circular rear lights are stationary, and all glass used is plain crystal plate.

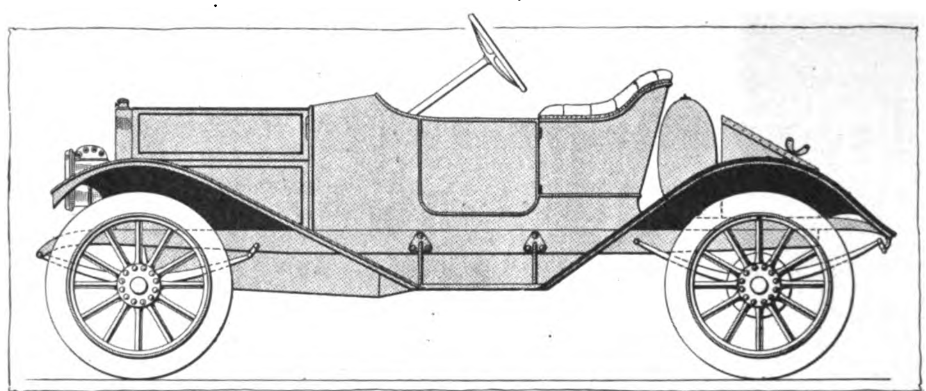


Fig. 4—Side view of standard Overland 1912 model 59-R

Suitable colors for painting the body would be the standard blue used on Overland cars for the cowl and body panels below the belt line, with black mouldings. This will agree with the chassis color. Above the belt line all framing and mouldings could be black to correspond with the black enameled cloth used for the side and back panels and the roof. The name panel on the doors to be blue and the metal mouldings around the quarter and rear lights for fastening the cloth on the edges to be black, also the door hinges.

The finish on the door handles, supports for the front windshield, exposed rim of the dash lamp and both the tail and headlights to be either silver or nickel.

For the trimming a suggestion that would harmonize well with the design would be blue broadcloth of a lighter shade than the body color, with lace of the same ground color and having a fleck of red woven into the pattern. The light touch of red will give warmth to the interior appearance and this can be further advanced by having the carpet similarly marked. The trimming of the body will be the same as if the exterior panels were of metal or wood. The blue silk curtains on the doors run on spring rollers, while those on the quarter and rear windows are draped.

Suitable appointments for the interior would be one card case and one ash tray with blue morocco finish fastened to the doors; an electric roof dome light, and possibly some form of corded hat rack. These and a few pockets suitably distributed will be all that are required.

The dash lamps are let into the dash with only the rim and the glass visible. The horn is located on the right side and is preferably of the electric type. The steering wheel is located on the right side and the change gear and brake levers in the center of the car, allowing easy access from either side. This construction also makes possible the use of a narrower body than usual. Cloth panel material will lessen considerably the cost of the article, and the body as designed, finished according to the description given above and mounted on the chassis will represent an outlay of approximately $800.

This design is very compact and for the purpose for which it is intended it will be found well adapted to meet all requirements.

To turn now to the roustabout design, Fig. 7 shows the same standard body as illustrated in Fig. 4, but with the addition of a closed-in top of waterproof cloth on rather novel lines. This top is provided with two large glass windows on each side, one on each door and another in each quarter back of the door. It is light and flexible and affords ample protection when raised with the glass frames in position. When lowered, as indicated in Fig. 6, it affords all the advantages of an open car. The windshield is stationary and is of the V-type, that is, it consists of two planes receding at a slight angle from a center pillar on the cowl. By this construction the wind-resisting surface is lessened, as the slanting sides deflect the air pressure instead of fronting it as is the case with the ordinary flat windshield. This form of construction also has the merit of imparting considerable strength and rigidity to the forward structure.

The top as a whole is quickly and easily manufactured and is designed so that it can be removed in the spring and the body

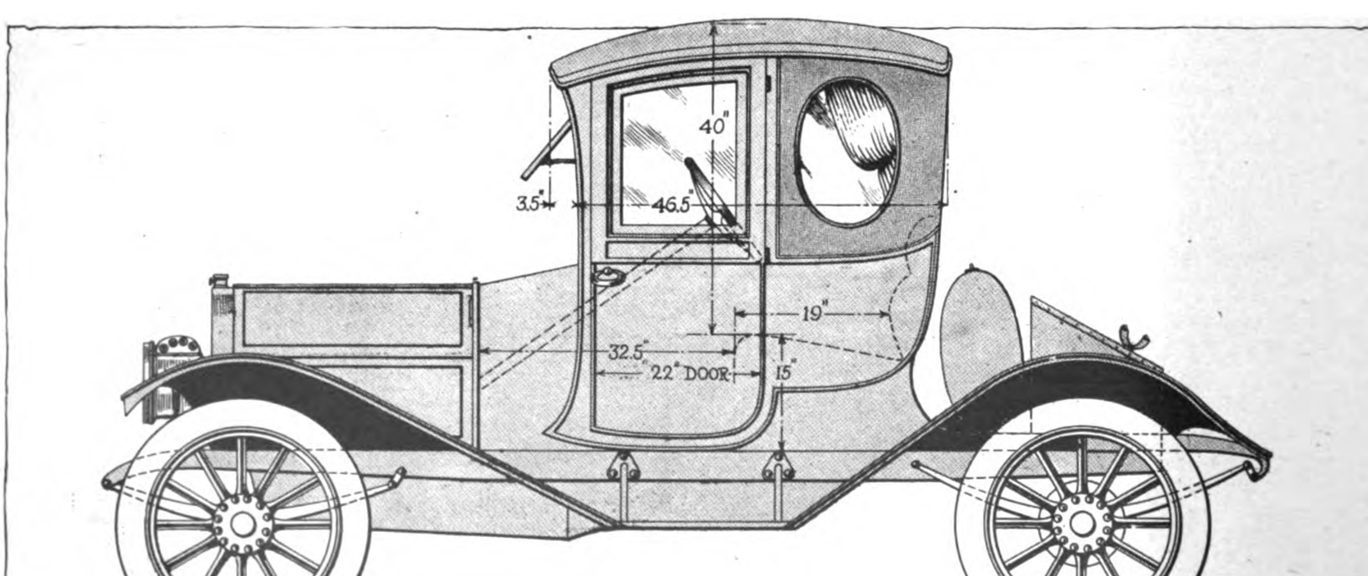


Fig. 5—Side view to scale of suggested coupé design for 1912 Overland model 59-R

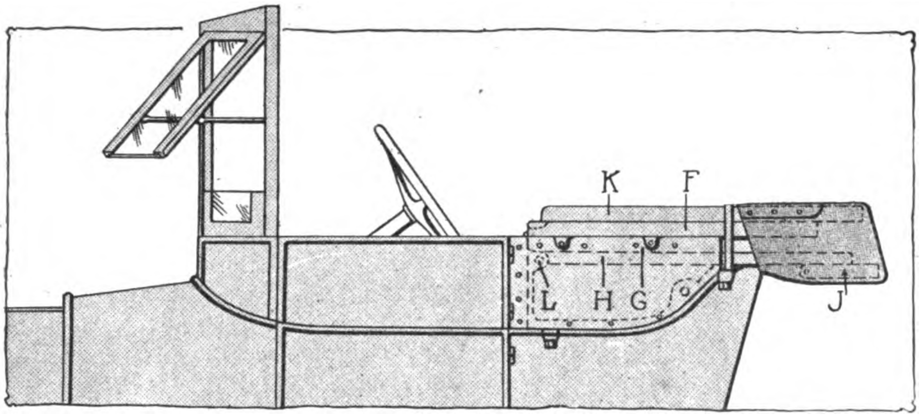


Fig. 6—View of roustabout design for Overland showing top down

For the quarter glass frames, the same provisions are made with flanges on the posts at the back and front of the frame. These frames are made to lift out when the top is lowered and can be stowed under the seat. When assembling in position with the top raised, these frames are put in from the outside, the top of the frame fitting into a pocket on each pillar. Two machine screws made specially for the purpose are then passed through lugs at the bottom, attached to the glass frame and made fast in plates inserted in the framing G, thereby securely locking the frame in position. To keep the frames from rattling and shaking loose and to insure against leakage of rain at points around the joints, all the edges of the door and quarter frames are bound with rubber channel.

returned to its original condition as an open car, as shown in Fig. 4.

Taking up the construction from the front, the windshield is made with solid panel and framing below line C, Fig. 7. The post A is connected by framing at the top to B at each side of the body and the glass is cut at D to form the visor.

The frames of the glass are of mahogany and the panel below C is formed of aluminum panel and molding.

Practically the only necessary alteration is that of a new door, which, as shown in Fig. 7, is made considerably higher than the original design.

The molding that bordered the top of the old door is shown across panel. One new door hinge is added above this molding line and the new lock is also placed above it. Conditions are allowed to remain as in the original car as much as possible to facilitate replacing the old parts, thereby permitting of the change being made without any great expense.

The door window frames are made to swing on hinges on line C and to turn down and lie flat against the inside of the door. Dotted lines E, Fig. 7, indicate the glass frame when in this position. These glass frames are of mahogany and the lower part of the frame is made extra thick to give a stable bearing when the frame is in the upright position. Spring catches, one at each side, are the means used to hold the frame erect. The posts B and F have metal flanges .0625-inch thick projecting 5 inches into the doorway, against which the door glass frame abuts when the door is closed. These flanges also form a wind break around the glass.

The large quarter glass used in connection with a collapsible top of the type illustrated is one of the distinctive features of this design and requires special construction to provide for same. The framing around the window is formed by the post or bow F at the front, the post or bow H at the rear and the horizontal framing G at the bottom. At the top between the bows F and H no framing is required, but a joint I is used to keep the bows properly separated. The joint I is also connected with the short bow J by a separate arm which is used to throw the bow into proper position when the top is folded down.

The other member to complete the folding top is the bow K. This horizontal bow engages in the bow F, as illustrated in Fig. 7, and when folded down it also engages with the same bow, and at the point where the latter breaks, as illustrated in Fig. 6.

A good quality of heavy-weight mohair or burbank of a dark color will be the most suitable material for the top cover and curtains. The top cover is fastened to the bows in such a manner as will allow folding properly. The curtains are made in five pieces; the back curtain and the quarter stays detach at the bottom and roll up, and the small curtain below the framing piece G is loosened when the top is folded and then replaced when the top is down.

A great deal of comfortable service can be obtained from a car thus equipped and the cost of changing the car from Fig. 4 to Fig. 7 will approximate an outlay of $300.

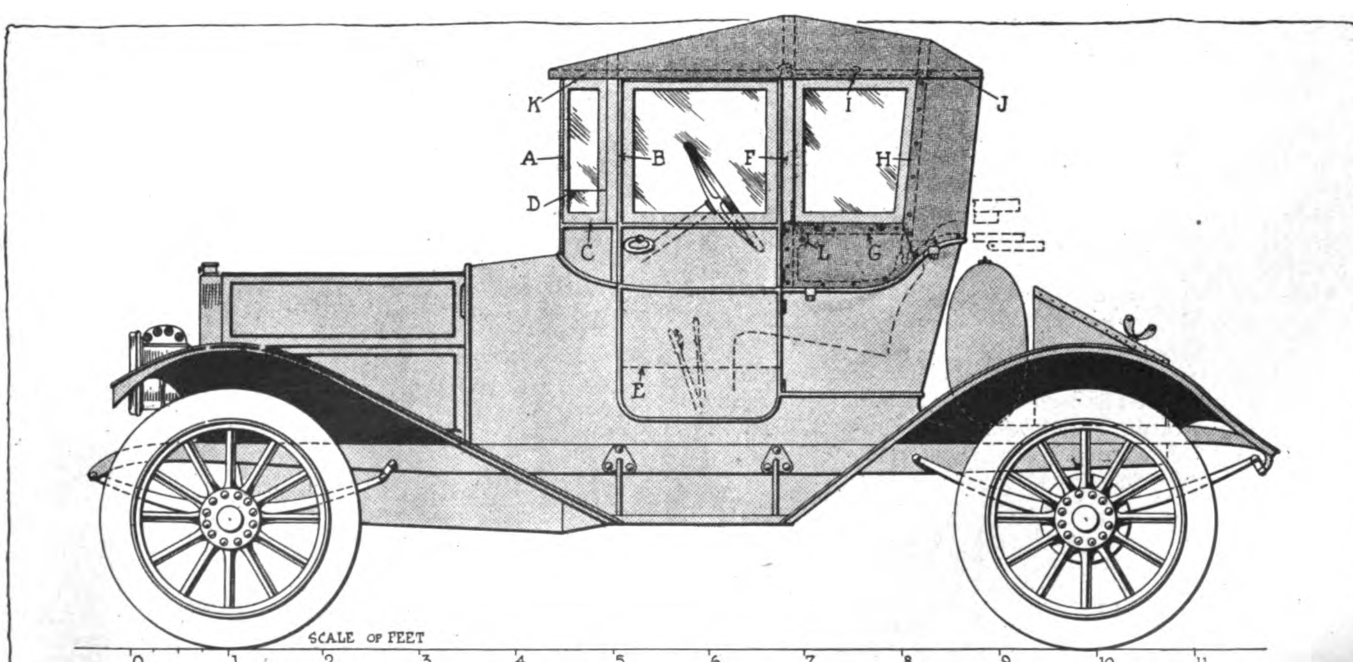


Fig. 7—Suggested collapsible hood design for Overland 1912 model 59-R

Among the New Books

Works Which Have Recently Appeared That Should Appeal to Automobilists as Well as to Those in the Industry

LABORATORY MANUAL FOR TESTING MATERIALS OF CONSTRUCTION, by L. A. Waterbury, C. E., Professor of Civil Engineering, University of Arizona, Member of the American Society for Testing Materials. Published by John Wiley & Sons, New York City. 270 pages, 5 by 7 inches, with sixty-eight illustrations. Cloth, $1.50.

While primarily intended as a manual for a school laboratory, this work is also of interest to the practical engineer wishing to brush up on certain details of material testing. The work is divided into nine chapters. The first chapter contains such information regarding the use of the different testing machines and methods of marking and conducting the tests as well as detailed instructions as to how to prepare a report. The various tools, instruments and measuring devices are taken up in the next chapter, while each of the remaining chapters deals with a specific material, including cement, concrete, iron and steel, wood, brick, sand, gravel, stone, asphalt, etc. In the appendix are several papers on subjects relating to the testing of materials.

MOTOR BODIES AND CHASSIS. By H. J. Butler, Technical Editor of *The Automobile and Carriage Builders' Journal;* Foreword by the Rt. Hon. The Lord Montagu, of Beaulieu, Editor of *The Car Illustrated*. Published by the D. Van Nostrand Company, New York City. 328 5 1-4 by 8 1-2-inch pages with numerous explanatory illustrations. Cloth, $2.50.

Up-to-date we have few complete books of this length which put into intelligible form the details of construction of the whole car from upholstery to spark-plugs. This book tells how the automobile is built. It gives specific information on every point and does not deal with the mere surface of the subject but goes to the heart of the matter. As a work which not only describes the different parts of a car but tells how each is built and gives the measurements required, it is unique. At every point it bears the mark of completeness and attention to detail.

THE MODERN GASOLINE AUTOMOBILE, ITS DESIGN, CONSTRUCTION, OPERATION AND REPAIR, by Victor W. Page, M. E., Consulting Engineer, formerly technical editor *Automobile Journal*. Published by the Norman W. Henley Publishing Company, New York City. 700 pages, 6 by 9 inches, with 500 original illustrations and ten folding plates. Cloth, $2.50.

There have been two distinct periods in American literature on the automobile. This mode of conveyance, which has probably created more interest than any other topic during the past 10 years, was the subject of many detailed writings when it first began to make itself known as a prominent factor in the world's progress. After that time there came a pause and we are now in the second period. All of this will explain why this work is modern and free from the elementary ties that bound the early authors. The book is a complete study of the automobile from fuel to upholstery. The trend in modern practice is outlined in the early chapters and step by step every portion of the motor, chassis and body are taken up and discussed. The illustrations are new and original. The Knight sliding sleeve valve and several of the later developments in rotary valves are explained. Of special value is the chapter on upkeep of the car.

MODERN MACHINE SHOP CONSTRUCTION, EQUIPMENT AND MANAGEMENT, by Oscar E. Perrigo, M. E., Member of the American Society of Mechanical Engineers. Published by the Norman W. Henley Publishing Company, New York City. 343 pages, 7 by 10 inches, with more than 200 illustrations. Cloth, $5.

In view of the interest which is just at present felt in factory efficiency a work of this kind should attract universal attention. The laying out of a plant has so much to do with the quality of the work that is turned out as well as with the cost of turning it out that too much cannot be said on the subject. In the first part of the book the author goes into details regarding the construction of the plant. He points out the various methods in use for different parts of the factory and gives elaborate directions regarding the use of specific materials for salient points in the construction work. The illustrations in this part of the work show how the actual building of some of the most modern factories is carried out, telling how certain puzzling problems have been met and solved. In the second part of the work the equipment and its arrangement have been touched upon, as has also the proper space to be allotted to each department and where they should be placed. The third part of the work takes up the actual system of management and paying of the men, the well-being of the employees and the authority to be vested in each of the foremen. The question of the superintendent's office and its work is given special attention.

GAS AND OIL ENGINES, by Alfred Kirschke, translated from the German and adapted to English practice by Charles Salter. Published by Scott, Greenwood and Son. Sold in the United States through D. Van Nostrand Company, New York. 158 pages, 4 1-4 by 7 1-2 inches, with 55 illustrations. Cloth $1.25.

This is a description of the principles of the more important developments in the gas engine field since 1860. It is a work more for the man interested in the larger gas engines than for one who is chiefly concerned with the smaller types. An especially good chapter on the Diesel motor and the principles of its operation lends considerable value to the work. The author, who is chiefly known through his efforts as lecturer at the State and Municipal School of Handicrafts, Halle, England, has touched upon the salient features of the best recognized types of motor and has contrasted these and compared them with a view of presenting a broad view of the entire situation.

PRIMER OF SCIENTIFIC MANAGEMENT. By Frank B. Gilbreth, member American Society of Mechanical Engineers. Introduction by Louis D. Brandeis. Published by D. Van Nostrand Company, New York City. 103 5 by 8-inch pages. Cloth. $1.00.

What is Scientific Management as an art? What is the Taylor system? How can I introduce the principles of cost saving into my business without destroying it? All these questions and many others are answered in this book which does not pretend to be a complete discourse on Scientific Management, but merely as the title states—a primer.

TOUR BOOK OF THE CALIFORNIA STATE AUTOMOBILE ASSOCIATION.. Published by the association. 630 pages, with maps Cloth, $2.50. Paper, $1.50.

Several hundred tours throughout the States on the West coast are mapped and outlined and the work contains all the valuable information that a book having routed tours generally has for the automobilist. Some unique and good features are incorporated in the way the book is laid out among them may be mentioned the large type used in numbering the pages and the complete index.

THE DRAFTING OF CAMS, by Louis Rouillion. Published by the Norman W. Henley Publishing Company, New York City. Twenty-four pages, pamphlet form, with sixteen explanatory figures. Price, 25 cents.

One of a series of practical papers issued by the same concern. This deals with the laying out of cams for al purposes and gives drafting-room directions on the method of drawing each.

PRIMARY BATTERY IGNITION, by C. Wadsworth, Jr. Published by the D. Van Nostrand Company. Seventy-seven pages, with twenty-eight illustrations. Boards, $1.50.

A little work on battery ignition that serves a worthy purpose in that it explains some of the simpler instruments and at the same time gives an insight into the workings of a battery ignition system. The high-tension coil is taken up in detail and practical information is given as to its adjustment. It is printed clearly on good paper and is written in such a way that no one should have difficulty in following the author.

Recording Work of Automobile Salesmen

New York Selling Organizations Use a Number of Blanks for Keeping Track of Salesmen's Arrangements

Elimination of Chance Work, the One-Man Idea and of Inefficiency Are the Aims of This System

SALESMEN, like other mortals, must do their work in a systematic way to accomplish things. The advantage of system, as in other fields of endeavor, is increased capability of the salesman to help himself and the firm, and the abolition, at least to a certain extent, of the one-man principle which is considered a detriment to modern business. Control of their activities may not look an attractive thing to the vanity of some salesmen, but the good ones among them generally recognize their own advantage in a progressive policy. Since a general staff officer in the army submits to a discipline and system, there is no reason why a salesman should not.

The A. Elliott Ranney Company, New York City, representatives of the Hudson Company, takes the sensible view that whatever means go to increase the efficiency of the salesroom and men are desirable, has developed a system on the ground of this principle. The fundamental scheme is the inducement of the salesmen to do as much work as is in their power and to give each man the credit which is due to him. This system has been the reason, to a considerable degree, that the company just mentioned has developed a splendid business during the past few years.

The system by means of which the salesmen's work is recorded includes a number of forms. On these forms daily, and in some cases weekly, records are entered, by which the salesmen inform the company of the calls made by them and the sales which they have closed; whereas in the communications from the firm to the sales staff the latter is informed of the standing of each man. Following are the forms used in the Hudson salesmen system of the Metropolitan branch:

1. Daily report of each individual salesman, giving the total of the work done by the writer and the various items constituting it.
2. Master card, giving the name of every prospect owner, which is made out and filed on the day when the first call is made.
3. Sales record made out by the salesman as soon as a transaction is closed.
4. Weekly sales statement given out by the firm to the salesmen.
5. A more detailed weekly statement which is kept in the office, giving the amounts paid to the company during the week, and during the selling season, being, thus, a sales statement.

Another form which is not in use by the Hudson branch in New York, but which should prove very useful if introduced, would be—

6. Layout of salesman's work for the next day, giving the appointments made, the arrangements made with the demonstrator, etc.; in short, all that is arranged beforehand and cannot be ignored without the possibility of complications arising therefrom.

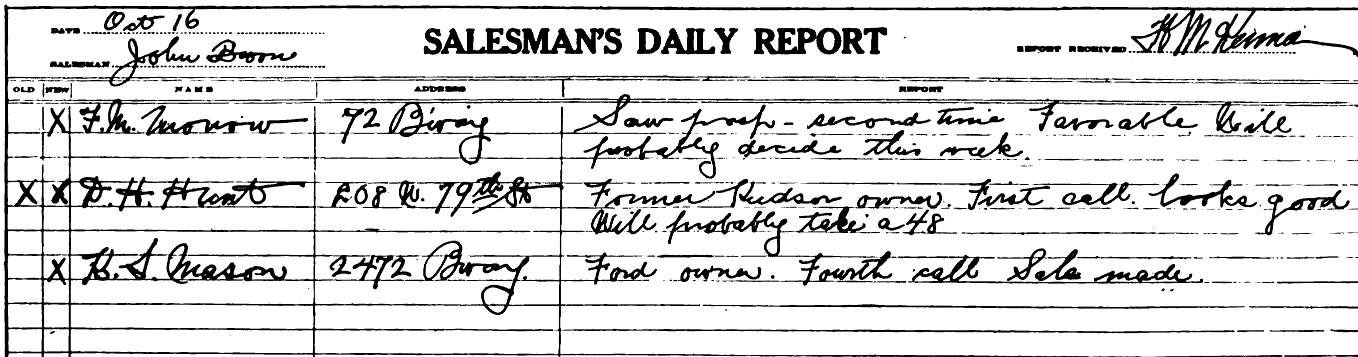
Fig. 1 shows the daily salesman's report, which is made out on a white blank, 14 inches wide and 7 inches deep, lined and printed in black. The blanks are kept in pads, and every salesman upon returning to the store at the close of the day fills out one blank, in the manner indicated in Fig. 1. He enters his name and the date on the form, and then reports every call he made. This is done with considerable detail, as shown by the three cases appearing in Fig. 1. Besides name and address of every party called upon, the circumstances worthy of being recorded are noted. Furthermore, in the case of each prospect owner it is stated whether he has owned Hudson cars before or not.

Upon the basis of the information afforded by the daily salesmen's reports the master cards are filled out, one being shown in Fig. 2. This form is 8 inches wide and 5 inches deep, and lined red and blue, with black printing. Spaces are provided for name and address of the prospect owner, under whose name the card is filed. All master cards are numbered in rotation as they are filled out. The name of the salesman and the dates of his first visit and of his demonstration also find their place at the head of the form. All the space below the heavy black line is given to details which appear on the daily report cards of John Brown, and the card is large enough to permit of entering details of a dozen calls, using both sides of the form.

The sales record, Fig. 3, is made out by a salesman when he closes a transaction. This form mentions whether the purchaser is a former Hudson owner or not, as the company keeps exact records of the nature of its business. Of course, a salesman keeps a record of the sale in his own notebook, but this is outside of the scope of the company's system.

One of the purposes of this system is to breed confidence in the firm, and when a salesman has been assigned a prospect and has properly followed him up he is entitled to the percentage on the sale, even if the transaction should be closed on the floor while he is not in the store. By this condition salesmen are induced to spend only a minimum of their time on the floor; that is, when they take their turn in salesroom service. They in turn spend a day in the salesroom to take care of the parties who come in from the street.

At the end of every week a statement, Fig. 4, is made out by the firm and a copy is given to every salesman or agent mentioned on the form. This gives the salesmen a chance of comparing their achievements, and calls their attention to an error, if such should occur in the crediting of sales to the men. The weekly sales report covering the work of the salesmen for the week and season until the end of the week is typewritten for the office records of the firm, being made out as follows:



SALESMAN'S DAILY REPORT

Date Oct 16

Salesman John Brown

Report received K M Hemma

Old	New	Name	Address	Report
	X	F. M. Morrow	72 B'way	Saw prosp - second time Favorable Will probably decide this week.
X	X	D. H. Hunt	208 W. 79th St	Former Hudson owner. First call. Looks good Will probably take a 48
	X	R. S. Mason	2472 B'way.	Ford owner. Fourth call Sale made.

Fig. 1—Daily report made out by the salesman of the A. Elliott Ranney Company, New York Hudson dealers

NAME K. L. Mason
No. 713
Salesman John Brown
ADDRESS 2472 Broadway, New York City
Source
Date Oct. 3-1912
Catalogue
Model 37 Touring
Dem. Oct. 8-1912 Perkins

SALES LETTER RECORD

Oct. 3—Address by Mr. George M. Bell, 145 East 55th street. First call on prospect. Seems doubtful. Owns Ford, is in favor of buying another one this year. Will, however, have 37 demonstrated to him next week.

Oct. 8—Saw prospect at 2:30 p.m. Showed car, gave demonstration; 10 miles on Long Island. Liked car, but will wait for some other demonstrations and decide in a week.

Oct. 13—Called again, third time. Promised to decide on the 16th.

Oct. 16—Fourth call. Sale made. Full equipment. To be delivered, if possible, on Nov. 7.

Fig. 2—Master card of Hudson sales company, which is made out for every prospect owner

WEEKLY SALES REPORT OF A. ELLIOTT RANNEY COMPANY, NEW YORK, ITS BRANCHES AND AGENTS, FOR THE WEEK ENDING SATURDAY, OCTOBER 26, 1912.

Name of Salesman	Models A	Models B	Weekly Amount	Gross* Amount	Canceled	Net Sale
Brown	1	1	$9,000	$27,875	.....	$27,875
Allen	0	1	4,000	25,650	.....	25,650
Smith	1	1	9,500	23,425	$10,000	13,425
Jones	2	1	14,000	18,995	4,000	14,995
	4	4	$36,500	$95,945	$14,000	$81,945

*Sold during the model season so far.

Name of Agent	A	B	Weekly Amount	Gross Amount	Canceled	Net Sale
Buckeye Auto Co.	1	1	$9,000	$12,550	.....	$12,550
Common Sense Auto Co.	0	1	3,500	11,000	$2,500	8,500
	1	2	$12,500	$23,550	$2,500	$21,050

Less 5.5 per cent. to dealers	$1,157.50
Net total amount of business at the end of the fifteenth week of the season	$19,892.25
Total of salesmen's sales	81,945.00
Grand total	$101,837.25

Model A

Sales previously reported,	6	This week, 5	Gross, 11
Cancels previously reported,	1	This week, 2	Gross, 3
			Net total, 8

Model B

Sales previously reported,	36	This week, 6	Gross, 42
Cancels previously reported,	3	This week, 1	Gross, 4
			Net Total, 38

Total number of cars sold up to date 46

Please credit me with following sale for week ending Oct 19 1912
Type 37 Touring Extra Body
Purchaser K. L. Mason. 2472 Bway city
Amount $1910.
Previously owned Ford
If conditional sale give details
Date Oct 16 1912 Salesman John Brown.

Fig. 3—Sales record used by Ranney Company's salesmen

SUMMARY OF CARS

	Gross A	Net A	Gross B	Net B	Old Owners	New	Other	Total
Brown	2	2	14	14	8	5	3	16
Allen	1	1	8	8	4	5	0	9
Smith	1	0	6	5	2	1	2	5
Jones	3	3	2	2	3	0	2	5
Buckeye Auto Co.	1	1	8	6	3	3	1	7
Common Sense Auto Co.	3	1	4	3	1	3	0	4
Totals	11	8	42	38	21	17	8	46

Percentage of Sales

Old owners	46 per cent.
New owners	37 per cent.
Other makes	17 per cent.
Total	100 per cent.

Comparative Weekly Statement of Sales Made During the 1912 and 1913 Seasons

	1912 Season	1913 Season
Number of cars sold by salesmen during 15 weeks	29	35
Number of cars sold by agents during 15 weeks	17	11
	46	46

This statement shows not only the number of cars sold by the various selling individuals and companies, but also the influx of cash during the week and the selling season so far progressed. It also shows the proportion of old Hudson owners among the buyers of new cars, thereby giving the company, and through it the factory, a chance of feeling the public pulse. This is one of the great points of this system. The weekly office record affords also a comparison of the business done during the present season with that of the previous one.

A system which is similar to that of the Ranney company in many ways and which has also been worked out with great care, is that of the New York branch of the American Locomotive Company. The forms used by this company are shown in the cut appearing on page 1057. Besides a sales blank is used.

The daily report and the master card are very similar to those used by the Hudson representatives, except for the provision of additional detail on the master card. The latter is 8 by 5 inches, and the daily report 11 by 8.25 inches, with blue lines and black letter printing. The daily out report is a sheet somewhat larger than the salesman's daily report and which is always kept on a desk in the salesroom. On this sheet each salesman, as he goes out, enters the time of his leaving and when he expects to return, as well as the parties whom he goes to see, in their proper order.

In this connection the system by means of which track is kept of the salesmen's appointments, as they come into effect, is worthy of mention. The salesmen when making appointments enter them on their daily report sheets, and when the stenographer at the office goes over these sheets and transfers their contents to the master cards, she also fills out appointment cards, Fig. 9, which are filed in order of the critical dates. As the dates of these engagements come up, the girl makes out a yellow slip for each appointment, and hands it to the salesman on the morning of the right day. In this way, part of the salesman's work for a day is outlined for him when getting to the salesroom in the morning. As to new prospects, these are assigned to him by the sales manager, who first receives all inquiries which come in. The manager distributes the work fairly equally among the salesmen, except where cases call for special skill with particular classes of prospects. Certain salesmen are used to follow up interested brokers, and others interested private prospects, and so forth. Likewise, different men cope with the pleasure car and truck situation, respectively. To assign a new prospect to a salesman, the manager fills out the card, Fig. 8, held by a perforation to Fig. 10. The former is filed in the office and the latter given to the salesman.

In the Alco Company's store a salesman must follow up a prospect to such an extent that a resulting order gives him a moral right to the commission on the deal. If a salesman calls upon a prospect only once or twice and the latter drops in after a month to buy a car, this is hardly considered the result of the man's work. If, on the other hand, a salesman calls on a prospect half a dozen times, and a car is finally sold to him in the store, while the salesman is not there, he is credited, in the case of either organization, with the sale. The Alco Company has a rule that when two men work on one prospect, credit goes to the salesman who did five-eighths of the work of getting him. To give an idea of this work, the average time necessary to bring about a sale in the Alco line is from ten to twelve calls for a pleasure car of the $6,000 type, and about twenty times for a truck.

Sales for Week ending.....October 26th, 1912

Salesman	Model 56	37	Total
Brown	1	1	16
Allen	0	1	9
Smith	1	1	5
Jones	2	1	5
Buckeye Auto. Co	1	1	7
Common Sense Auto Co	0	1	4
	5	6	46 to date

Fig. 4—Weekly sales statement given to Hudson salesmen

One form which is suggested above under (6), is not used by either the Hudson or Alco companies. This is a layout, made by the salesman, which covers the work he expects to do during the day. This form would take the combined place of the appointment and daily out blanks, and be kept on the salesman's desk. It would be even more exact and true to the situation than the layout formed by the duplicates of the appointment slips, Fig. 9. Another point on which improvement is possible, is the matter of regular communication between salesman and office. The salesman who makes it a point to call up headquarters at regular hours, say at 10.30 and 3 o'clock, will save himself time in many cases, and will be sure that no important matter relating to his trade is delayed in the office or salesroom.

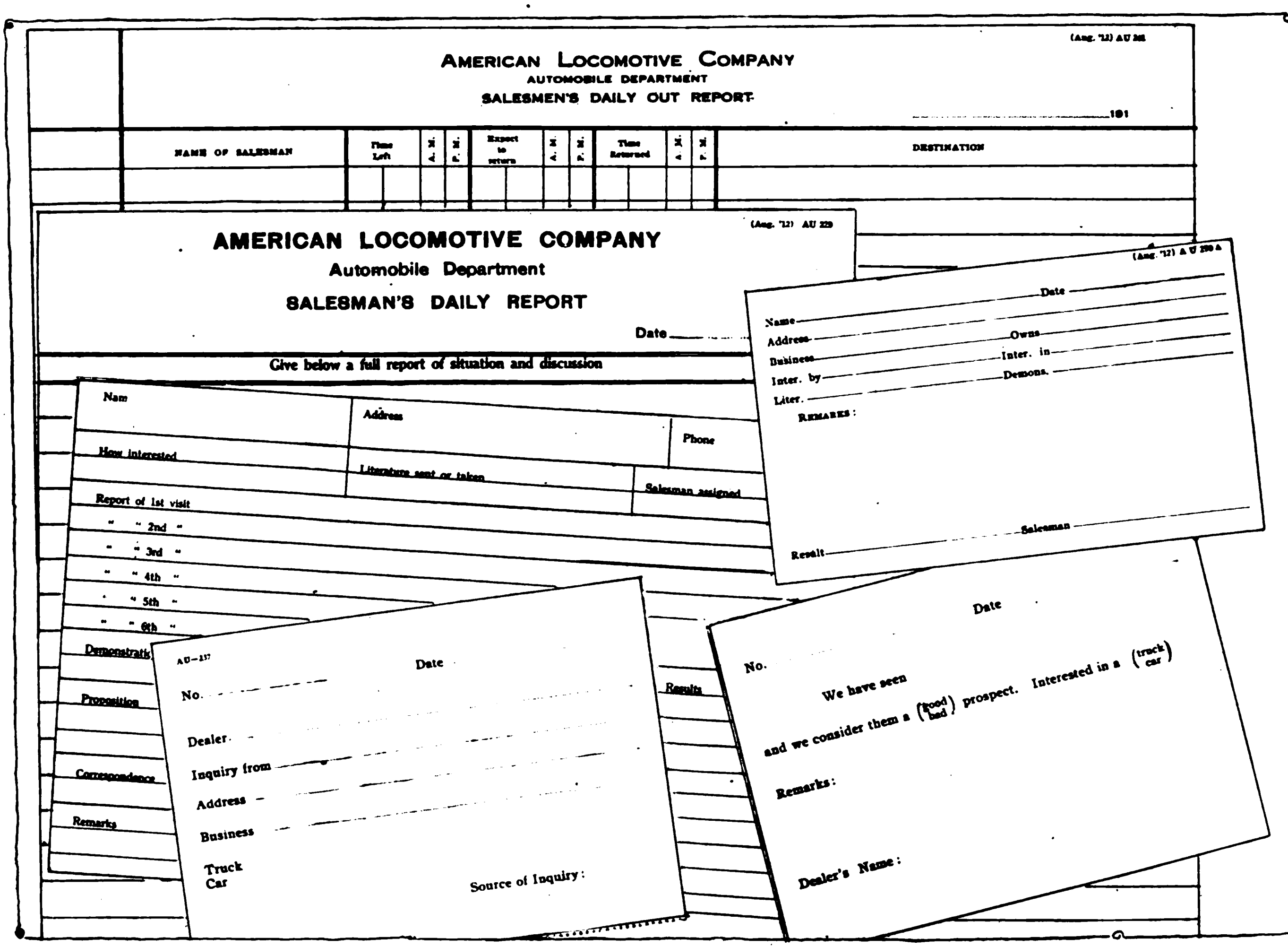
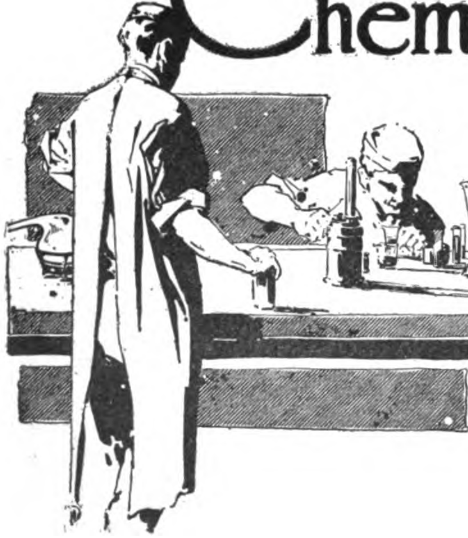


Fig. 5—Alco company's daily out report. Fig. 6—Salesman's daily report. Fig. 7—Alco master card. Figs. 8 and 10—Assignment card. Fig. 9—Appointment card

The Chemistry of Cylinder Oils



Considerable Variation in Gravity and Viscosity Found to Exist in Same Grade of Different Brands

Part IV

Being the fourth of a series of articles on cylinder oils which will appear from week to week. Discussions are invited and the columns of THE AUTOMOBILE *are open to pertinent criticisms.*

By W. Jones

IN Table B we give the analyses of forty samples of oil, all of which were obtained in New York City. The different brands are represented by letters, and the different grades of each brand are shown by numbers. These letters and numbers will be carried through all analyses to represent the brand and grade.

This table of analyses is given to show what the various brands of oils are, at the present time in the city of New York, and for comparison with the same brands to be obtained in other cities. While this is the primary object of these analyses, the table may also be of much use in comparing the different brands, one with the other, being, of course, careful to always compare the same grades, in the different brands. These different grades are, as above stated, marked by figures and are so arranged that the same figure in each brand shows the same grade, and where there is only one grade it has been marked so as to correspond to a similar grade in the other brands.

We have in brand A eight different grades. No. 1-a and No. 2-a, are water-white oils. No. 1-a is marked light and No. 2-a is marked medium. The two oils are, however, almost of the same gravity, and there is not much difference in the viscosity, and notwithstanding they are so near alike, No. 2-a, which is marked medium, is, in fact, a lighter oil than No. 1-a. These two oils may be compared with brand M, which is also a water-white oil. These three are the only white oils in the list, and we have added the letter to the number to indicate them.

There are some very interesting points to be observed about these three oils:

First, the gravity is almost the same in all three, although they are quite different oils and come from different sources. They are the only oils we so far have **with a gravity as low** as .8686, and there is only one other oil **which has a carbon** figure as low as these.

Second, while the gravity is almost t**he same, the viscosity** at 80 degrees Fahrenheit is very differ**ent. In brand M we** have the viscosity 1.7647, and in brand **A, No. 1-a and No.** 2-a, we have 4.2857 and 4.128, this alon**e showing the oils to** be quite different, but at the temperat**ure of 350, all three** oils are very much alike.

The flash and fire points are of cours**e quite a little higher** for the thicker oils.

We may also go a step further and s**how the total sulphur** in brand A. No. 1-a is the lowest we **have so far found in** any of these oils, being only 0.046 per **cent., while that in** brand M is 0.049.

We have also determined the heat of **combustion of these two oils, and find them very nearly the same, for brand A No. 1-a, we have 19,798 B.t.u. and for brand M we have 19,708 B.t.u. This is the highest heat of combustion we have yet found, and the only other one we have at these figures is brand H No. 1, where we have 19,761 B.t.u., and it is also curious to note that the sulphur in this oil is also low, being only 0.049 per cent. and the carbon is the only low carbon we have, being 0.34 per cent. As brand H is not a white oil, it is quite obvious that we need not select a white oil as giving the best results.**

The other oils in this list are of all shades of color, from light to dark, and as a rule the thicker they are the darker they are. All the grades marked No. 1 come labeled light; those marked No. 2, as medium; those marked No. 3 as heavy. These three grades seem to be the most in use and these numbers in the different brands should be compared together. Of the other numbers, Nos. 4 and 5 are special oils, and No. 6 is extra heavy. I will call attention here to brand I No. 3, which is a very thick oil; however the oils in this brand are marked light, medium and heavy.

In comparing the Nos. 1, 2 and 3 of each brand we find the gravity to vary considerably:

In	No. 1	from	.8705	in brand	F	to	.9153	in brand	J
"	" 2	"	.8756	" "	E	"	.9108	" "	J
"	" 3	"	.8801	" "	E	"	.8955	" "	H

In the viscosities at 80 degrees Fahrenheit we find a variation as follows:

In	No. 1	from	2.2500	in brand	C	to	7.500	in brand	J
"	" 2	"	3.5714	" "	F	"	9.2857	" "	I
"	" 3	"	4.6071	" "	C	"	54.6428	" "	I

This would show at once the uselessness of purchasing oil by the brand and grade or by name only, without knowing just what the oil represented really is.

Going back again to the viscosities, we find that in the three grades in all the brands we have a variation in the viscosity at 80 degrees Fahrenheit from 3.2353, in brand A to 54.6428; in brand I a variation of 51.4075, yet at a temperature of 212 degrees Fahrenheit we have a variation of only 2.7500; while still further at 350 degrees Fahrenheit we find only a difference of 0.1428, and this is including brand I No. 3, which has a viscosity at 80 degrees Fahrenheit of 54.6428.

We think there could be very little advantage in using the thick oil, while there certainly would be a great disadvantage in the amount of carbon it would give. Selecting an oil from this table, from the carbon figures, we would pick out brand H No. 1, which has a carbon figure of 0.34, and about the last we would take would be brand I No. 3, with a carbon figure of 2.33 per cent., or nearly 2 per cent. more. This would certainly overcome any slight increase in the lubricating properties of the thick oil, due to its higher viscosity.

In brand B we have two oils of the same grade, but we notice they are quite different oils. In brand C we find Nos. 1, 2 and 3 in duplicate, and here again we see a large difference not only in the viscosity, but also in the carbon.

It is very possible that this is as close as oils can be prepared on a commercial basis, but this is a point we would like to find out. If they are liable to differ as much as these do in this brand C, it would seem advisable for large users to purchase their oils on specification.

(To be continued.)

Weak Spots in Our Lubricating Systems

THE greatest difficulty found in lubricating a motor is to supply the oil in proportion to the speed at which the bearing surfaces are moving over each other. When two metal plane surfaces are in moving contact the movement is resisted by a variable amount of friction. Sliding contact produces a higher friction than does rolling contact because the area over which the force of friction is exerted is great in the first instance while in the rolling contact the area is practically nil, being merely a point or a line. **As the speed increases, the resistance per unit of time, or, in other words, the power of the resistance is augmented.**

The power that is used in overcoming frictional resistance is transformed to a large degree into heat. **Hence, when the coefficient of friction rises, the heat increases and along with the rise in heat come a consequent rise in the coefficient of friction.** This continues until the resistance becomes so high that the power exerted by the friction is greater than the power utilized in driving the moving parts and the bearing binds and the result is what is known as a seized or frozen bearing.

In a bearing there are two factors which could increase the coefficient of friction where a given amount of oil is supplied. The first is a rise in the temperature of the metal and the second is a poor condition of the bearing itself.

With the above conditions in mind a study of how the oil reaches the cylinder wall is of particular interest. **In the average form of splash system there is a marked tendency towards feeding too much oil at low speeds in order that there will be enough at high speeds. It is a matter of doubt that the amount of oil splashed up by the scoops on the connecting rods increases with the speed.** When the connecting rod is whirled around at high speed it would seem that it would sweep every vestige of oil out of the narrow trough which is generally made to hold it. With such high speed, when the motor is turning over say 1800 revolutions a minute, with the connecting rod passing through the trough every 1-30 part of a second, is it possible to renew the oil in the trough as thoroughly as when the connecting rod is moving at half that speed? Hence, it may well be asked if in the splash system the oil is fed to the cylinders in an increasing ratio with the increase in speed. **If we design the lubricating system for average touring speed we are getting insufficient oil at high speeds and our motor smokes at low speeds.** Can this be overcome by any modification of design such as troughs interconnected with the throttle, being raised and lowered by its motion; or by replenishing the oil supply to the troughs by pumps having a greatly increased delivery at high motor speeds? A small fraction of a second is a short time, and the tendency towards other systems is perhaps the explanation.

(To be continued.)

TABLE B—ANALYSES OF AUTOMOBILE CYLINDER OILS—BY W. JONES

Brand A.	Specific Gravity	Specific Viscosity at 80° F.	Specific Viscosity at 212° F.	Specific Viscosity at 350° F.	Carbon per cent	Flash Point °F.	Fire Point °F.	Acidity	Sulphuric Acid per cent
No. 1 a	0.8686	4.2857	1.4285	1.0714	0.36	440	505	.0029	tr.
" 2 a	0.8616	4.1428	1.3214	1.0357	0.40	436	490	.0030	0
" 1	0.8984	3.2353	1.3214	.....	0.70	384	432	.0044	0
" 2	0.8992	4.1764	1.3571	.....	0.75	404	460	.0059	0
" 3	0.8948	6.1764	1.4285	1.0357	1.03	422	474	.0049	0
" 4	0.8980	4.2857	1.2857	1.0357	0.68	406	452	.0029	0
" 5	0.8968	5.6071	1.3571	1.0357	0.51	418	470	.0029	tr.
" 6	0.8898	58.2142	4.0357	1.1428	1.56	532	610	.0029	0
Brand B.									
No. 2	0.9103	4.4643	1,2500	.....	1.70	428	474	....	0
" 2	0.9117	5.3571	1.3928	1.0357	0.82	428	476	.0034	0
Brand C.									
No. 1	0.8860	2.2500	1.3214	.....	0.65	420	476	.0025	0
" 2	0.8866	3.6428	1.2500	.....	1.00	424	476	....	0
" 3	0.8868	4.6071	1.4285	.....	1.10	428	478	....	0
" 6	0.8874	6.3214	1.4285	.....	1.10	428	490	....	0
" 5	0.8976	18.6071	2.0000	1.1071	2.35	454	526	.0044	0
" 1	0.8846	3.9284	1.2857	1.0535	0.52	440	494	.0030	0
" 2	0.8852	4.4642	1.2857	1.0357	0.43	424	490	.0030	0
" 3	0.8855	5.2857	1.3571	1.0714	0.45	450	500	.0030	0
Brand D.									
No. 1	0.8747	3.8571	1.4285	.....	0.44	438	494	.0029	0
Brand E.									
No. 1	0.8953	5.1428	1.2857	.....	0.52	412	464	....	0
" 2	0.8756	4.1085	1.3571	.....	0.70	434	490	.0103	.0324
" 3	0.8801	7.5353	1.5357	.....	0.93	450	506	....	.0223
Brand F.									
No. 1	0.8705	3.3928	1.2143	.....	0.55	440	494	....	0
" 2	0.8777	3.5714	1.2500	.....	0.78	438	486	....	0
" 2	0.8738	3,5714	1.2500	.....	0.53	442	494	.0123	.0286
Brand G.									
No. 1	0.8821	3.2857	1.2142	1.0535	0.42	428	484	.0034	0
" 2	0.8884	5.3571	1.4285	1.0714	0.70	458	516	.0044	0
" 3	0.8844	7.3214	1.5000	1.0714	0.70	458	518	.0034	tr.
Brand H.									
No. 1	0.8712	4.0714	1.3214	1.0714	0.34	448	506	.0034	0
" 2	0.8901	4.3214	1.2875	1.0714	0.70	436	476	.0034	0
" 3	0.8955	5.8928	1.3571	1.0792	0.83	456	518	.0030	0
Brand I.									
No. 1	0.8764	3.9285	1.3214	1.0357	0.50	452	504	.0034	.0076
" 2	0.9014	9.2857	1.5000	1.0535	0.96	436	494	.0030	0
" 3	0.8941	54.6428	3.9642	1.1785	2.33	546	624	.0039	0
Brand J.									
No. 1	0.9153	7.5000	1.4285	1.0357	0.51	396	424	.0034	0
" 2	0.9108	7.8571	1.4642	1.0357	0.91	440	492	.0039	tr.
Brand K.									
No. 2	0.8862	5.5000	1.3571	1.0714	0.68	436	476	.0039	0
" 6	0.8847	18.2857	1.8214	1.1250	1.30	478	530	.0039	0
Brand L.									
No. 1	0.8719	3.4642	1.3392	1.0357	0.54	440	480	.0034	0
Brand M.									
No. 1 a	0.8684	1.7647	1.1428	1.0357	0.30	325	358	.0029	0

The Engineers' Forum

3-Point vs. 4-Point

Discussion of Relative Merits of These Systems for Motor and Gearbox Support Continued from Last Week

Dunham Favors Four-Point System and Cites Many Advantages—Souther Leans to Three-Point

Part II

Henry Souther Expresses His Views

George W. Dunham Emphatic for Four-Point

J. G. Perrin States Four-Point Merits

Chester S. Ricker Talks for Three-Point

Stewart McDonald Believes in Four-Point System

HARTFORD, CONN.—Editor THE AUTOMOBILE:—Regarding three-point as compared with four-point suspension for motors and gearsets, my inclination as an engineer has always been for the former, and I have assisted in the design of cars using it and have used cars myself so constructed. I know that it is a good thing only if properly applied.

The principle, I have felt, is right, because it is impossible to make a rigid frame and not very practical to make a motorbase or a gearbox strong enough to prevent the frame or its supports from yielding and bending.

I have seen many four-point suspension engine legs and gearbox legs broken by the flexing of the frame and because the application of the four-point support was not good.

Four-point suspension can be applied so as to permit enough motion to relieve all strains from engine base of gearbox; in fact, that is done by several cars of well-known construction. At the same time, I believe the three-point suspension is the easier to construct and therefore, all other things being equal, the better.—HENRY SOUTHER, Consulting Engineer.

Finds Four-Point System Best

DETROIT, MICH.—Editor THE AUTOMOBILE:—Just a few words in plain English, eliminating technical expressions: On the face of it, it would appear that three-point suspension is the only construction worthy of consideration. Theoretically, anything but three-point suspension is unmechanical, but actual experience demonstrates that four-joint suspension is undoubtedly the most all-around satisfactory.

Examination of the automobile as it is built today shows that four-point suspension is the best accepted practice. This suspension, four-joint, is undoubtedly possible, only on account of the extreme flexibility of an automobile chassis, and while it would seem that a motor bolted down to the frame at four points is bound to be sprung out of shape, on account of the giving of the frame, in actual service just the reverse is true—the frame supplying the flexibility and the motor holding practically rigid.

There are so many advantages connected with the four-point method that it would seem the three-point suspension must have originated from one of three causes: First, theorizing; second, lack of rigidity in motor design and construction, and, third, desire of the engineers to construct the car theoretically correct in every detail, rather than obtaining the results by the most direct means.

There are a number of cars with so-called three-point suspension, but, in fact, there are very few embodying this construction. I have in mind a motor supported at one end by means of feet extending out onto the frame rails, and at the other end there is a rigid cross-member, to which the motor is securely bolted by two bolts in close proximity. This would seem to be three-point suspension, but if one stops to consider the securing of the end with two bolts close together makes a rigid suspension and is practically the same as four-point insofar as all practical results are concerned.

In argument for and against the two methods, I merely wish to call attention to the fact that in machine construction, often those which appear unmechanical are the best, and where there is but little difference one way or the other, the simplest and the shortest cut to the result is undoubtedly the most advisable method.

I believe that in the contest work during the entire history of the automobile, in practically every case where a large number of events were entered and a large percentage of these events won, the suspension was four-point.

To sum up the situation in a practical way, and that is the way in which the average automobile buyer looks at it, the following are a few points, the consideration of which should give one a fair idea of motor suspension:

First—A big majority of successful racing contest cars have four-point suspension.

Second—A big majority of the best cars built today have four-point suspension.

Third—The motor with four points of suspension is more stable and less inclined to rock under heavy loads under varying conditions.

Fourth—The three-point suspension is undoubtedly theoretically correct, just as much as the sliding gearset, which is universally used, is absolutely unmechanical and opposed to all theory.

Would not careful consideration of the above lead one to choose the four-point construction?—GEORGE W. DUNHAM, Chalmers Motor Company.

Disapproves of Flexible Mounting

DETROIT, MICH.—Editor THE AUTOMOBILE:—My experience with three-point suspensions has not been very favorable either with engines or unit power plants, where the point of the triangle is on the front cross member.

With the fore-door type bodies and enclosed jobs, I have obtained much greater satisfaction with a good, rigid frame, the motor and gear-box being fastened thereto very rigidly, than where schemes for flexible mounting have been used.

Of course, with a rigid frame having power unit and body fastened to same more or less rigidly throughout, a very easy spring suspension is advisable, and, in fact, almost a necessity.

On light cars, of course, things can be done in the way of flexible suspensions which would not work out so well on larger and heavier cars. We found in racing, and especially in 24-hour races, that we got much better results where the engine was fastened to the frame at four points than where we tried to arrange for a flexible mounting of engine.

I do not imagine a more severe test can be made to show up faulty construction of power plant and frame and axle than during the latter half of a 24-hour race when track at corners especially is only a little better than a plowed field.

I might qualify the above description of our engine mounting as regards the power plant being rigidly fastened to frame by stating that the two front engine arms are hung on brackets of sheet metal which are more or less flexible and the engine arms are not therefore directly attached to side members of frame.—J. G. Perrin, Lozier Motor Company.

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Illustrates Three-Point's Advantages

Indianapolis, Ind.—Editor The Automobile:—It has been utterly impossible for me to give you any story on three-point suspension, but I instructed a photographer to get some photographs which I feel will explain more than anything I could say regarding the advantages of three-point suspension.

You will note from the front view of the car, Fig. 1, how much the car has been distorted in order to show the effect of exceedingly rough going on the motor car chassis. The diagonally opposite wheels in this case have been raised 10 inches in order to obtain the effect shown. As a measure of the distortion, you can notice the position of the center of the starting-crank shaft. This normally is at the center of the slot in the front cross-member. In the photographs this actually touches the side of the slot. That means that the motor has been twisted over to one side very nearly 1 inch, yet I readily cranked the motor, proving that none of the bearings was in the least pinched by this distortion. This is a proof that the three-point suspension is certainly worth while.

The second photograph, Fig. 2, shows the method of supporting the motor and the trunnion at the front of the motor is shown through the fan. In this photograph you can gain some idea of the construction, some of the points of which I will enumerate below.

The rear supporting member for the motor is only held in place by two bolts, one of which is shown at the rear end of the crankcase. The weight of the motor is carried, however, on the long rectangular projection milled on the rear end of the crankcase. This projection is horizontal and extends the full width of the aluminum case.

The steel cross-member which fastens on this is slotted so as to receive the projection on the crankcase. As a result the motor support has a bearing 1.5 inch wide and about 14 inches long, thus relieving the bolts from any shearing strains.—Chester S. Ricker, Henderson Motor Car Company.

—

Four-Point on Four-Cylinder Cars

St. Louis, Mo.—Editor The Automobile:—There are a number of conditions present in the four-cylinder motor which call for greater rigidity than with the six-cylinder, and hence a stronger, more rigid form of support is considered essential by us.

With the four-cylinder motor there is more vibration due to the unbalanced relation of the connecting-rods at the upper and lower dead points, because of their angularity.

This vibration is best cared for, we think, by providing four-point support for the engine when it is a four-cylinder.

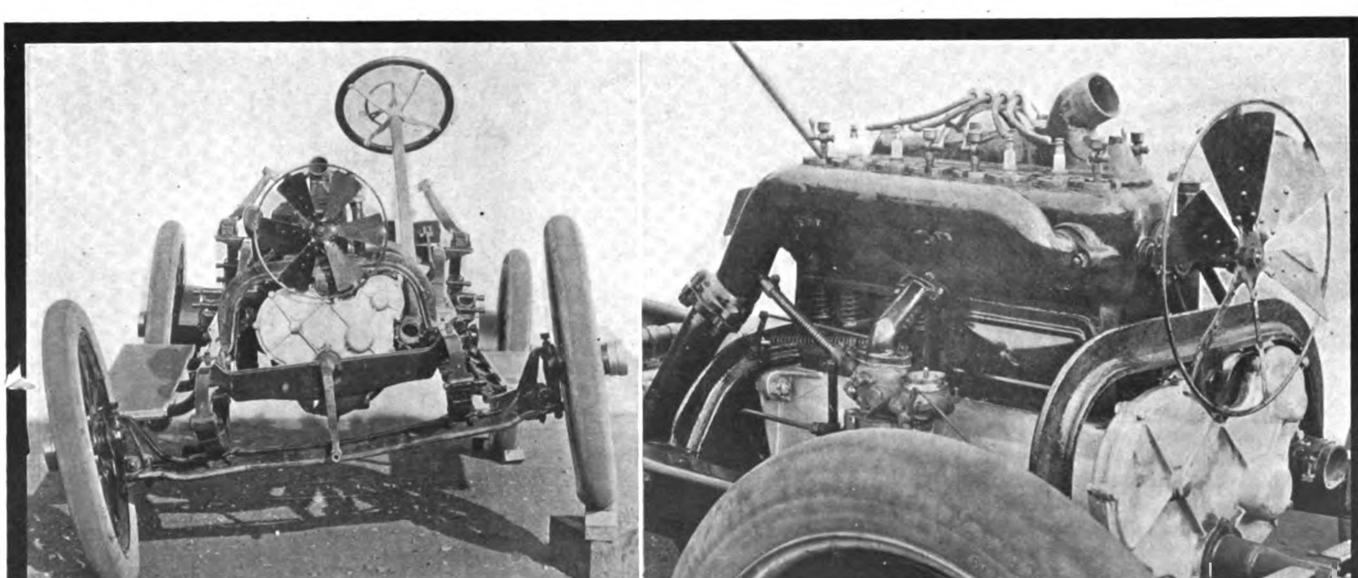
Then, too, the distortion of the frame due to uneven roads does not seriously affect a four-cylinder motor because the cranks are 180 degrees apart.

With the six-cylinder motor the vibration is more effectively eliminated both with respect to unbalanced forces and unbalanced couples, and hence three-point suspension affords ample support and vibrational resistance.

Furthermore, the cranks of the six-cylinder engine being only 120 degrees apart, the frame distortions due to road unevenness are more serious in their effects.

For these reasons we utilized four-point suspension on our four-cylinder motors and three-point suspension on our six-cylinder motors.

Another element to be considered, of course, is the increase in the frame distortion effect upon a motor which measures longer—the effect upon a four-cylinder being much less than upon a six-cylinder of the same stroke and bore.—Stewart McDonald, Moon Motor Car Company.



Importance of Proper Weight Distribution; Priming Device for Acetylene; Cannot Start His Motor; Ether as a Priming Agent; Shellacked Hose Hard to Remove; Removing Carbon from Opposed Cylinders; Toe-In Explained

Weight Distribution Important

EDITOR THE AUTOMOBILE:—Mr. MacNutt does some designs of cars an injustice when he says that it is necessary to use chains to get traction. It is all a matter of proper weight distribution. If the larger portion of the weight is on the rear and the engine nearly able to wind the front end up into the air as it tries to turn the rear axle then a condition is produced where practically all the weight is on the drivers and they will take that rig anywhere. I do not know when the buying public will learn this simple fact, but I live in hope that they will some day. They talk quite learnedly about four-wheel drives, but what is the use of a four-wheel drive when it is possible to carry practically all the weight in the driving wheels and get nearly the same result anyhow?

I must disagree with him as to the effect of chains on the tires. I submit that a road made of chains will wear out the tires much faster than a smooth road, and I fail to see any difference if the wheel carries the chain instead of the road carrying it. That a chain fixed across the tire will quickly wear it out, no one denies. That a loose chain does not hit twice in the same place and so does not make its damage apparent so soon is also true, but that the wear caused by chains "is inappreciable" I do not believe. Weight on the driving wheels is the right answer. If Mr. N. will inject a teaspoonful of sulphuric ether and gasoline in equal parts into his cylinders he will get results on cold mornings.

Saginaw, Mich. CHARLES E. DURYEA.

—Distribution of the weight is important, but it would seem that for traction the co-efficient of friction between the vehicle and the road would be even more important.

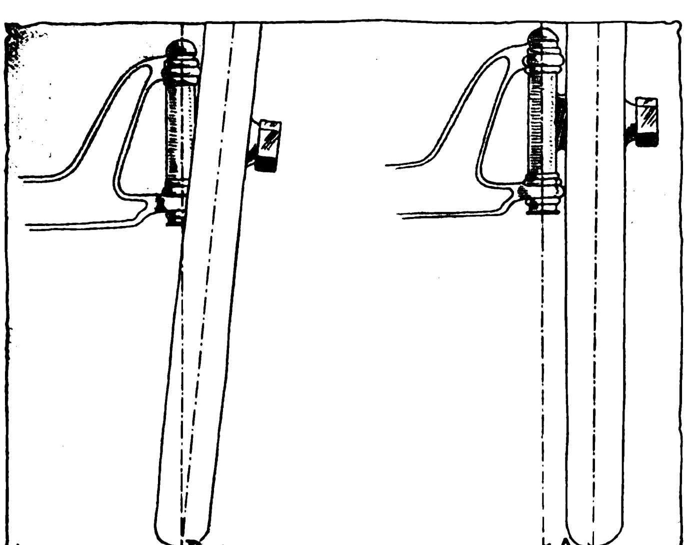


Fig. 1—Diagrammatic view of two conditions of front wheels

Reader Suggests Priming Device

Editor THE AUTOMOBILE:—Kindly advise me through Letters Answered and Discussed is there a priming valve made which accomplishes the action I describe and partly illustrate in accompanying sketch. I mean a valve, such as in Fig. 2, which will allow acetylene gas to flow into the inlet manifold, thereby filling the cylinders with gas, if it is pressed just previous to switching off the current on stopping the motor. That should leave the cylinders filled with gas and ready to explode when battery current is applied to the plugs. At the same time the button on the dash should be pressed, giving engine a good start. Should the car stand long in a cold garage, as in my case, and gas escape from the cylinders one could pull up on the starting handle and the same time pull a little wire hook in front of the radiator which would release the valve and allow entrance of gas into the cylinder, thereby making starting easy. I have been using a device, Fig. 3, which was described in THE AUTOMOBILE about a year ago and which has saved me many an hour of back-breaking work in trying to start the motor on cold mornings, but I wish to improve on that.

New York City. R. H. PANKOW.

—There are many devices on the market such as you have described, most of them being used in connection with starters. With such a device it would not often be necessary to crank as the gas would enter the cylinder if the valves were opened just before the motor stopped after the spark was turned off and would remain there at atmospheric pressure for a long time. It would be merely necessary to start on the spark in probably 75 per cent. of the cases in which the motor was warm. In cold weather the addition of such a priming device would be valuable. The device you mention as having tried with success is merely another application of the same principle and has been used with success by many motorists.

Motor Will Not Start

Editor THE AUTOMOBILE:—Would you kindly tell me how to remedy the following trouble:

The engine of my car cannot be started. Priming does no good, the engine does not give a single explosion. Carbureter has been opened and closed, but it does not seem to have any effect.

The plugs are in A1 condition. I am using a Holly carbureter on a four-cylinder Wood car.

Plainfield, N. J. READER.

—There are but two conditions necessary for securing an explosion in the cylinder of a motor. The first is that you have an explosive charge within the cylinder and the second is that you have a spark to explode it. To secure continuous explosions is another matter, as this brings in all the functions of the motor. To secure the first condition, however, requires but the two necessities mentioned. Since you are unable to get any explosion at all your problem is one in which these two factors are to be considered.

An explosive charge may be introduced into the cylinder through the priming cup. The addition of four or five drops of ether to each cylinder will also tend to make this charge more explosive. If this is done on each cylinder and you find that on turning the motor over you get no explosion, you may attribute the trouble to the fact that the ignition system fails within the cylinder in spite of the fact that the spark-plugs are evidently in the best of condition. Remove the plugs from the cylinders and lay them upon the tops of the cylinders so that the metal on the outside of the plugs is in contact with the cylinders. Turn the motor over slowly by hand and see if there is a spark at the gaps on all four cylinders. Note the sparks carefully and see if they are bright, live flashes. This can be done better in the dark. If they are not good on either the battery or magneto, the points are too far apart and should be moved more closely together. Examine all the wiring connections and see if they are tightly and carefully made. Much current can be lost through a poor connection.

If you are using battery ignition, see if it measures up to the required strength of 6 volts. Then follow along the wiring to the coil. Note if the ground connection is good. This is often a source of weakness. See if the vibrator points are adjusted correctly. When the switch is on, a steady hum like the buzzing of a bee should emanate from the coil box. If not, dress platinum points flat by filing lightly and turning the adjustment screw until the hum is of the correct pitch. If coil is not right send it to the maker for repair, as the chances are decidedly against your improving it by attempting to disassemble it.

If, after putting the ignition system in good order and introducing an explosive charge into the cylinder, the motor does not fire regularly all the symptoms and notes possible should be made and forwarded to this department for a further explanation.

Believes in Use of Ether

Editor THE AUTOMOBILE:—I notice in the issue of November 7 a discussion regarding the use of ether in gasoline to offset the effect of bad gasoline. I beg to advise that my experience had been that 10 to 12 ounces of ether, added to 10 gallons of gasoline, makes the gasoline operate about as well as the highest-grade gasoline that can be bought. I have introduced this amount into mine and 10-cent gasoline. Commercial ether is very cheap, costing only about 18 to 20 cents a pound.

There is practically no water in commercial ether and its affinity for water is so great that it will saturate and practically eat up any small amount of water which there is in the gasoline. I have been able to run an automobile engine experimentally in 60 per cent. water and 40 per cent. ether.

Milwaukee, Wis. P. C. AVERY.

—In view of the general prediction of a rigid winter and also taking cognizance of the growing desire of the automobilist to use his car in the winter as well as the summer, the opinions of those who have had experience with ether both as a priming agent and as a factor in increasing the value of low-grade fuel, become distinctly valuable. THE AUTOMOBILE would welcome any ideas on this subject, as they would assuredly be of value to a large body of automobilists who refuse to put their cars in dead storage in spite of the vigorous onslaughts of Jack Frost.

Removing Shellacked Hose

Editor THE AUTOMOBILE:—If you know of anything that will remove a hose that has been fastened on with shellac will you kindly publish it in THE AUTOMOBILE.

Niagara Falls, N. Y. R. N. PATTISON.

—If you have an old hose the best advice would be to cut it off and put a new one on, because you will find that even after you have got it loose it will crack when you attempt to slip it off the metal connections. On the other hand, if you have a hose connection that is fairly new, take an old hacksaw blade and run it along an emery wheel to take off the teeth and then thin it down a little more at one end. This will be very flexible and by its aid and with the assistance of what alcohol you can work beneath the rubber with the hacksaw blade you can probably work it loose. If you once get it started the rest will come easily.

Cleaning Buick Cylinders

Editor THE AUTOMOBILE:—Could you tell me through the columns of THE AUTOMOBILE how to clean the cylinders of my model 14 Buick? Also how to fix it up for the winter.

Birdell, Pa. J. NORVIN HATFIELD.

—The Buick two-cylinder opposed motor is of the horizontal type and would seemingly present problems that would render it difficult to clean. This is not the case, however, as it can very well be scraped through the valve cover plates in the same manner as would be pursued with a vertical motor. The plates are taken off and scrapers of various shapes used until every point has been reached. To do a thorough job, however, with any motor the best way is to take it down and remove the cylinders. When this is done there will be no difficulty in reaching every point. If you are not going to run the car during the winter it will require but little attention. It would be a good plan to enamel the motor if the old enamel is worn off and to apply a coat of cylinder oil to all the exposed bright parts. Some oil should be injected into the cylinder and the motor turned over by hand once or twice to keep the cylinder in good condition during the winter.

If you are going to use the motor during the winter the compression should be tested by noting the resistance to turning the motor over by hand or by trying the car on various hills to see if the climbing powers are what they should be. If not, the cleaning of the cylinder and the grinding of the valves will be enough to restore the power in most cases. Clean out the old oil from the reservoir and replenish with new. Clean the spark-plug points. Tighten all the loose nuts throughout. Look at all water and other connections to see if there are any leaks. If there are, remove them by replacing gaskets. Try the ignition system after the plugs are clean and the wiring has been inspected, taking careful note that the batteries are of the proper strength. If any trouble develops it will probably be in the connections. These are a few points which must be noted. Others will occur in looking over the car for in a model as old as this there are sure to be some parts that are worn and which will have to be replaced.

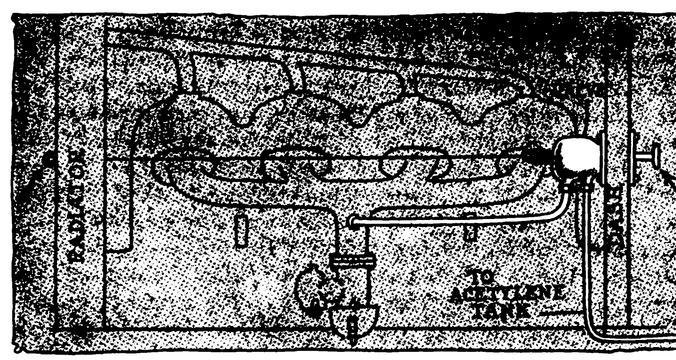


Fig. 2—Priming device for use with acetylene suggested by reader

Mounting of Front Wheels

Editor THE AUTOMOBILE:—Would you please give me the following information in regard to front wheels?

1. When one is standing looking at the automobile from the front what is the angle or degree at which the wheels are tipped, approximately?

2. Why is this done and what good is it?

3. Looking forward are the front wheels pointed straight ahead, and why?

4. Looking forward are the front wheels toed in a little toward the center, and what for?

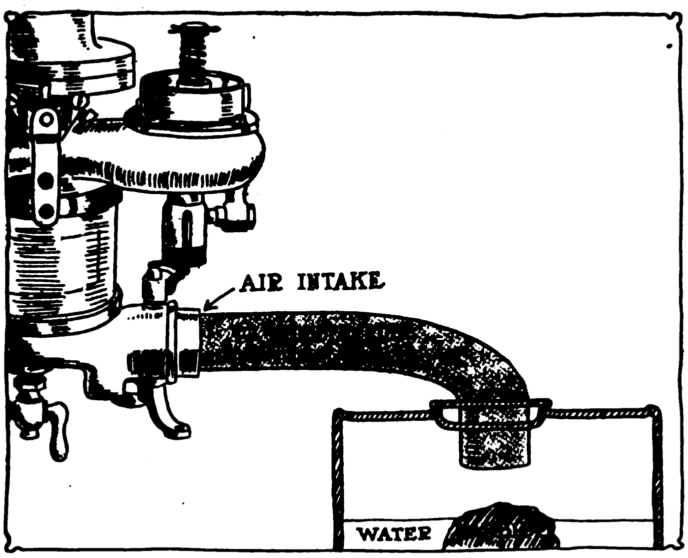


Fig. 3—Easy starting device which has been used with success in many garages

5. This last question is per the sketch, Fig. 1, as though the wheels pointed to a point away off in the distance.

Hartford, Conn. HARRY ALLEN.

—1. At about 3 degrees to the vertical.

2. This is done to minimize the shocks that are carried up to the hand steering wheel. As may be seen in Fig. 1, there are two ways shown in which the front wheels may be mounted. In the right view the line through the center of the steering knuckle is parallel to the line through the center of the wheel. In the left view the line through the wheel meets the line through the steering knuckle at P. the point at which t he wheel has contact with the ground. The difference in the two mountings will be apparent from a minute's study. Where the two lines do not intersect there is a small arm A representing the distance between the two parallel lines. Any impact between the wheel and an obstacle produces a turning moment about the steering knuckle which will be equal to the product of the force multiplied by the arm. Where this arm is zero, as it is when the two lines intersect at the point of contact between the tire and the ground, there can be no moment and hence no shock transmitted to the steering wheel from a straight-on contact with any object.

3. They are pointed straight ahead. That is the distance between the front ends of the two wheels is the same as the distance between the rear. If it were not so the tires would be rapidly worn away as they would be pusheed over the road and would not roll perfectly.

4 and 5 are answered under question 3.

Automobile Axle Conditions

Editor THE AUTOMOBILE:—Few owners of automobiles realize the important part that the rear system plays. In fact, most owners think that it is only a minor part of the car and that so long as the engine runs smoothly they are running their car under ideal conditions. This is largely due to the fact that most parts of the engine are reciprocating, while those of the axle are rotating. The former causing knocks; the latter causing almost any kind of a noise from a rattle to a groan.

How many buyers of cars today realize the importance of the rear housing? Few at least are ever posted as to their weak-

2—We must consider the brakes, which should always be powerful enough to hold the car and at the same time not powerful enough to grab or slide the wheels. I am inclined to think that most brakes are too powerful and consequently increase the tire cost. In the selection of any axle the greatest of care should be exercised to get away from the grabbing spoken of before and also the rattle which sooner or later will occur. A heavy lining should be used on all contracting brakes to protect the brake shoe from excessive heat, thereby causing the paint to crack off.

Internal expanding brakes are not advisable in that they are not accessible should the lining wear and begin to roll, neither can they be gotten to easily enough to insure proper lubrication on the operating bars.

The bearings should be of such a type that they can be easily taken up. This not only applies to the wheel, but also to the differential and pinion-shaft bearing. All bearing retainers and carriers should have a ground fit so that they are forced about .001 or .002 of an inch, according to the load they are to carry.

If the bearings are of the radial or cup-and-cone type they should by all means have line contact, of course. They should have a load factor of something like 300 per cent. in order to insure them against certain sudden shocks which occur from time to time.

If the buyers of cars will consider the above carefully they may save many hours of trouble and perhaps many dollars.

Wyoming, O. J. E. BRANSON.

Correct Way to Adjust Schebler

Editor THE AUTOMOBILE:—In THE AUTOMOBILE for October 24, and also in an issue of some months ago, you gave instructions for adjusting model L Schebler carbureter. Your instructions for adjusting low speed were to turn needle valve to the right until closed. Then to turn to the left about a turn and a half.

After having failed to adjust a new model L by these instructions, I got from the Schebler company a copy of their instructions. Their instructions for adjusting low speed were—after closing needle valve—to turn to the left from four to five turns. I tried this method of adjusting and found that it worked satisfactory on my carbureter.

Little's Mills, N. C. J. P. LITTLE, JR.

The Best Non-Freezing Solution

Editor THE AUTOMOBILE:—Would you please tell me the solutions that are commonly used in preventing the water from freezing in the radiator.

Detroit, Mich. CARL SCHNEIDER.

—In the issue of October 24, the question of non-freezing solutions was fully taken up and the merits of all the solutions was explained. A digest of the remarks in that issue follows:

—There are three well-known anti-freezing compounds which have been used extensively and which have proved themselves to be valuable for this work. They are alcohol, glycerine and calcium chloride. Besides these there are many others that are good, but they nearly all have some drawbacks that prevent them from being as useful as would otherwise be the case.

About the most popular of all the solutions to use in the motor is the alcohol. Wood alcohol or denatured may be used. The cost is small; denatured alcohol may be purchased for 60 cents per gallon and the price of wood alcohol is about the same. The advantages of alcohol are that it is very easily handled and that there is no action on the metallic parts of the circulating system.

When using denatured alcohol the freezing point will be different. In tabular form for temperatures between 5 above and 20 below zero Fahrenheit, the denatured alcohol solutions will be as follows:

Freezing Point	Denatured Alcohol	Water
+ 5 degrees Fahrenheit	24 per cent.	76 per cent.
0 " "	29 " "	71 " "
— 5 " "	32 " "	68 " "
—10 " "	34 " "	66 " "
—15 " "	37 " "	63 " "
—20 " "	40 " "	60 " "

Glycerine possesses many characteristics which would seem to stamp it as the ideal non-freezing agent. The boiling point is high and, as will be seen in the diagram Fig. 7, does not change the boiling point of the mixture regardless of the percentage added to the cooling water. Glycerine reduces the freezing temperature materially when added to the water, but does not do so as rapidly as wood or denatured alcohol.

When reducing the freezing temperature to such an extent that the water will not freeze in a cold climate it is necessary to add so much that the water tends to become gelatinous and for this reason it has been mixed very often with wood or denatured alcohol in a very successful attempt to combine the merits of the two. When glycerine alone is used the mixtures that are required for different temperatures will be found in the following table:

Freezing Point	Glycerine	Water
+28 degrees Fahrenheit	10 per cent.	90 per cent.
+15 " "	30 " "	70 " "
+ 5 " "	40 " "	60 " "
0 " "	48 " "	52 " "
— 5 " "	54 " "	46 " "
—10 " "	58 " "	42 " "

When the glycerine and alcohol are used together they are used in equal quantities. This mixture, which is purely mechanical, has not as great a tendency to rot the hose connections as a pure glycerine solution would have. It has more water in it than would the latter and is thus more free to pass through the radiator and other parts of the circulating system without doing harm. On the other hand, there will be less alcohol in this solution than there was in the pure alcohol solution and the result of this is that there will not be so much evaporation and necessary replacement of the cooling fluid after the motor has been run for a time. The glycerine and the alcohol are stirred up together and added to the water in the following proportions:

Freezing Point	Mixture	Water
+20 degrees Fahrenheit	15 per cent.	85 per cent.
+15 " "	20 " "	80 " "
+10 " "	24 " "	76 " "
+ 5 " "	27 " "	73 " "
0 " "	29 " "	71 " "
— 5 " "	30 " "	70 " "
—15 " "	32 " "	68 " "

We now come to calcium chloride, $CaCl_2$, and water. This compound has been recommended by many and is very good, although it has its dangers in the difficulty of securing the chemically pure article. In buying the calcium chloride for use in the cooling system of an automobile the crude article costing about 10 cents a pound should not be purchased. The chemically pure article costs about 25 cents a pound and is very satisfactory. The objections to the use of the material is its tendency to set up an acidic action in the radiator. Chloride of lime, which should be kept out of the radiator, is often a constituent of the commercial calcium chloride and care must be used in getting the chemical from a reliable concern who will guarantee the purity of their products. With the calcium chloride solution the percentages are given by weight instead of volumes as are the other tables:

Freezing Point	Calcium Chloride by Weight	Water by Weight
+10 degrees Fahrenheit	15 per cent.	85 per cent.
+ 5 " "	17 " "	83 " "
0 " "	19 " "	81 " "
— 5 " "	21 " "	79 " "
—10 " "	22 " "	78 " "
—15 " "	23 " "	77 " "
—20 " "	25 " "	75 " "

His Alcohol Evaporated

Editor THE AUTOMOBILE:—The writer has read your articles on Experience of the Automobilist in Cold Weather.

The latter part of December, 1911, I filled the radiator with 1-3 alcohol and 2-3 water, and thinking I was absolutely safe in not having my radiator frozen, I left the car out frequently.

For a week or so I had no trouble with my radiator freezing, but one very cold evening about the first of January I left the car in front of my house as usual, and when I came out and started the engine, I found the pump and radiator frozen solid.

I made a test of the solution that was left in the radiator, and found about 5 per cent. of the alcohol left in the water, this, of course explains why it was frozen.

New York City. D. L. MOORE.

—This is a natural experience and one which is to be expected when using any of the alcohols. It is really necessary to use a hydrometer with an alcohol solution in order to note the changes in specific gravity on account of the evaporation. The specific gravity of the mixture when the alcohol is first added should be noted and then at frequent intervals samples may be drawn off and should any change be noticed alcohol should be added until the solution is restored to its former condition.

In THE AUTOMOBILE for October 24 this problem was taken up along with many other considerations of the cooling problem in winter months. An instrument which was particularly adapted for telling the freezing point of a mixture was described. It may be stated that this was simply a hydrometer that was scaled off to read in freezing points instead of specific gravities.

Self-Starter for Ford Car

Editor THE AUTOMOBILE:—Please advise me what self-starter is practical for the Ford car.

Tolu, Ky. V. HARTON.

—Practically any of the acetylene starters could be fitted to your Ford car with very little expense. There are many of these on the market that give entire satisfaction selling as low as $10. They are connected to the acetylene supply and have attachments which fit on the top of the cylinder in place of the priming cups. The gas is controlled from a valve on the dash which admits a supply of gas to the cylinders and fires the charge when the ignition is switched on. One of the spring starters which automatically spin the motor until it starts could be fitted.

Although it would be well within the realms of possibility to install an electric or air system, these two would cost you so much that the two above systems would probably be the only ones to consider. The spring starter has the advantage of starting the motor while on dead center and the acetylene the advantage that in case the motor fails to start for some reason at first you will not have to get out and wind it up.

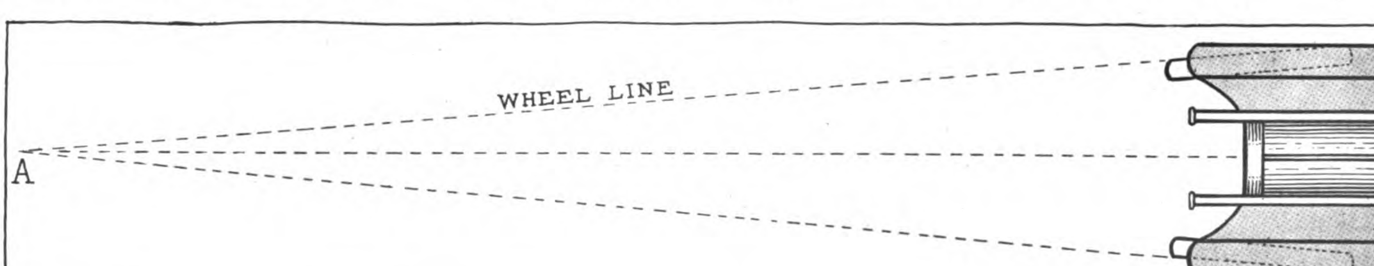


Fig. 4—Improper condition of the wheels. When this is true the tire wear is exceedingly rapid

The AUTOMOBILE

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The Annual Model

WHETHER the annual model is for better or for worse is still an unsettled question with automobile makers. Many of them imagine they have settled the question, but when their conceptions on the matter have reached the final analysis it is evident that they still desire many of the advantages that accrue from the annual model. There are some makers who would like the public to understand that they are opposed to the annual product because by such a course the impression is spread broadcast that their models are sufficiently perfected and an annual overhauling of them is not necessary to keep them in the forefront.

At the present time the American automobile is not a sufficiently perfected machine to warrant the elimination of the annual model. There are nearly twenty unsettled designs in connection with our automobiles. The question of self-starters is so far from its final form that many makers will have to change from season to season before an unchanged product has been evolved. To-day the ignition system is not in its last and final stage. In Europe the majority of the manufacturers are fitting a single magneto without any auxiliary system such as battery or dry cells. In America the concerns using the magneto as the only system are so few as to constitute a hopeless minority, yet it is almost a safe statement to make that within five years one single system of ignition will suffice just as one carbureter, one oil pump, one water pump or one clutch does to-day.

American automobile makers are not settled, in fact, far from it, on the question of rear axle construction. All of them are looking into the question of reducing the unsprung weight of the axle, some are introducing worm drive instead of bevel drive and others are making numerous changes. These questions will have to be wrestled with for years to come. The history of Europe in such matters will be repeated in America.

It is true that the annual model has worked some ills, but many ills have been attributed to it for which it has not been responsible. If the annual model has been responsible for different concerns adopting different accessories, that has been purely a business proposition with such houses. The annual model has been blamed for the landslide towards the acetylene starter of last year, which form of starter has again gone out so prominently since then. Granted that it played its part in this field it cannot be denied that **the sooner an accessory is conclusively proven unsatisfactory the better.** It is much preferable to have such a decisive verdict reached within 12 months than to require 36 months to get it.

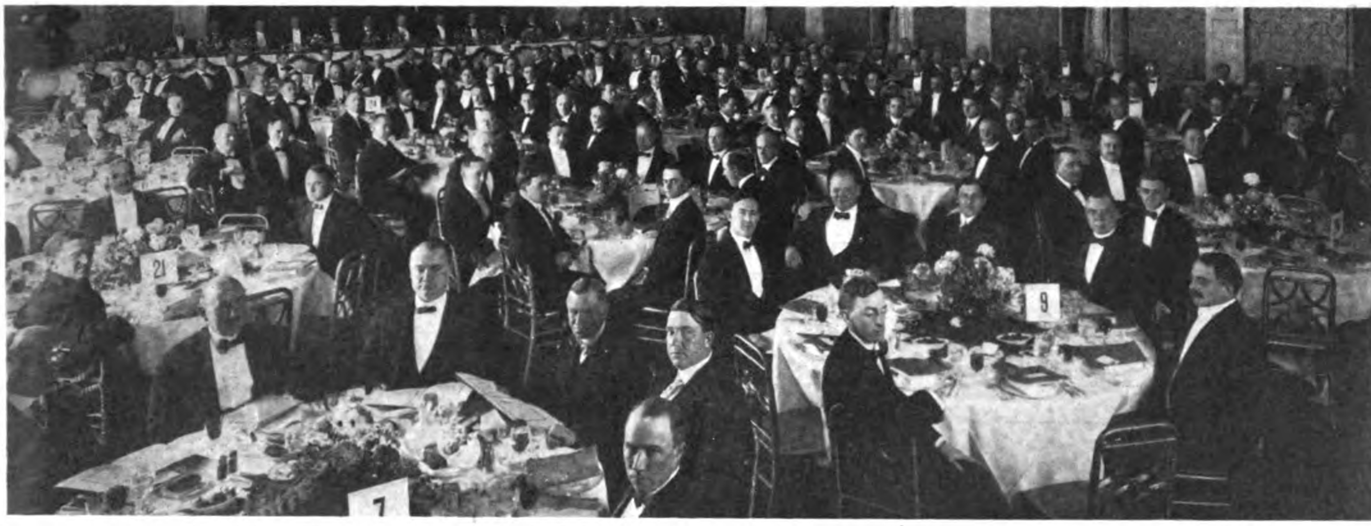
So long as automobile shows are continued so long will it be necessary to have the annual model. If the annual model is discontinued and cars exhibited at the 1913 shows are the same as those seen at the 1912 shows, then the public will stop attending shows, and the show will surrender its mammoth advertising value.

It is difficult to see why certain concerns are opposed to the annual model when in the same breath they acknowledge that they must continue making changes in their present models. So long as these changes are frequent, as they will be for some years to come, it will be necessary to adopt new models, new series, new numbers—it really makes little difference as to what the particular nomenclature is.

To the buyer it will facilitate matters if there is some symptom of similarity in the time when these are announced. There must always be a cleaning up of one model and a beginning of the next, so far as the factory is concerned; and when it comes to the dealer it will be necessary for him to announce his new number, new series or new types to his clièntele. If the dealer makes such announcement to his own injury that cannot be helped. He is his own keeper and is responsible for his own deeds.

It is unjust to tie to the annual model abuses in the business that are due to other causes. It is quite impossible to consider the annual model as responsible for the business system a dealer has in his salesroom. A good dealer will be a good dealer in spite of annual series or types; and a poor dealer may only find in the annual model an excuse for the failure of his business.

It must be acknowledged that the early announcement of the annual model has worked an injury due to the apparent disrupting of the selling field when the warm days of spring are coming and sales should be greatest. Often these stoppings of sales have not been as great as imagined, but they form a by no means negligible factor.



Gathering of 250 members and guests of the National Association of Automobile Manufacturers at the banquet held at the Hotel Pontchartrain, Detroit, Mich.

Heads of Industry Meet as N.A.A.M. Holds Its First Big Mid-Year Convention at Detroit

Manufacturing and Selling Corporations Are Represented and Hear Speeches and Discussions on Various Subjects, As Experts Deal with Pertinent Topics During 2-Day Session in the Capital of the Automobile Industry

DETROIT, MICH., Nov. 16—The first mid-year convention of the National Association of Automobile Manufacturers was held at the Pontchartrain Hotel November 14 and 15. It is doubtful if the association ever held a more successful meeting, in the light of the large number of prominent manufacturers who were present, the fund of valuable knowledge which was imparted, the important business transacted and the results accomplished.

The convention was opened Wednesday, November 13, with a meeting in the afternoon of the executive committee of the association, composed of W. E. Metzger, president; S. D. Waldon, W. C. Leland, R. D. Chapin and Hugh Chalmers, Detroit; W. T. White and L. H. Kittridge, Cleveland; Alfred Reeves, New York; H. H. Rice, Indianapolis; G. W. Bennett, Toledo, and S. A. Miles, Chicago.

However, it was not until Thursday morning when the general sessions commenced that the greater number of the members arrived.

This day was taken up with the reading of various authoritative papers and discussions, while in the evening the Detroit members tendered to those from out of town, and to other invited guests, a most enjoyable banquet in the auditorium of the Pontchartrain. About 250 attended the affair, and in addition to the many interesting speeches a variety of entertainment was provided. A. E. Larned, former president of the Detroit Board of Commerce, acted as toastmaster, while at the speakers' table were Henry Ford, Hugh Chalmers, W. E. Metzger, H. B. Joy, Thomas Henderson, L. H. Kittridge, R. E. Olds, H. O. Smith, Hal Smith, James Keena, George T. Moody, L. W. Goodenough, J. C. Wetmore, E. B. Boyd, Nat Duke, and J. N. Willys.

On Friday morning several more papers were presented, and in the afternoon an important conference between leading representatives of the railroads and the members brought the actual business of the convention to a close.

A number of the visitors remained over until today in order to visit some of Detroit's many interesting automobile and parts factories.

The Detroit Committee on Arrangements for the meeting was composed of William E. Metzger, Flanders Motor Company; Hugh Chalmers, Chalmers Motor Company; S. D. Waldon, Packard Motor Car Company; R. D. Chapin, Hudson Motor Car Company; W. C. Leland, Cadillac Motor Car Company, and H. W. Ford, secretary, Chalmers Motor Company.

The first speaker on the program at the opening session on Thursday morning was S. A. Miles, general manager of the National Association, who outlined its past work, its present objects and its future. He explained the reasons for holding the convention at this time when manufacturers are not busy with shows. Meetings held during the show season do not furnish the members a suitable opportunity to get together, to know each other and to ascertain what is going on in the association and in the world of automobiling, and to get out of the association the full benefit of the advantages it offers.

In his talk, Mr. Miles considered the history of the association for the special benefit of the newer members. The association was organized November 10, 1900, at the first show held in New York. The first executive committee meeting was held on December 3, 1900, and the body was incorporated May 4, 1904. The industry was then a mere dot in the world of commerce. There were about a dozen manufacturers, a few experimenters and a few importers.

Mr. Miles traced the course of the National Association during the days when the Selden patent was in force. Although the association never had any connection with either the licensed or unlicensed faction, and had in its ranks members of both sides, it was the victim of circumstances, and with the formation of the two rival bodies, commonly called the licensed and the unlicensed associations, it became a house divided within itself, though it did not fall. Since the reversal of the court decision and the abandonment of the licensed association, the National Association has regained much of its former strength, although it is not yet, as it once was, the sole representative of the trade.

Relations of N. A. A. M. and A. L. A. M.

Another body, known as the Automobile Board of Trade, has been formed, and much of the work of the two organizations now existing is duplication. It is hoped that the two can be consolidated, as there is much sentiment in that direction at present.

"No matter whether this can be accomplished or not," said **Mr. Miles, "the removal of the barrier between the two classes of members and the return of the National Association to power was the signal for results which plainly show the inevitable consequences of co-operation.**

"Our freight department backed by the members and the influence of a united industry became a real power and its value increased tenfold. Our commercial vehicle committee became so active that its work is among the most important we have done. Our show committee jumped into the breach and headed off threatened opposition in New York. The membership committee has added nineteen members to the roll, so that we have now 105 upon the list, by far the greatest number in our history. **Our work became once more aggressive and creative. We have done more good in the last 18 months than in the 7 years preceding."**

Mr. Miles touched upon the work of the good roads committee and on the association's co-operation with the A. A. A., the most notable result of which has been the securing of the appointment of a joint committee in Congress to take up the policy of the federal aid to the good roads movement. The association has been instrumental in the prevention of the passage of freak and discriminatory laws against automobilists and in the enactment of sane registration statutes.

The general manager further reviewed the work of the traffic department, the co-operation with the Manufacturers' Contest Association, the adoption of standard warranties, truck standardization activities and show work. He closed by saying, "The association, like the trade it represents, is stronger, richer and better than ever before; hence we have reason to believe that we shall continue to be more useful with every new year of our existence."

The general transactions of the convention resolve themselves into six principal divisions, namely: general business, traffic considerations, commercial vehicle work, yearly model discussion, selling problems and manufacturing. These divisions will be taken up in the order named.

Much of the business of the executive committee was of a general nature. Three were admitted to membership, swelling the total to 105. These were August Becker, Lippard-Stewart Motor Car Company, Buffalo; F. D. Waggoner, General Vehicle Company, Long Island City, N. Y.; and H. S. Miller, Lauth-Juergens Motor Car Company, Freemont, O.

The association will conduct a local show at Pittsburgh to fill a vacancy on the local show circuit caused by the inability of the two local organizations there to agree upon an exhibition in which the united trade may take part. The association is also in communication with the director of exhibits at the Panama-Pacific Exhibition and contemplates the taking over of and the allotment of the space which will be devoted there to the display of automobiles.

The commercial vehicle committee returned a resolution to the executive committee opposing an open-air motor truck show, it having been suggested that such an exhibition be held in the summer or fall of 1913, either as an experiment supplemental to the regular mid-winter show or to take the place of the latter after this winter. It was argued that such a show would give opportunity for the display of trucks in operation and of loading and unloading devices, but the predominance of opinion was that there are enough shows already, and that to introduce a big exhibition between April and December would tend to prolong the show season throughout the year, with its attendant disorganization of the factory forces.

Because of the cancellation of an agreement which formerly existed between the Manufacturers' Contest Association and the American Automobile Association as regards the running of contests, the National Association signified its willingness to appoint a committee to co-operate with the contest board of latter. Up to the time of the formation of the M. C. A. the National Association took an active part in the control of contests, and this is practically a step in the reverse to that policy.

In view of the soaring price of gasoline, the advisability of taking steps toward bringing about legislation to remove the ban upon the wholesale manufacture of wood alcohol for fuel purposes was discussed. It is stated that this fuel could be manufactured and profitably marketed at 10 cents a gallon, and many car makers and dealers feel that the association should act to relieve the ban which was placed upon the promiscuous manufacture of wood alcohol at the last session of Congress.

Although little is heard of the National Association in connection with good roads work, nevertheless its influential activities along this line have brought about many improvements in our national highways. The association has a good roads committee of which R. D. Chapin is chairman.

Mr. Chapin, in treating the subject of good roads, said in part:

"Some 8 years ago the association first interested itself in good roads work. It appealed to your executive committee, even then, that eventually touring was to become much more common in this country than abroad, where the finest of roads obtain. We knew that good roads were bound to come here, but our aim has been to hasten their construction, to help shape the legislation, both state and national, bearing upon highways, and to study the best types of roads for motor car travel.

Automobile a Road-Building Factor

"As each of you well know from your experience, our ideas have changed greatly in the past decade. The use of the roads by the tremendous number of motor cars that we all have produced has revolutionized the art of road building. It has given a great impetus to the making of permanent and continuous arteries of traffic. This very construction has in turn stimulated to a great extent the use of our product. **It has always been my opinion that the future expansion of our industry is in a great measure proportionate to the improvements in the roads of every state. We have each found that where the highways were good, automobiles were used in large and increasing numbers.**

"Two years ago your committee became convinced that from then forward the automobile user was perhaps the strongest factor, outside of the farmer, in the securing of good roads legislation. We therefore, in conjunction with the American Automobile Association, organized a Good Roads Board, composed of R. P. Hooper, president of the A. A. A.; A. G. Batchelder, chairman of the Executive Committee; G. C. Diehl, chairman of the Good Roads Committee; S. D. Waldon, representing the Automobile Board of Trade; C. J. Butler, representing the Motor and Accessory Manufacturers Association, and myself, representing the association. Our purpose was to co-ordinate the good roads work of the manufacturers and the users, bringing to bear the enormous influence of the organized body of users.

"Through the initiative of the National Good Roads Board the first Federal Aid Convention ever held in this country took place in Washington in January last. It was a notable gathering, country-wide in the complexion of its attendance, and including men who are leaders in the movement in their respective states.

"The concrete results of the convention was a resolution adopted by Congress, providing for a joint committee of House and Senate to take up the Federal Aid question in its

entirety, and to evolve a concise proposition. This joint committee now consists of five members each from the Committees on Post Offices and Post Roads of the two branches of Congress. With this committee we shall have much to do from this time on.

"Briefly summarized, the plan is for a comprehensive system of national roads to supplement well organized state systems, which shall include inter-county, market and township roads, with adequate provision for upkeep and a gradually improved form of construction.

"It is the belief of your committee that until we secure the construction of highways that will be permanent in the character of their roadbed, all roads will be much more expensive to maintain than should be the case. **We therefore say frankly that in favoring all highway construction, we hope the time is not far distant when the main arteries at least will be of some permanent construction that will need practically no attention for years after being laid. The government can do more to bring about a universal permanent highway construction throughout the country than any other agency. Hence, another reason for our campaign for national highways and Federal Aid.**

"National, state, county or township highways which bear the brunt of transportation, according to their particular uses, should be the ones first to receive consideration. Main township roads would have first call on the town; in like manner the principal county roads should first be built; the same idea holds good in selecting the roads of a state, and finally, those highways which serve in a national or inter-state manner, demand the Federal Government's primary recognition.

"Summarizing our efforts, let me say that we are endeavoring, through the user, to create highway departments in states that have none; to let the motor car owner pay his just proportion of taxes, these taxes to go into the respective highway funds; to secure federal aid and federal supervision of the inter-state roads, and to hasten as much as we can highway construction in every county in the United States."

The standard warranty which has been adopted by the National Association for both pleasure cars and commercials has been quite generally used by the members of the organization, but not unanimously. In this connection, S. A. Miles said: **"That the standard warranty is sound has been demonstrated by the fact that we have never heard of a case in which a manufacturer or a dealer suffered serious loss through its use."**

Freight Service Discussed

To urge its unanimous adoption, A. L. Pope, of the Pope Manufacturing Company, Hartford, Conn., prepared a paper entitled, "Why all Manufacturers Should Use the Standard Warranty." This was read by L. H. Kittridge, of the Peerless Motor Car Company, Cleveland. **Although advocating the use of the warranty, the paper took the stand that the car maker should not refer so much to the warranty which his product carries as to the service which he can give should anything happen to it. He should not expound so loudly that he will give free repairs, but he should so build his machines that there will be no repairs needed whether free or not.**

Ever since the organization of the Traffic Department of the National Association in 1908—4.5 years ago—no event in the movement of automobiles has escaped its attention. Through the efforts of this department most satisfactory results have been obtained in assisting manufacturers, and hence, indirectly dealers and car owners, to move their cars to their destinations.

One of the most important matters considered was that of freight car service, and to cope with this during the coming winter the N. A. A. M. has decided to instal a branch traffic department in the city of Detroit which will be opened by J. S. Marvin, who is head of this department of the association work, at the earliest moment. **The work of this department from the Detroit office will cover probably from Buffalo east and will consist in following every freight car filled with automobiles from the time they leave the various factories in this territory until they reach their destinations, when every effort will be made to get them hurriedly unloaded and immediately returned to the factory. By such a follow-up plan it is hoped that all available cars for automobile railroad shipment will be used to the fullest capacity.**

It developed in the discussion between the automobile manufacturers and the freight representatives of the various railroads who attended the conference at the request of the manufacturers, that the shortage of cars was often due to carlessness on the part of teh automobile manufacturer as well as neglect on the part of the railroads. **It developed that automobile manufacturers not infrequently get freight cars delivered to their factory shipping platforms and hold them 3 or 4 days and perhaps longer before making a shipment.** The railroad companies in Detroit by investigation discovered this abuse. Loss of time in this way is equally as disastrous as delays on the part of the railroad company holding the empty cars at the point of delivery after the dealer has taken the vehicles out of them.

Marvin Talks on Transportation

But the railroad freight representatives announced that their respective roads are doing much to relieve the situation by new cars, some of the companies having recently placed orders for as many as 500 new ones.

The railroad representatives who were present at the conference were A. B. Atwater, assistant to the president, Grand Trunk Railway System and General Manager of the lines in the United States; E. B. Boyd, assistant vice-president, Missouri Pacific Railroad and the Soo lines; G. C. Conn, vice-president and traffic manager, Pere Marquette Railroad Company; J. S. Bartle, assistant traffic manager, Atchison, Topeka and Santa Fe Railroad Company; Nat Duke, assistant traffic manager, Delaware, Lackawanna and Western Railroad Company; and W. C. Rowley, general freight agent, Michigan Central Railroad Company.

In speaking on the subject of traffic as it applies to the National Association, Mr. Marvin outlined the workings of the traffic departments of the large industrial concerns as a comparison. **He placed the amount of freight earned by the railroads of the country on shipments of automobiles from all factories at not less than $6,000,000 per year and explained how this expenditure should be supervised.**

"The question of service," said Mr. Marvin, "is of vital importance to the industry. When the railroads fail to operate on accustomed schedules or when they are unable to keep pace with the manufacturer of any article within reasonable limits in the supply of freight cars, the situation is about as serious as could be imagined. The conversion of finished goods into cash is interrupted.

"When industries in general find it difficult to secure sufficient freight cars, the situation is rendered all the more difficult for the automobile factories, for when a car shortage occurs, shippers of other articles gain the use to a large extent of the automobile cars.

"Such a car shortage exists in this country today; the railroads are right now taxed to the limits of their resources in handling the exceptionally large crops and a heavy movement of traffic of all kinds. The return of freight cars to the home roads is difficult of enforcement, and when it is considered that the observance of this rule is all that the automobile industry has to depend upon for the shipment of its goods, the real aspect of the situation confronting us is apparent. To shippers of other articles which can be loaded in ordinary box cars it does not matter so much if the cars they load are owned by the railroad furnishing them, but the automobile shipper hasn't this choice and must in the main depend upon the outlying railroads returning the initial lines' automobile cars."

The subject of Yearly Models was brought up for discussion, the principal speaker on the topic being H. O. Smith, Premier Motor Manunfacturing Company, Indianapolis, Ind.

Mr. Smith's address was entitled Yearly Models and in it he took a firm stand against such and attributed many of the present ills of the industry to annual models. He characterized the annual series or models as a barnacle which has fastened itself upon the industry.

Among the various injuries worked by the annual model

is that of factory expense in that each annual model, incorporating changes means the abandoning of jigs, tools and other equipment. There is also a factory loss in production because the workmen in the factory who have grown familiar with the production of the previous model produce at a lower capacity during the time required to familiarize themselves with the new job.

I am not sure that any particular changes made from year to year makes new buyers, an exception, however, being the addition of such an accessory as self-starters. **How many of the 990,000 automobile owners in the United States to-day purchase their first car because it was one of the latest models?**

One of the ills of the annual model is the early announcement, an example being a concern announcing in April, 1912, its 1913 model, this announcement being made before some of the Iowa dealers had a chance to even demonstrate their 1912 models to the buyers. These are the announcements that merely serve as signals to the buying public to stop buying 1912 models and wait until the full complement of 1913 models have been announced.

Yearly models cause unrest in factories. There is always a hurry. A hurry to complete the last of the old models; a hurry in the true room to get the jigs and tools ready for the new models, and other hurries.

The annual models can be charged with the second-hand car evil which has loaded itself on the industry.

Mr. Smith concluded his paper by presenting the fact that the new annual models or series do not actually create new business.

Following this paper one of the most heated discussions of the entire conference took place. The makers ranged themselves on both sides. Those who talked in favor of the annual model advanced the argument of style as a selling factor, whereas those opposed to the annual model centered their arguments around service rather than style.

The Multiplicity of Models

To the manufacturing branch of the automobile industry the address by G. W. Bennett, Willys-Overland Company, Toledo, Ohio, on the multiplicity of models belongs. Mr. Bennett advocated the concentration upon a small number of models, since the marked successes of the automobile industry will in the future lie in specializing, each plant making that which best fits its demands, and producing that model in the quantities to which its place in the automobile market entitles it.

To make several models in a factory which is equipped to make not more than one satisfactorily necessarily restricts the output of that plant and divides the energies of its engineers, its operative force and its selling force into several small channels, all of them considerably below par in efficiency because of such division.

The growth of the industry shows that the most prominent manufacturers have realized this and are catering to the class of demand which they can best supply. I believe that this development will become more marked, and that in a very few years each factory will limit its product to one model with perhaps several styles of bodies interchangeable on the chassis.

It may not always be possible for one manufacturer to profitably restrict himself to one chassis, but it will be possible, if more than one is considered necessary, to make a large number of the parts interchangeable, and only in this event would the production of two models be warranted or likely to be successful.

Furthermore, the subject of subsequent service is involved so much that where more than one model is built adequate service to the user is difficult and consequently seldom satisfactory, and without that satisfaction complete success is impossible.

Mr. Bennett pointed out that since the interests of the dealer are identical with those of the manufacturer, concentration of the manufacturer on a single model allows the dealer to focus his atention to this same single type, with his consequent better acqaintance with it and the methods necessary to sell it.

He said that it would be expecting too much to hope that the industry would be able to arrange production so that every company will prosper, but he stated that the association was in better shape to accomplish such a result than any other agency.

Two Papers on Selling

Chalmers and Benson Consider Problems of Marketing Cars

Extracts from Addresses Read Before the National Association of Automobile Manufacturers

On automobile selling, the manufacturers heard two able papers, one by Hugh Chalmers, Chalmers Motor Company, Detroit, who attacked the selling problem with which the car maker of today is confronted, and the other by E. R. Benson, Studebaker Corporation, Detroit, on territory and discounts.

Our selling problem, said Mr. Chalmers, may be roughly divided into two classes—first, those the solution of which can best be accomplished by the manufacturers as a whole working together; second, those in the solution of which each company must go its own way and find its own best methods. It is the first class, very naturally, that we should consider here.

We are led to the first problem worth our while to consider by the question What is selling? What constitutes a sale?

It seems to me that selling—selling a motor car, for instance—is something more than simply exchanging an automobile for a check or for so much cash. This may be merely a friendly transaction; or an exchange, fair or unfair, or perhaps a bit of charity or philanthropy. Selling, real selling, is the disposal of goods at a profit. Anybody can give goods away, but selling things at a profit is a job for good salesmen and good business men. Let us keep this point in mind.

Now, gentlemen, business exists for the net. It is a nice enough thing for those who like it to build up a great volume of gross business merely for the sake of talking about it, but the final test of success is in the net figures. The prime object for which we are all working, therefore, is to make money.

It seems to me that automobile dealers are of more vital importance to both the manufacturer and the buyer than is the dealer in nearly any other line of business. **The right sort of automobile dealer is harder to get than a good dealer in other lines**—that is why he is so vital to the manufacturer.

And, again, an automobile dealer is needed more by the buyer after the purchase than is the dealer in any other line—that is the public's vital interest. Both the manufacturer and buyer, therefore, are anxious to have a good dealer and to have him remain so. **A good dealer won't remain good very long unless he can make some money; unless his business will show a net profit. Either he will get out of the business, or he will simply drift along for a time, only to fail entirely in the end.**

Mr. Chalmers pointed out how over-production affects sales, how second-hand cars, weather, good roads and honest advertising have a good or bad influence.

Inasmuch as the apportionment of territory and the discount to be allowed the agents are much mooted questions, Mr. Benson's talk was very timely.

Territory, in one sense, he said, is the capital of the sales manager, inasmuch as out of it he has to obtain his results. The subject of territory, therefore, commands the deepest study and research; it demands that we should all have ready the best sources of information and the latest data to draw from; that we should have on hand statistics on population and wealth, late reports on manufacturing and other industries, reports on crops, on mercantile conditions, on the status of the markets of the country, as well as continual reports from our own traveling representatives, analyzing conditions from their points of view.

Mr. Benson believes that the discounts and divisions of territory, no matter to which class given, should all be controlled, systematized and agreed to by the manufacturer in order to insure his procuring the most out of the territory. He took up the consideration of the bonus or rebate plan and the system of graduated discounts by which the dealer commences at one rate and gets a greater discount in proportion to the amount of business he does.

Truck Committee Report

Revised Body Weight Allowance Scale Is Submitted

Scale of Demonstration Charges for Commercial Vehicles Lowered—Warranty Work Progressing

MR. WALDON presented reports of the work of the Commercial Vehicle Committee since the June 4 convention of the National Association and of the business transacted at the meeting of this committee November 6. As a result of its deliberations the association revised the scale of mimimum body weight allowances based on stake types, as adopted at the March meeting of the association. The revised schedule representing approximate averages of weight of all types of bodies commonly fitted to chassis of the different capacities follows:

Load Capacity, Pounds	New Body Weight Allowance, Pounds	Former Body Weight Allowance, Pounds
1000	600	500
1500	750	...
2000	900	600
2500	1000	...
3000	1050	700
4000	1200	800
5000	1350	900
6000	1500	1000
7000	1600	1100
8000	1700	1200
9000	1750	1300
10000	1800	1400
12000	1900	1600
14000	2000	1800
16000	2100	2000
18000	2200	2200
20000	2300	2400

The scale of demonstration charges for commercial vehicles which was adopted at the June meeting of the National Association was lowered. This was done because it was deemed desirable that the charges should bear a close relation to the actual normal cost of operation of the vehicles and that the rate per ton-mile of work done should decrease as the capacity of the unit increased. The new schedule is given:

Truck Capacity Tons	Approximate Average Cost Per Day	New Scale of Demonstration Charges Per Day	Former Scale of Demonstration Charges Per Day
½	.....	$10.00	$10.00
1	$8.50	10.00	10.00
1½	9.50	11.50	.....
2	10.50	13.00	15.00
2½	11.50	14.00	.....
3	12.25	15.00	20.00
3½	13.00	16.00	.....
4	14.00	17.00	25.00
4½	15.00	18.00	.....
5	15.50	19.00	30.00
6	16.50	20.50	30.00
7	17.25	22.00	35.00
8	17.75	23.00	35.00
9	18.25	24.00	40.00
10	18.50	25.00	40.00

Efforts made to ascertain the extent to which the standard truck warranty recommended by the National Association has been adopted by manufacturers have brought forth replies from sixty-four makers. Sixteen members and eighteen non-members have reported their definite adoption of the warranty and their intention to incorporate it in their new catalogs when issued. Nine other member companies and one non-member are in favor of the standard warranty and report that when they are manufacturing commercial cars on a sufficiently large scale to require a truck warranty they will probably adopt this one. Seven non-members favor the warranty and say they will adopt it if a majority of the makers do so. Three members and one non-member report that they have the question under consideration. **Opposition to it was found in only nine cases.**

With a view to rendering truck bodies more readily interchangeable between different makes of trucks of the same capacity rating, and to enable the body builder to make up stock bodies that can be mounted on any make of chassis on demand, the committee collected a large amount of data from truck manufacturers and from an analysis of this data recommended two standard frame widths which were adopted by the association.

These frame widths are 36 and 42 inches and frame lengths, also adopted, for distances back of the seat, are in multiples of 1-2 foot from 48 inches for the lightest package delivery car to 216 inches for the largest sizes of trucks. The committee's idea in making frames in multiples of the foot and 1-2 foot lengths is so that the number of frame lengths in common use on trucks of 1, 1 1-2, 2, 3 and 5-ton trucks can be reduced to fifteen sizes to meet all ordinary requirements even with short, medium and long wheelbases in each capacity. These would be made in 1-2-foot lengths from 8 feet to 15 feet. However, ten sizes from 9 to 14 feet will take care of all ordinary requirements.

These frame lengths can be made up to fit the two widths of frames—36 and 42 inches—and in any of the standard types of bodies desired. If these recommendations are adhered to by a majority of the truck manufacturers it will make the problem of supplying bodies much simpler for the maker of this part of the completed vehicl.

Three Papers on Truck Subjects Read

In addition to the report of the work of the Commercial Vehicle Committee since the last convention of the association in June, three papers dealing with truck and business vehicle subjects were presented during the course of the Detroit convention.

S. D. Waldon, Packard Motor Car Company, considered the relative business in pleasure cars and trucks:

On every side we hear the prediction that the motor truck business will be the big end of the motor car industry in a few years, said Mr. Waldon. We get it from newspapers; we get it from bankers, and automobile manufacturers believe it themselves. Undoubtedly many automobile manufacturers and their agents, too, have begun to look upon the truck as the vehicle which is going to carry the financial load of the pleasure car business.

Now, it is well worth while at this time to inquire carefully what justification there is for this prevalent conviction. Is the growth in the volume of the truck business not vastly overestimated, and has it not already been more than fully anticipated and discounted by manufacturing preparations?

A somewhat startling answer to these questions is found by a simple comparison of the present relation of the volume of truck business to passenger car business in the United States and the number of factories engaged in each branch of manufacture.

Carefully compiled statistics, which are very conservative, show that 652,000 passenger cars were registered in the various states last year. The same compilation shows that 25,500 commercial vehicles were registered in the same year. **On this basis there was one truck to twenty-six pleasure cars.**

The total estimated value of the passenger cars was, in round numbers, $812,000,000 and the total valuation of the trucks was $56,000,000. This makes the proportion of passenger car value to truck value last year approximately 15½ to 1.

Investigation shows the astonishing fact that there are about an equal number of factories in the country producing passenger cars and commercial cars. The numbers are variously estimated according to the ideas of different enumerators as to what constitutes an active manufacturing concern.

Probably as good a criterion as any is the number of makers who exhibited their products in each line at last winter's automobile shows at New York and Chicago. There were 111 different manufacturers of pleasure cars in the Garden, Palace and Coliseum shows and 101 exhibitors of commercial cars.

Thus we find that there are nearly as many companies competing for $56,000,000 worth of truck business as there are companies dividing among themselves the bulk of the $812,000,000 worth of passenger car trade. On an average the truck manufacturers had done a total business of about $560,000 apiece up to the beginning of this year and the passenger car makers a business of about $7,320,000 apiece.

State registrations for the first two months of 1912 showed

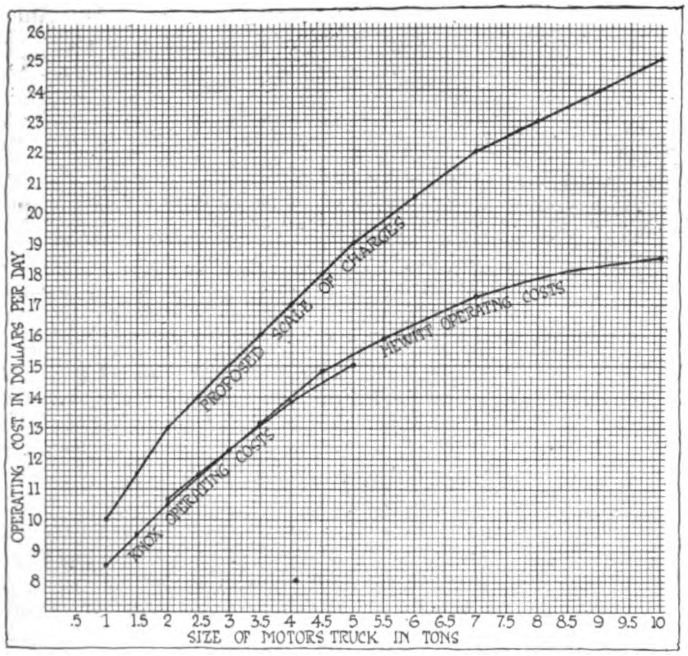


Chart illustrating average actual motor truck operating costs per day and scale of demonstration charges based on them as proposed by the N. A. A. M.

17,126 commercial cars registered, as compared with 342,439 passenger cars, or slightly less than 1 to 20.

There is no desire on my part to belittle the motor truck business, but in giving my personal attention to the work of the Commercial Vehicle Committee of the National Association some of these facts have come home to me with particular force, and it seems that a considerable number of persons have been carried away with enthusiasm over motor truck prospects and embarked in their manufacture without making any study of existing conditions and calculating the prospects of the future.

The cost of manufacturing and selling trucks is considerably higher proportionately to the volume of business done than the cost of manufacturing and selling passenger cars.

In connection with the consideration of truck matters, an address was delivered by M. L. Pulcher, Federal Motor Truck Company, Detroit, on the subject of the injudicious truck selling methods and their effect.

The necessity for disposing of product in order to realize on it and devote the money to payment of accounts and the continuance of manufacture, said Mr. Pulcher, is the root of numerous evils in the selling end of the business. There are two principal kinds, one originating with the factory and the other with the sales force.

The executives at the factory probably believe that theirs is the best truck built of its rated capacity and price, and they cannot see why the salesman should have any difficulty in selling it; consequently they press the sales force.

The first result of such factory policies is to realize the object—quick sales. If there were no other and adverse results such would become common practice, but the fact is they are going out of favor both with the truck manufacturer and the public.

The selling of trucks is not very different from the selling of other machinery, and it should be done on the same sound basis.

Mr. Pulcher took up the methods of sales from the salesman's end, discussing the fallacies of price-cutting and the various ways of arriving at charges for demonstration. The common fault of knocking the other fellow's product in order to make sales was discouraged.

David Beecroft, editor of The Automobile, discussed a subject of vital interest to motor truck manufacturers, in that he showed a situation with which the commercial vehicle manufacturer must cope and must remedy in order to make his product show up to its best advantage. Mr. Beecroft's subject was Transportation Delays at Railroad and Dock and City Terminals.

Of 287 motor truck and horse wagons checked at railway and steamboat terminals in the cities of New York, Chicago and Detroit it was discovered that these vehicles had an average delay of 11.3 minutes from the time they reached the proximity of the freight terminals until they reached the unloading platform and were ready to begin unloading or loading operations.

Figures taken of the length of time required for these 287 vehicles to unload or load showed an average of 27.3 minutes each, so that, roughly speaking, each vehicle waited almost half as long to get to the loading or unloading platform as it required to perform the loading or unloading. This loss of time cuts down the efficiency of the motor truck as well as that of the horse vehicle.

Of the three cities, New York, Chicago and Detroit, the last showed the least delay. Of forty-two vehicles checked in the city of Detroit the average delay at one railway freight terminal was 3 minutes and at another 4.4 minutes. This difference in time was due to narrower approaches at one than the other. Chicago averages better than New York in the reduction of time lost at terminal depots. **Of three leading Chicago freight terminals in investigations extending over three successive days, the average delay at one depot was 6.2 minutes per vehicle, at another 11.7 minutes, and at the third the amazing figure of 25 minutes.** In contrast with this are the figures taken from three New York City dock terminals based on observations extending over a similar period. In one the average delay was 9 minutes, at a second 10, and at a third 15.5. While these averages do not appear abnormally high, they invariably represent a high ratio with the time required to unload. This is demonstrated at one Chicago depot where the average delay was 25 minutes and the average unloading time 24 minutes, so that each vehicle waited longer to get the chance to unload than was required in the unloading. At another Chicago depot the average delay was 11.72 minutes, and the average unloading time 23.74 minutes, giving a delay-unloading ratio of 1 to 2. In New York, at one of the docks the average delay was 10 minutes and the average unloading time 19 minutes, which is more than a 1 to 2 delay-unloading ratio.

But all of the loss of time or delays at freight terminals, whether in connection with railroads or steamboat docks, is not due to lack of capacity—lack of system is a big factor in many cases.

One of the greatest obstructions to the reduction of delays at present is the driver of horse vehicle. He is generally in sympathy with the delays and often actively assists in causing them. Recent observation showed traffic jams in the city of Chicago, where 155 to 175 vehicles, mostly horse trucks, and some motor trucks, were held for 1 hour and 20 minutes. The blockade was finally broken up by mutual consent of the drivers, and was accomplished in fewer than 5 minutes. Many horse drivers make it a point of reaching the railroad freight yards and spending from ½ to 1 hour sleeping. They often miss their turn at the unloading platform, but are not disappointed in that they have accustomed themselves to doing but three trips or to carrying three loads per day, which allows of wasting a great deal of time, and they calculate on doing this.

The whole horse vehicle driver situation is so unsatisfactory that the dealer in motor trucks will have to give it his most careful investigation or he will meet with disappointment.

John C. Wetmore went straight to the point in his talk at the N. A. A. M. meeting late Thursday afternoon, using as his subject, "Contests as an Aid to the Automobile Industry."

He stated it as his opinion that the manufacturers must provide contests to make the news to enable the newspapers of the country to continue the generous treatment now given news of the automobile industry and stated that unless the makers came forward more liberally with entries for contests they would soon find themselves barred practically from the news columns of the country.

Mr. Wetmore said that from one end of the country to the other there was a war to-day against the amount of space given to motoring and he advised that the N. A. A. M. recommend to the A. A. A. the reclassification of great racing events and segregation of great classics for every class of cars, giving it as the opinion of the newspaper men that greater good would be done the industry by having the great events of the year each a star event in one locality instead of grouping many great events as at present.

He advocated the formation of local promoting associations such as New York has formed to promote track races, road races, hill climbs, touring events, exhibitions, orphans' day outings, and so on, these events being promoted by a stock company composed of all dealers with 50 per cent. of the profits to a sinking fund to cover possible future losses.

Truck Demonstration Charge To Be Lower

National Association Figures on Reducing Cost to Prospective Purchasers, Especially in Large Vehicles

Compilations of Knox and Hewitt Companies Used as Basis for Recently Adopted Scale of Prices

TREATING demonstration charges based on operating costs, the National Association of Automobile Manufacturers has compiled the following article and tabulations:

Theoretically, the cost per ton of motor trucking should decrease as the size of the truck increases, and logically, any schedule of charges for demonstrating motor trucks should bear a definite relation to the actual cost of operation and maintenance. Such charges should also be so fixed that the cost of doing a given amount of work will be less with the power vehicle than with horses and wagons.

The most elaborate tables of truck operating costs are those issued by the Hewitt Motor Company and the Knox Automobile Company. They agree closely in the average per diem costs of motor trucks from 2 to 5 tons' capacity. These costs are shown in the appended table in columns two and three, together with a schedule, in column four of uniform approximate average costs for all truck sizes. The costs are also plotted in the lower curves of the accompanying chart.

The work done by each size of truck is shown in ton-miles in column six. The ton-mile capacity of a truck in a working day is assumed to be the tonnage rating of the vehicle (column one) multiplied by its speed in miles per hour (column five) times one-half the number of working hours, that is 5. The miles per hour are the N. A. A. M. standard speed ratings. Five hours is taken as the total daily running time, as in general trucking service about one-half of the 10-hour day is consumed in waiting for loading and unloading and other delays.

Dividing the daily cost of operation by the ton-miles of work performed gives the ton-mile cost in cents shown in column seven. It is noteworthy that the rate drops gradually from the 1-ton size to the 5-ton size, and then gradually increases to the 10-ton size.

As nearly as can be calculated from information at hand the cost of doing work with horses is as follows:

COST OF TRUCKING WITH HORSES

Tons	Team (horses)	Daily Rate	Miles Per Working Day	Ton Miles	Ton-Mile Rate (cents)
1	1	$5.50	16	16	34.37
2	1	6.50	16	32	20.31
4-5	2	8.50	12	48-60	17.70-14.16
8-10	4	17.50	12	96-120	16.35-14.58

According to this table, based on statements furnished by professional truckmen, it costs twice as much to do work with horses as with motor trucks, even allowing only 5 hours' running per day for the power vehicle. The horse figures show the average maximum day's work for animals, but if the waiting time of the motor truck is cut down one-half by quick-loading methods its work capacity is increased one-half and the ton-mile rate decreased proportionately.

If it is conceded that the charges for demonstrating motor trucks should be higher than the actual cost of operation, it is found that a schedule one-quarter higher gives the scale shown in the dotted line in the chart, ranging from $10.62 a day for a 1-ton truck to $23.12 a day for a 10-ton truck.

As this is an awkward scale of dollars and cents, the scale shown in the solid line, ranging from $10 a day for a 1-ton truck to $25 a day for a 10-ton truck, has been adopted by the N. A. A. M.

The new scale is materially lower than the system of rates that has been in effect generally, the chief reductions appearing in the charges made for the larger sizes of trucks. These amount to as much as $15 a day for 10-ton truck demonstrations and range from that figure to a saving of $1 or more on the smaller sizes.

Big Men as Truck Drivers

Automobile trucks have created a demand for a new type of chauffeur, according to the officials of the Automobile School of West Side Young Men's Christian Association, Eighth avenue and Fifty-seventh street. It is the heavy man, with well-developed muscles, who can drive and care for his car and also load and unload, that will find himself much in demand.

This fact is emphasized by the present enrollment at the automobile school, where a great many of the students are men who have been sent to the school by business concerns that are using motor trucks. Almost without exception, the companies have picked big, muscular men.

A. W. Robinson, sales manager of the truck department of the Locomobile Company of America, in a letter to Edward L. Wertheim, Educational Director of West Side Y. M. C. A., voices the same opinion. Mr. Robinson says:

"I do not think the average chauffeur for pleasure cars will make the proper driver for a truck. One of the difficulties is going to be in getting men who will be able to operate and take care of the mechanical feature of the truck and willing to load and unload. For these men, however, there is going to be a big demand.

"We would be glad to have your opinion on this matter."

Inquiries were made by Mr. Wertheim to ascertain the average wages paid to motor truck drivers. Investigation showed the following average of wages:

Drivers of 1-ton trucks $18 per week.

Drivers of 3-ton trucks $21 and $22 per week.

Drivers of 5 to 7-ton trucks $25 per week.

The employment department at West Side Y. M. C. A. also shows this tendency for big and muscular men to drive trucks. Many business houses secure their employees through the Y. M. C. A. employment bureau.

"Send us a driver for motor truck, but he must be a big man," is the tenor of many letters received.

Tabulation Showing Operating Costs in Real Experience Compared With the New Scale

1 Truck Capacity (tons)	2 Average Operating Cost Per Day (Hewitt)	3 Average Operating Cost Per Day (Knox)	4 Approximate Average Cost (per day)	5 N. A. A. M. Speed Rating (MPH)	6 Ton-Miles Per Day, 5 Hours' running	7 Rate Per Ton-Mile (cents)	8 Scale of 125% of Operating Cost (per day)	9 Rate Per Ton-Mile (cents)
½				16	40		$10.00	25.00
1	$8.58		$8.50	15	75	11.33	10.00	13.33
1½	9.50		9.50	14	105	9.04	11.50	10.95
2	10.53	$10.60	10.50	13	130	8.07	13.00	10.00
2½	11.48		11.50	12	150	7.66	14.00	9.33
3		12.20	12.25	11	165	7.42	15.00	9.09
3½	13.18		13.00	10½	183¾	7.07	16.00	8.70
4		13.80	14.00	10	200	7.00	17.00	8.50
4½	14.84		15.00	9½	213¾	7.01	18.00	8.30
5		15.00	15.50	9	225	6.88	19.00	8.40
6			16.50	8	240	6.87	20.50	8.54
7	17.2[illegible]		17.25	7	245	7.04	22.00	8.97
8			17.75	6	240	7.39	23.00	9.58
9			18.25	5½	247½	7.33	24.00	9.69
10	18.50		18.50	5	250	7.40	25.00	10.00

British Designers Aim at Increased Motor Efficiency

(*Continued from page* 1039)

ticularly well adapted to thermo-syphon cooling, the water pipe connections being of the simplest nature. In the case of the six-cylinder engine the cylinders are cast in two blocks of three cylinders each. As regards the valves, these are arranged on one side of the engine, giving an L-type combustion chamber, this type being held by most British makers to be the most satisfactory. The valve tappets and springs are inclosed by readily detachable doors. For the purpose of valve construction a special steel is employed having a high percentage of nickel and thus offering great resistance to over-heating and pitting. The inlet and exhaust valves are interchangeable. The crankcase of the four-cylinder engine have five bearings and the bushings in which the crankshaft journals run are white metal. The bolts which hold the bearings in place pass through the top of the crankcase so that the metal of the crankcase is held in compression instead of in tension. The lower part of the crankcase forms an oil sump only.

Another interesting feature is connected with the cooling, which is termed assisted thermo-syphon. With this arrangement the fan spindle is supported by the water inlet pipe, and the spindle of the fan is extended to the waterjacket carrying at its inner end a propeller, which, while it assists in driving the circulating water, provides sufficient clearance not to impede the circulation should the fan belt become detached.

The crankshaft, which has five bearings in the case of the four-cylinder engine, has seven in the case of the six-cylinder engine; it is constructed of the highest quality nickel chrome steel, oil hardened. The crankshaft, as well as the camshaft, bearings may be inspected by the removal of a pair of aluminum doors on the side of the crankcase.

Ignition is performed by a high-tension magneto. The armature is driven by a dog-coupling mounted on a shaft extending from the timing-gear casing, the design of which permits the fitting of independent dual ignition to the 20-horsepower car when required. The firing point is, of course, variable from the steering wheel.

The control of the engine is effected by a throttle lever and a magneto advance lever, both fitted above the steering wheel, in combination with a pedal accelerator.

For 1913 the following Napier motors will be constructed:

Horsepower	No. of Cylinders	Bore and Stroke
59.9	6	127 x 127
45	6	102 x 127
30	6	82 x 127
15	4	82 x 127

The engine has a bore of 82 millimeters by a stroke of 127.

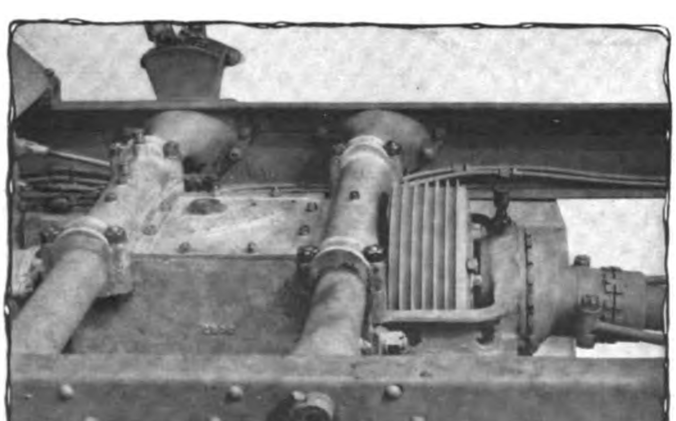


Fig. 11—Crossley gearbox attachment on the 1913 20-horsepower chassis

The Bosch high-tension magneto of the single order is retained, with variable control. Considerable attention has been paid to the lubrication, which is of the entirely forced-feed type. A rotary oil pump delivers oil to the bearings under pressure with a valve arrangement adjusted to regulate the amount of oil according to the speed of the engine, a relief valve being provided which prevents the oil rising above the maximum. This is obtained by a spring-loaded valve which returns any excess of oil to the sump. The oil-circulating pipes are outside of the base chamber, so that they are easily detached for cleaning, although every precaution is taken to filter the oil by means of gauze filters in the oil filling inlet, and in the chamber between the pump and the outlet pipes.

The carbureter is of the two-jet type, with rotating throttle valve and adjustable air shutter. It is fed gasoline under pressure, a small air pump being worked from the engine camshaft. As an instance of the care given to minute details, the air inlet of the pump is covered by very fine gauze to prevent the suction of any dust.

Another feature is that the exhaust pipe is carried down the front end of the engine, which prevents heat getting to the front seats, a particular advantage where the scuttle dash is employed. Fig. 1, showing the side view of the Napier chassis, clearly indicates the general arrangement of the whole.

With regard to the 15-horsepower model, the bore and stroke of the engine are 82 by 127 millimeters, with cylinders cast in pairs. The engine and gearbox are built up as a unit. It will be noticed that the flywheel is at the front end, and another feature is that the base chamber of the engine is not open to the gearbox or the clutch. Each of these component parts has its own oil chamber, the reason being that oil which was suitable for the engine was not satisfactory for the clutch, which is of the multiple-disk type. A cock is attached for the purpose of indicating by means of a rod the level of oil in the clutch chamber. When filled up to the necessary level, oil flows out of the cock, and denotes that the requisite lubrication is provided.

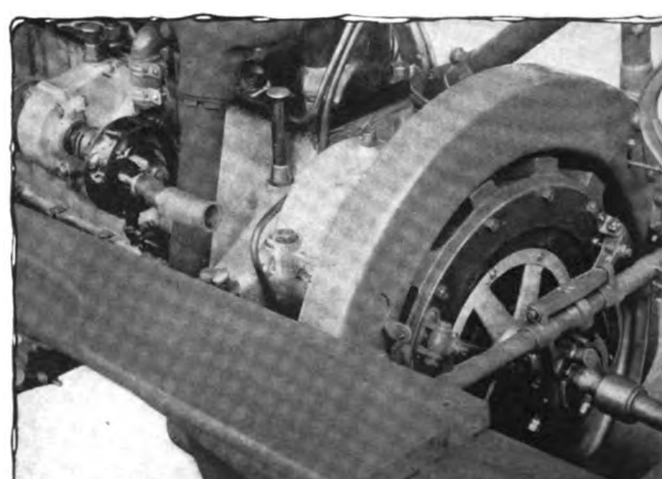


Fig. 12—View of the clutch and rear suspension of the Deasy motor

Spur gears are used for driving the camshaft and spiral for the magneto, which is of the single Bosch type. Cooling is on the thermo-syphon principle, and it will be noticed that there is an extra outlet immediately above the exhaust valves between the spark-plugs.

The Argyll program for 1913 comprises four types, that is, a 12-horsepower four-cylinder poppet valve engine henceforward to be called a 12-18 horsepower; a 15-horsepower model for colonial purposes fitted with a poppet valve engine: a 15-30 horsepower and a 25-50-horsepower sleeve valve model.

The 12-18-horsepower engine has the same bore and stroke dimensions, that is: 72 millimeters by 120 millimeters, but the exhaust and inlet valves are of larger diameter and consequently, more power is developed.

The 15-horsepower is similar in most respects to the 12-horsepower, but it has 80 millimeter by 120 millimeter cylinders cast in pairs. Thermo-syphon cooling in conjunction with an efficient ball-bearing fan insures proper cooling.

Briefly, there is in the Argyll engine, Fig. 17, a single sleeve, and this sleeve has a combination movement produced by an oscillation and a reciprocation, thus any point upon the sleeve describes an ellipse upon the cylinder wall. The sleeve has five ports in its upper end and the cylinder has six ports. Three of these ports are for the inlet of the gases and three for the exhaust; meanwhile the central port in the sleeves serves alternately as an exhaust and an inlet port. The exact shape and size of these ports has been decided after considerable experiment.

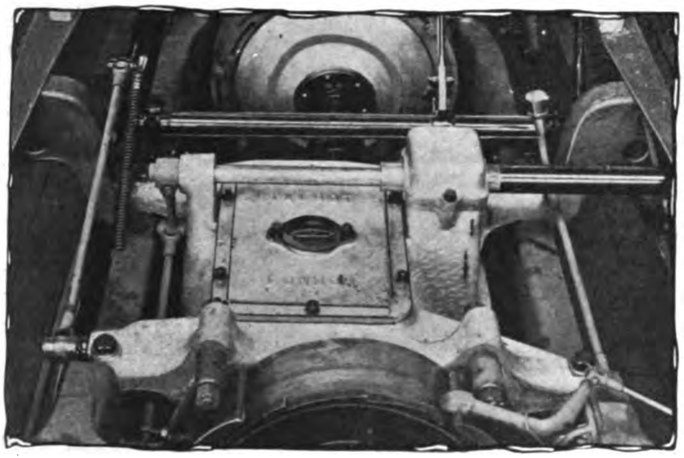


Fig. 13—Talbot gear box and brake mounting with long spiral back-spring

The crankshaft has three bearings, the journal diameter being 45 millimeters. The bearings from the front end have lengths respectively of 82 millimeters, 64 millimeters and 80 milllimeters, while the crankpins have the same diameter as the shaft and a length of 50 millimeters. The short crankwebs have a width of 54 millimeters and a depth of 24 millimeters, and the center webs have the same width and a depth of 40 millimeters. Thus, there is very little chance of whip. The crankshaft has at its flywheel end an oil throw collar of 64 millimeters diameter and at the forward end a double V collar to act as an oil throw. The pistons have a length of 102 millimeters and are provided with three rings. The small ends of the connecting-rods are well drilled to provide lubrication, and rather substantial bushes are fitted. The sleeve driving shaft has a diameter of 32 millimeters and 50 millimeters. A silent chain, 1.5 inches wide, is employed to revolve the shaft. Outside the chain pinion and close up against it is a ball journal bearing to take the pull of the chain, and at the rear end of the shaft a double ball thrust is provided to take up the end-thrust of the spiral gears.

There is one small alteration that has been made in the sleeve-driving mechanism. A small hole has been drilled through the wall of the plunger into the interior so as to break any small vacuum that might otherwise be caused.

The oil pump has gears of about 25-millimeter pitch diameter and a tooth width of 12 millimeters. The port which supplies the pump with oil is a long drilled hole at the bottom of which is a small ball valve contained in a removable seating and one would expect that the fact that the pump has to draw its supply of oil from a point some 10 inches beneath it might lead to trouble. The oil pump is held up in place onto a conical seating by four studs bearing upon a square flange so that the pump is readily removable. There is a chamber on the side of the crankcase containing a float and needle indicator for ascertaining the oil level, and the top of the needle passes through a small fitting having a spring lid which normally holds the needle down. Lifting the lid makes the needle free to slide. The under side of the crankcase has longitudinal ribs to assist in carrying away the heat of the oil used for lubrication as shown in Fig. 17.

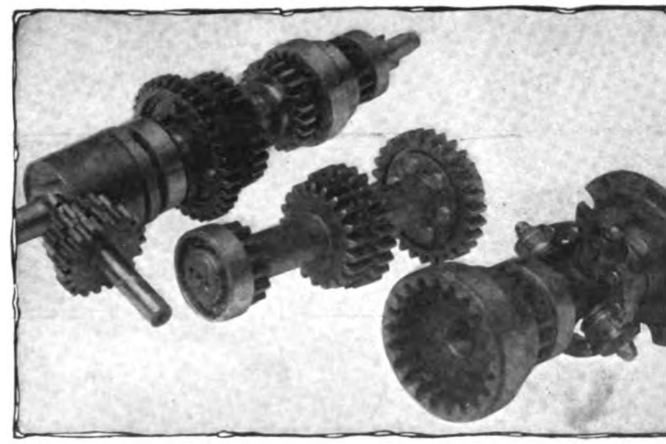


Fig. 14—Three gearshafts and gears in Crossley change-speed set

There is another piece of detail work in connection with the spiral gear. Immediately above the oil pump can be seen the main oil way and there passes through this opposite to each spiral gear a drilled set-screw. In this manner a stream of lubricant is continually thrown upon each of the four gears so that there is not much possibility of trouble here.

As in the earlier engines neat ebonite caps cover the ignition plug pockets and prevent the accumulation of dust or dirt which might easily occur otherwise. The cylinder head is, of course, separate, as in the Knight engine, and this leads to certain convenience in the matter of the cleaning of the cored out portion and also facilitates cylinder boring. The manifold pipes through which the mixture passes to the cylinder are water-jacketed.

The Briton engine has cylinders 68 millimeters in diameter and a stroke of 120 millimeters. The cylinders are cast in pairs and a water space is allowed between each pair of adjacent cylinders. The pistons are perhaps shorter than is usual with this class of engine, being only 70 millimeters long and but three rings are provided, one of which serves to keep the wristpin in place. The crankshaft is 38 millimeters in diameter and the bearings are ample, especially the rear one against the flywheel, which has a length of 90 millimeters. There is, however, what appears to be an unnecessary overhanging of the flywheel, though it will be seen that the crankshaft is strengthened hereabouts to prevent the possibility of whipping.

The camshaft is a solid one and it is considerably enlarged at the bearings, which are three in number, so that the whole shaft can be pushed in endwise, the cams passing easily through the bushes. There seems to be no objection to this method of construction and it certainly makes for cheapness.

The valves have a diameter of 32 millimeters and it will be seen that the guides have hollow interiors. The hollowing of the guide presents an advantage in this wise: When the guide of the exhaust valve becomes slightly worn the escaping gas which usually is the cause of much annoying hissing noise would be checked in its flow by expanding into the pocket of the guide.

The valve tappets are furnished with fiber insets to deaden the noise of contact with the valve stems and at their lower ends the tappets have rollers 25 millimeters in diameter. The valve mechanism is inclosed to silence the action.

The construction of the Deasy engine in no way differs from the usual Daimler-Knight motor, which is, as usual, fitted with the Daimler vibration damper at the front end of the shaft. The object of this arrangement is to damp the vibration, which is caused when the periodicity of the crankshaft, considered as a spring, corresponds with the rate at which it receives impulses from the pistons. It will be realized that, however stiff the crankshaft is made, the fact that the drive is taken only from one end tends to allow the front crank throw, under explosion pressure, to twist very slightly forward relative to the flywheel. This twisting effect is, of course, intermittent and is due to the natural elasticity of the crankshaft, which when the impulse is

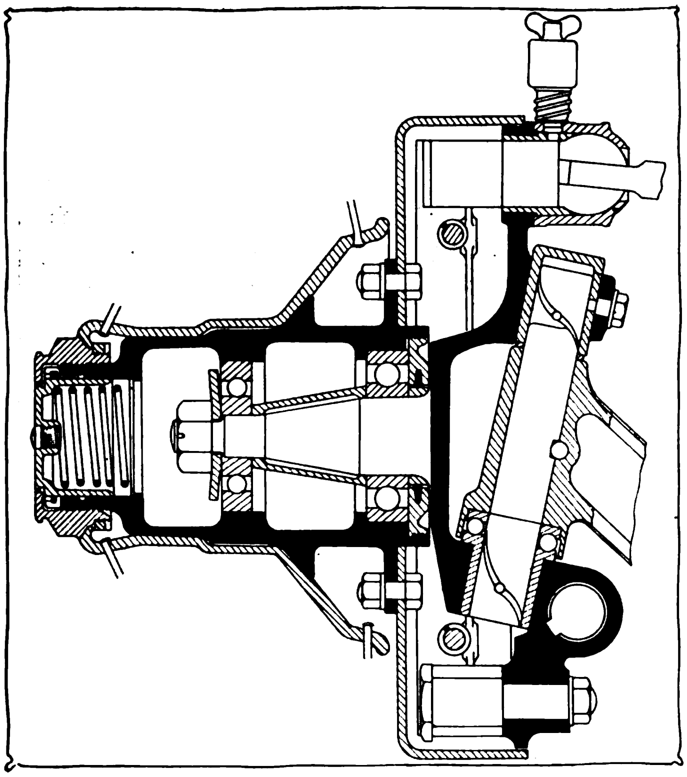


Fig. 15—Steering knuckle and front wheel mounting on the Argyle

removed, springs back to its normal position. When, however, the piston impulses correspond to, or become multiples of, the natural period of the crankshaft, considered as a spring, then the amplitude of torsional oscillation is considerably increased. The vibration produced in this manner which is found on all six-cylinder motors, and also on four-cylinder ones to a less extent, is produced only at certain definite engine speeds. In order to overcome this trouble the special vibration damper referred to above is fitted to the front end of the crankshaft, and consists of a supplementary flywheel not positively attached to the crankshaft, but driven through what is practically a multiple-disk clutch. When the periodic vibrations commence, the inertia of this frictionally driven flywheel causes it to slip, thus preventing the synchronization of the various disturbing forces and causing the vibrations to neutralize one another.

The carbureter fitted by the Deasy company is one of its own design, and as shown in Fig. 7. The throttle is of the butterfly type and works in a water-jacketed casing. Immediately below this is the casting which forms the float chamber, and through the center of which is the passage containing the jets. These jets are mounted on a hollow cross-bar which is cast integral with the float chamber and within the central passage is a valve so arranged as to slide freely in a vertical direction.

The float is of the annular type and surrounds the jet chamber, as shown in the section. It operates the needle valve contained in the upper part of the carbureter, which also carries a plunger, by means of which the float may, when necessary, be agitated. The gasoline is led directly to the inlet valve and need not be detached so long as the upper part of the carbureter remains attached to the inlet pipe. The whole of the bottom half, containing the annular float, jets and the sliding valve, is instantly detachable by partially undoing a couple of thumb-nuts.

The arrangement enables the engine to accelerate with extreme rapidity. As mentioned above, this is brought about by the inertia of the valve, which causes it to lag behind momentarily when the throttle is opened suddenly. This means that for a fraction of time a very powerful suction is placed upon the pilot jet, thus giving the engine a very rich mixture, which is gradually weakened as the valve rises. This prevents any tendency to fire back into the carbureter when a sudden opening of the throttle takes place.

The New Star Company is producing five models for the coming season, two of which are entirely new and have engines with long stroke, as shown in the table and in the description which follows:

Horsepower	Cylinders	Bore and stroke
10/12	4	80 x 120 millimeters
12/15	4	80 x 120 millimeters
15.9	4	80 x 150 millimeters
20.1	4	90 x 150 millimeters
23	6	80 x 120 millimeters

The 10-12-horsepower model has en bloc cast cylinders and the unit method of combining engine clutch and gearbox. It has a strong two-bearing crankshaft, a camshaft driven by spiral gear, magneto ignition, thermo-syphon cooling and force-feed lubrication.

The 12-15 model is the same as that known last season as the 12 horsepower. The cylinders are cast in pairs and the units are carried separately in the frame. There are four speeds and a reverse.

The 15.9 horsepower and the 20.1 horsepower are entirely new models and their design is practically identical.

The cylinder diameter of the 20.1-horsepower motor is 90 millimeters and the piston stroke 150 millimeters. The connecting-rod is of about usual proportions, that is, about two and one-sixth times the stroke, though it has the appearance of being a little longer than this. As the cylinders are off-set, the pistons can be short, and they are in fact only a trifle longer than the cylinder diameter. The crankshaft journals have a diameter of 50 millimeters and are three in number. The cylinders of each pair are very closely placed, there being only the smallest film of water between them. This fact, though a little objectionable from the point of view of the cylinder, is advantageous to the crankshaft and enables a strong compact shaft to be employed. Thus the central web of the crankshaft is not inclined to suit the crankpin as is sometimes necessary and it has a depth of 35 millimeters. The center lines of the crankpins fall immediately below the cylinder centers, so that the thrust is evenly distributed over the journal and this is a very desirable feature. The camshaft has a diameter of 30 millimeters and the cams are cut solid upon it.

The ignition of the Star motors is by the high-tension Bosch system. This follows the usual English practice which is decidedly away from battery, dual or double systems. High-tension ignition alone being fitted. Lubrication is by means of the splash system.

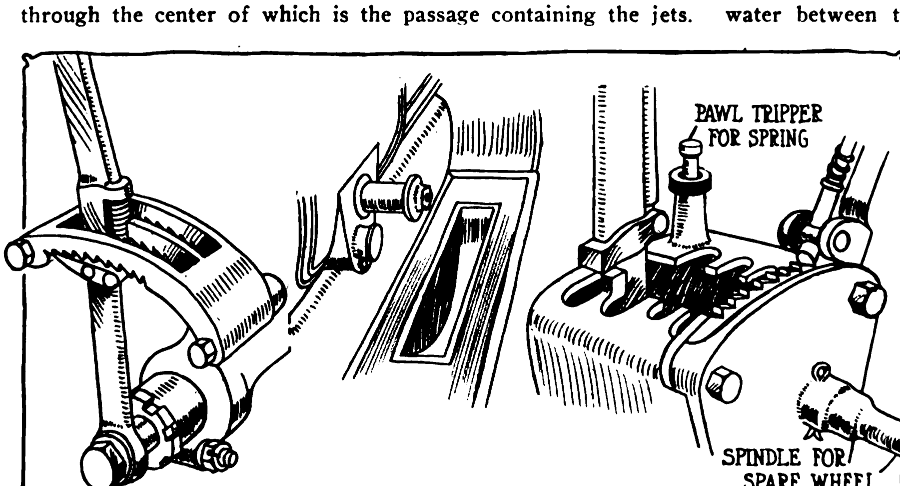


Fig. 16—Daimler change speed gate and exterior and interior view of spare wheel spindle on Talbot cars

Three of the Daimler models have been retained for the sea-
1 1913 and two added, as given in the following table:

Horsepower	Cylinders	Bore and Stroke
20	4	90 x 130 millimeters
26	4	101 x 140 millimeters
38	4	124 x 130 millimeters
30	6	90 x 130 millimeters
39	6	101 x 140 millimeters

'rom the above it will be seen that the 80 by 130 has been ninated and will be no longer constructed. The 90 by 130 etained at a slightly increased price. The four-cylinder 101 130 will in future be made with a stroke of 140, and is praclly a new model. The 38-horsepower four-cylinder 124 by remains as last year. The six-cylinder 80 by 130 will not be le in the future, and in its place a six-cylinder 90 by 130 is stituted. The large six-cylinder model 101 by 140 is retained. stroke of this engine has been increased to 140 millimeters. s regards the 20-horsepower model, only minor alterations e been made in connection with this type. With the engine ight improvement has been effected in the lubrication ar- gement. As is well known the Daimler lubricating system onnection with the Knight engine consists of a multiple- ger pump which supplies filtered oil to troughs placed be- h the connecting-rods, these troughs being adapted to be d or lowered to suit the varying speeds of the engine.

ie new 26-horsepower model, bore 101 by 140 stroke, has, as l, the cylinders cast in pairs, but they are placed out of cen- vith regard to the crankshaft. The amount of this désaxé ig is 13 millimeters.

iother modification of the previous Daimler practice con- in setting the magneto and pump shaft parallel with the cshaft instead of being set across at the front and driven oiral gearing. In the new model silent chain drive is em- d.

e Clement Talbot Company is not introducing any new in its engines for 1913. Four models will be constructed llows:

orsepower	Number of Cylinders	Bore and Stroke
12	4	80 x 120 millimeters
15	4	90 x 140 millimeters
20	6	80 x 120 millimeters
25	4	101 x 140 millimeters

e following are the chief characteristic features of all models: Cylinders cast in pairs; all valves in line and interchangeable; camshaft operated by spiral gearing; pump for lubrication and water circulation; Bosch dual magneto ignition with variable control; leather-faced cone clutch; gearbox with four speeds and reverse; bevel drive; inclosed driving shaft from gearbox to back axle, and semi-floating live axle.

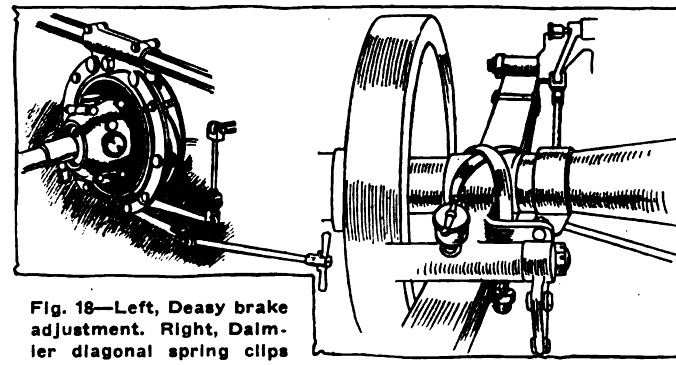


Fig. 18—Left, Deasy brake adjustment. Right, Daimler diagonal spring clips

Engine lubrication of the Talbot cars has received most careful attention. The oil pump is of the rotary type and driven vertically by spiral gearing from the camshaft. The circulation is indicated by a gauge fitted onto the dashboard. For the distribution of the oil the crankcase is furnished internally with a pipe from which branches are taken to each crankshaft bearing. The crankshaft is drilled, through which the oil passes to the big bearings. Fig. 5 shows the six-cylinder crankshaft with connecting-rods attached.

The large use of cone clutches and four-speed gearsets is well brought out by a study of what a few of the representative makers are doing in this line.

No change has been made in the leather cone clutch on the Daimler, but the universal joints of the clutch and gearbox have been made with large bearing surfaces. The gearbox now has the layshaft driving gears at the front end, as with last year's cars, the sliding universal joint of the fore and aft shaft is placed behind the gearbox. The reason for this practice being that the travel of the sliding bearing is thereby reduced while the action of the universal joint is further reduced by the placing of the rear springs beneath instead of above the axle. Another advantage of this arrangement is the smoother driving

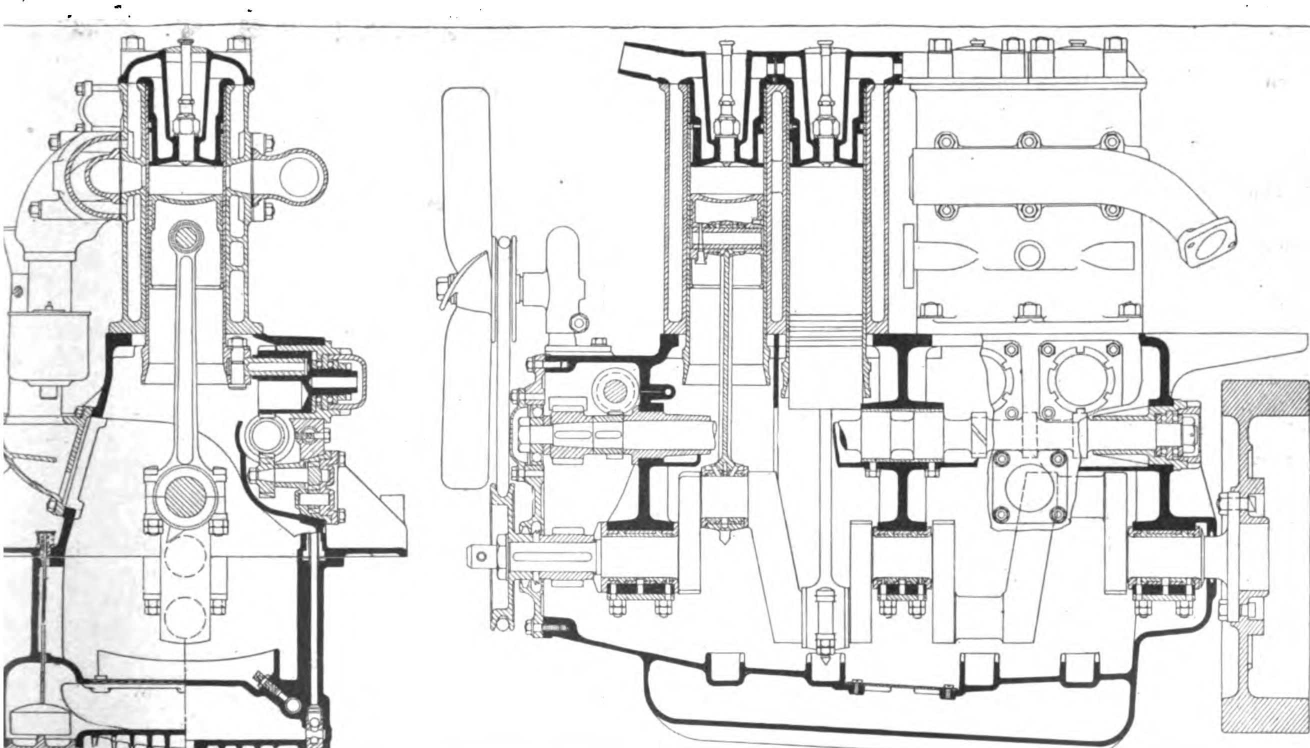


Fig. 17—Transverse and longitudinal sections of the Argyle sleeve motor continued for 1913 without radical change

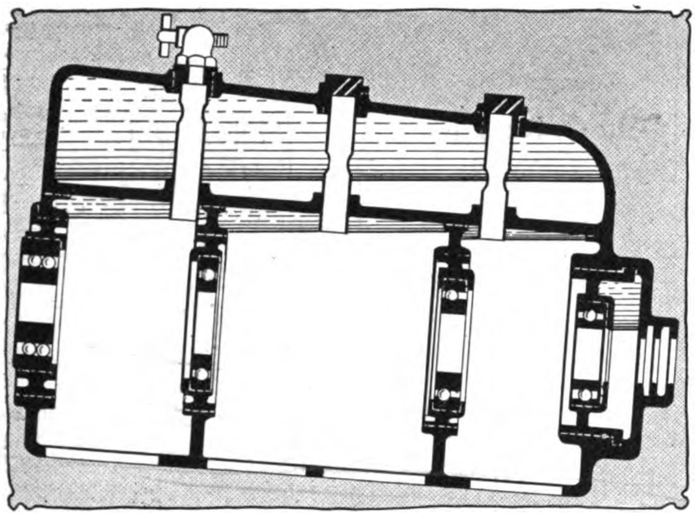


Fig. 19—Oryx crankcase, showing the unique oiling system

and braking action and the lowering of the frame height from the ground.

The Wolseley clutch is of the multiple all-steel disk type and thirty plates are employed inclosed in an oil-tight casing. A split-plate universal joint is fitted between the clutch and the gearbox. The gearbox, particulars of which have already been given, is provided with four speeds. The front end is centrally bolted to a double cross-stay which also carries the brake shaft and clutch levers. The rear end of the gearbox is bolted to the channel section frame cross-member. A three-joint suspension is thus provided.

With the Humber cars the clutches are of the leather type and are so inclosed within the flywheel that they are not affected by dirt or moisture. An aluminum cover plate is provided, and the clutch works entirely in oil.

On the Swift car the clutch is a leather cone with springs under the leather to allow of easy engagement. The four-speed gearbox is actuated by gate change, the gear wheels themselves being supported on short castellated shafts mounted on suitable load ball bearings, a special feature of this box being the design of the layshaft as all the gears on the latter are separate units.

The Arrol-Johnston clutch is of the floating-plate type, a plate gripped between two others, the whole running in oil. The clutch is readily adjustable and as the rotating part is very light, gear changing is rendered an easy matter. The clutch cross-bar is held in adjustable bearings, and it is claimed that this method of mounting is responsible for an absence of all chattering of the clutch pedal—a source of annoyance in some cases.

The Adams clutch is of the leather-faced cone type with a somewhat unusual spring arrangement embodied in the design. The spring, instead of being placed behind the male clutch disk is in front of it. The clutch shaft is hollow to receive the crankshaft spigot and at its inner end there is a disk screwed on and locked to act as an abutment for the spring. A cap screwed over a cylindrical extension of the flywheel and female clutch member serves to adjust the compression of the spring, and a ball thrust bearing is situated within the cap. There is, moreover, a special locking ring from the adjusting cap and this is provided with a set-screw to receive it. A ball thrust bearing is provided on one of the forks of the flexible coupling which comes into play when the clutch is disengaged, a coiled spring keeps the two thrust disks of the bearing in position. There is a well-designed universal coupling to permit some flexibility between engine and gearbox, and a De Dion type of joint is provided in which a malleable cast iron pot is provided with case-hardened steel working surface held in place by pegs and a steel back plate. The clutch pedal operates through a link and bell crank lever.

Belsize combines the clutch and gearbox, the whole forming one unit. As regards the clutch, this is of the metal-to-metal variety and both members are of cast iron. The diameter of the male member of the small end of the taper is 10 inches and the width 2.375 inches. A very stiff spring is used, having six coils of round steel .375 inch in diameter, and a good ball thrust bearing is provided to come into play when the clutch is disengaged. The spigot bearing from the clutch is 1.25 inch diameter and 4.125 inches long and has a phosphor-bronze bushing.

The Vauxhall clutch is of the multiple-disk type. There are thirteen driving plates and twelve driven, adhesion being secured by a helical steel spring 3.5 inches in diameter. The shaft which transmits the drive from the clutch plates to the universal coupling is 1.5 inches in diameter, and attachment is made at both ends by means of taper and key. The flywheel, to which the outer casing of the clutch is attached, has a diameter of 16.25 inches and a rim width of 3.25 inches. The spring load on the clutch spring can be varied by revolving the cup-shaped casting in one direction on the other, subsequent locking being performed by screwing up the ring-nut. A ball bearing supports the forward end of the clutch shaft.

The New Star clutch is somewhat interesting in that it is a leather cone clutch completely incased at the back. This casing permits the use of oil. Some of the advantages of the plate clutch are present and, as will be remembered in the diagram recently published, the leather cone clutch is not at all failing in popularity. It is believed that clutches of this type are to be far more numerous than in the past.

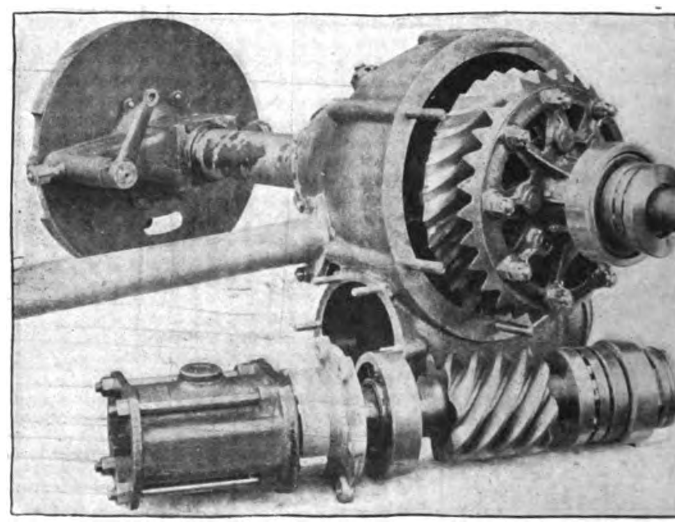


Fig. 20—Worm drive on Napier 15-horsepower car

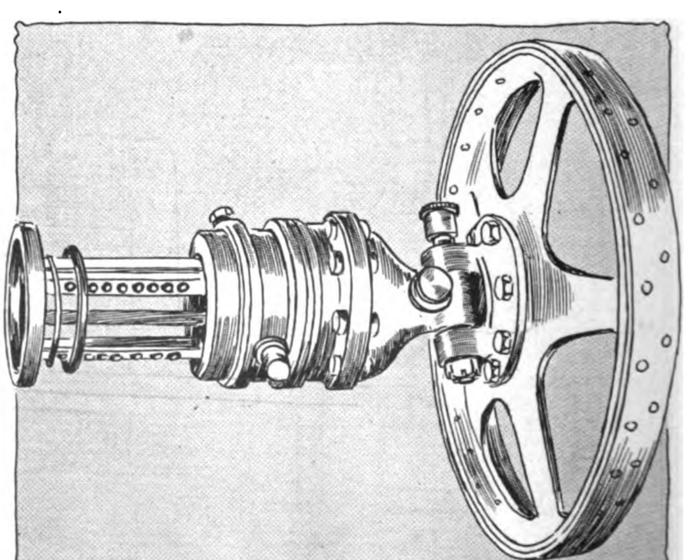


Fig. 21—Leather-faced cone clutch in use on the Germain-Knight

The Argyle clutch is of the plate type and has forty-five plates. A peculiarity of the design is that there is no extension of the crankshaft to support the clutch shaft, but this shaft is supported in a ball bearing held in the flywheel.

Three speeds and a reverse are provided on the Briton car with a direct drive on the highest speed. A peculiarity of the construction at once noticeable is the fact that both plain and ball bearings are in use; the short shaft which first receives the drive of the engine has a plain bearing with a phosphor bronze bush; the spigot bearing is likewise a plain bearing, while the remaining bearings are ball bearings. Of the gears on the secondary shaft two are cut solid with the shaft and the remaining two form a part of a single forging.

A three-speed gearbox is applied to the Bell cars. This gearbox is characterized by the arrangement of a sliding sleeve on each shaft, which has the effect of throwing the layshaft completely out of gear when the direct third is engaged.

The Maudslay Company last year was conspicuous in the use of a chain-driven gearbox. A return has this year been made to the orthodox spur-gear type. The worm drive to the back axle has also been dropped by a return to the bevel, Fig. 23.

The whole of the Napier change-speed mechanism is fitted within the gearbox, gears being changed by a partial rotative and transversal movement of the cross-valve and sliding sleeve. An innovation with regard to gearbox is the fitting of ball bearings in the place of rollers, which have hitherto been used.

Rear axle, brake, torque rod and other chassis construction details have been given special attention by the English engineers as the following points will illustrate:

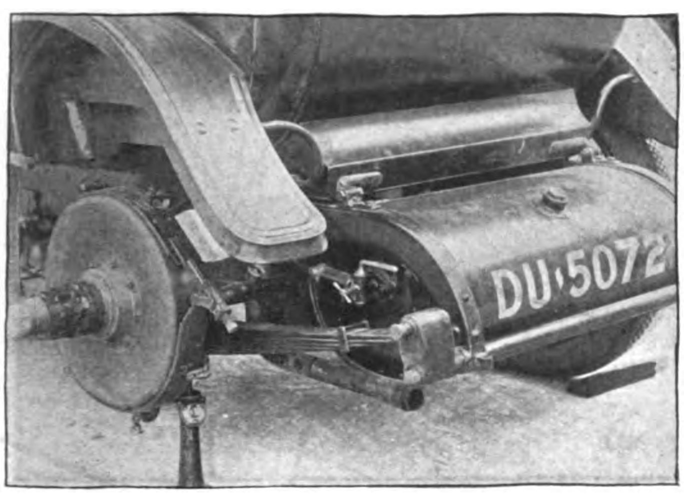


Fig. 22—Rear view of new Daimler 26-horsepower car

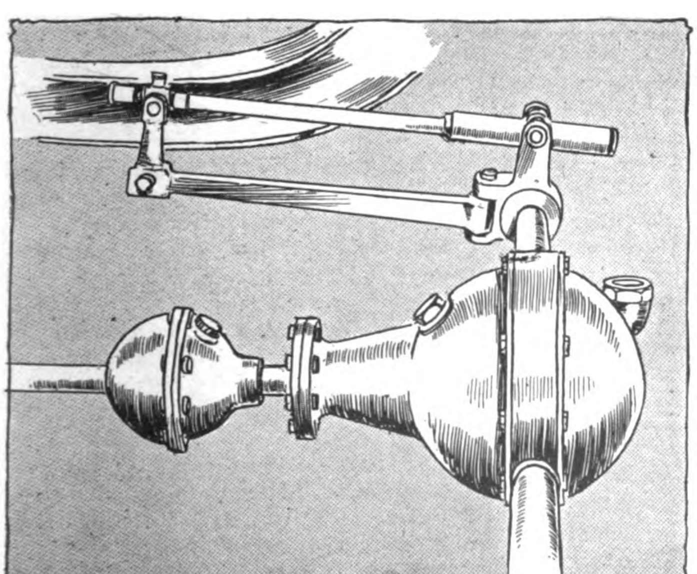


Fig. 23—Simple construction a feature of Maudslay rear axle

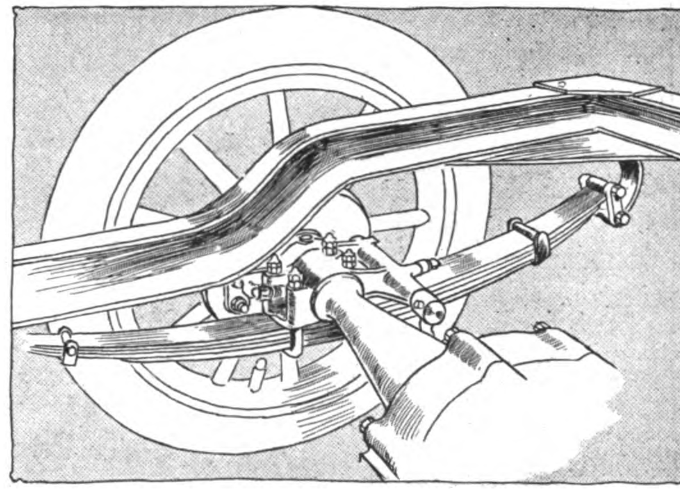


Fig. 24—De Dion returns to the underslung form of rear suspension

The Deasy foot brake is on the propeller shaft. The brake shoes are supported on a stout cross tube, carried by the side-members of the frame. This is generally a better system than that of carrying the brake shoes on studs secured to the gearbox. A ready means of adjustment is provided and is operated by means of a handle which extends slightly beyond the side-member of the chassis, so that this operation can be carried out in a moment without taking up any floor-boards or getting underneath the car. The handle actuates a screw which forms a link connecting the two halves of the brake together, and by which they are equally and simultaneously operated.

The rear brakes are internally expanding and are expanded by cams carried on brackets formed in one with the back axle casing. They are applied differentially by a compensating device which is connected to the hand lever.

The gasoline tank is carried under the scuttle dash and feeds by gravity, the lever of the pedal being arranged at such a height to give sufficient hold to feed the carbureter on the steepest incline.

The rear axle on the B. S. A. has an overhead worm. The road wheels are provided with a single ball journal bearing, thus a small proportion of the load is taken on the axles, which, however, are 30 millimeters in diameter. The permanent hubs are driven through a key and the Rudge-Whitworth type detachable wheel is fitted. Lubrication for the ball journal bearing is provided for by the removal of a screw plug, the lubricant passing through small drilled holes in the axle and thence into a shallow groove in the permanent hub. As the hub is fixed by means of a single key only, the groove must necessarily coincide with the small drilled hole in the shaft.

The return to the bevel drive by the Maudslay company indicates the improvements that have been made as regards the means for rendering the bevel gear more silent in action. Just as the Knight engine compelled manufacturers and designers to set about the adoption of means to render the tappet valve engine more quiet, so the introduction of the worm drive has led to great improvements being made in the method and means of hardening bevel gears to prevent warping, the chief cause of noise. One system employed with crown wheels is to copper-plate all except the teeth. The coated part is then not affected by the cementation process, and the wheel after dipping and the teeth hardened can be more easily got true. The fixing of a substantial tail bearing at an extension of the pinion shaft is found in connection with the Maudslay chassis.

Parallel torque and tension rods are also fitted. The springs are three-quarter elliptical, very long and wide, with the frame upturned over the back axle.

(To be continued.)

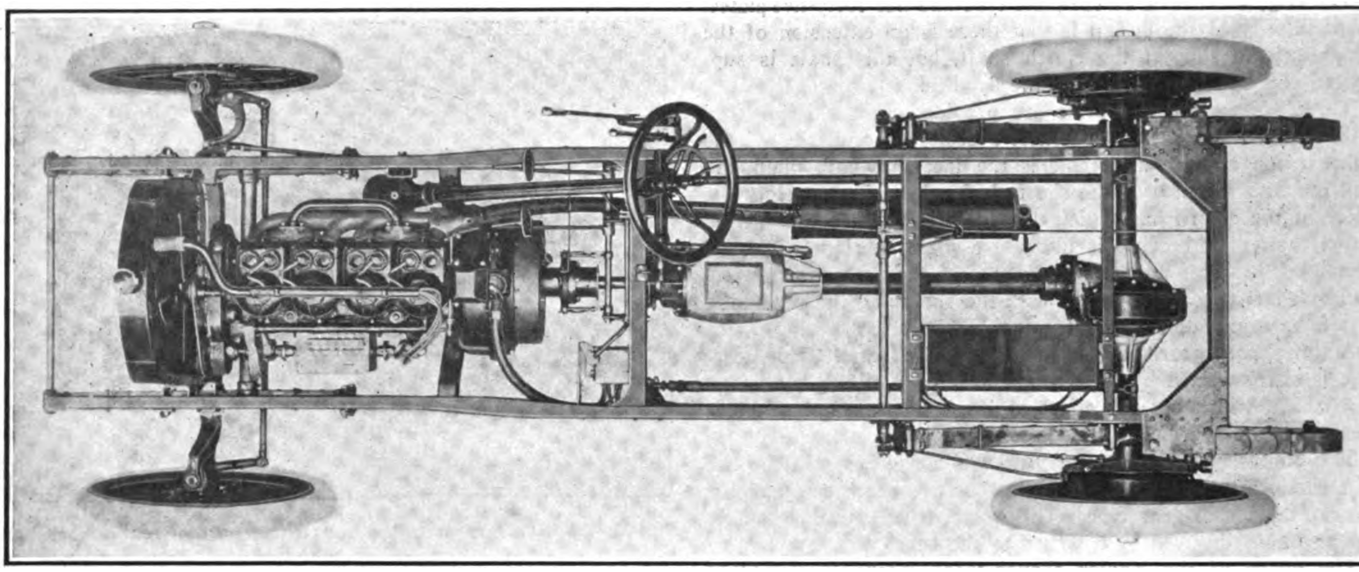


Fig. 1—Rambler Cross Country chassis, showing arrangement of torque, drive and suspension members

Rambler Drops All But the Cross Country Model

Principal Changes for 1913 Include Fitting of Electric Starting, Lighting and Ignition System; Change in Motor Dimensions and Fittings; Adoption of Cone Clutch and Adjustable Steering Column

FOR the season of 1913 there will be but one Rambler chassis on the market. This model, which is to be known as the Cross Country, will combine all the refinements which the Thos. B. Jeffery Company has made up to date. Among the prominent features are the combination electric starting and lighting system, the adoption of the Stromberg carbureter, increase in valve dimensions, longer connecting rods, better placing of wiring, adoption of the cone clutch, shortening of the hand stroke required to shift gears, simpler brake connections, and an adjustable steering column. The larger model Rambler which embodied a motor with a bore of 5 inches and a stroke of 5.5 inches has been discontinued. This was a heavier model.

Taking up the power plant which is designated by the makers as a gasoline-electric, it may be said that the gasoline engine has four cylinders of the L-head type with valves on the right side. The cylinders are cast separately and are 4.5 inches both bore and stroke. Though the motor has three bearings the use of the self-starter has not necessitated the addition of another bearing between motor and flywheel. The offset crankshaft which has been a feature of Rambler construction for many years is continued. It is shown in Fig. 3 together with the principal dimensions, but the connecting rods have been lengthened slightly to give less wear between pistons and cylinders.

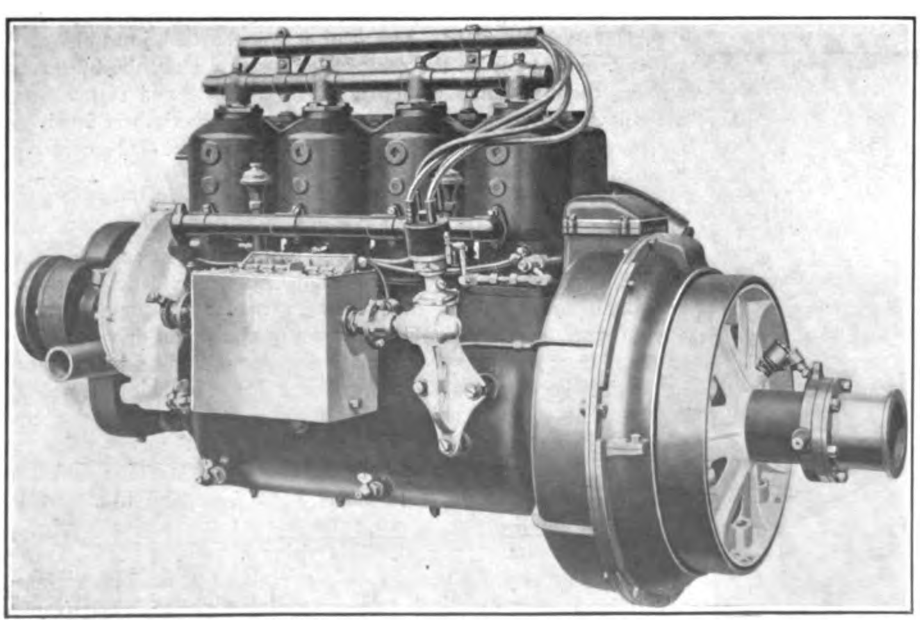


Fig. 2—Mounting of new mechanical oiler, showing longitudinal shaft drive and cone clutch

Both intake and exhaust valve have been increased to 2.125 inches in diameter and are interchangeable. The only other alteration in the motor is in the use of a Detroit mechanical oiler of 2 gallons capacity, located on the motor base at the left of the cylinder, Fig. 2. The oiler is a seven-feed type with four oil tubes leading to the cylinders and the remaining three to the crankshaft bearings. A splash is contained within the crankcase. The supply of oil is contained directly in the box that also houses the plunger pumps which send the oil through the leads to the different bearings and to the cylinders. This gives a combination of force-feed and splash although the system is non-return and non-circulating. As will be seen from the illustration there is a longitudinal shaft which passes through the mechanical oiler box terminating at one end at the timing gears from which it is driven and at the other end at the timer which is actuated by the shaft. Within the oiler box are seven small plunger pumps each operated from the longitudinal shaft by a small crank. By an ingenious arrangement the length of the stroke of each of these pumps can be lengthened or shortened by means of a nut located on top of the mechanical oiler box. When the stroke is shortened the supply of oil given through the lead that that particular pump takes care of, is correspondingly decreased. In the bottom of the crankcase are located draincocks which may be opened to allow the surplus oil which will gather in the crankcase in time to drain off. The filler hole for the mechanical oiler is located in the top of the box in the usual manner. Besides this there are two breather pipes communicating with the crankcase through which an additional supply of oil may be poured when it is desired to fill the crankcase, such as when the car is used for racing or if the supply in the crankcase has been removed while the old oil was cleaned out. The motor suspension is continued as a three-point support, a tubular cross piece, 2 inches in diameter, forming the front supporting members. The entire motor is mounted at a slight rearward slope to give a straight line drive to the rear axle.

Another change is in the use of a Stromberg carbureter with a hot-air jacket from the exhaust manifold on the footboard. Immediately in front of the steering post is a push button by which the air intake may be closed to give a richer mixture on starting. The new type of radiator, Fig. 8, which appeared for the first time in the 1912 cars is continued in the 1913 Cross Country. A belt-driven fan immediately behind the radiator is driven from the shaft upon which drives the pump and assists the latter in maintaining the cylinder cooling. Ignition wiring has been changed from position at the right side of the cylinder to a point immediately above the water manifold, where it is incased in a waterproof tube, as is shown in one of the motor illustrations.

Immediately behind the motor-generator-flywheel, which is hereinafter described, and partially within its housing is the clutch. The latter embodies a decided alteration from previous Rambler design in that for next year it is of the cone type instead of the internal expanding type which has been heretofore one of the features of this product. The new clutch is shown in Fig. 4 and is a direct acting cone in which gradual engagement is obtained by springs under the leather facing.

Located amidships on the chassis frame is the three-speed selective gearset, which embodies a slight change in design for 1913. The arrangement of the gears and control connections have been altered slightly, in order to decrease the movement of the hand required in changing speeds; heretofore it has necessitated a movement of the top of the gearset lever of nearly 1 foot, whereas, in the new arrangement the total movement is but 6 inches. There has been no change in the propeller shaft or rear axle, the latter being rigidly connected to the gearset by means of a torsion tube surrounding the propeller shaft. On each side of the propeller shaft tube are the torsion rods which, as for the past year, are in V form, the spreading arms attaching to vertical arms on the rear axle housing as shown in the chassis view, Fig. 1.

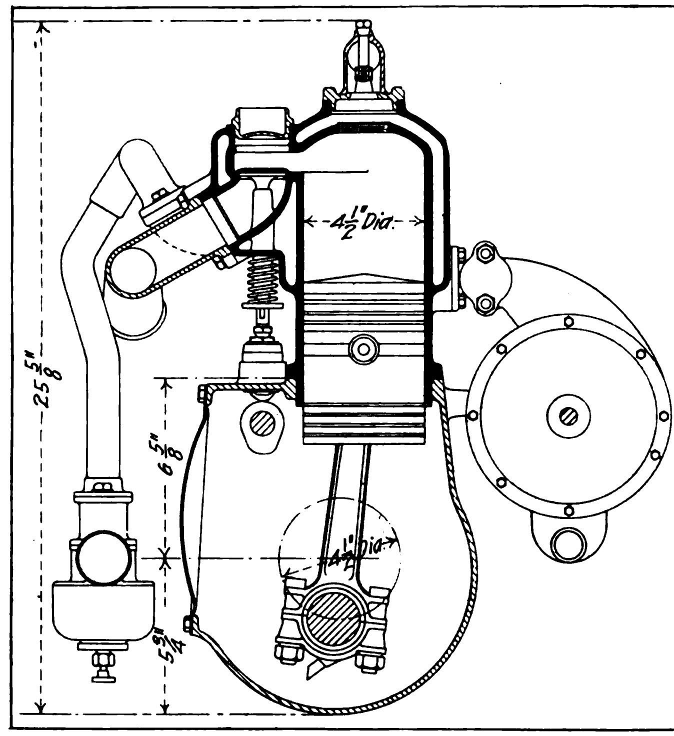


Fig. 3—Rambler 1913 cars will have longer connecting-rods and larger valves

The rear axle is of the floating type with roller bearings, drive axle shafts and gears forged integral and the wheels secured to the square taper axle end. The front axle is a drop-forged I-beam with an adjustable taper roller bearing.

The brakes are internal expanding and external contracting on the rear wheel drums, which are 14 inches in diameter and 2 1-2 inches in width. There has been a slight alteration in the brake connection which makes for simplicity in the new models. The

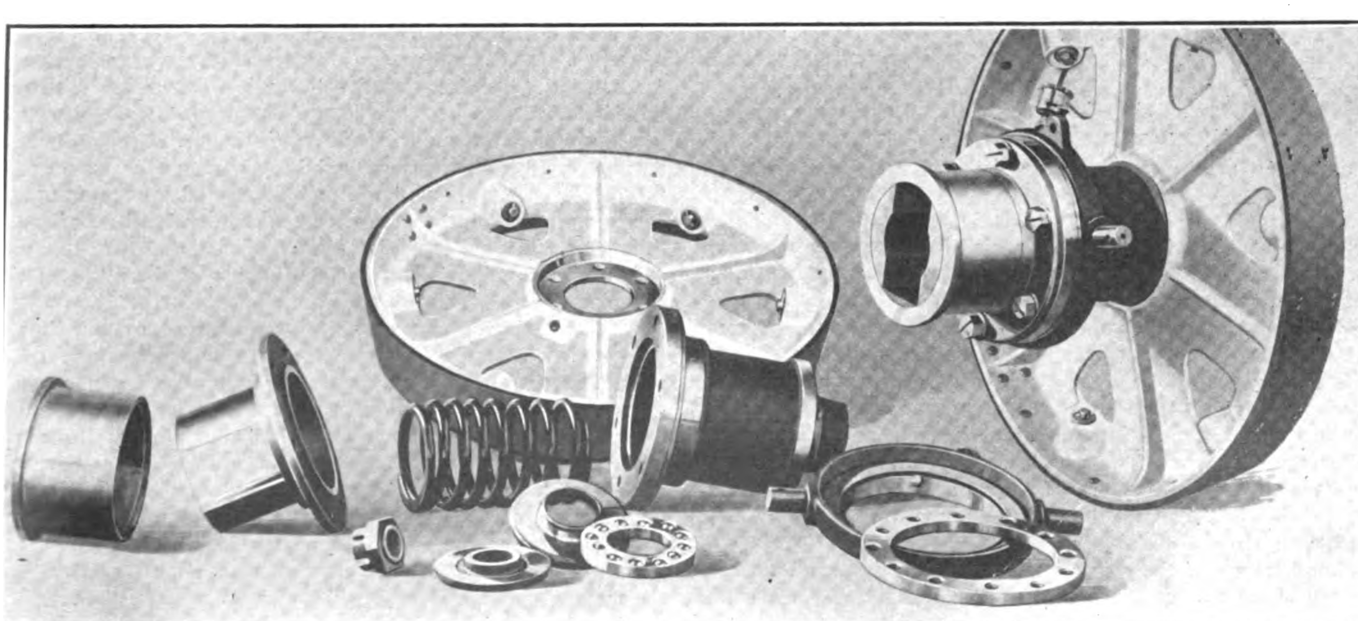


Fig. 4—Disassembled view of the cone clutch. New on the Rambler car for the 1913 season

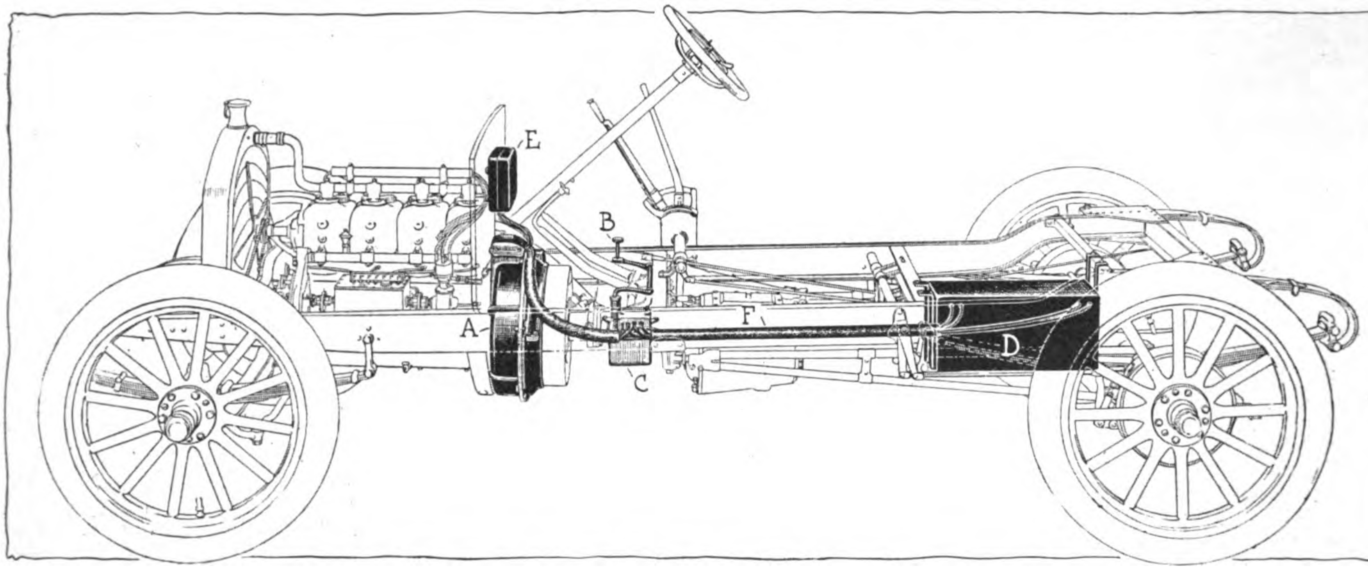


Fig. 5—Starter mounting. A, motor-generator; B, control; C, switch; D, accumulator; E, regulator, F, conduit

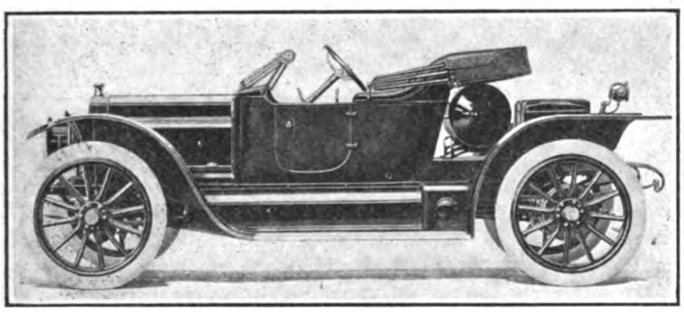


Fig. 6—Rambler roadster with rumble seat fitted aft of tank

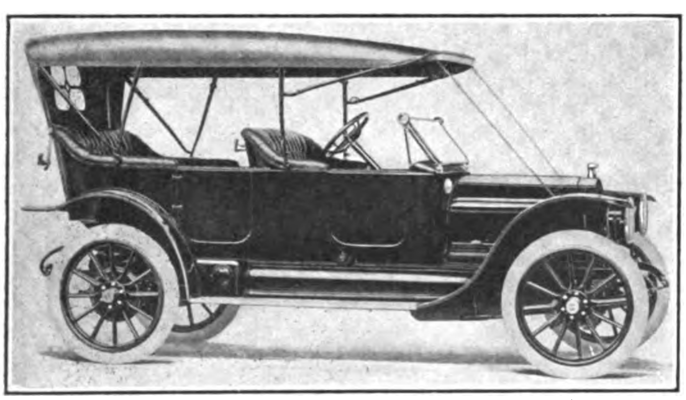


Fig. 7—Five-passenger touring car, Cross Country model, with full equipment

countershafts for the two brakes which formerly were separated, are now combined in one; one being located within the other; the outer one being in the form of a tube.

The frame construction is the same as that of the present model, being a tapering straight-line channel to just forward of the rear axle where there is a kick-up to clear the latter. Wide gusset plates are provided at the corners to prevent distortion. Springs are continued as semi-elliptic in front and three-quarter elliptic in the rear. The wheelbase is continued at 120 inches and the tires on all but one of the models—the Gotham, are 36 by 4 inches in size; with the latter body the tires are 37 by 4 1-2 inches in size.

Another one of the recent improvements which has been continued in the new model, is in the adjustable steering pillar. The steering column is hinged to the frame and the column rises through a slot in the floor. A metal plate through which this column passes covers this slot. The under side of the slot is serrated and these serrations mesh with others on the floorboards. Clamping bolts hold the plate in any desired position and by loosening the bolts the plate may be moved forward or aft, giving the steering column any desired tilt.

The starting, lighting and ignition system which is unique on account of its unit construction with the motor and because it is the first starter that has been fitted to the Rambler cars, may be briefly described.

The chief factor of this system is the motor generator. This system comprises: 1, a dynamo, which performs the functions of both motor and generator and replaces the flywheel of the gasoline engine, 2, a storage battery, 3, a switch operated by a foot pedal, and 4, a regulator, which is located upon the dash. The phantom view of the chassis shows these four elements as they are installed in the car. The chief portion of this system is, of course, the combination flywheel, electric motor and generator. As shown in one of the illustrations, the flywheel housing also has the function of the field frame, the eight field coils being wound on the cores which are bolted to the housing. Within this frame rotates the armature of the dynamo, taking the place of the usual flywheel and being attached to the crankshaft of the engine in the same way as the flywheel is attached. The crankshaft also carries the commutator, the brushes of which are carried on a ring just behind the armature and is held in place by bolts that pass through it for attachment of the rear portion of the housing. The fact that the flywheel is done away with permits its weight to be taken up in that of the dynamo so that the different parts can be made of ample size without increasing the weight of the system unduly. Consequently, all parts of the motor generator are large and substantial, the commutator, for instance, is 10 inches across and the carbon brushes, of which there are eight, are .75-inch square. It is stated that the total weight of the unit is slightly less than that of the flywheel that it replaces.

When running as a generator, the motor generator charges the storage battery at a 30-ampere rate and a pressure of 24 volts the controlling relay connecting battery and generator at speeds of from 8 to 10 miles per hour. To start, a foot button is pressed permitting current from the battery to run the motor generator as a motor at a voltage of 24 volts. The armature is rotated at 200 revolutions per minute and as the crankshaft of the gasoline engine is an integral part of the armature shaft, the engine is turning over at the same speed. Should the weather be cold and carburetion pure, the heat created by the friction of the moving parts, it is said, will warm them sufficiently to give the initial explosions. When the engine is running on its own power, the electric motor automatically changes into an electric generator to charge the battery. Lights are supplied with current from the battery at pressure of 6 volts and ignition at 12 volts, the electric system displacing a magneto as a source of ignition current. The generator charges the battery at the rate of 30 amperes, while the current required for ignition, and lighting, is together 9 amperes, while it is stated that the amount usually required for starting is replenished within 2 minutes after the motor has attained a speed of from 10 to 15 miles per hour. The controller is designed to automatically disconnect the storage battery and generator when the speed of the motor drops below that sufficient to charge, so that there is no opportunity for the battery to discharge through the motor except for starting purposes. The starting button operates an oil switch on the chassis frame side member and the storage battery is hung between two cross members of the frame below the tonneau.

Five different bodies are fitted to the Cross Country chassis. These include a four-passenger touring, a five-passenger touring, a two-passenger roadster, a Sedan body with inside drives and seating four passengers and a Gotham or limousine body with inside drive, seating seven. The bodies are trimmed in nickel with body fenders and fillers of black enamel. The upholstering has been increased from 8 to 10 inches depth and a bumper has been fitted on the forward ends of the front springs. The electric lighting equipment includes 9 1-4 inches headlamps with port dashlamps flush with the dash line. The rear lamp is mounted on the fender and has a twist switch so that it will comply with local city ordinances.

Aside from standard equipment, the features of the Cross Country roadster, in the matter of accessories, is that of the trunk rack with two suit cases; the two closed bodies are trimmed in gray bedford cord with electric piller lights between driver's seat and rear compartment, in the case of the Gotham body, and electric dome light in case of the Sedan.

Harking Back a Decade

FROM *The Automobile and Motor Review*, November 15, 1902: Emil Grossman has sold his interest in *The Automobile and Motor Review* to H. M. Swetland. Mr. Grossman will retire from the company immediately.

Commander Wells, of the London Fire Brigade, has introduced an automobile fire engine into the metropolitan service. His experiment consists of converting a horse-drawn steamer into an automobile, the work being done in the shops of the department. The propelling engine is a two-cylinder steam motor.

M. H. Kilmer, of Ocean Grove, N. J., recently spent 27 days in touring the Catskills. It rained 14 days of the time, but Mr. Kilmer, who was on vacation, declares that he never enjoyed a tour so much as the one he made. He kept an approximate record of his mileage, and says that he averaged nearly 100 miles a day. His total repair bills were $3.30.

A straightaway speedway for the exclusive use of automobiles is being planned across the Jersey Meadows, connecting the west bank of the Hudson with the excellent highways in the northern part of New Jersey. The plan involves the laying of concave steel rails in a slightly crowned road surface. It is planned to sow grass seed between the rails to solve the dust problem. W. J. Stewart, of the Automobile Club of New Jersey, is the proposer of the plan.

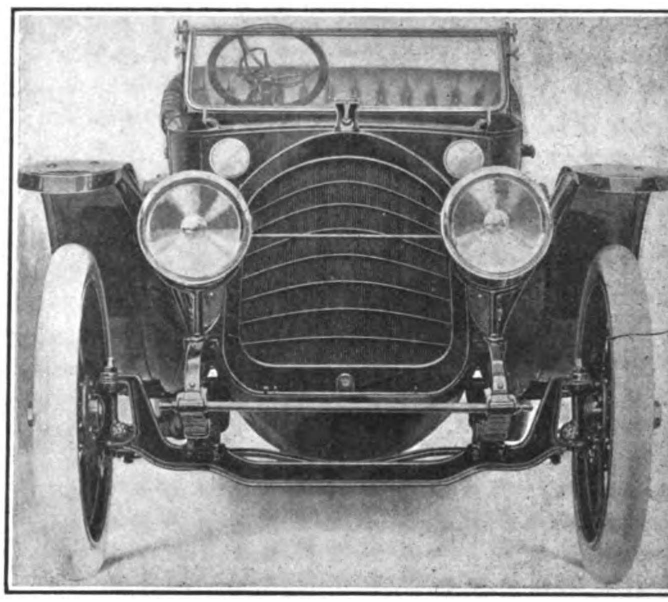


Fig. 8—Front view of the Cross Country, showing radiator adopted last year

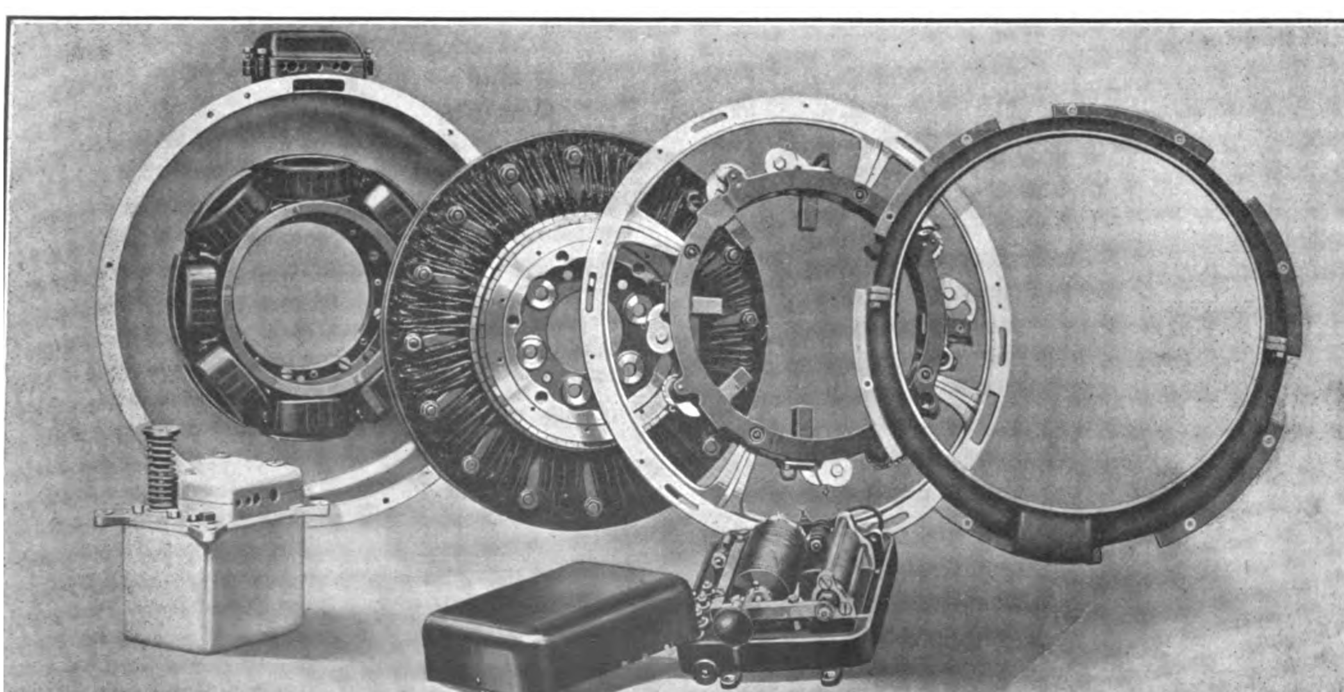


Fig. 9—View of the assembly of the motor generator, the switch, starting button and dash regulator

Factory Miscellany

Giant crane which runs the length of the frame arm of the factory. The crane spans that section of the factory and has a track 800 feet in length

QUANTITY production means the necessity of transferring tons of material through a considerable distance. Reduced to ton-miles the amount of work done in the Ford factory would astonish the average individual. The above illustration shows one of the cranes that render possible the speed at which the Ford car is turned out. Every 58 minutes a car is assembled. A constant supply of heavy parts must be delivered to the assembling room so that there shall be no delay. These cranes do the work. As may be seen from a study of the illustration, the crane extends directly across the frame arm of the factory. The length of the track is 800 feet and the crane can travel this distance at a speed of about 15 miles an hour. Throughout the factory the Ford company has eliminated the truckman and nowhere are to be seen men who struggle behind an overloaded truck, a common sight in many factories. One of the most useful cranes is a big gantry crane not shown in the illustration that labors in connection with the foundry. This crane on stilts walks along over freight cars, picking out their loads of pig iron or scrap or shoveling out their loads of sand. It has a 6-ton clam shell shovel for raising sand and gravel. It hoists pig iron and scrap with a gigantic magnet. This is dropped into the metal and current thrown on. It is then raised, covered with bars of pig and pieces of scrap. When this load is over the place where it is desired to deposit it, the magnet is lowered and the electric current switched off. The magnet is a magnet no longer and the metal drops.

NEW SYRACUSE FACTORY—The New Process Raw Hide Company, Syracuse, N. Y., has erected additions which the company claims makes its complete plant the largest single plant in the world devoted exclusively to gear-making and gear-cutting. The latest additions are a four-story and basement wing extending 65 feet by 180 feet at right angles to the old building and a heating plant in the rear 60 feet by 50 feet housing three 125 horsepower boilers. The new buildings are fireproof throughout, having steel framework, reinforced concrete floors, concrete roofs, brick curtain walls and steel window sash. New equipment to the extent of $100,000 has been installed. The accompanying photograph shows the factory.

Syracuse Company Moves—The Precision Die-Casting Company, Syracuse, N. Y., has moved into its new offices and factory.

Cadillac Factory News—The Cadillac Motor Car Company, Detroit, Mich., is now turning out sixty cars a day, having a force of 5,500 men.

Goodrich Entertains Clevelanders—The B. F. Goodrich company, Akron, O., recently entertained at its factory 410 members of the Cleveland Chamber of Commerce.

Cutting's Kansas City Factory—The Cutting Motor Car Company, Jackson, Mich., has completed arrangements for a branch factory at Kansas City, Mo., to cover western territory.

Gregg Starts Body Factory—W. S. Gregg has started in a business for himself, in a new modern two-story brick building, Los Angeles, Cal., erected for the purpose, where he will manufacture automobile bodies, windshields and rims.

Canadian Factory Progress—In 10 years automobile plants in Canada have increased 4,559 in number, $798,829,009 in value of capital, 175,108 in number of persons employed, $127,274,301 in earnings of salaries and wages and $683,722,-157 in value of products.

To Build Beaver Six—The Beaver Six is the name of a new automobile to be manufactured in Portland, Ore. A group of Portland business men have filed incorporation papers for the $300,000 Beaver State Motor Company. The first automobile has been manufactured and in a short time announcement will be made of the site of a $30,000 plant. P. A. Coombs and J. A. Friddle are the designers of the car, which will be on two models, roadster and touring car of 45 horsepower.

Growth of Canadian Industry—The growth of Canadian nanufacture is well illustrated by the progress being made by the Brockville, Ont., Atlas Automobile Company. This company will build additions in the near future that will riple the present premises.

To Manufacture Trucks—Theodore D. Gere and Frank B. Tracy, of Owego, N. Y., have formed a partnership to manuacture a commercial motor truck and negotiations are in progress for leasing the Robert Nichols building in Owego or the manufacturing plant.

Orders New Equipment—The Lewis Electric Welding Company, has placed an order for new equipment which will ncrease both its scope and output. The company has maerially increased its capitalization and will soon enter upon he manufacture of an increased line of automobile parts.

Toledo Company Adds—The Electric Auto-Lite Company, Toledo, O., will build an addition to its plant in that city, roviding for 40,000 square feet of floor-space. The work is lready under way and the company expects to be installed n the new building before January 1.

Moon Installs Equipment—The Moon Motor Car Comany, St. Louis, Mo., plans to make further improvements to s plant and to install a large amount of new equipment. During the past season, additions have been made to the lant which more than doubled its capacity.

Accessory Plant Planned—The Ernest Lee Machine Comany, Cleveland, O., has had plans prepared for the construcon of a factory for the manufacture of automobile accesories. The plans call for a one-story brick structure, 100 et by 320 feet, at an estimated cost of $15,000.

To Build Truck in Boston—The Frank Rilion Company, ell known in the electrical field in New England with headuarters in Boston, has decided to build motor trucks of om 1 to 6 tons capacity designed by Victor J. Houdon. The ehicles will be built in the present workshops in South oston.

Visit Cleveland Plants—The engineers of western Pennlvania, with headquarters at Pittsburgh, have arranged with e Cleveland Engineering Society for a joint inspection trip rough several Cleveland manufacturing plants, including e Winton Motor Car Company and the White Motor Car ompany.

Marathon Builds—The Marathon Tire & Rubber Comny, Cuyahoga Falls, O., is constructing a 65 feet by 300 et building in which new machinery is to be installed as on as possible. The company was recently organized for e purpose of manufacturing inner tubes and a general line rubber goods.

Westinghouse Plant Increased—The Westinghouse Elecic and Manufacturing Company, Pittsburgh, Pa., has rented e first floor of a large building, and is installing machinery. The new plant will be used for the manufacture of automole accessories and will employ 200 men and an equal numr of women.

Philadelphia's Police Regulation—Automobile equipped th two pairs of lamps or lights must use only the less brilnt pair on streets with railway tracks and on Broad street d Diamond street and Twenty-first street within the disct bounded by the Delaware and Schuylkill Rivers and ie avenue and South street.

Ford's New Plant—The Ford Motor Company, Detroit, ich., has opened up a new assembling and service departent at Sixteenth street and Washington avenue, that city.

Shows, Conventions, Etc.

Nov. 16-25.........Atlanta, Ga., Annual Show, Auditorium-Armory, Atlanta Automobile and Accessory Association.
Jan. 2-10..........New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 4-11..........Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-25.........New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 22-25.........Geneva, N. Y., Annual Automobile Show.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Buffalo, N. Y., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27 Feb. 1.....Ottawa, Ont., Ottawa Motor Show, Howick Hall, Louis Blumenstein.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Jan. 30-Feb. 1.....Canandaigua, N. Y., Annual Automobile Show.
Feb. 1-8..........Chicago, Ill., Annual Automobile Show.
Feb. 10-15.........Chicago, Ill., Truck Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 11-15.........Ottawa, Ont., Annual Automobile Show.
Feb. 12-15.........Geneva, N. Y., Automobile Show, Armory, Louis Blumenstein.
Feb. 15-22.........Newark, N. J., Annual Automobile Show, First Regiment Armory, New Jersey Automobile Exhibition Company.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 20-22.........Canandaigua, N. Y., Automobile Show, Louis Blumenstein.
Feb. 24-Mar. 1.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1.....Paterson, N. J., Annual Show, Paterson Automobile Trade Association.
March 3-8.........Pittsburgh, Pa., Annual Automobile Show.
March 8-15.........Boston, Mass., Annual Automobile Show.
March 19-26.......Boston, Mass., Annual Truck Show.
March 24-29.......Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Nov. 29-30.........Richmond, Va., Track Races, State Fair Grounds, Richmond Automobile Club.
May 30............Indianapolis, Ind., 500-Mile Race, Speedway.

Proposed Contests

Nov. 23-24.........Track, Fresno, Cal., Barney Oldfield.
Nov. 28-29.........Track, Richmond, Va., Richmond Automobile Club.
Nov. 28...........Road Race, Visalia, Cal., W. H. Lipton.

Foreign

Dec. 7-22..........Paris, France, Paris Automobile Show, Grand Palais.
Jan. 11-22.........Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.
March ....France, Sealed Bonnet 3000-Mile Run.
April ....Barcelona, Spain, International Exhibition.

The cars are sent from the factory to this department in a knocked-down condition, where they are assembled and sent to the various agencies. Besides the assembling room there are the general offices and a large stock room, where a complete stock of parts is carried.

View of the complete new plant of the New Process Raw Hide Company, Syracuse, N. Y., including the recent additions

News of the Week Condensed

Cartercar pay car used by the Detroit, Mich., department of public works. It saves time and precludes losing the pay rolls

PAID from Cartercar—By adopting a system of paying the Detroit, Mich., employees in the department of public works from the new city pay car, the city paymaster is able to save much time, and also eliminate any risk of losing the payrolls. The accompanying illustration shows part of a line of sixty men being paid off, the entire operation requiring only 10 minutes from the time the car enters the yards. The new car is the product of the Cartercar Company, Pontiac, Mich.

Delmore Opens Garage—E. J. Delmore, formerly with the Windsor, Ont., Hupmobile plant, has opened a garage in Reese, Mich.

Against Bulb Horn—Los Angeles, Cal., has just enacted an ordinance directed against the use of the bulb horn an as automobile warning signal.

Spare Succeeds Skilton—R. Y. Spare has succeeded R. J. Skilton as manager of the retail sales force of the Oldsmobile Company, Philadelphia, Pa.

Sullivan Alco Manager—The American Locomotive Company, Providence, R. I., has appointed G. L. Sullivan manager of the Chicago, Ill., branch.

Welch Manager Michigan—The Michigan Motor Car Company, Kalamazoo, Mich., has appointed E. A. Welch eastern sales manager, with headquarters in that city.

Fletcher Truck Manager—H. R. Fletcher has been appointed to take charge of the sales of the Flanders truck for the E. V. Stratton Company, Albany, N. Y.

Franklin Sales Conference—The annual conference of the district sales managers of the Franklin Automobile Company, Syracuse, N. Y., will be held at the factory on November 21 and 22.

Buick Savannah Factory Branch—A factory branch of the Buick Motor Company, Flint, Mich., is to be established in Savannah, Ga. J. E. Finney will remain at the head of the concern.

Knight Tire in Atlanta—The Knight Tire & Rubber Company, Canton, O., manufacturer of the Knight tires, has opened a branch office in Atlanta, Ga., under the management of H. C. Ross.

Motz Opens Branch—The Motz Tire & Rubber Company, Akron, O., has installed a direct Boston, Mass., branch. M. A. Frank is in charge of this new branch, which is located at 4 Dundee street.

Durston Resigns—R. H. Durston has severed his connection with the Syracuse, N. Y., office of the American Cole Company and will in the future devote his time to an automobile business with J. Bowman.

Want Large Membership—An effort is being made by the Alabama Good Roads Association to swell its membership to 10,000. Speakers of the association will visit each county in the state during the winter to preach the doctrine of good roads.

Automobile in National Park—In order to take care of the tourist travel in Glacier National Park next year, A. Brewster, of Belton, Mont., has just purchased six Chalmers cars, which will make regular trips from Glacier Park station to St. Mary's Lake.

Richmond Show Association Formed—The Richmond Automobile Dealers' Show Association, Richmond, Va., organized for the purpose of conducting automobile shows and racing events in that city, has been chartered by the state Corporation Commission.

Wetmore at Y. M. C. A.—The opening of the tenth year of the West Side Y. M. C. A. automobile school occurs next Thursday evening, November 21, when J. C. Wetmore will speak on "The Chauffeur, a Potent Factor in the Advancement of the Automobile."

Drown with Steel Concern—J. W. Drown, formerly advertising manager of the Standard Roller Bearing Company, Philadelphia, Pa., has resigned and accepted a position as sales manager of the Pressed Steel Manufacturing Company, 504 Land Title Building, that city.

To Open Newark Salesroom—A new showroom in Newark, N. J., is soon to be opened. It is located on Halsey street and occupies nearly 20,000 square feet of floor-space. The enterprise is headed by Messrs. Dalley and Van Vleck, who will handle the Touraine Six.

Cumberland's $40,000 Garage—The Cumberland Motor Company, Nashville, Tenn., is erecting a garage and sales room at Fifteenth street and Broadway, the total cost amounting to $40,000. The salesroom which fronts on Broadway will extend 100 feet across and 40 feet deep.

A Modern Garage—The modern garage is the title which Philo C. Fuller, of Grand Rapids, will confer upon the $85,000 automobile palace which he is now erecting. The structure will be of Spanish architectural type, with a three-story angle and one-story wings. It will be 140 feet by 100 feet in size.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
\ttleboro, Mass	Metz	W. B. Hollander
3artlesville, Okla	Moon	Cherokee M. C. Co.
3lockton, Ia	Hupmobile	Asa Terrill
Boston, Mass	Havers	Hoyt Carbureter & Auto Co.
3ridgewater, Mass	Overland	H. C. White
3rockton, Mass	Little	Fisher-Nickerson Co.
Buffalo, N. Y	Pullman	Auto Sales Co.
Charlotte, N. C	Oakland	Model Garage
:incinnati, O	Alco	Peters & Keating
:leveland, O	Alco	Maurice Rohrheimer
:olumbus, O	Empire	W. W. Schott & Co.
:olumbus, O	Metz	D. W. Short
:ouncil Bluffs, Ia	Studebaker	T. A. Mitchell
:raig, Ia	Moon	The Craig Auto Co.
)avenport, Ia	Michigan	R. Altendorf
)enver, Colo	Michigan	F. P. Sevier
)ixon, Neb	Mason	R. Paul
;reenville, O	Overland	Swope Music & Auto. Co.
Iarrisburg, Ill	Moon	C. V. Parker
acksonville, Fla	Alco	Wiesenfeld Warehouse Co.
oplin, Mo	Moon	Joplin Supply Co.
.eesville, S. C	Oakland	H. A. Meetz
.ittle Falls, N. Y	Franklin	F. F. Stacey
.ittle Rock, Ark	Oakland	C. L. Hoffman
.ouisville, Ky	Packard	Southern Motors Co.
ong Meadow, Mass	Havers	C. W. North
.os Angeles, Cal	Moon	L. C. Buxton
owell, Mass	Little	Lowell Auto. Co.
owell, Mass	Oakland	Lowell Auto. Co.
lacon, Mo	Moon	Macon Garage Co.
Mediapolis, Ia	Moon	Fleenor's Garage
Miami, Fla	Alco	Chas. Jones
Minneapolis, Minn	McIntyre	MacArthur, Zollass, Thompson Co.
Montclair, N. J	Moon	Montclair Garage
Montreal, Que	Cole	Royal Auto. Co.
New Orleans, La	Haynes	Demack Motor Car Co.
Philadelphia, Pa	Havers	V. P. Dadula
Portsmouth, O	Ford	W. J. Friel
Portsmouth, O	Mitchell	R. S. Pritchard
Portsmouth, O	Paige-Detroit	Portsmouth Auto. & Mach. Co.
Providence, R. I	Metz	W. B. Hollander
Regina, Sask	Franklin	Regent Motors Lit.
Rosalie, Neb	Mason	T. Lake
San Francisco, Cal	Fiat	Dwight Whiting
Savannah, Ga	Oakland	J. J. McDonough, Jr.
Seattle, Wash	Havers	R. H. & H. C. Gray
Sidney, Neb	Franklin	McIntosh & Brewer
Springfield, Mass	Mitchell	R. A. McKee
St. Matthews, S. C	Oakland	Banks Auto. Co.
St. Paul, Minn	Pope-Hartford	Fosnes, Saterlee, Babcock Co.
Superior, Neb	Hupmobile	L. R. Kesterson
Syracuse, N. Y	Alco	Jefferson Gar. Co.
Syracuse, N. Y	Havers	James Auto Co.
Tampa, Fla	Alco	Chas. H. Moorhouse
Toledo, O	Imperial	Cornelius & Hobly
Valley, Neb	Studebaker	Johnson & Clark
Wilmington, N. C	Oakland	H. L. Fennell

Motor Train Service—The Chicago, Terre Haute and outheastern Railway Company has established motor train :rvice between Terre Haute and Dana, Ind.

Annapolis Boulevard Completed—The Annapolis boulevard :tween Boone and Revelle has been completed so that now ere is a continuous stretch of boulevard from Brooklyn to nnapolis.

Chase Manager The Falk Company—C. F. Chase has been ›pointed sales manager of the gas engine department of The ılk Company of Milwaukee, Wis., which also manufactures kerosene gas engine.

Cool Pathfinder Manager—H. G. Salisbury, recently ap›inted general manager of the Pathfinder Motor Car Comny of California, has appointed Barry Cool manager of the .n Francisco branch.

Ijams in Chicago—R. L. Ijams, assistant to C. A. Gilbert, :stern district manager of the United States Tire Comny, has been transferred to the central district under J. C. eston with headquarters in Chicago, Ill.

Kingsford Leaves Peerless—Mr. Russell T. Kingsford has signed his connection with the Peerless Motor Car Comny, Detroit, Mich., to accept the position of chief engineer th the Rushmore Dynamo Works, Plainfield, N. J.

Perkins with Rushmore—Mr. J. Perkins, for several years perintendent of the Saurer motor truck factory of the In'national Motor Company at Plainfield, N. J., has resigned ; position there, to become superintendent of the Rush›re Dynamo Works, Plainfield.

Small Resigns—Allen H. Small, assistant manager of the lwaukee, Wis., branch of the Buick Motor Company for me time, has resigned to accept the position of district ınager for the Oakland-Wisconsin Motor Company, state ent for the Oakland, Empire and Detroiter.

Reavell Manager Diamond—O. C. Reavell has been transred to the management of the Indianapolis branch of the amond Tire and Rubber Company, Akron, O. He succeeds W. Fauvre, who has been advanced to manager of the npany's Chicago, Ill., sales and distributing branch.

Wants Motor Trucks—Commissioner Edwards of Salem, ıss., who has charge of the street cleaning department, ns to request the board of aldermen to make an approation for 25 motor trucks to be used as garbage wagons to e the place of the horse-drawn vehicles now in use.

Highway Commission Inspection—The members of the ıssachusetts Highway Commission started recently on ir annual inspection of the roads and bridges of the Bay te and before they finish they will have visited 320 towns l 33 cities. They are making the run in a Locomobile.

Stewart Traveling Representative—Roy D. Stewart, forrly mechanical manager of the Milwaukee, Wis., branch the Thos. B. Jeffery Company, and more recently manr of the Walsh & Schulz garage, has resigned to become sconsin traveling representative of the Vacuum Oil Comıy.

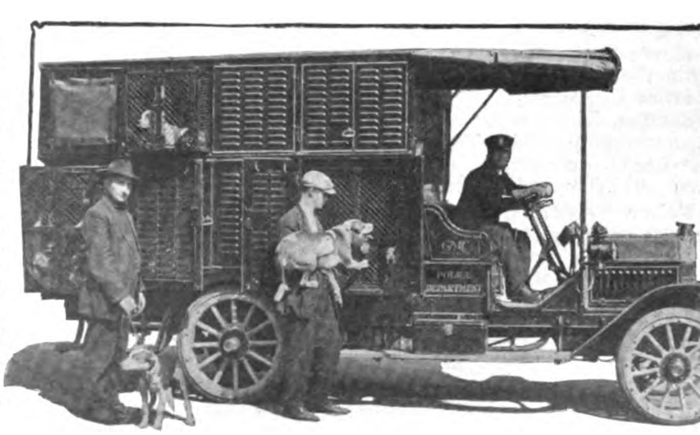
Walker Makes a Change—Warren T. Walker, formerly h the Locomobile and Matheson branches in Boston, Mass., has been appointed manager of the Boston branch of the Kelly-Springfield tire company, succeeding Manager Beach, who has been sent to take charge of the San Francisco, Cal., branch.

Highway Construction Completed—An interesting piece of highway construction known as the Rincon sea-level cut-off has just been completed. The road saves 9 miles between Ventura and Santa Barbara, Cal., and eliminates the dangerous Casitas Pass, with its climb of 1,200 feet and its dangerous and narrow roads.

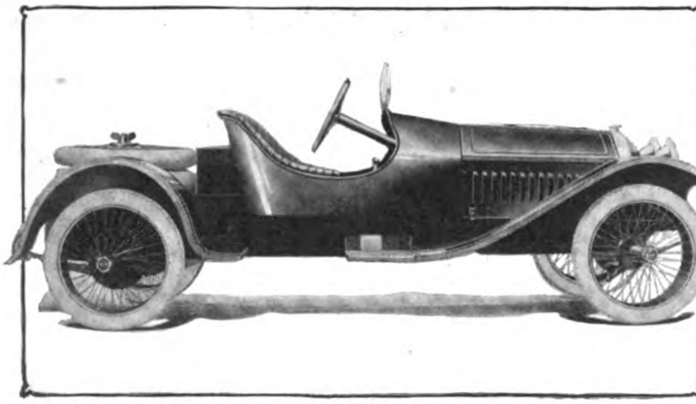
Cadillac Moves—The Jonas Automobile Company, representing the Cadillac, has moved into its new home, the Cadillac Building, Milwaukee, Wis. The former quarters at 417-421 Wells street are now occupied by the Wolleager Auto Sales Company, successor to the Milwaukee branch of the Studebaker Corporation.

United Tire's Agencies—The United States Tire Company has recently opened new sub-branches in Newark, N. J.; Birmingham, Ala.; Rochester, N. Y.; Washington, D. C., and Milwaukee, Wis. In the near future sub-branches also will be opened in Providence, R. I.; Worcester, Mass.; Baltimore, Md.; Syracuse, N. Y., and in Columbus and Toledo, O.

Cadillac Breaks Record—The Los Angeles-San Francisco, Cal., record over what is known as the valley or inland route, one of the road classics of California, was broken recently by a 1913 Cadillac, driven by Charles Soules, the former racing driver. The distance is close to 500 miles, and the Cadillac negotiated the run in 17 hours and 5 minutes. This time breaks the old record by 40 minutes.



The latest addition to the Detroit fleet of municipal trucks is a G.M.C. dog catcher's wagon. The vehicle is operated under the direction of the Detroit police department and is impounding on the average of ninety muzzleless canines per day. The new wagon is designed to carry the dogs in the most humane manner possible. Fourteen cages of various sizes are provided and whenever it is necessary, a vicious dog may be kept apart from the others in a separate compartment



One of the new Oakland models, the six-cylinder, 60-horsepower two-passenger roadster

Wilder in New Rooms—The Wilder Motor Car Company is now occupying its new salesroom in Louisville, Ky.

Robartes Locomobile Manager—F. W. Robartes has been appointed manager of the Washington, D. C., branch of the Locomobile Company, succeeding James J. Flynn.

Savannah Run on Thanksgiving—Preliminary arrangements for an automobile run on Thansgiving Day are being perfected by the Savannah Automobile Club, Savannah, Ga.

Goodloe Atlanta Manager—T. B. Goodloe, who has been in charge of the Richmond, Va., sub-branch of the United States Tire Company, has been appointed manager of the Atlanta, Ga., branch of the same organization. Mr. Goodloe is succeeded in Richmond by J. G. Given.

Prest-O-Lite in Portland—The Prest-O-Lite Company, Indianapolis, Ind., recently opened a factory branch in Portland, Ore., and word has now just been given by H. H. Van Horn, who will have management of the branch, that the Searchlight Gas Company of Chicago, Ill., will establish its northwest branch in Portland.

Garage Cost $30,000—John B. Hauf, of Albany, N. Y., is having constructed in that city a garage and storehouse. The dimensions of the new building are 110 feet by 44 feet; its cost is to be about $30,000. The new building will be absolutely fireproof, consisting of four stories, the first two being for the garage.

Sager Selected—The Cadillac Motor Car Company, and the Packard Motor Car Company, both of Detroit, Mich., have selected the Sager Diamond Bumper, made exclusively by the J. H. Sager Company, Rochester, N. Y., who have been granted letters patent covering both mechanical and ornamental design.

Clearing House Success—When the automobile clearing house was first formed in Seattle, Wash., it was with the idea of keeping it going not more than a month, but owing to the wonderful success of the venture it has been made a permanent institution on automobile row and it bids fair to be one of the largest automobile concerns on the Pacific Coast in a year's time.

Kurtz Retires—E. W. Kurtz has announced his retirement from the position of director of advertising for the General Motors Company, Detroit, Mich., the work and purpose of the advertising department of the General Motors having been accomplished. This department at the general offices has been discontinued, each individual plant now having its own publicity and advertising department.

Frisco Selling Organization—A new kind of automobile selling organization is being tried out in California and is being watched with a great deal of interest by San Francisco dealers. The organization is known as the Mutual Motor Agencies of Northern California, and is composed of small automobile concerns organized for the special purpose of pushing a popular-priced automobile on the market.

Lamb-Daniel Company Formed—H. A. Daniel, formerly purchasing agent of the Carter Car Company, Pontiac, Mich., and J. J. Lamb, a local advertising man, are the principal figures in a newly formed concern in that city to be known as Lamb-Daniel & Company, with headquarters in the Union Trust Building. The new firm will act as manufacturers' representative for several Detroit automobile parts manufacturers.

Convicts Construct Automobile—Convicts at Sing Sing prison, New York State, have completed the construction of an automobile with exception of the engine, which was purchased from a motor dealer. Commissioner Edwards of the street cleaning department of New York City will inspect the machine and if satisfactory it will be purchased and installed in the street cleaning department of the metropolis at a cost of $5,000.

San Joseites Organize—At the beginning of October a number of the automobile enthusiasts of San Jose, Cal., organized a motor club in that city. Within 2 weeks they secured a membership of 275, raised $45,000 actual cash, have purchased 90 acres of Toothill land near Alum Roçk, and have let a contract for an extensive club house and the laying out of extensive grounds. The officers are: W. S. Clayton, president; John R. Chance, secretary; Albert Bettins, treasurer.

Minneapolis Busy Building—Three automobile buildings are being constructed in Minneapolis, Minn., for Andersch Brothers, Abbott-Detroit, to cost $35,000; for The Colby Motor company, to cost $10,000 and for the Bowman & Libby, Inc., Overland, and the Goodyear Tire & Rubber company, to cost $100,000. The Ford Motor company will erect a $200,000 building and the Avery company, Peoria, Ill., has bought a site for an implement and automobile building.

Dayton Tire Suit—The Victor Inner Tire & Rubber Company, Dayton, O., is the defendant in a recently filed suit in the United States District Court brought by Cecil Adamson, East Palestine, O., who alleges that the concern has infringed on a patent on improvement in tire vulcanizing repair apparatus. He asks $5,000 damages, an accounting and an injunction restraining the defendants from further infringement on his patents. J. Everett Inman and George Inman are named in the suit.

Washington Company's Troubles.—An involuntary petition in bankruptcy has been filed against the F. K. B. Company, Washington, D. C., automobile supplies, at 1110-1112 Fourteenth street, N. W., by the Continental Rubber Company, R. E. Dietz Company and the Commercial National Bank of that city, whose claims aggregate $12,000. The assets are said to be about $7,000. The bankruptcy court awarded adjudication, referred the case to a referee in bankruptcy and appointed Wilton J. Lambert and L. P. Loving receivers under a bond of $10,000.

Wisconsin Expends $950,000—A review of the highway situation in Wisconsin at this time presents a most satisfactory state of affairs. During the past year approximately $950,000 has been expended in permanent highway improvement and the estimates for next year, based on the demands of the counties for state aid, are in excess of $1,750,000. The report of A. R. Hirst, chief engineer of the Wisconsin State Highway Commission, shows that the counties are asking $811,150 from the state for permanent work in 1913, as compared with $453,417 demanded for 1912 work. Engineer Hirst's report shows that about 35 miles of concrete road were constructed during the closing season. The average cost is 90 cents per square yard.

Automobile Incorporations

AUTOMOBILES AND PARTS

AUBURN, IND.—De Sota Motor Car Company; capital, $20,000; to manufacture automobiles. Incorporators: L. M. Field, Hayes Fry, Glenn Fry, V. Van Sickle, H. J. Clark.

CHICAGO, ILL.—Keeton Motor Company; capital, $60,000; to manufacture automobiles and accessories. Incorporators: L. C. Roberts, K. R. Roberts, W. C. Spenny.

CLEVELAND, O.—Auto Mart Company; capital, $10,000; to deal in and rent automobiles. Incorporators: Edward C. Plietz, W. L. Radcliffe, William H. Hasselman, William R. Wallace, Louis C. Heimberger.

CLEVELAND, O.—Hall-Miller Auto Company; capital, $5,000; to deal in automobiles of all kinds. Incorporators: Joseph A. Freund, Jr., A. M. Freund, L. Greenfield, Charles Kovanda, J. A. Freund.

CLEVELAND, O.—Motor Mechanism Company; capital, $25,000; to manufacture automobiles and parts. Incorporators: Edward Younger, Florence Castle, Herbert O. Evans, H. E. Gray, S. E. Sackerman.

CLEVELAND, O.—Northern Ohio Motor Company; capital, $25,000; to deal in automobiles. Incorporators: Herbert W. Bell, E. L. Benning, F. C. Anselm, E. P. Elrich.

DANBURY, CONN.—Fillow Auto Company; capital, $30,000; to manufacture automobiles. Incorporators: A. Homer Fillow, Joseph W. Juengst, B. M. Fillow.

INDIANAPOLIS, IND.—Hunter-Hammond Auto Company; capital, $12,000; to manufacture automobiles and accessories.

NEW YORK CITY, N. Y.—Foreign & Domestic Automobile Repair Company; capital $10,000; to manufacture automobiles. Incorporators: L. O. Rothschild, Otto A. Deffea, Max Kaplan.

NEWARK, N. J.—Van Deman & Wainwright; capital, $50,000; to conduct a general automobile business. Incorporators: A. J. Thurstans, W. A. Waters, J. Rose.

TORONTO, CAN.—Standard Garage, Ltd.; capital, $40,000; to manufacture automobiles. Incorporators: Samuel W. Marchment, Harold W. Marchment, Douglas L. Berwick.

Ayers in Charge—J. C. Ayers has taken the managership of ıe General Motors Truck Company's Detroit branch.

Clement Production Manager—C. M. Clement has become roduction manager of the Metal Products Company, De-·oit, Mich.

Somerville Sales Manager—W. A. Somerville has taken the osition of sales manager of the Stromberg Motor Devices ompany, Chicago, Ill.

Addition to Ford Branch—Ground has been broken for the :w addition of the Ford Auto Company, Baltimore, Md., hich is to join the present building.

Losey Buick Manager—R. H. Losey, formerly of Indian-ıolis, Ind., has been named manager of the Atlanta, Ga., ·anch of the Buick Motor Company.

Flynn Resigns—James J. Flynn has resigned as manager of e Washington, D. C., branch of the Locomobile Company. is successor has not yet been appointed.

Ong Office Manager—The Sterling Auto Company, Detroit, ich., has engaged D. G. Ong, former paymaster of the anders Motor Company, as office manager.

Municipal Garage for Providence—The work of motorizing e municipal department of Providence, R. I., has progressed far that a municipal garage has been established.

Jenkins With Abbott—W. M. Jenkins, former sales man-er of the Simplex Motor Car Company has become Pacific ıast representative of the Abbott Motor Company.

Albany's Parade—Albany, N. Y., had an automobile parade :ently. Headed by a band on a Mack truck the column sembled at Central avenue and Northern boulevard.

Franklin Dealer Moves—The H. J. Mich Auto Company, nneapolis, Minn., Franklin dealer, has moved into a new esroom and service station at 1400 Hennepin avenue.

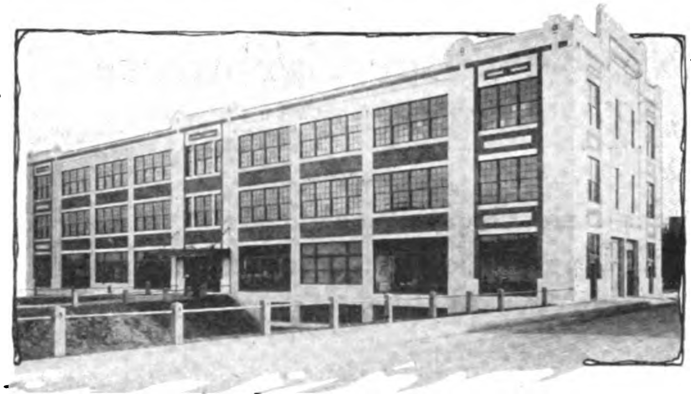
Secoir with Studebaker—Carl J. Secoir, purchasing agent the Havers Motor Car Company, Port Huron, Mich., has ned the forces of the Studebaker Corporation, Detroit, ch.

KisselKar Branch Moves—The Boston branch of the Kis-Kar Company moved recently from the Motor Mart into new building just completed for the branch on Common-alth avenue.

Wilcox Gives Dinner—The H. E. Wilcox Motor Car Com-ıy, Minneapolis, Minn., gave a dinner at the Kaiserhof ing Made in Minneapolis Week, for 125 drivers of Wilcox :ks in that city.

New Oakland Branch—The Oakland Motor Car Company opened a new branch at Houston, Texas, with A. J. Chal-ıir in charge. Mr. Challinoir was formerly connected with factory at Pontiac, Mich.

Buys Gasoline Cars—The Northern Central Railway has chased eight gasoline motor cars for use in its mainte-ce of way department on the Columbia and Frederick branch between Columbia, Pa., and Frederick, Md., a distance of 68 miles.



New sales and service building of the Thomas B. Jeffery Company in Boston, Mass.

Maus Joins U. S. Tire—John B. Maus has joined the United States Tire Company's selling forces in the capacity of special assistant to O. S. Tweedy, eastern district manager. Mr. Maus will have his headquarters in New York.

To Handle Great Western—The Great Western Auto Sales Company has been formed in Indianapolis, Ind., by C. E. Williams and J. E. Williams and will distribute the Great Western line of cars in Indianapolis and vicinity.

Nakes Chosen President—At the annual meeting of the Albany Automobile Dealers Association, Albany, N. Y., held in the office of the Dominant Motor Car Company, Chauncey D. Nakes, of Albany Garage, was chosen president.

New Home for White Company—The White Company has purchased more than an acre of land on Commonwealth avenue, Boston, Mass., next to the new KisselKar building, on which will be erected a salesroom and service department.

Baltimore Franklin Moves—The Baltimore branch of the Franklin Automobile Company, Baltimore, Md., has moved into new quarters at 1919 N. Charles street, and a thoroughly up-to-date service station has been established at the new address.

Motz Changes to Branch—The Motz Tire & Rubber Company has changed its line in Boston, Mass., formerly handled by the Standard Tire & Rubber Company as an agency proposition to a factory branch with M. A. Frank as manager and headquarters at 4 Dundee street.

Cobb Is Manager—A. M. Cobb, formerly manager of the Thomas branch, Chicago, Ill., has succeeded to the position of manager of the Velie branch left vacant by the retirement of Morton H. Luce, who goes to New York representing the Marion and American. George L. Sullivan, of New York, has been appointed manager of the local Alco branch in place of B. C. Day.

Baker Sales Show Increase—The sales increase in the pleasure car department of the Baker Motor Vehicle Company, Cleveland, O., for October, 1912, shows a net gain over October, 1911, of 123 per cent. This is 36½ per cent. higher than the total sales for April, 1911, which marked previously the greatest monthly volume of sales in the history of the Baker Company.

Haynes' New Alloy—Elwood Haynes of the Haynes Automobile Company, Kokomo, Ind., was the principal speaker at a meeting of the Indiana branch of the American Chemical Society held in Indianapolis one night recently. Mr. Haynes explained a new alloy which he recently discovered, and which he believes will revolutionize the manufacture of surgical instruments and hard metal tools.

Vehicle Club Election—The Electric Vehicle Club, of Boston, held its annual meeting at which plans for reorganization were discussed. The organization committee was instructed to prepare a constitution and by-laws for presentation at the next meeting. The following officers were elected: Day Baker, president; E. S. Mansfield, vice-president; H. S. Thompson, secretary; J. S. Codman, treasurer.

Rochester Club Elects—At the annual meeting and election of officers of the Rochester Automobile Dealers Association, Rochester, N. Y., Frank W. Peck was unanimously re-elected president, while C. E. Hartson was chosen again for vice-president. George J. Bauer was elected secretary. A. F. Crittenden, who has withdrawn from the automobile business, resigned from the treasurership and was succeeded by F. R. Luescher.

Automobile Incorporations

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GARAGES AND ACCESSORIES

RMINGHAM, ALA.—Alabama Tire Repair Company; capital, $15,000; to r automobile tires. Incorporators: J. E. Kennedy, Al C. Garber, P. B. m.

ICAGO, ILL.—Abbey Auto Livery Company; capital, $2,500; to conduct neral automobile and garage business. Incorporators: George W. rman, John K. Lenox, Clara A. Blackwell.

WCASTLE, IND.—Rose City Auto Company; capital, $10,000; to conduct ieral sales agency and garage. Incorporators: Frank E. Smith, Charles Mouch, William F. Byrkey, Howard M. Van Matre, Gordon Cameron, ence Bailey, Albert D. Ogborn.

ILADELPHIA, PA.—M. S. H. Sales & Rubber Company; capital, $10,000; eal in automobile tires and mechanical rubber goods. Incorporators: k A. Harrigan, J. V. Harrigan, Robert J. Skilton.

CINE, WIS.—Racine Auto Tire Company; capital, $75,000; to manufac- pneumatic tires. Incorporators: L. J. Elliott, C. Wright, M. E. er.

LEIGH, N. C.—Reitzel Automobile Service Company; capital, $25,000; nduct an automobile service station. Incorporators: O. C. Klingman, Reitzel, L. G. Klingman.

CHMOND, KY.—Madison Garage; capital, $2,000; to conduct a general e business. Incorporators: Roy Montgomery, Frank E. Chase, M. C. gg.

ELBYVILLE, KY.—Fawkes, Pulliam & Graham; capital, $3,300; to con- a general garage business. Incorporators: E. B. Graham, George es, Harry Pulliam.

EDO, O.—Toledo Auto Shows Company; capital, $10,000; to conduct tomobile show. Incorporators: J. W. Banting, A. A. Atwood, H. W. ns, Guy R. Ford.

CHANGES OF NAME AND CAPITAL

RTON, O.—Heathman Soliday Motor Company; name changed to Frank eathman Motor Company.

New-Miller Carbureter Has Three Adjustments

Float-Feed Device Incorporates Many Novel Features—Interconnected Throttle and Air Valves

New and Ingenious Tools Used in Making Product Which Can Be Turned Out at Rate of 400 Per Day

A NEW style carbureter has been brought out by the New-Miller Manufacturing Company, which is worthy of attention because it involves several new and seemingly exceptionally desirable features. One of the greatest advantages of this carbureter would appear to lie in the fact that the gasoline level is co-incident with the fuel level. On most concentric-float carbureters the fuel level has been about .06 inches below the jet nozzle. As a consequence of this it is generally necessary to flood the carbureter by priming before starting the motor in cold weather. Other features which are noteworthy are the modified venturi which in this case is merely a constriction in the air passage in the neighborhood of the jet; the interconnection of the auxiliary air and the throttle, high, low and intermediate speed adjustments, free float; connection of throttle to needle valve; taper on needle valve corresponding to air port area and accurate idling adjustments.

Fig. 1 shows the interior of the New-Miller carbureter, a quarter section being cut out on the line of the needle. Through the design of this carbureter, the makers claim it is possible to bring down the vacuum in the manifold to the relative minimum, and, at the same time, take in the charge in such a way that it will not be deflected to either wall of the carbureter or manifold. To accomplish this, the auxiliary air is taken through an annular intake just enough air being taken through the normal to lift the gas out of the vacuum cup in the top of the nozzle.

The throttle butterfly D is connected with a toggle to a pis-

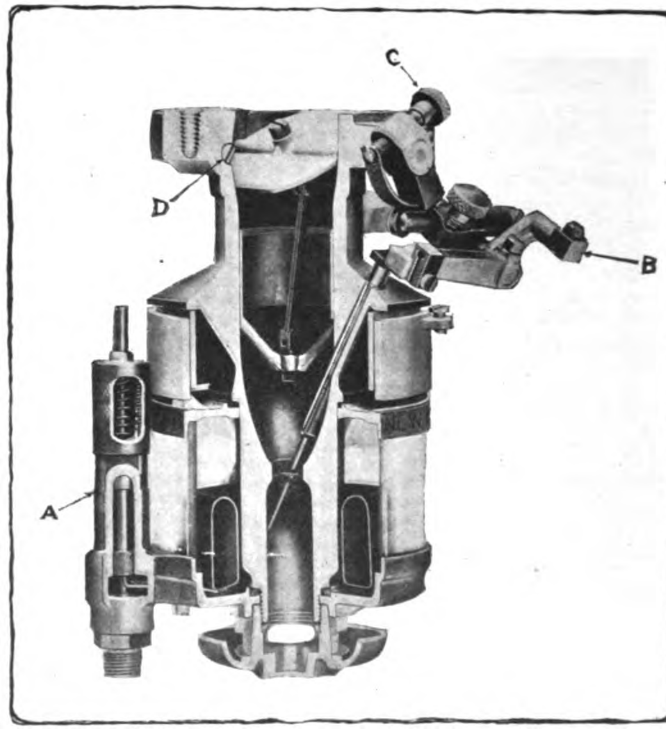


Fig. 1—Quarter section through the New-Miller carbureter showing construction

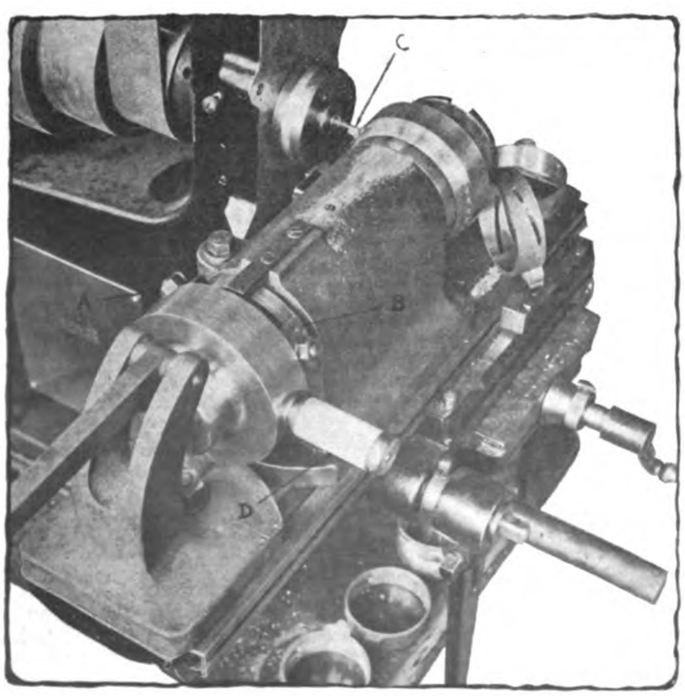


Fig. 2—View of slotting tool especially designed for the New-Miller carbureter

ton that travels over the ports for the auxiliary air. The throttle butterfly is also connected to the needle valve. Every movement of the throttle B has a corresponding movement of the air piston and the needle. In order to give a greater throttle range, the wall around the butterfly is cut on a radius. This gives a much greater range than is possible with the ordinary straight walled carbureter.

The action of the New-Miller carbureter is entirely mechanical, so that the motor, if turning over 1,500 or turning over 300, will receive the same percentage of air and gas at all times. By having the auxiliary air piston connected to the butterfly, it is possible to give the motor a long, hard pull until you have decreased your speed to such an extent that it is necessary to release your clutch and shift gears without loading the manifold.

New-Miller carbureters are all equipped with copper floats, which float free, suspended in the gasoline, until the motor stops, at which time it locks the gasoline. The ordinary method of tilting the butterfly to the proper angle to secure low speed is entirely done away with in this carbureter. The butterfly has one side milled out, and there is inserted in the body of the carbureter at the center of the radius cut for the butterfly a quarter-inch round brass rod with a radius milled on the inside to match the radius of the carbureter. This can be turned down until it will completely close the milled portion of the butterfly or opened to admit just enough gas to secure low speed.

Another advantage claimed by the makers is that it is never necessary to prime, as the float level of the gasoline is the same as the top of the nozzle, or the vacuum cup in the nozzle. To take care of different temperatures and the constant varying grade of gasoline the needle can be raised or lowered from the seat, thereby changing the diameter of the needle in the nozzle while the car is running or standing idle to any desired size and overcoming on the instant any difficulties of this kind.

The New-Miller carbureter has been tooled up to make the parts absolutely interchangeable in five sizes and they are designed for a quantity production of something over 400 daily. Some of the tools for this carbureter are unique in their design. They have been designed by O. L. Snyder, engineer and designer of all the tools in the New-Miller plant.

Fig. 2 shows the cam tool C, for milling the slots in the side of the air sleeve, one of these sleeves standing at the head of

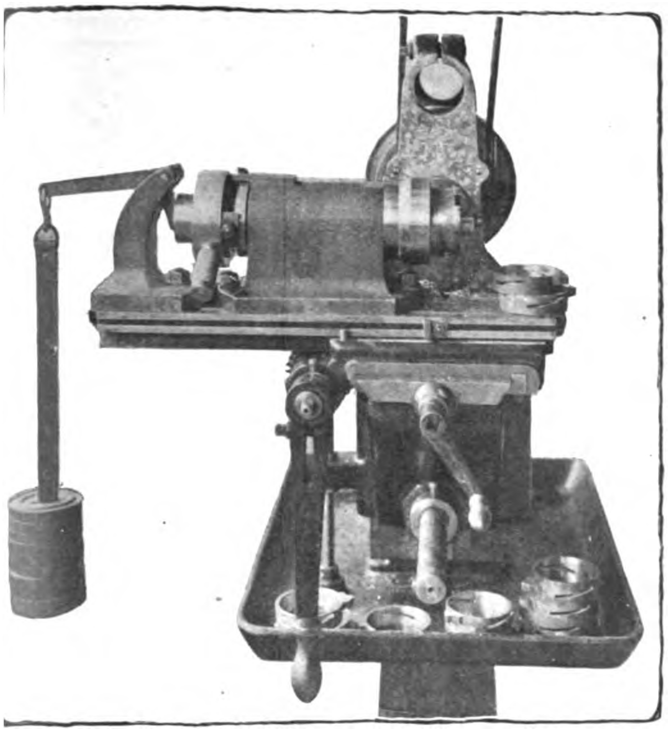


Fig. 3—Rear view of tool used in slotting cams for the New-Miller carbureter

ııs tool showing the slot on each side of the sleeve cut to ıe proper angle. All sleeves are cut on the same degree but ·ith different travels. This tool is also shown in Fig. 3. In ig. 2 the index head is shown. This index head has two zero ıarks at exactly 180 degrees. The head is graduated from each ːro mark 90 degrees on either side. The lock stops B are set ther side of the zero mark to the graduation. On the inside f this case are two master cams fitting into each other, with a ː-degree pitch. The index head is fastened onto a shaft running through the center, the first cam being fastened to the ısing, the other being known as the free cam. This shaft running through connects with the head on the back end holding ıe handle D. This handle is used not only for throwing the ork, but for releasing the free cam underneath. When the ork is set, stops 1 and 2 are set to the degrees on the index ːad. The cutter C is turned through the material, and the stop released and the work thrown over to the opposite stop, when ıe same operation is performed on that side. It is possible to ırn out one of these cams completed every 32 seconds or about ooo per day.

Fig. 3 shows the weights that are used in holding the free ım in against the stationary cam.

Fig. 4 shows what is known as the radius tool. This is for ıtting the radius in the body for the travel of the butterfly. he cutting edge of the tool is set on the same radius as the ıt in the body, the turret being moved up to the stop and the ver used to carry the tool through the work. This tool has a ıpacity of about 40 carbureters every hour, and there are five of ese in operation.

To adjust the New-Miller carbureter, run auxiliary air sleeve › and leave wide open; after you have made all your connec- ›ns for gasoline, leave the throttle closed, turn on your gaso- ıe and adjust your float level nut, the knurled nut above A. ig. 1, so that the gasoline is even with the mark on the stem arked float level. Never above mark. The mark A is at the me level with the top of nozzle. You then start your motor running with the throttle still closed. If steering-post adstment is used, remove nozzle screw; knurled nut above cam . Now raise the cam B forward till engine runs smoothly. It never necessary to prime this carbureter in starting, as the ısoline is always level with the nozzle.

Next adjust the intermediate speed by running the little screw between B and the knurled nut just mentioned, back or forward until the wheel on the roller is about in the position shown in Fig. 1. You can now open your throttle, and adjust the high, by turning to the left which will give you more gas, or by turning to the right, which will cut the gas down.

The intermediate speed is simply an adjustment for your motor to take the high speed a little quicker and for you to ride on intermediate speed with your throttle part-way open, with more or less gas, according to the conditions of the country in which you are driving. The farther out the little wheel is run on the track, the more gas you will have at intermediate speed and the quicker you will take your high on throwing open the throttle. When your high is adjusted properly, you can close the throttle, and the low speed for idle running is seen in Fig. 1, D.

By inserting a screwdriver in the slot D you can turn this to the right until the motor is running as slow as it is possible to get it. You are running then on the idle speed, with nothing but gasoline and what air comes in through the normal opening. When these adjustments are once set, it is never necessary to change them, no difference what the condition of the weather or the grade of the gasoline.

It is the contention of the New-Miller Carbureter Company that in the winter time, when gasoline is very hard to vaporize and when the grade of gasoline goes down, as it does every day, the proportion of air to gasoline must be maintained the same as in warm weather and for a high grade of gasoline, and to do this, the only way feasible is to increase the supply of gasoline. This is accomplished by the steering-post adjustment.

Fig. 1 shows the little cam riding on the lever, and by moving it to the right the needle is allowed to lift out of the nozzle, increasing the diameter of the nozzle thereby. The bottom of the stem of the needle has a taper at the point of entering the nozzle, and on the end of the needle has three butterflies. By lifting the needle the size of the orifice is varied in this nozzle according to how far the taper is taken out of the nozzle or driven down in. In other words, it is possible to put in the smallest needle that is practicable, or increase it to the largest practicable by simply adjusting the steering-post control. The proportions on high, intermediate and low remain just the same under all conditions.

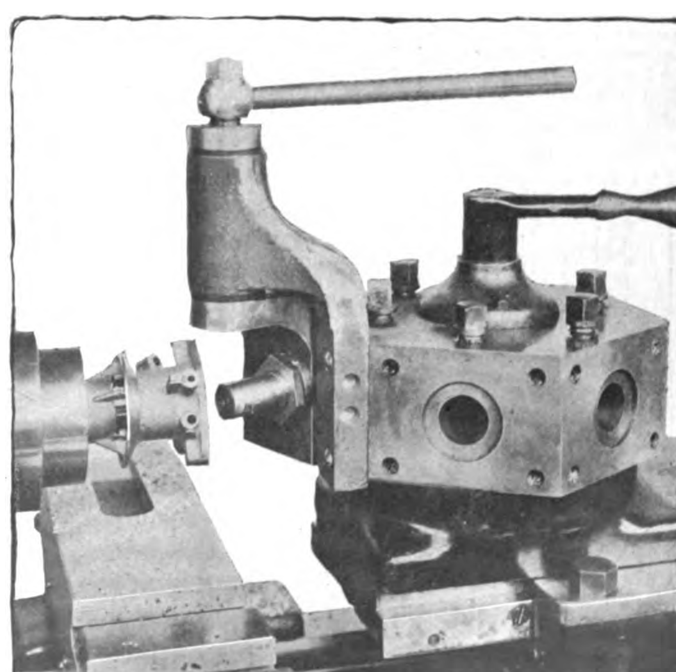


Fig. 4—Tool for cutting radius in body for the travel of butterfly valve

Viso Spark-Plug; Saunders Fuel Saver; Ford Electric Headlights; Seat Covers for Ford Cars; Burke Work-Saving Inflation Valve; Fuel Consumption Gauge; Azadian Indicators; Automobile Gasoline Lock

THE tendency to keep the user of an automobile well informed as to the working of its various parts is well illustrated by the increasing number of spark-plugs equipped with visible-gap features. The latest product developed along these lines is the Viso plug, Fig. 1, made by the Rapp Mfg. Co., Toledo, O. This plug is of conventional exterior, but has two distinguishing features, namely, the visible spark-gap and the adjustability of the jump gap between the two firing points. The visible spark-gap is formed between the top end of the positive electrode and a short point shaped at the lower end of the terminal screw; these two ends are held in a glass insulation which is surrounded by a metal coat resting on the porcelain insulation. By turning the metal coat of the glass, the positive or central electrode which screws in a threaded bearing, may be screwed up or down, thereby varying the distance between it and the electrode formed on the shell. The porcelain is formed without any holes or cavities, to prevent the formation of deposits therein. The spark-plug is made in the standard sizes and porcelain and shell are interchangeable.

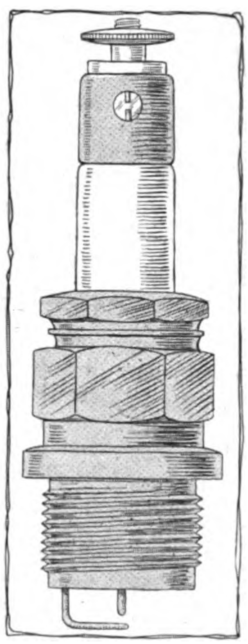


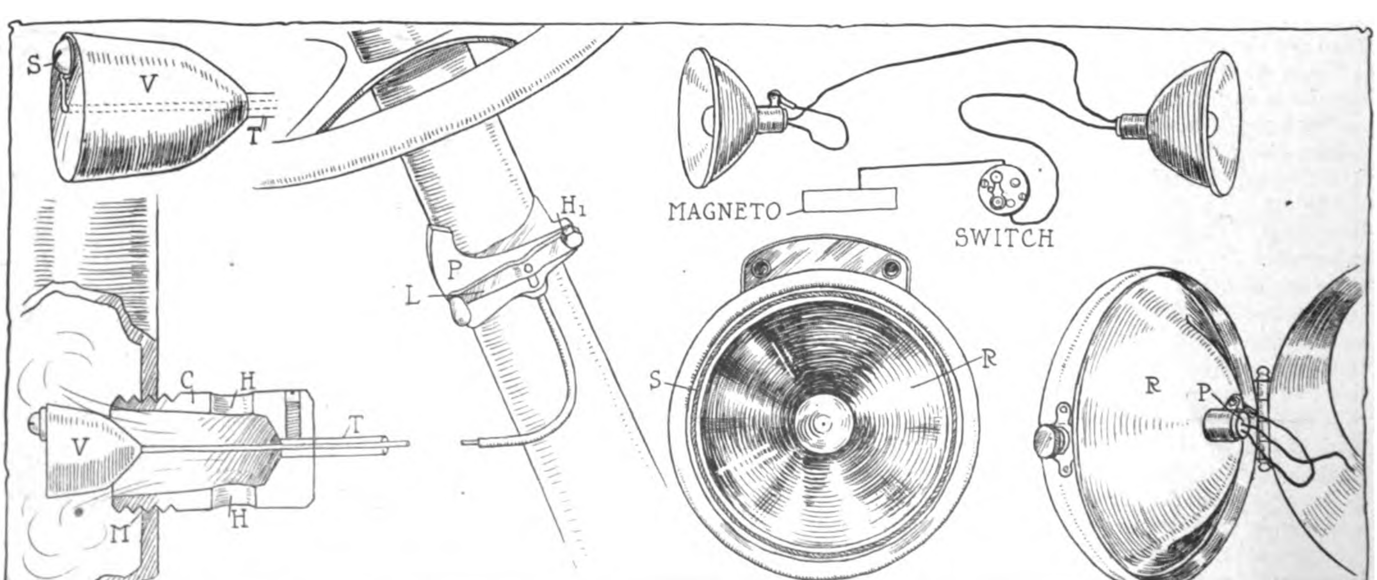
Fig. 1—View of the Viso spark-plug, which is equipped with a visible spark-gap and adjustable central electrode

Electric Headlights for Fords

The Motor Car Equipment Company, 55 Warren street, New York City, has recently constructed an electric lighting outfit for Ford cars, Figs. 4 and 5, which consists of a pair of parabolic reflectors fitting into the acetylene lamps furnished with Ford automobiles. In the apex of each reflector is fitted a socket P equipped with connections through which current may be furnished to a bulb B. The reflector R of each lamp is silvered on its concave surface, and the bulb is positioned practically in the focus of the parabola, so that all light is emitted in the shape of a parallel beam. To keep the lens from being scratched the front edge of the reflector is faced with a strip S of white soft material. The wires enter the lamp through the hole in which the acetylene burner is ordinarily mounted. The method of connecting the lamps is shown in the scheme, Fig. 4. The Ford magneto, which is mounted in the flywheel and generates sufficient current to supply a set of lights, is used as the source of electricity.

Saunders Gasoline Saver

To utilize to its fullest extent the gasoline consumed by the motor, the Leslie R. Saunders Company, 927 West Seventh street, Los Angeles, Cal., has evolved the Saunders gasoline saver, Figs. 2 and 3, which is simply a device for supplying auxiliary air to the mixture flowing from the carbureter to the manifold. It consists of a 1.5-inch brass cylinder C, Fig. 2, formed with four air holes H and fitted into a threaded hole M in the intake manifold, thus presenting a pasage from the exterior atmosphere to the interior of the manifold. This passage, however, is ordinarily closed by a conical valve-plug V which, like the cylinder C, is made of brass and exactly fits the inner end of C, thus closing the hole M. Through the apex of C enters a Bowden wire, which passes all the way through V and is fastened by the screw S, while its other end is connected to a small operating lever fixed to the steering column as shown in Fig. 3. The wire is conducted through a tube T leading from the steering column to the manifold, and as the Bowden wire is practically incompressible, a slight movement of the lever unseats the valve V, permitting of air being drawn in through H and M, due to the suction in the intake manifold. The method of fastening the operating lever to the



Figs. 2 and 3—Saunders gas saver and operating mechanism. Figs. 4 and 5—M. C. E. Company's electric lights for Ford cars steering column consists in the use of the brass wire which is wound around the column and the hole H1 in the plate P; this hole is also the point at which the lever L is attached, and around which it may be turned. As the gasoline saver is operated independently of the throttle, it may be brought into action at any time, and used either to increase the air in the fuel mixture after the throttle has been fully opened, or it may be applied as an air brake, when the car is coasting down a hill, with the throttle closed. As a much smaller throttle opening may be used in connection with the gas saver, the saving in fuel effected by its use is appreciable. Except for the tapping of the manifold no changes have to be made in installing the apparatus on an automobile.

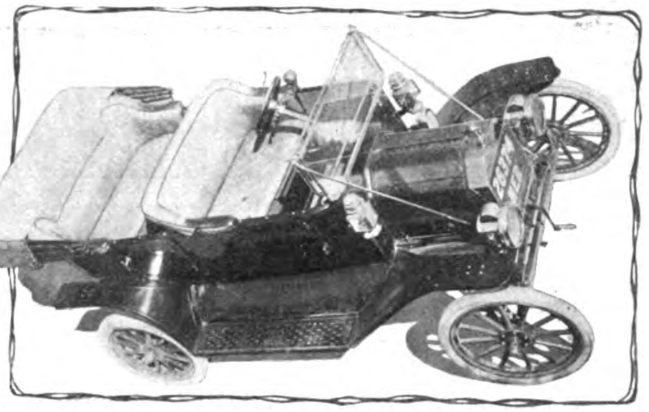


Fig. 6—Reynolds seat covers for Ford cars

Reynolds Seat Cover for Fords

To improve the appearance and to shield the seats of Ford cars against wear, the E. W. Reynolds Company, 713 South Fifteenth street, Omaha, Neb., has undertaken the manufacture of seat covers, Fig. 6. These covers are made of fine, dark brown material cut to fit any model T touring car.

Crary Gasoline Lock

A lock which is interposed in the gasoline line and which serves to shut off the flow of fuel from the tank to the carbureter, is made by the Crary Gasoline Lock Company. This device is illustrated in Figs. 8 and 9. It is a shut-off valve which has a turning play of about 90 degrees and is connected by a flexible shaft to the operating mechanism which may be installed in any suitable position on the dash or floor board. This control mechanism consists of a specially constructed Yale lock, Fig. 8. The valve itself is gas-tight and is said to absolutely prevent leakage of fuel or air. The device may be installed in any suitable position on the dash or floorboard of an automobile.

Holley Fuel Consumption Gauge

The amount of gasoline used per mile should be a point of interest to every automobilist, as it has a direct bearing upon his fuel bills. To enable automobilists to learn what amount of fuel is used by their motors for every mile, under various operating conditions, that is, on the level, on up or down grades, the Holley Brothers Company, Detroit, Mich., have developed the consumption indicator, Fig. 11. The latter consists of a narrow inverted funnel, supported by a frame which is secured to the car, and equipped with a glass gauge communicating with the interior of the funnel-shaped reservoir. In its use, the frame of the indicator is attached to a side-lamp bracket, or to any other suitable part of the dash, and the outlet of the tank which is controlled by a cock is connected to the gasoline supply pipe, while the line from the fuel tank is shut off. The tank is filled up until the floating ball in the standpipe disappears, after which the car is started and sped up to the velocity at which it is desired to make the test. When the ball becomes visible, the odometer is set to zero and the car is run, until the meter registers 1 mile. Now the motor is stopped and the amount of gasoline consumed noted on the indicator scale.

Azadian Line of Indicators

A line of various indicator gauges for use on automobiles are manufactured by the Azadian Gauge Manufacturing Company, Syracuse, N. Y. The line includes water, gasoline, oil, pressure and tires gauges, and a representative product is shown in Fig. 10, this being the Azadian tire gauge.

Burke Minimum-Work Tire Valve

The Burke Valve Company, Cleveland, O., manufactures the tire valve, Fig. 7, which is so constructed as to permit of easy inflation, without the exertion of waste effort. This waste effort, so-called, is the pressure necessary to unseat the ordinary tire valve by compressing the spring holding it to its seat. Assuming the spring pressure against the seat to be 40 pounds, it takes an effort of 40 pounds every time the spring is unseated; in other words, if an ordinary hand pump with a stroke of 1 foot is used for inflation and if a tire is filled with 100 strokes of this pump, 4,000 foot-pounds (.125 horsepower) of work must be spent in opening the valve to permit of all the necessary air being forced into the inner tube. The peculiar construction of the Burke valve is claimed to overcome this evil completely. As Fig. 7 shows, the valve consists of the stem S, which is threaded internally for the valve and externally for the dust cap. The valve mechanism proper consists of a stud V, one end of which is formed as the valve seat designed to retain the valve W. This valve is composed of a plunger, shaped as a piston with air passage through it, which has a reversible rubber valve R at its end; when the latter bears against the sharp edged end of the stud S, the valve is sealed against the internal tire pressure.

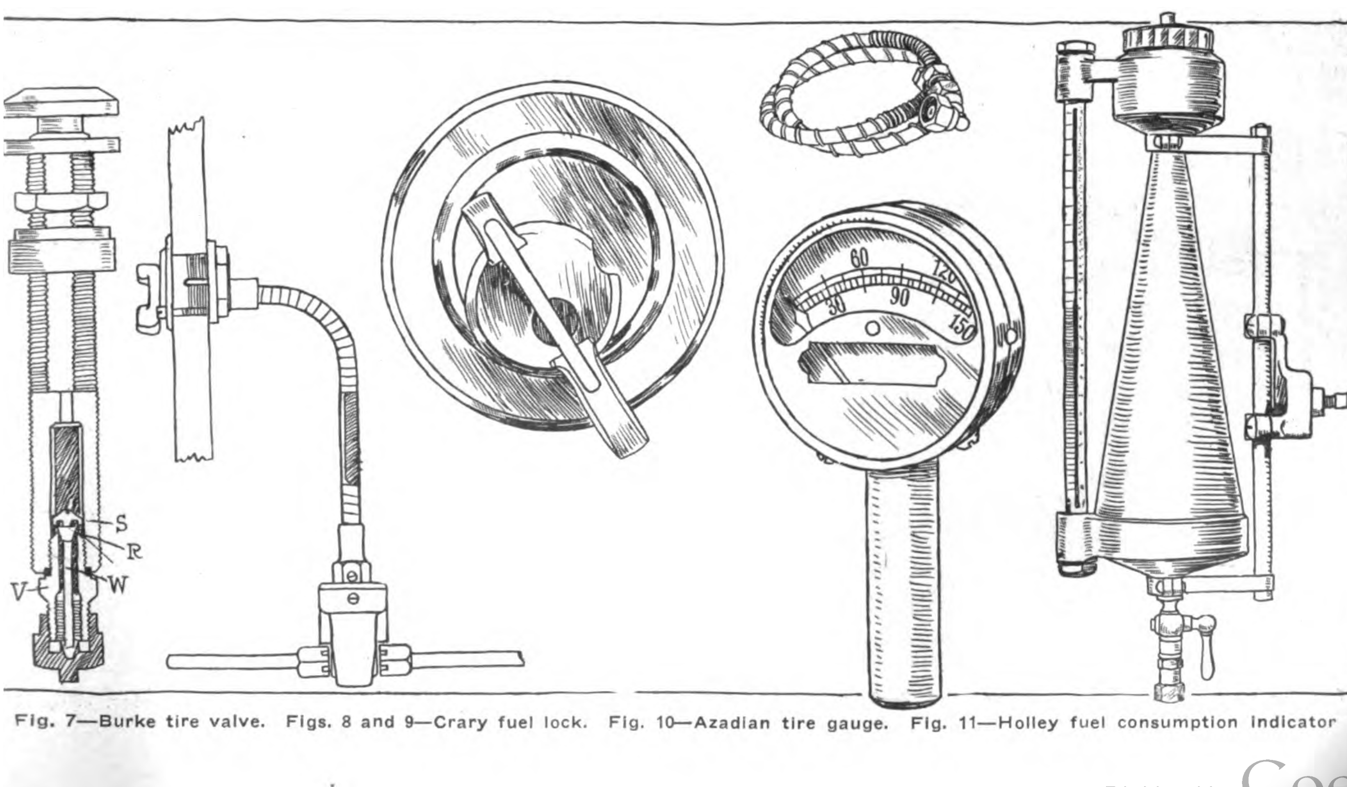


Fig. 7—Burke tire valve. Figs. 8 and 9—Crary fuel lock. Fig. 10—Azadian tire gauge. Fig. 11—Holley fuel consumption indicator

AUTOMOBILE SEARCHLIGHT—Having an auxiliary reflector which prevents the loss of light.

The patent refers to a construction as the one shown in Fig. 1, where a main parabolic reflecter R serves to produce a parallel beam of light. In front of the reflector is a burner B emitting the light which is concentrated by the reflector R. An auxiliary reflector R1 in axial alignment with R and positioned in front of B; this auxiliary reflector consists of a double convex lens L, the side remote from the burner being silvered so as to throw all the light it receives back upon R.

No. 1,044,252—to Henry Salesbury and Thomas Whitaker, London, Eng. Granted November 12, 1912; filed July 15, 1908.

Valve Truing Tool—Including a support permitting of free lateral motion.

The subject matter of this patent is a valve-truing device, Fig. 2, which consists of supporting means S for the extreme end of the valve stem, a tool T for grinding the beveled face of the valve and a support S1 for this tool which is formed with a passage P, permitting of free lateral motion of the valve.

No. 1,044,254—to Allan C. Sargent, Westford, Mass. Granted November 12, 1912; filed November 1, 1911.

Shock Absorber—Using an inflated bag in combination with a leaf spring suspension.

This patent refers to an automobile shock absorber which has an elliptical frame F, Fig. 4, including a number of hinged sections S, the adjacent ends E of which are reduced in width. Top and bottom stretches of the frame F are channeled longitudinally at their inner sides, and an inflated bag B positioned between the elliptical frame seats in the channeled portions of the same.

No. 1,043,820—to George S. Foster, Pueblo, Colo. Granted November 12, 1912; filed October 21, 1911.

Muffler Construction—Comprising a circuitous, open pipe, into which the exhaust pipe of the motor discharges and into which air is sucked from outside, thereby silencing the exhaust.

The subject matter of this patent, Fig. 3, is a muffler for internal-combustion motors constructed on a very simple principle. The waste gases leaving the motor by way of the exhaust pipe E are silenced by passing through the circuitous pipe P, which is of substantially equal cross section throughout its length and open at its ends P1 and P2. These open ends are in alignment and arranged with a gap between them; the outlet end E1 of the exhaust pipe E opens into the inlet end P1 of the pipe P, while the outlet end P2 of the latter opens somewhat in the rear of E1. In the wall of the circuitous pipe, inwardly opening check valves are provided which are not shown in Fig. 4, and which open in response to the vacuum created in P by the exhaust gases rushing through it. The mixture of the air and exhaust gases brings about the muffling of the latter.

No, 1,044,157—to Paul Fehde, Berlin, Germany. Granted November 12, 1912; filed July 5, 1911.

Internal-Combustion Motor—In which the valves are actuated from a rocker shaft mounted between two rows of cylinders served thereby.

The internal-combustion motor described in this patent, Fig. 5, comprises a crankcase in which a crankshaft is journaled, carrying connecting rods, the upper ends of which are fastened to pistons which travel in the cylinders C and C1. The latter are arranged in V-manner immediately above the crankcase, with an upwardly divergent gap between them. At the upper ends of the cylinders valve chambers V and V1 are formed, rigidly with C and C1, respectively. These chambers are in rigid relation to the cylinders and formed with seats and directly opposite openings O, which are closed by plugs. Between the inner walls of the valve chambers and the inner upper ends of the cylinders a valve-gear chamber G is formed; a camshaft S is journaled in the lower portion of G, and a rocker-arm shaft above it on which rocker arms A are mounted. Valves W and W1 engage the valve seats formed in the chambers V and V1, respectively, and their stems are engaged by the rocker arms A which operate the valves by a trip hammer motion.

No. 1,044,198—to Alphonse Joseph Lavoie, Outremont, Quebec, Can.. Granted November 12, 1912; filed August 21. 1911.

Hydraulic Clutch Construction—The rotor used in this mechanism is mounted eccentrically and is shaped with radial impelling blades.

The subject matter of this patent is a hydraulic clutch including a casing which forms a fluid chamber, the latter containing an eccentrically mounted rotary piston. Radial blades are slidably mounted in the piston, and project at opposite sides thereof, against which resilient rings are loosely fitted. These rings act on the projecting portions of the blades. A conduit is formed in the casing, adjacent to the principal chamber formed in it and connected to it at spaced points, the capacity of this conduit being variable by the operator of the device.

No. 1,043,617—to Horward L. Manley, Kansas City, Mo. Granted November 5, 1912; filed January 15, 1912.

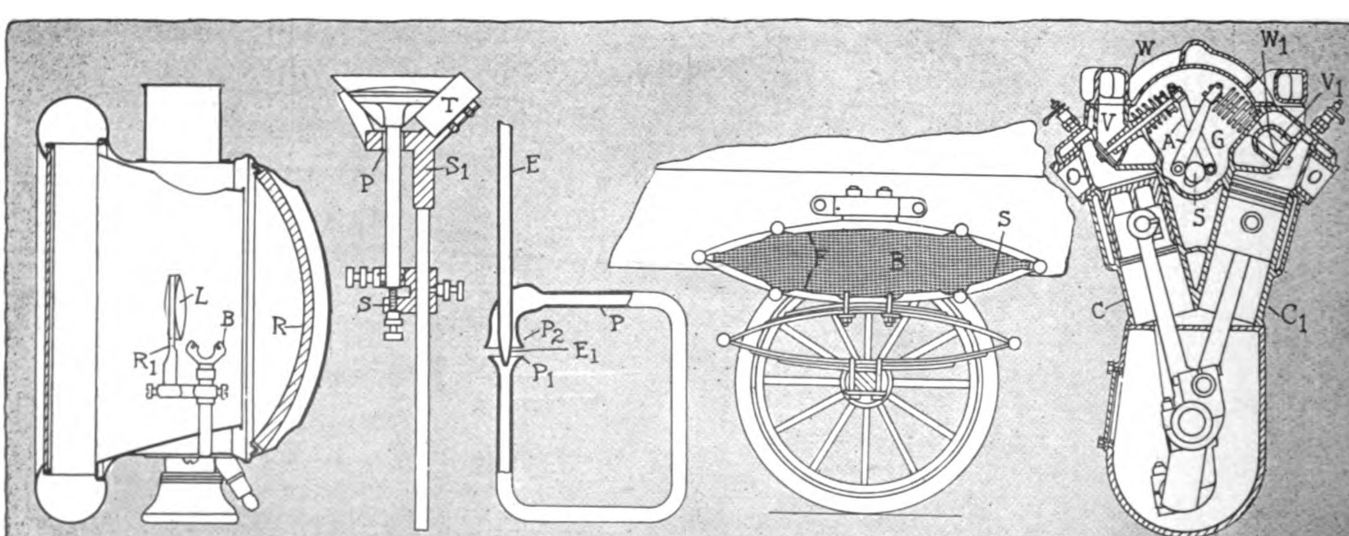


Fig. 1—Salesbury-Whitaker reflector. Fig. 2—Sargent valve tool. Fig. 3—Fehde muffler. Fig. 4—Foster shock absorber. Fig. 5—Lavoie V-type motor

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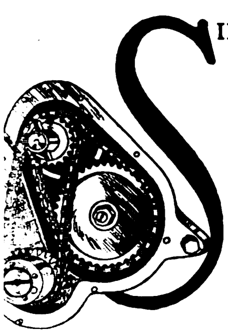
The AUTOMOBILE

Skillful Work Is Silencing American Motors and Chassis

Attention to Detail Is Eliminating Lost Motion, Gives Reduced Wear and Promotes Quietness—Rattling Accessories Are Among Noisy Nuisances

Working to Close Limits the Surest Cure in Many Cases—Cam Design of Utmost Importance—Use of Spiral Gears, Silent Chains, Etc., Increasing



SILENCE of action marks the ultimate refinement of a machine. Noiseless action once secured, it only remains necessary to use proper materials to perpetuate this condition. The steps made by American designers toward securing a quiet running motor have been particularly marked during the past few years and this advance has gone hand in hand with advances in metallurgy—the art of selecting the proper metal for the proper place. To the casual observer the noises issuing from the different parts of the car combine into one inharmonious whole, but to the trained ear the chorus is dissected and each component hiss, groan and squeak is assigned its proper place.

In the motor there are four prominent sources of noise: the valve action, timing gears, magneto drive and carureter. These parts can be segregated and treated separately. 'he noise of one has no bearing upon the noise of the ther.

In answer to the question, "What have you done to silence our valve action?" THE AUTOMOBILE received a series of nswers from the most prominent engineers throughout the ountry showing that, although the means differed, the earnest ttention of the engineering staffs was turned toward a study f this particular part of the motor.

The valve action of the poppet-valve motor can be sepaated into the cam, follower mechanism, tappet and valve.

The root of the noise evil in the valve action has been traced the cam. This presents a problem which engineers have not et reduced to such a point that they are unanimous upon the oint as to which is the best cam for all around use. There e two causes of cam noise, first, the striking of the side of the m against the follower, and, second, the striking of the folwer against the cam due to the fact that on the down stroke the valve at high speed the cam runs away from the folwer for a brief interval and then the latter strikes it with fficient impact to create a sharp tap. With a cam so designed at the follower never leaves it, it is evident that this noise dispears. At the same time, however, this means a slower

Fifteen Silence-Producing Points That Are Becoming General Practice

- Designing cams that give power with silence.
- Using helical gears in the timing set.
- Replacing gears by silent chain and sprockets.
- Inserting felt and fiber pads at contact points.
- Reducing clearance at valve tappet to .003 inch.
- Fitting cover plates over parts that are noisy.
- Using leather, springs and rigid keys in magneto drive.
- Limiting backlash in gearset from .001 to .003 inch.
- Employing aluminum and other non-resonant metals.
- Making gears solid to eliminate bell action.
- Putting accessible adjustments on rear axle.
- Using worm drive in place of bevel gears.
- Fitting spiral springs to compensate for wear.
- Firmly attaching lamps, horns and other accessories.

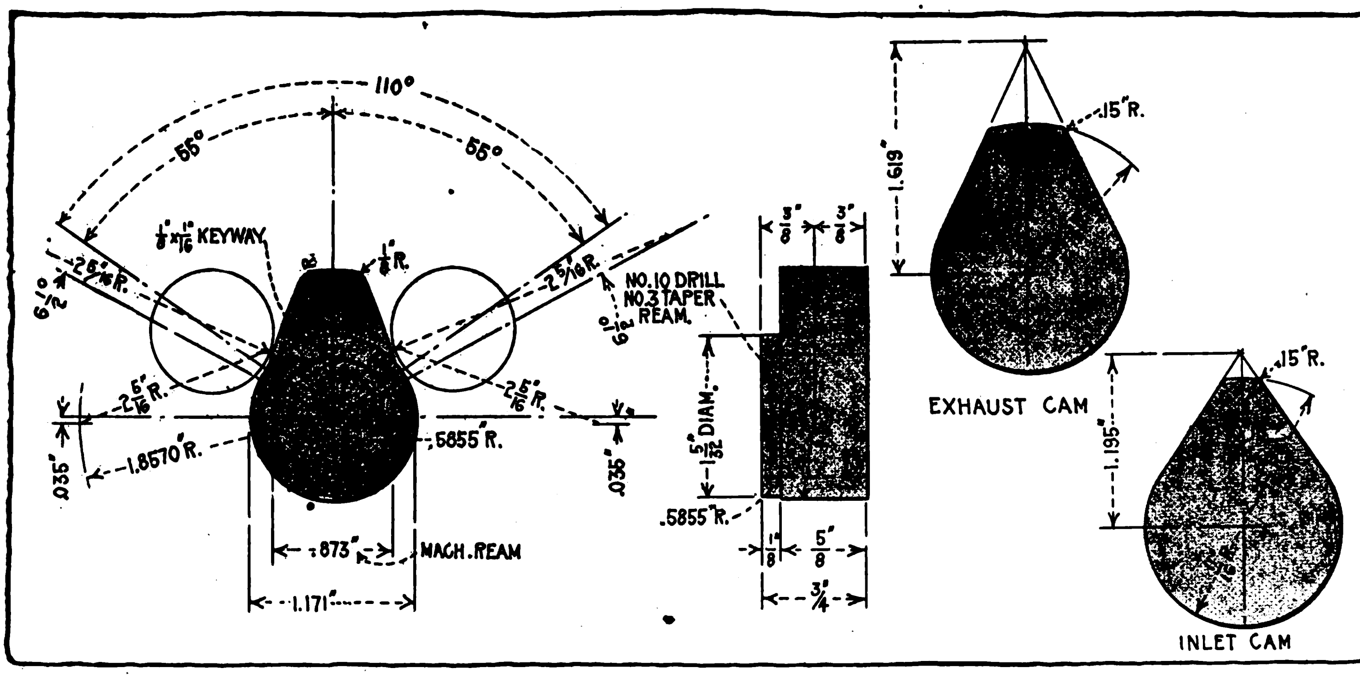


Fig. 1—Left, full working drawing of a straight-sided cam. Right, illustrating difference in intake and exhaust cams

movement of the valve and consequently an appreciable falling off on power. The maximum power is secured with the flat-sided cam giving quick opening, closing and—noise. One maker states, "Our touring cars are much more silent than our speedsters and racing cars because we are able to make a cam of more advantageous shape, the opening and closing of the valves not being as sudden." Another, who uses the cam design shown at the right of Fig. 4, states, "You will notice that there are no flat spots on the profile and hence, by keeping close to the limits, we are able to secure quietness in operation."

A study of Figs. 1 and 4 gives an idea as to general practice. Neglecting the variations in the shape of the cam due to the difference in valve timing of the different motors, the factors which determine the contour are the type of linkage used, the function of the valve, whether inlet or exhaust, the lift and diameter of the valve and their relationship, piston displacement per unit of time of the motor, and, it may be added, the purpose of the motor, although perhaps this latter is taken in with the others.

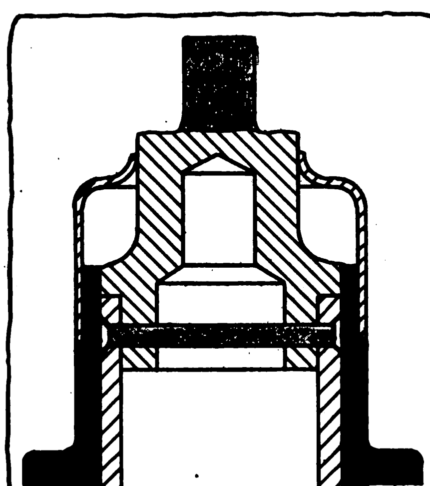


Fig. 2—Valve lifter; note light construction

Although all other parts of the valve mechanism may be interchangeable, the exhaust and inlet cams must be different. This may readily be perceived if the action of the exhaust gases is taken into consideration. There must be a sufficiently large opening of the valve when it is first released to allow the pressure to drop to atmospheric before the piston starts on its up, or true, exhaust stroke. If not there is a considerable loss of power. This means a sudden and quick opening of the exhaust valve and hence a steep cam. Note the contours of the exhaust cams in Fig. 1. These are examples of a quick opening. In comparison with this the enlarged exhaust cam in Fig. 4 may be studied. The tangent lines are drawn from the point at which the valve starts to open and are hence a measure of the slope of the cam at this point. The further away the intersection of these two is from the center of the cam, the earlier the opening.

It is evident that a flat-sided cam, such as that shown in Fig. 1, will give a quicker opening than the rounded cam shown in Fig. 4. It is also evident that the noise which accompanies the overcoming of the inertia of the valves and linkage will be greater with this flat-sided cam because the clearance is taken up more suddenly. The two cams in Fig. 4 have been enlarged to show the relation between the cam contour and the clearance which is laid out in the dotted circle surrounding the cams. When the cam comes into action, the distance between the surface of the cam and the clearance circle will be zero. For the sake of simplicity, let the clearance as outlined in the clearance circle, Fig. 4, represent all the clearance in the mechanism. That is, between the cam and follower, as well as in the component linkage. Supposing for the moment that the side of the cam is absolutely flat, as is the case in racing cars, where noise is no objection and power the object. The impact of the cam on the follower is resisted by the weight W of the whole valve action as well as by the pressure P of the gases within the cylinder upon the valve head and the tension of the valve springs. The factors W and P are referred to later.

This shows the tremendous hammering effect produced by the flat or straight-sided cam. Taking the force of the blow as even 10 pounds, however, it can be readily perceived that the noise of a metal-to-metal contact at any speed would be considerable. This neglects such features as bad adjustments between stem and tappet, etc. It is a question of power versus silence.

Before leaving the subject of cams, one more cause of cam noise should be considered. It is just as important to have a quick closing as opening. The valve cannot be closed any more quickly than the spring can act. If the cam runs away from the follower when the valve begins to close, the follower will impinge upon the cam immediately afterwards giving a hammer blow which is a noise producer. This is a question of cam and spring design. The springs must be heavy enough to keep the follower on the cam, the cams must be of such design that they do not necessitate too heavy a spring to keep the followers upon them and finally the springs cannot be so heavy that they consume too much power and necessitate too much energy in lifting them. The latter fact is of particular importance in that it is a distinct factor in the noise and hammer effect in the opening of the valve.

Engineers and designers are trying to get the power-giving cam and silence at the same time by using non-vibrating and cushioning materials. Fiber lends itself to this purpose with more success than most other materials, although the use of felt washers between contact points has had considerable success and is a growing practice.

So far no mention has been made of friction in the valve mechanism itself. Friction is important because it is an indirect cause of increased noise. It increases the factor W in the impact formula. Friction depends upon three things: First, area of contact; second, quantity and quality of lubrication; third, pressure between bearing surfaces. Taking these up separately the area of surface contact may be first mentioned. Friction is included in the factor W and directly affects the inertia.

Actual contact will only exist between the lifter and guides and the valve stem and guides. Other contact than this can be neglected. Taking the valve lifter, for instance, a general type of which will be seen in Fig. 2, the first consideration is that there must be sufficient bearing surface to take care of the side thrust due to the side component of the thrust delivered by the cam to the lifter when the cam acts directly upon it. When the thrust is delivered through a follower and other linkage the side thrust is practically eliminated, although other factors enter. Oil leakage is also to be guarded against and a long guide aids in this. The illustration represents general practice. The length of the valve stem guide must be sufficient to prevent leakage and must be arranged so as to be adequately cooled to prevent sticking.

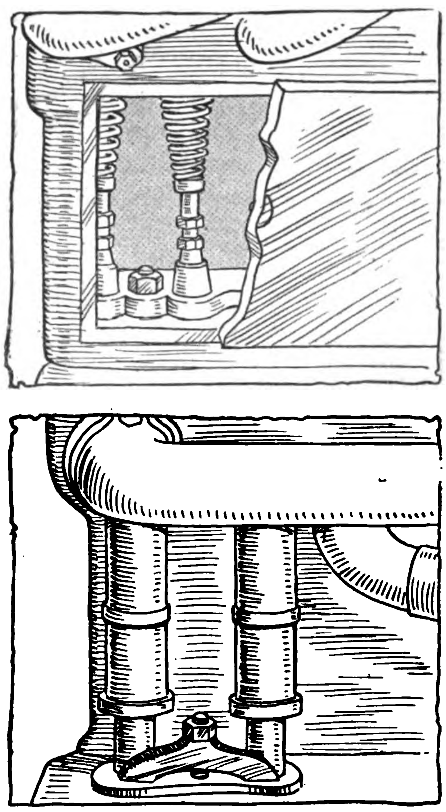


Fig. 3—Upper, cover plate for two valves. Lower, independent cover tubes

Lubrication of the followers will present no difficulty. Indeed, the trouble will be the other way, as there is a marked tendency for the oil to leak through the guides and down the side of the crankcase. Fig. 2 shows the light metal cap generally used to guard against this.

Pressure between bearing surfaces is due in the case of the following mechanism and in the tappet guides by side thrust and by the weight of the parts. All parts of the valve mechanism should be as light as possible. The principal reason for this, however, is to cut down the factor W in the equation for inertia mentioned above.

Admitting that a certain amount of noise throughout the valve action in the poppet type is a necessity, it is interesting to note what means are taken to render the sound inaudible to a person sitting in the car. Fig. 3 shows two methods of inclosing the valves. The upper illustrations show a method that is growing in favor. It is, in fact, an individual housing over each spring and tappet. The lower illustration shows the more popular form of housing. This is a complete housing for the entire side of the motor, or, where the cylinders are cast in pairs, the housing extends over each pair of cylinders. Aluminum or other non-resonant material is used here.

What used to be a prolific source of noise are the timing gears. Spur gears which do not mesh as well as they should produce a grinding hum that stands out

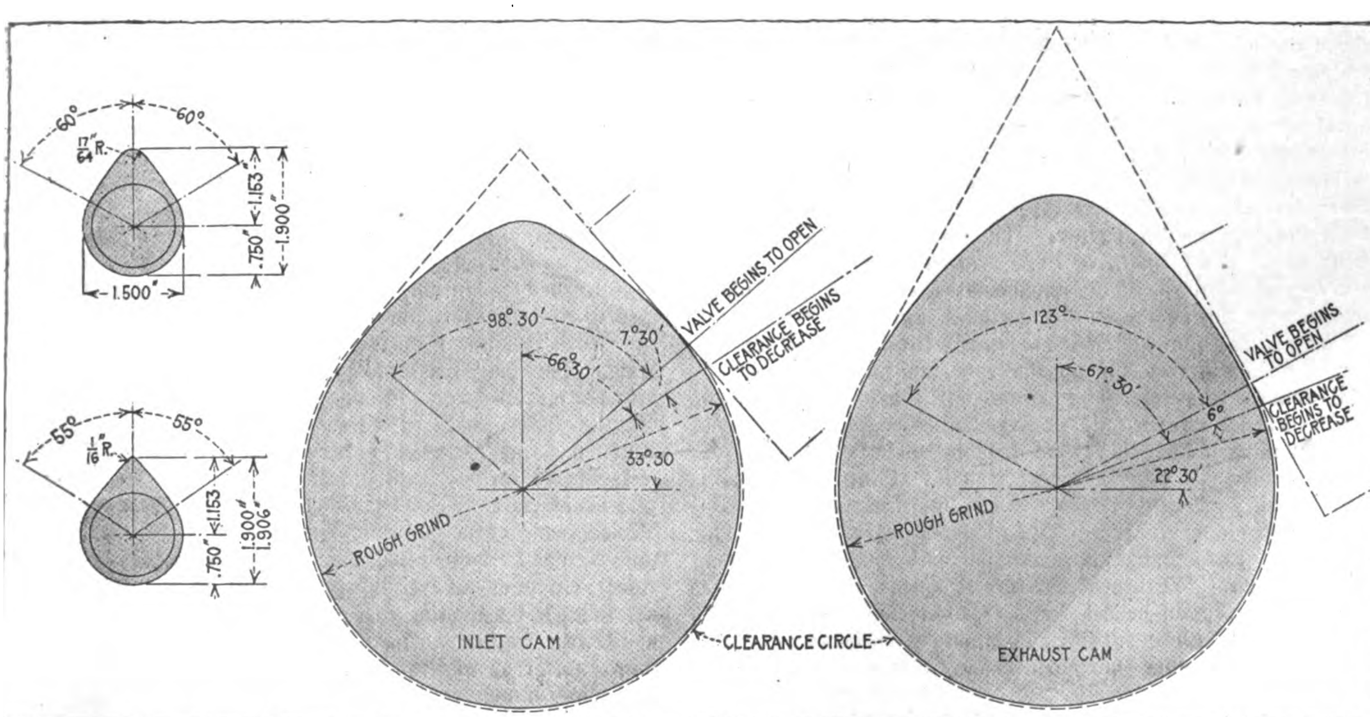


Fig. 4—Left, curved exhaust and inlet cams. Right, enlarged view of cams, showing clearance circles

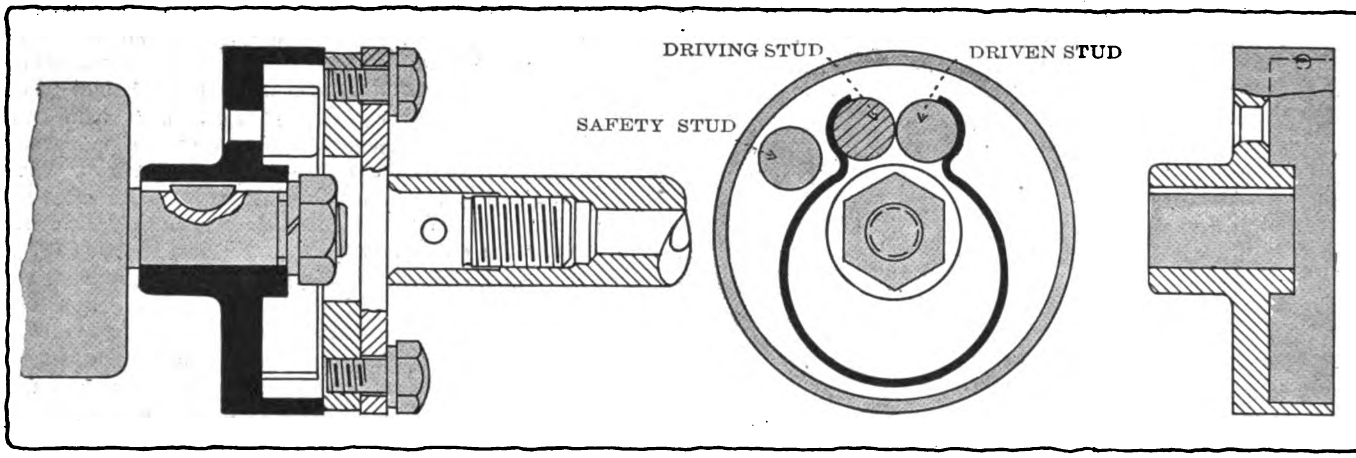


Fig. 5—Side and transverse sections of spring magneto drive and a side section through feather type

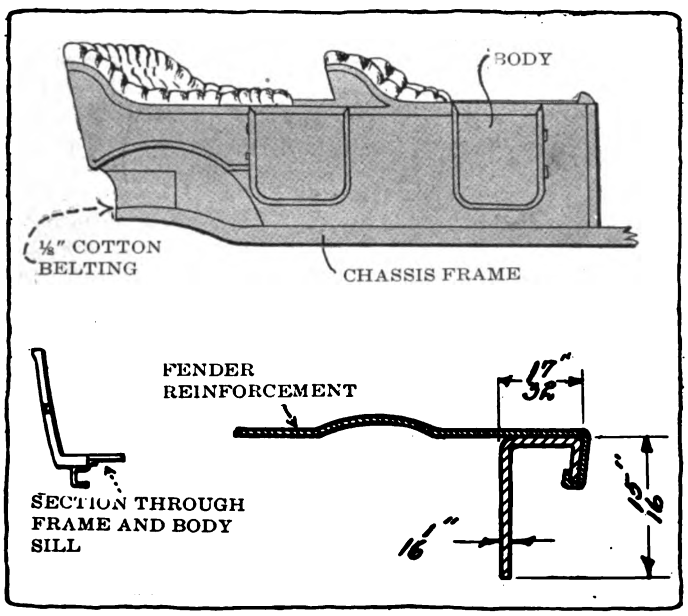


Fig. 6—Means taken to eliminate body and fender squeaks

above the other noises as black against white. Three methods are now used to overcome noise in this part of the mechanism: Improved methods of manufacture of spur gears, the use of spiral gears and silent chains. It may be stated here in reference to the improved methods of gear manufacturing that owing to the competition of the silent chain and the spiral gear and other devices the manufacturers have been compelled to focus their attention on this matter. The result is that they are all grinding to closer limits or have changed over to the helical gears or chain drive. The statements of some of the leading engineers on this subject in response to a canvass by THE AUTOMOBILE are as follows: "We are using helical gears which are almost noiseless even though they are not meshed properly." "All timing gears are cut twice and any that vary more than .00025 inch are thrown out." Several other engineers gave this as the limit to which they were grinding their timing gears of the spur type. Another engineer stated that the timing gears used by his concern were made silent by "using a steep angle spiral and holding the eccentricity of gears below .001 inch and fitting the gears so that the maximum back lash is .003 inch." Another states, "We use a cast iron against a steel gear, both of which are cut in helical shape." Other engineers state that they limit back lash to .001 inch; maintain center distances to .001 inch; and many other statements tending to show that the care in manufacture has increased. In one case the engineer of a large factory claimed that he was obliged to adopt a gear of not greater than 15 degrees angle of spiral with 10 pitch on account of an electric starter which operated through them. In his opinion, however, the 29-degree spiral was much more silent.

The engineer of a concern using a chain-driven timing set states that they were obliged to adopt a chain larger than that recommended by chain manufacturers for the reason that the smaller sizes would not stand up under a heavy load. To further produce silence with these chains they are using a composite fiber sprocket for the magneto gear to reduce the hum.

The above shows that in many cases it is a question of improved manufacture rather than changed design. The old type of motor with its ill-fitting pistons, rings and bearings was noisy and would not stand up because there was too much lost motion. The tendency towards cutting down the limits of tolerance was greater during the past year than ever. The cry for close grinding work from the engineer was responded to by the workman and tool maker to a remarkable degree. Ringing gears are becoming unknown. The solid gear eliminates the bell action of the lighter designs and cures another source of noise.

Many magneto couplings are noisy. The old style of Oldham coupling was particularly troublesome in this respect, starting to rattle as soon as a small amount of play developed. The magneto drive of today is through a coupling which compensates for the lost motion as soon as it occurs, in other words, the drive is through a spring. For the sake of illustration a detailed drawing of one form of magneto coupling is shown in Fig. 5. As may be seen from the lettered view, the drive is through studs. The spring, shown in black, holds the driving stud against the driven stud in spite of any wear that could occur between these two studs. The safety stud is to take care of the coupling in case of any breakage of the spring. The side section is shown to the left of Fig. 5. As may be seen, the drive is taken up by the magneto through a No. 3 Woodruff key furnished on the magneto shaft. A simple form of keyed magneto connection is shown in part section at the right end of Fig. 5. A prominent magneto concern uses a laminated flat spring. The drive is directly through this spring, which is located transversely on the end of the drive shaft, and engages with the driven shaft by means of a slot through which the laminated spring passes. The flexibility is thus gained through the laminated spring. Leather couplings are also used and give great satisfaction. They have met with great favor in Europe.

Noises which emanate from the gearset are prevented in the same manner as those which exist in the timing gears, with the evident exception of spiral gears. The use of non-resonant materials for the housing is a particularly valuable feature here, but the true way of curing noisy gears is by working to closer limits. Accuracy of gear cutting is one of the first requisites of a quiet-running motor. The rear axle is the same. Where the limit formerly was .002 inch it has been reduced to .00025 inch in many of the best factories. It is a significant fact that evel-gear rear axles became noticeably more quiet as soon as ıe worm drive began to make itself felt as an important con- ːnder on account of its silence. It has been the same story ver again of the valves. When the sleeve-valve motor began) cut such a wide swath in the industry immediately the pop- et-valve makers fought back with the same weapon—silence.

Noise in the gearset is generally found on the first and re- erse speeds. This is natural owing to the larger number of ːeth in engagement and hence for the greatly increased chance f back lash. Noise in the rear axle is not so apt to be apparent ·hen the car is new as after it has been run for about a month. : is then that the noise which was at first concealed perhaps by heavy packing of grease begins to make itself felt. In order) get away from this makers are preparing tests on the rear xles which bring out every weak point. One maker says, "Our ːar axles are coupled to a dynamometer and driven by means f an electric motor for a considerable time before being placed ı the car. They must pass inspection for silence before being ːcepted." The testing room is the greatest factor in securing lence there is. Its power of accepting and rejecting should be ıd is absolute in a large factory.

Spring leaves and bolts should receive more than the modi- ım of attention that is sometimes the case. The fitting and brication of the bolts has received special attention in one fac- ıry where they have fitted a wick within the bolt. The oil is ːd to the bearing surface by capillary attraction and it is aimed that one filling will last for 1,000 miles. Integral grease ıps, etc., are old institutions, but are still being fitted to care- ılly designed cars. In connection with remarks on spring ›lts it may be said in passing that there are makers who be- ːve that spring bolts, built as specified by S. A. E. standards, ·e too tight to permit of good lubrication and hence give rise) squeaks.

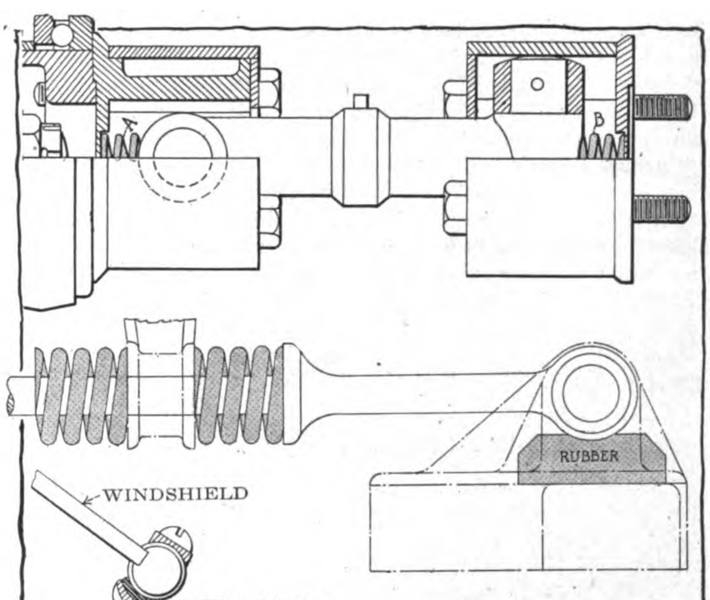
Chattering brakes are not as common as they were at one me. The customary attaching of drag springs to keep the ıoes free of the drums under running conditions is sat- factory. It may be stated that the linkage is noisy at times, ɔwever, and this is prevented in many cases by the intro- ıction of spiral springs which take up the rattle.

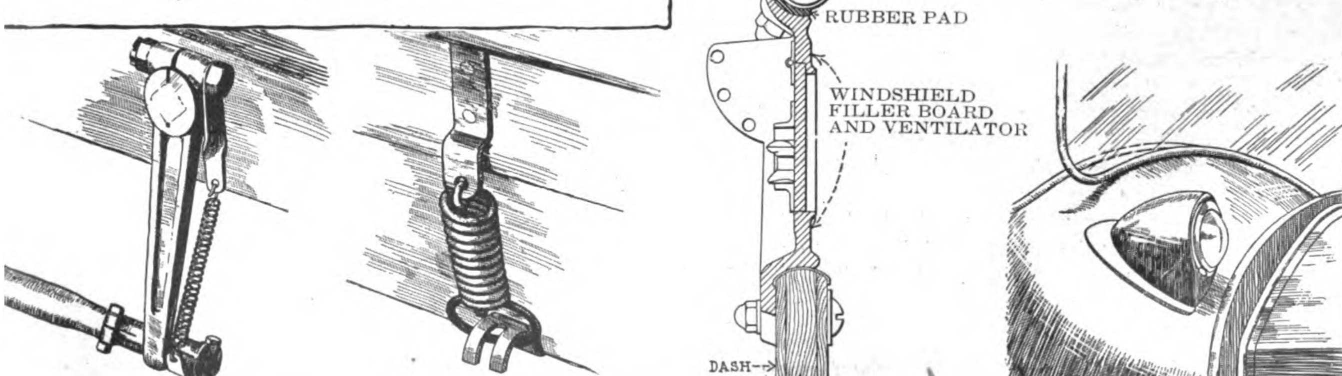
Probably more rattle issues from the miscellaneous gear ɔout the car than from the motor and running gear put to- ether. The sketches in Fig. 7 show some of the ingenious ıethods in use to suppress these rattles. At the top right is ıown at A and B the two coil springs fitted in the floating ıember of the universal joint. This construction does not ıtail much expense and certainly makes for silent running. he same car is fitted with a rubber block in connection with ıe torsion lever bumper link; this is shown just below the niversal joint floating member. Rattling drag links are ɔmmon after a car has been run more than 10,000 miles. 'ne maker gets away from this by putting in a spiral spring, ; shown at the left end of Fig. 7. Adjoining this sketch is nother showing the use of a spiral spring which will elimi- ate the rattle of the bottom pan very effectually.

A particularly frequent source of noise is to be found in the fitting of windshields. These are often fitted by two or three brass clips which hold them to the dash. The clips are sure to work loose after a time and the result is that the windshield is free to move over the dash, creating a squeak which is distinctly audible. The attachment shown in Fig. 7 with a rubber pad between the dash and the shield silences one source of squeak effectually, while the other source, between the dash and the shield, is prevented by lapping the filler board over the dash. Lamps can make a very disagreeable rattle, but not when fitted into the top of the dash cowl, as shown in the lower right corner of Fig. 7.

All the squeaks issuing from the poor mounting of accessories such as horns, speedometers, lamps, license plates, trunk racks, tire brackets, etc., cannot be compared to the squeak which will issue from a badly mounted body. The use of a layer of anti-squeak material between the frame members and the body is universal. This is placed as indicated in Fig. 6. It generally consists of woven cotton belting or sometimes rubber or felt. A tight connection between the body and frame is naturally imperative for other reasons than silence. Reinforcements throughout, however, are good noise preventers and not the least of these is the fender reinforcement as shown in Fig. 6. Where it is not a case of silence versus power, as it is in many parts of the car as pointed out, good workmanship is the answer.

THE AUTOMOBILE wishes to extend its thanks to the many prominent engineers who have kindly furnished information showing the present practice in their respective plants and the means employed in approaching the problem of silence both in its entirety and in detail.





g. 7—Top, springs A and B in floating member of universal joint, torsion bumper rod. Bottom, left to right, spring fitted to drag link, spring bottom pan holder, padded windshield connection, non-rattling lamp

Flanders Named As Head

Receivers of U. S. Motor Co. Announce New Manager of All the Properties Emerging From Bankruptcy

Another Spark Plug Suit—W. C. P. Settlement Approved —Grabowsky Company Bankrupt—Other Trade News

ANNOUNCEMENT made Tuesday by Robert Walker and W. E. S. Strong, receivers for the United States Motor Company, makes public the appointment of Walter E. Flanders as manager of the company and its five factory subsidiaries for the receivers and W. F. McGuire as assistant manager. They will have authority over all departments of the company except the auditing, accounting and treasury, which will be operated for the present by the incumbent forces.

For various reasons there has been considerable delay in getting started on the manufacturing schedule of the Maxwell plants but the receivers have just announced that the preliminary work has been concluded and that the flotation of the $1,500,000 of receivers' certificates will be undertaken shortly. It was found that another inspection of the plants had to be made and this served to delay proceedings.

Practically 96 per cent. of the claims against the company have been filed with the designated depositary and the time for depositing stocks has been extended until December 15, when it is expected that about 60 per cent. will have been impounded.

The course of the procedure has not all been smooth, however. Suit has been entered against the company in the New Jersey branch of the United States District Court on behalf of three creditors whose claims aggregate about $5,000. The grounds for the action apparently are that the New York suit is invalid because the complainant company, the Brown & Sharpe Manufacturing Company is a Rhode Island Corporation and the United States Motor Company has its legal existence in New Jersey. The apparent theory of the complainants in this case is based upon the same assumption as was the demurrer to the court's jurisdiction which was informally filed in the New York suit. Judge Hough disposed of the claim by stating from the bench that in his opinion, he did have jurisdiction. Whether or not there is any element of contempt of court in the New Jersey suit is a question that has stirred up considerable interest in New York.

Spark Plug Repairs To Be Tested

Suit has been entered in the United States District Court by the Rajah Auto Supply Company against the American Auto Supply Company charging infringement of the Mills patent 825,856, covering porcelain spark-plugs. While the patent itself forms the basis of the suit, the main contention is that the defendant company made a practice of advertising and selling the porcelain parts of spark-plugs with which to repair Rajah plugs.

The suit raises an interesting point of law somewhat similar but much more limited in its scope than the point involved in the famous Dick Mimeograph case. The Rajah people claim that under their patent they have the right to insist on repairing their own plugs, using a patented material. In the Dick case the Supreme Court held that the patentee had the right to control the use of unpatented material with the patented device. Newell and Neal represent the Rajah party.

Court Approves W. C. P. Settlement

Following favorable action by the creditors of Wyckoff, Church and Partridge, Inc., the United States District Court has issued an order approving the sale of the assets of the embarrassed corporation to Chester Griswold, Howard C. Dickinson and George W. Ellis. The assets will be turned over to the committee on Saturday. The creditors receive $150,000 in cash in addition to certain credits that have been marshaled by the receiver, John S. Sheppard, Jr., which amount to between $20,000 and $30,000. All told the settlement means something over 27 cents on the dollar.

The claim against the Driggs-Seabury Ordnance Corporation and the counterclaim of that company together with the property of Wyckoff, Church and Partridge, Inc., held by the Driggs-Seabury company are not considered in the settlement. The attornews who have handled the matter state that the elements of the controversy will approximately balance.

A corporation to continue the business is in process of formation and its details will be announced subsequent to the actual consummation of the court action.

John S. Sheppard, Jr., has been named as trustee for the creditors.

Grabowsky Company Bankrupt

DETROIT, MICH., Nov. 25—The Grabowsky Power Wagon Company was adjudicated a bankrupt by Judge Tuttle, in the United States District Court on November 22. The concern will be operated by the receiver, the Federal Trust Company, until December 5, when a meeting of the creditors will take place, at which bids for the plant and equipment will be considered.

Receiver Named for Poss Company

DETROIT, MICH., Nov. 25—Affairs of the Poss Motor Company were brought to a head last week with the filing of a petition in the United States District Court before Judge Tuttle by the

Automobile Securities Quotations

THE stock market was strong again last week with Goodyear's continued advance the feature. This stock shot up $38 a share on a few bids and fewer sales, making another new mark at 450. Firestone also showed great strength, being marked up 5 points over last week's level. Goodrich declined a point on the New York Stock Exchange and the other tire companies were steady.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajab-Grieb Rubber Co., com	..	..	180	191
Ajax-Grieb Rubber Co., pfd	..	..	100	104
Aluminum Castings Co., pfd	..	..	100	102
American Locomotive Co., com	36	36½	46	46½
American Locomotive Co., pfd	106½	107	103	103½
Chalmers Motor Company	..	..	125	145
Consolidated Rubber Tire Co., com	7	11	11	14
Consolidated Rubber Tire Co., pfd	10	20	50	60
Firestone Tire & Rubber Co., com	175	180	290	295
Firestone Tire & Rubber Co., pfd	107	109	105½	107
Garford Company, preferred	..	..	99	100
General Motors Company, com	37½	38½	37	38
General Motors Company, pfd	77	79	79	79½
B. F. Goodrich Company, com	*240	*245	70	70½
B. F. Goodrich Company, pfd	*118½	*119½	106¾	107¼
Goodyear Tire & Rubber Co., com	230	240	450	455
Goodyear Tire & Rubber Co., pfd	104	106½	104½	105½
Hayes Manufacturing Company	..	..	..	90
International Motor Co., com	..	..	20½	22½
International Motor Co., pfd	..	..	74	78
Lozier Motor Company	..	..	..	45
Miller Rubber Company	..	..	143	147
Packard Motor Company, pfd	104½	106	105½	107½
Peerless Motor Company	..	..	115	120
Pope Manufacturing Co., com	40	45	27	29
Pope Manufacturing Co., pfd	66	70	70	72
Reo Motor Truck Company	8	10	8¾	9½
Reo Motor Car Company	23	25	19½	21½
Studebaker Company, common	..	..	42	43½
Studebaker Company, preferred	..	..	94	96
Swinehart Tire Company	..	..	99	101
Rubber Goods Mfg. Company, com	85	95	100	..
Rubber Goods Mfg. Company, pfd	100	105	105	108
U. S. Motor Company, com	*17	*19	8	10
U. S. Motor Company, pfd	*62	*64	‡30	‡35
U. S Motor Company, 1st preferred	..	..	65	70
White Company, preferred	..	..	105	108

*Old. ‡Second preferred.

Detroit Foundry Company and several other creditors, to have the Poss concern adjudicated a bankrupt. E. H. Rogers was appointed receiver, and the case referred to Lee E. Joslyn.

It is claimed by the petitioners that the Poss company is insolvent and that the plant has not been in operation for the past 3 or 4 months. It is further claimed that a number of judgments have been filed against the concern.

The Poss Motor Company will contest the granting of the petition when it comes up in court again within 2 weeks, on the ground that with the help of the major creditors' committee which is now engaged with its affairs, it can be set on its feet. Reorganization plans are at present under way. It is stated that $150,000 new capital is needed and that half of this amount was in sight when the petition was filed by the minority creditors.

It is further contended that the truck is a good one and can be sold as fast as manufactured, and that additional capital is what is needed to make the concern a paying proposition.

Durant Heads Chevrolet Company

DETROIT, MICH., Nov. 25—The following officers were elected at a recent meeting here of the board of directors of the Chevrolet Motor Company, Flint, Mich.: W. C. Durant, president; J. D. Port, vice-president; W. H. Little, second vice-president; Dr. E. R. Campbell, treasurer; C. R. Hathaway, secretary; W. M. Murphy, assistant secretary.

Daimler Import Assets Very Small

Schedules in bankruptcy of the Daimler Import Company show liabilities of $67,261 and assets of $4,626.. The latter consist of an automobile, spare parts, accounts and a bond for $2,000. The liabilities consist of claims by Lawrence F. Braine and the New Netherlands Bank, H. A. Content and others.

Market Changes of the Week

FEW changes took place in the markets last week. Antimony, Bessemer steel, copper electric, lead and scrap rubber had changes. Antimony dropped $.00 1-8 on Thursday, closing at $.08 7-8. Bessemer steel dropped $.50 on Monday, due to poor trading, closing at $27.50 per ton. Copper electric suffered a material change of $.00 1-10. Lead dropped $.10 on Thursday, closing on Monday at $4.50 per 100 pounds. Tire scrap declined on Thursday $.00 1-8 and remained at that figure throughout the rest of the week, closing at $.09 7-8. Copper lake, open-hearth steel, petroleum, and tin remained constant. In the chemical market sulphuric acid and cyanide potash remained at their old figures of $.99 and $.19 respectively. Gasoline, linseed oil, rapeseed oil and lard oil offered no material changes in prices, closing at $.21, $.52, $.73, and $.96 respectively.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Week's Change
Antimony, per lb.......	.09	.08⅞	.08⅞	.08⅞	.07⅞	—.00⅛
Beams and Channels, 100 lbs...............	1.61	1.61	1.61	1.61	1.61	....
Bessemer Steel, ton.....	28.00	28.00	28.00	28.00	27.50	—.50
Copper E'ec., lb.......	.17½	.17 9/20	.17⅜	.17⅜	.17⅜	—.00 1/10
Copper Lake, lb........	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	....
Cottonseed Oil, Nov., bbl.	6.03	6.17	6.17	6.17	6.17	+.14
Cyanide Potash, lb......	.19	.19	.19	.19	.19	....
Fish Oil (Menhaden)...	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals. @....	.21	.21	.21	.21	.21	....
Lard Oil, pr'me........	.96	.96	.96	.96	.96	....
Lead, 100 lbs..........	4.60	4.50	4.50	4.50	4.50	—.10
Linseed Oil............	.52	.52	.52	.52	.52	....
Open-Hearth Steel, ton..	28.00	28.00	28.00	28.00	28.00	....
Petroleum, bbl., Kansas, crude.......	.73	.73	.73	.73	.73	....
Petroleum, bbl., Pa., crude...........	1.80	1.85	1.85	1.85	1.85	....
Rapeseed Oil, refined...	.73	.73	.73	.73	.73	....
Silk, raw Ital..........	....	4.40	....	....	4.37½	—.02½
Silk, raw Japan.........	....	3.90	....	....	3.90	....
Sulphuric Acid, 60 Beaumé	.99	.99	.99	.99	.99	....
Tin, 100 lbs...........	4.95	4.95	4.95	4.95	4.95	....
Tire Scrap............	.09¾	.09⅞	.09⅞	.09⅞	.09⅞	—.00⅛

Huber Case in Spotlight

Patent Trial Interests Detroit Industry—Packard Adds Three More Buildings To Its Factory Plant

Five Manufacturing Companies Announce Changes and Promotions Affecting Their Department Heads

DETROIT, MICH., Nov. 25—Preparations for taking testimony in the Emil Huber three-point suspension patent case brought by the North American Vehicle Company, owner of the patent, against the Detroit Taxicab and Transfer Company, which is being defended by the Kelly Motor Truck Company, maker of the trucks operated by the Taxicab concern, are now under way. R. A. Parker, attorney for the plaintiff, states that in all probability the case will be begun in about 2 weeks, or as soon as the models which he is having prepared are completed. It will come before Judge Tuttle in the United States District Court in this city.

Changes in Michigan Factories

DETROIT, MICH., Nov. 25—The past week has seen a number of changes among the department heads of various Michigan factories. Among the more prominent are the following:

E. A. Nelson, chief engineer of the Hupp Motor Car Company, has resigned that position to take up consulting work. His position will be taken by his former assistant, F. E. Watts, while D. T. Hastings, formerly with the Packard company, will assume the duties of assistant engineer.

The Cass Motor Truck Company, Port Huron, Mich., has engaged E. J. Farkas, formerly chief engineer of the Cartercar Company, Pontiac, Mich., as consulting engineer. He is at present engaged in developing a line of trucks for the concern.

J. J. Ramsey has become vice-president and treasurer of the A. C. Knapp company, body makers. Mr. Knapp's former connection was with the E. R. Thomas Company, Buffalo, of which he was secretary and treasurer.

The Olds Motor Works, Lansing, Mich., now has E. R. Van Linden as its factory manager, G. D. Baker, who formerly held that position, having resigned to become manager of the Diesel Engine plant, Ghent, Belgium. Mr. Van Linden held a similar position with the Buick plant No. 1, at Flint, Mich.

The Flanders Motor Company has added W. F. McGuire to its staff as production manager. Owing to ill health Mr. McGuire resigned last spring from a similar position with the Ford Motor Company.

Packard Adds Three New Buildings

DETROIT, MICH., Nov. 25—The Packard Motor Car Company has enlarged its factory plant to the extent of three new buildings which are now in the course of construction. They are to be entirely of steel, concrete and glass and are in line with the company's policy of shop units. The Packard company already has 37 acres of floor space, and these new buildings, which bring the number up to thirty-three, will swell the acreage to about forty. About 7,000 men are at present employed at the plant, the weekly pay-roll amounting to about $500,000.

DETROIT, MICH., Nov. 23—The Gearless Differential Company has been incorporated with a capital stock of $20,000 to manufacture a patented differential device which is claimed to do away with gears for this part of the rear axle. A system of ratchets and rollers is employed. The incorporators are: Frank Howarth, G. D. Bailey and W. N. Trudean.

Warren Board Is Enlarged

Directors' Committee to Consist of Nine Members—First Solid Tire in West Built at St. Louis

Ohio Answers Insolvency Suit—Foreign Trade Will Pass $4,000,000,000-Mark Before the Year Ends

DETROIT, MICH., Nov. 25—At a meeting of the directors of the Warren Motor Car Company, several changes were made in the personnel of the concern. Homer Warren was re-elected president; C. R. Wilson was made vice-president; F. T. Lewis, secretary, and L. M. Hamlin, treasurer. R. W. Allen, formerly secretary of the organization was made general manager and assistant secretary and treasurer.

Under the reorganization, the directors' committee consists of nine as follows: Homer Warren, C. L. Wilson, C. H. Wilson, H. H. Bassett, S. G. Jencks, F. T. Lewis, John Mowe, G. Jahn and L. M. Hamlin. This committee is at present working on a trust agreement which will be submitted to those interested about the first of December.

First Solid Tire Built in West

ST. LOUIS, Nov. 25—The St. Louis Tire and Rubber Company, which was organized recently in this city turned out the first solid tire Saturday. This is the first solid rubber automobile tire to be made west of the Mississippi River.

J. A. Swinehart, who is vice-president and general manager of the new firm, stated that the company obtained possession of the building November 6, broke ground for the engine on the same day, unloaded all the machinery from the cars, placed same in running order and turned out a tire in 17 days.

Mr. Swinehart stated that there is no foundation for the report that the St. Louis concern is a branch of the Swinehart Company, of Akron.

Ohio Answers Insolvency Suit

CINCINNATI, O., Nov. 25—The Ohio Motor Car Company, against which the Eisemann Magneto Company and other creditors brought proceedings in involuntary bankruptcy a few weeks ago, has filed its answer denying that it is insolvent or that it has committed any act of bankruptcy as charged. A demand is made for a hearing before a jury. President C. F. Pratt, upon the authority of the board of directors, made the answer. Great efforts are being made to reinforce the Cathage plant. It is thought that the bankruptcy matter will be cleaned up the same as it was 2 years ago. According to a rumor, West Virginia capitalists have offered $600,000 for the plant.

Foreign Trade Over $4,000,000,000

Preliminary estimates of the foreign business of the United States for the calendar year of 1912 indicate that the aggregate will be not far from $4,000,000,000. This will be divided into exports, $2,300,000,000, and imports, $1,800,000,000. The big exports of grain may raise the total of out-bound shipment above the figures given. Imports have doubled in value since 1901 and exports since 1904.

Mais Factions Fight for Dividend

INDIANAPOLIS, IND., Nov. 25—Stockholders and creditors of the old Mais Motor Car Company are making a lively fight in the Superior Court in Indianapolis to determine which shall receive about $80,000 which is in the hands of Franklin Vonnegut, received for the concern. The property and business of the company was sold some time ago to a reorganized company by the same name, headed by Frank H. Wheeler.

When the company was in debt about $180,000 and before the receivership proceedings had been brought, creditors agreed to an extension of time if they should receive a payment of $75,000. The company raised $67,000 in cash and a note for $8,000 and paid the money to the creditors.

The stockholders now claim that the creditors were to receive nothing unless they received the full amount of $75,000, and that the payment of $67,000 was therefore illegal. They also claim they have a trust interest in the money in the receiver's hands.

Palmer Factory Nearing Completion

DETROIT, MICH., Nov. 23—The Suburban Motor Car Company, which has in construction an automobile factory at Ecorse, a suburb of Detroit, has been reorganized under the name of the Palmer Motor Car Company, of which R. A. Palmer, former general manager of the Cartercar Company, Pontiac, Mich., is vice-president and general manager. Mr. Palmer is also president of the Palmer-Bee Company, dealers in power transmission machinery and factory equipment.

The Ecorse plant is about half completed and it is hoped that it can be finished so that manufacturing may be commenced the first of the year, at which time announcement of the type of cars it contemplates building will be made.

W. A. DeSchaum, who designed the Suburban car, will not be connected with the concern.

Underwood Metal Bill as Revision Basis

The Underwood bill revising the tariff on metals, which was passed by both houses of Congress early this year and which encountered the veto of President Taft, will probably form the basis of the new legislation to be adopted at the special session of Congress next spring.

The metal schedule incorporated in the Underwood measure provided for a tax of 6 per cent. on pig iron; 10 per cent. on alloys and from 15 to 35 per cent. ad valorem on various kinds of manufactured and partially manufactured metals. These rates represent a downward revision of from 2 to 25 per cent.

The free list under the Underwood bill includes iron ore, hoop and band iron, barbed wire, fence wire, cut and wrought nails, tungsten ores, and a few other items.

Bankers Offer Overland Stock Purchase

Advance offering of the recently purchased block of $5,000,000 first preferred stock of the Willys-Overland Company has been made by William Salomon & Company. The stock bears 7 per cent. cumulative dividends. On the basis of last year's report of consolidated earnings, the company earned 66 per cent. on the preferred issue. According to the Salomon announcement, the company sold 22,548 cars in 1911-1912 season and for the year ending June 30, 1913, expects to put out 38,200. Figuring on that basis the bankers state that the company should earn full par value on the preferred issue offered.

DETROIT, MICH., Nov. 25—The first real get-together meeting of the Detroit Section of the Society of Automobile Engineers was staged at the Detroit Motor Boat Club house on Thursday evening, November 21. An informal dinner was served and there were 125 on hand to enjoy the repast. This is the largest gathering which has ever turned out for an affair of any nature given by the Detroit section. No engineering subjects were discussed, the object being to afford the members an opportunity to become better acquainted with one another. By offering social advantages to its members in addition to those merely technical it is hoped to gather in many others.

Grand Prix To Be Revived

French Club Decides to Run Classic Next Year With Small Field if Necessary But Extends Time

New York Dealers Organize To Rehabilitate Contests and Seek to Secure the 1913 Vanderbilt Cup Race

PARIS, Nov. 15—After being buried, the French Grand Prix race has been revived, the Automobile Club of France deciding to hold the race whatever the number of starters and to admit entries at ordinary fees until December 31, and at double fees until March 31. The race will be held during the first fortnight in July; the place has not yet been selected. At the present time there are seventeen entries, the makes being Sunbeam, Delage, Peugeot, Schneider, Itala (with valveless model) Mathis, Mercedes, and Opel.

In an interview, Chevalier Rene de Knyff, president of the sporting committee of the Automobile Club of France, gave it as his opinion that with the extended time for receiving entries the total number would be thirty-five or probably forty starters, thus assuring a most interesting race.

It was recognized that the original decision to close the lists at the end of October was a mistake, for a number of concerns were unable to decide whether they would be able to compete at such an early date, and even those who had entered were unable to commence the construction of cars until they had received assurance that the race would really be held.

A sidelight on the reasons which led the Automobile Club to revive its Grand Prix, after having obtained only sixteen out of the necessary forty entries, is given by *L'Echo des Sports.* "The real reason why the Automobile Club of France has decided to preserve its Grand Prix is the attitude of the newspaper *L'Auto*. Once more our contemporary has earned the hearty thanks of the automobile industry. Without it the Grand Prix would certainly have been dead and buried. It must not be supposed that this is a joke; it may be a little ironical, but that is all. We can declare to-day, without fear of contradiction, that *L'Auto* was not expecting the results it has provoked. All that it hoped for was the burial of the Grand Prix, although it took care not to give public expression to that hope. It would have followed the funeral procession with tears and lamentations; it would have accompanied the defunct as far as the cemetery. Then, having taken off its black coat, it would have rolled up its sleeves and given itself up heart and soul to the triumph of its own race, that race which was announced in all the majesty of big headlines and leaded matter in the issue of the paper declaring the certain abandonment of the Grand Prix, dead with only sixteen out of the necessary forty entries. It was a note of defiance which awoke the club to action. Without this note the automobile club would have been content to allow its Grand Prix to sleep its eternal sleep. Instead, it rushed into the fray, taking a decision which has earned for it the compliments of all lovers of sport."

The 3-litre race, to be held by *L'Auto,* has been fixed for Sunday, June 29, the course not yet being decided on. Present entries are Peugeot and Delage, but the list does not close until March, and it is confidently expected that between thirty and forty cars will be secured.

New York Dealers Seek Vanderbilt

The Motor Dealers' Contest Association, of New York, composed of prominent members of the metropolitan trade, was formed Monday at a meeting attended by about forty. The purpose of the organization is to rehabilitate racing, road contests and tours and the main object that confronts it is the capture of the 1913 Vanderbilt Cup race. The tentative plans of the association are to secure the race and run it on Long Island.

The association will be incorporated for $30,000 and the shares will be sold among the trade, the individual concerns of which are limited to three shares each. The machinery of the organization will consist of a board of directors, numbering eleven; an executive committee consisting of eight and three committees; respectively on racing, road contests and touring to be named by the board.

Temporary Chairman John C. Wetmore has announced the following committee to canvass the trade for co-operative support: George H. Robertson, William C. Poertner, Edward McShane, E. Lescaris, J. C. Nicholls, A. J. Inderrieden and E. F. Korbel.

Contest Board Rules on Protests

At the last meeting of the Contest Board A. A. A. the appeal of the Central Auto Company, of Grand Rapids, Mich., from the referee's decision in the recent reliability run of the Grand Rapids Automobile Club, penalizing a Cadillac car two points for raising the hood in control, was overruled. The hood was raised by an outsider but the board ruled that the possibility of such an occurrence showed negligence on the part of appellant.

The Coey-Mitchel Auto Company and the Stutz Motor Car Company, of Chicago, were suspended until June 1, 1913, for failure to report for start in the recent run around Lake Michigan.

The Moline Automobile Company and the Staver Carriage Company were suspended until June 1 for advertising the performances of the Moline and Staver-Chicago cars in the Lake Michigan run as those of stock cars.

Hoosiers Endorse Coast Tour

INDIANAPOLIS, IND., Nov. 25—The Indiana Automobile Manufacturers' Association, at a meeting in the Claypool Hotel in this city last Thursday night, gave a plan for a run from Indianapolis to the Pacific Coast its unqualified indorsement. This means that the Indiana manufacturers will make the trip, and July 4 was selected tentatively as the date for making the start from Indianapolis.

This trip will take the place of the Indiana Four States Tour which was held this year and last. It is estimated that a car with two occupants can make the trip for $370, including the return trip by rail. The route has not been selected and a committee is now working out this feature of the run.

H. O. Smith, of the Premier Motor Manufacturing Company, has suggested that immediately following the arrival at the Pacific Coast, exhibits of Indiana-made cars be held in Los Angeles, San Francisco, Portland and Seattle.

Motor Truck Club Extends Scope

The Motor Truck Club, of New York, has elected Ellis S. Howland secretary and general manager and has secured official headquarters at 1845 Broadway. The club intends to maintain a bureau for the collection and distribution of data on automobile trucks. It will hold weekly sessions at which leading men in the industry will be invited to speak.

The welfare committee, consisting of L. A. Van Patten, Emerson Brooks, E. W. Curtis, Jr., and Arthur J. Slade, has outlined some of the new activities in its recent report. Among the recommendations are the following: That a bureau of information be established to secure specific information about costs; that a registry of motor truck drivers be established; that the committee on papers work out programs for the coming year so that special emphasis can be laid successively upon the various phases of truck operation and numerous other practical suggestions.

Market for Motor Trucks Outlined By Industries

OF much interest to the industry is the following article and compilation issued by the commercial vehicle committee of the National Association of Automobile Manufacturers on the market for trucks as shown by the interest displayed by the various commercial industries in the last national shows.

A tabulation of all responses received to invitations to attend last winter's shows has been made by the statistical department of the National Association of Automobile Manufacturers. Invitations were sent, in round numbers, to 40,000 companies located in the territory embraced by the New England, Middle Atlantic and North Central states as far south as Tennessee and as far west as Oklahoma. Most of these companies have a financial rating of $50,000 or more, indicating that they are easily capable of buying trucks or delivery wagons.

About 7,500 companies responded to the invitations, and these are included in the tabulation, making the most comprehensive investigation ever undertaken along this line.

As originally compiled, the list showed 225 distinct lines of business, including manufacturers, jobbers, wholesalers, retailers, commission merchants and others in each line. These various trades have been rearranged into broad groups of allied lines for convenient reference. In order of the number of replies received, the trades most prominently represented are as follows:

Building and contracting trades	482
Metal and hardware trades	392
Grocery trades	306
Machinery and tool trades	276
Light, heat and power companies	255
Dry goods and clothing trades	253
Furniture, beds and bedding, carpets, rugs and house furnishing	223
Brewing and liquor trade	219
Expressing, teaming, etc.	214
Coal and wood	205
Printing, publishing and allied trades	176
City governments	155
Lumber trades	151
Textiles and dyeing	143
Paints, oil and decorating trades	142
Heating, plumbing and steam fitting trades	126
Department stores	123
Storage and moving	117
Produce and commission	117
Steam railroads and equipment	112
Paper and paper box trades	111
Meat and packing trades	106
Boots, shoes, hats, gloves and men's furnishing	100

It should be borne in mind that the number of companies represented in any particular trade is not necessarily an indication of the exact relative interest of that trade in commercial motor vehicles nor of its probable absorbing ability during the coming year. These are dependent upon the proportion borne by the number represented in the list to the total number of companies in each trade in the territory tributary to the shows and the average number of trucks operated by the truck owning companies in that trade. For example, the probable demand for power vehicles by the 123 department stores would greatly exceed the demand by the 176 printing and publishing companies or the 117 storage and moving companies.

In the entire United States there are 4,700 department stores, of which 123, or about 1 in 38, are represented in the show list; there are 989 storage warehouses in the country, of which 78, or 1 in 12, responded to show invitations; and there are 26,500 printers and publishers, of whom 133, or 1 in 200, responded

The tabulation is appended, with the trades insignificantly represented omitted.

Trades Represented at National Motor Truck Shows

	Chicago Show	N. Y. Show	Both
Baking and bakers' supplies	19	31	50
Barrels and boxes	15	15	30
Brewing and malting	72	72	144
Wines and liquors	18	48	66
Bar supplies	5	4	9
	95	124	219
Building and contracting	81	188	269
Building materials	28	45	73
Brick, tile, stone, sand and gravel	31	44	75
Roofing and roofing materials	11	19	30
Sash, doors and blinds	19	16	35
	170	312	482
Coal and wood	126	79	205
Cleaning (and dyeing, rugs, pneumatic)	17	12	29
Clocks and watches	12	5	17
Silverware and jewelry	2	12	14
	14	17	31
Cigars and tobacco	11	20	31
Confectionery	19	26	45
Ice cream	5	4	9
	24	30	54
Department stores	59	64	123
Dry goods	27	58	85
Clothing and underwear	38	130	168
Boots, shoes and rubbers	14	35	49
Hats, caps and gloves	7	19	26
Men's furnishings	4	21	25
Millinery, trimmings and notions	13	41	54
	162	368	530
Drugs and chemicals, druggist's supplies	32	34	66
Electrical machinery and apparatus	27	30	57
Furniture, beds and bedding	93	89	182
House furnishings	10	11	21
Rugs and carpets	4	16	20
	107	116	223
Florists and florists' supplies	10	18	28
Seeds and nurserymen	8	9	17
	18	27	45
Groceries and grocers' supplies	101	132	233
Flour and milling	34	27	61
Canning	6	6	12
	141	165	306
Heating and ventilating	5	11	16
Stoves and furnaces	16	10	26
Steam fitting and fittings	4	4	8
Plumbing and plumbers' supplies	26	50	76
	51	75	126
Ice, cold storage and refrigerators	15	18	33
Importing and exporting	3	55	58
Iron, steel and other metals	50	82	132
Structural steel	4	5	9
Metal manufacturing	41	79	120
Hardware	59	72	131
	154	238	392
Leather, trunks, leather goods	20	36	56
Laundry and laundry supplies	14	20	34
Soap	5	11	16
	19	31	50
Light, heat and power companies	123	132	255
Lumber	127	136	263
Lumbering	4	4	8
Millwork	12	11	23
	143	151	294
Machinery and belting	72	75	147
Machinists and boilermaking	8	17	25
Engines, elevators, fans and blowers	14	11	25
Tools	13	13	26
Foundries	24	29	53
	131	145	276
Meats	26	38	64
Meat packing and packers' supplies	32	10	42
	58	48	106
Milk, dairies, butter and cheese	35	26	61
Mineral, spring and soda water, and supplies	22	26	48
Office machines and supplies	13	11	24
Blank books, stationery, periodicals	5	15	20
Safes	1	..	1
	19	26	45
Municipalities	86	69	155
Municipal officials	203	186	389
Paper, paper boxes, tags and labels	33	78	111
Paving and paving materials	14	11	25
Paints and varnishes	29	32	61
Painting and decorating, and supplies	14	10	24
Oils and grease	21	23	44
Wall paper	8	5	13
	72	70	142
Pianos and musical instruments	14	35	49
Produce and commission	43	74	117
Printing and publishing, supplies	58	86	144
Ink and type founding	5	1	6
Engraving, electrotyping, lithographing	15	11	26
	78	98	176
Railroad (steam) companies	49	26	75
Railroad cars, equipment and supplies	22	15	37
	71	41	112
Rubber goods	10	25	35
Storage and moving	61	56	117
Expressing	42	54	96
Teaming and delivery	49	58	107
Livery	9	2	11
Wagons, carriages and parts	19	14	33
Hay, grain, feed, harness and shoes	20	23	43
	200	207	407
Textiles and dyeing	9	134	143
Telephone service	13	1	14
Undertaking, caskets, cemeteries	12	27	39

ccessory Exhibitors Signed for Chicago's Show

ACCESSORIES COMMERCIAL VEHICLE SECTION PASSENGER VEHICLE SECTION

Coliseum Gallery

oline Oil Co	New York
ago Drop Forge & Fdy. Co	Chicago
nber Motor Co	Marion, Ind.
rial Brass Mfg. Co	Chicago, Ill.
dard Roller Bearing Co	Phila., Pa.
tter-Kent Mfg. Wks.	Phila., Pa.
. Ham Mfg. Co	Rochester, N. Y.
ver Arms Co	Syracuse, N. Y.
e Machine & Stamping Co	Cleveland, O.
. Light & Heating Co	New York
. & N. J. Lubricant Co	New York
Chain Tire & Grip Co	New York
Accumulator Co	Chicago
ney Mfg. Co	Hartford, Ct.
e Electric Co	Lowell, Mass.
er Instrument Co	Beloit, Wis.
Grieb Rubber Co	New York
. Smith Co	Milwaukee, Wis.
rd Mfg. Co	Detroit, Mich.
olic Rubber Co	Youngstown, O.
h Dixon Crucible Co	Jersey City, N. J.
Roller Bearing Co	Newark, N. J.
Tire & Rubber Co	Akron, O.
Cramp & Sons Ship & Eng. Bldg. Co	Phila., Pa.
en-Detroit Axle Co	Detroit, Mich.
en Roller Bearing Co	Canton, O.
Rubber Co	Chicopee Falls, Mass.
r Brass Mfg. Co	Kenosha, Wis.
ear Tire & Rubber Co	Akron, O.
r Mfg. Co	Hartford, Ct.
Tire Co	New York
& Davis	Amesbury, Mass.
Goodrich Co	Akron, O.
ard Welding Co	Cleveland, O.
nal Tube Co	Pittsburgh, Pa.
nger Device Mfg. Co	Pendleton, O.
r Gear Co	Muncie, Ind.
orf Electrical Co	Newark, N. J.
nd Chain & Mfg. Co	Indianapolis, Ind.
m Oil Co	N. Y. City
ran Ball Bearing Co	Cleveland, O.
Williams Co	Brooklyn, N. Y.
Harris Oil Co	Providence, R. I.
rd Suspension Co	Jersey City, N. J.
in Chain & Mfg. Co	Worcester, Mass.
ental Motor Mfg. Co	Muskegon, Mich.
-Line Gear Co	Syracuse, N. Y.
Mfg. Co	Plainfield, N. J.
n-Mott Co	Flint, Mich.
eld Spark Coil Co	Dalton, Mass.
one Tire & Rubber Co	Akron, O.
Parts Mfg. Co	Muncie, Ind.
lvania Rubber Co	Jeannette, Pa.
Electric Co	Anderson, Ind.
nart Tire & Rubber Co	Akron, O.
l Horn Mfg. Co	Cleveland, O.
idated Rubber Tire Co	New York
r & Schebler	Indianapolis, Ind.
nd Rubber Co	Akron, O.
ghouse Electric & Mfg. Co.	E. Pittsburgh, Pa.
c & Storage Battery Co	Phila., Pa.
Mfg. Co	Chicago, Ill.
Bowser & Co	Ft. Wayne, Ind.
ds & Jones Mfg. Co	Detroit, Mich.
o Electric Co	Kokomo, Ind.
Kingston & Co	Kokomo, Ind.
elt Co	Phila., Pa.
erg Motor Devices Co	Chicago, Ill.

Coliseum Annex, Second Floor

rd Storage Battery Co	Cleveland, O.
rine Lubricants Co	New York
*Warner Mfg. Co	Toledo, O.
*Muncie Gear Works	Muncie, Ind.
*Baldwin Steel Co	
*Esterline Co	Lafayette, Ind.
*Texas Co	New York
*Gemmer Mfg. Co	Detroit, Mich.
*Edison Storage Battery Co	West Orange, N. J.
*Stewart & Clark Mfg. Co	Chicago, Ill.
*Cotta Transmission Co	Rockford, Ill.
*Royal Equipment Co	Bridgeport, Ct.
*Briggs Magneto Co	Elkhart, Ind.
*Buda Co	Harvey, Ill.
*United Rim Co	Akron, O.
*Waukesha Motor Co	Waukesha, Wis.
*American Bronze Co	Berwyn, Pa.
*Findeisen & Kropf Mfg. Co	Chicago, Ill.
*National Coil Co	Lansing, Mich.
*Ross Gear & Tool Co	Lafayette, Ind.
Kells Mfg. Co	New York
*Bower Roller Bearing Co	Detroit, Mich.
*New Miller Carburetor Co	Indianapolis, Ind.
*Detroit Lubricator Co	Detroit, Mich.
Ingersoll-Rand Co	New York
*Sheldon Axle Co	Wilkes-Barre, Pa.
*James L. Gibney Rubber Co	Phila., Pa.
*Garage Equipment Mfg. Co	Milwaukee, Wis.
*Gould Storage Battery Co	New York
*Ignition Starter Co	Detroit, Mich.
*Empire Tire Co	Trenton, N. J.
*A. Schrader's Son, Inc	New York
Herz & Co	New York
*Pantasote Co	New York
Cleveland Hardware Co	Cleveland, O.
*Homo Company of America	Jersey City, N. J.
*Champion Ignition Co	Flint, Mich.
*Stutz Auto Parts Co	Indianapolis, Ind.

Coliseum Annex, Second Floor—Passenger Vehicle Week (Only)

Federal Rubber Mfg. Co	Cudahy, Wis.
White & Bagley Co	Worcester, Mass.
Seamless Rubber Co	New Haven, Conn.
Connecticut Telephone & Electric Co	Meriden, Conn.
Michelin Tire Co	Milltown, N. J.
McCue Co	Buffalo, N. Y.
Valentine Co	New York City
Hoffecker Co	Boston, Mass.
C. Cowles & Co	New Haven, Conn.
Lovell-McConnell Mfg. Co	Newark, N. J.
Randall-Faichney Co	Boston, Mass.
G. Piel Co	Long Island City
Dean Electric Co	Elyria, O.
Kellogg Mfg. Co	Rochester, N. Y.
Doehler Die Casting Co	Brooklyn, N. Y.
Racine Rubber Co	Racine, Wis.
Sparks-Withington Co	Jackson, Mich.
Lee Tire & Rubber Co	Conshohocken, Pa.
C. A. Shaler Co	Waupun, Wis.
J. H. Sager Co	Rochester, N. Y.
Standard Thermometer Co	Boston, Mass.
Marathon Tire & Rubber Co	Cuyahoga Falls, O.
Universal Tire Protector Co	Angola, Ind.
Walpole Rubber Co	Boston, Mass.
New Jersey Car Spring & Rub. Co.	Jersey City, N. J.
Hess Spring & Axle Co	Carthage, O.
Endurance Tire & Rubber Co	N. Y. City
Schoen-Jackson Co	Media, Pa.
Double Fabric Tire Co	Auburn, Ind.
Simms Magneto Co	N. Y. City
Batavia Rubber Co	Batavia, N. Y.
John L. C. Dykes Co	Chicago, Ill.
Vorhees Rubber Mfg. Co	Jersey City, N. J.
International-Acheson Graph. Co.	Niagara Falls, N. Y.
Automobile Supply Mfg. Co	Brooklyn, N. Y.
Leather Tire Goods Co	Niagara Falls, N. Y.
Adam Cook's Sons	N. Y. City
Coes Wrench Co	Worcester, Mass.

*NOTE—Exhibitors occupying space in both the passenger and commercial vehicle sections.

ACCESSORIES—PASSENGER VEHICLE SECTION

First Regiment Armory Gallery

Horseless Age Co	New York
Perfection Spring Co	Cleveland, O.
S. Breakstone	Chicago, Ill.
Arminger Chemical Co	Chicago, Ill.
Motor	New York
Mayo Mfg. Co	Chicago, Ill.
Tuthill Spring Co	Chicago, Ill.
Barco Brass & Joint Co	Chicago, Ill.
Peck Wheel Co	Chicago, Ill.
National Motor Supply Co	Cleveland, O.
Automobile Journal Pbg. Co	Pawtucket, R. I.
Vanguard Mfg. Co	Joliet, Ill.
Racine Mfg. Co	Racine, Wis.
L. P. Halladay Co	Chicago, Ill.
Motor Car Publishing Co	Kansas City, Mo.
Brown Co	Syracuse, N. Y.
S. K. F Ball Bearing Co	New York
E-C Sales Co	Chicago, Ill.
N. Y. Coil Co	Chicago, Ill.
Grip Nut Co	Chicago, Ill.
Rhineland Machine Works Co	New York
Marburg Bros., Inc	New York
Economy Equipping Co	Chicago, Ill.
Pittsburgh Model Engine Co	Peru, Ind.
Sarco Engineering Co	N. Y.
William L. Tobey	Boston, Mass.
Metal Stamping Co	Long Island City, N. Y.
E. Edelmann & Co	Chicago, Ill.
Norma Co. of America	New York
Illinois V Ray Sales Co	Chicago
Charles O. Tingley & Co	Rahway, N. J.
Morrison-Ricker Mfg. Co	Grinnell, Ia.
Chilton Co	Phila., Pa.
Motor Age	New York
Longdin-Brugger Co	Fond du Lac, Wis.
Automatic Motor & Engineering Co	Chicago
U. S. Ball Bearing Mfg. Co	Oak Park, Ill.
Northway Motor & Mfg. Co	Detroit, Mich.
Automobile	New York
Motor Vehicle Publishing Co	New York
Motor World Publishing Co	New York

COMMERCIAL VEHICLE SECTION

First Regiment Armory Gallery

Horseless Age	New York
Perfection Spring Co	Cleveland, O.
Merchant & Evans Co	Phila., Pa.
Federal Chain & Mfg. Co	Springfield, Mass.
Motor	New York
Highland Body Co	Elmwood Pl., O.
Tuthill Spring Co	Chicago, Ill.
Service Recorder Co. of Ill	Chicago
Detroit Puncture Co	Detroit, Mich.
Never-Skid Mfg. Co	New York
Sewell Cushion Wheel Co	Detroit, Mich.
Automobile Journal Publishing Co	Pawtucket, R. I.
Rhineland Machine Works Co	New York
Marburg Bros., Inc	New York
Economy Equipping Co	Chicago, Ill.
Pittsburgh Model Engine Co	Peru, Ind.
Sarco Engineering Co	New York
Semple S. Scott	Chicago, Ill.
Rich Tool Co	Chicago
Harrow Spring Co	Milwaukee, Wis.
Cleveland Worm & Gear Co	Cleveland, O.
Norma Co. of America	New York
Lavigne Gear Co	Corliss, Wis.
Polack Tyre & Rubber Co	New York
Torbensen Gear & Axle Co	Newark, N. J.
Chilton Co	Phila., Pa.
Motor Age	New York
Philadelphia Storage Battery Co	Phila., Pa.
Automatic Motor & Engineering Co	Chicago, Ill.
Automobile	New York

Machine Tools Interest Industry

rle L. Downs, secretary of the Automobile Board of Trade Committee, has returned to New York after a trip through Middle West devoted to the project of holding an exhibit of ine tools in connection with the coming national show in York. Mr. Downs stated that not over six manufacturers een signed up for the show but that there are prospects for siderable representation despite the shortness of the time s still available.

: show situation is somewhat complex as regards machine The contemplated exhibit will be the first to be held in ountry and its announcement attracted a large amount of ion throughout the industry. At the Olympia show there uch an exhibit and it proved to be one of the most inter- features of the show. But the manufacture of machine is largely on order, little stock being maintained. Thus, ifficulty that stands in the way of a complete exhibit in ry is that available machines will be hard to get.

er F. Clarkson, general manager of the Society of Auto- : Engineers, declares that a complete exhibition of ma- tools would be interesting to the whole industry and that A. E. was strongly in favor of adding such an attraction national show.

Atlanta Show Makes Much Money

ATLANTA, GA., Nov. 25—The Atlanta automobile show ended Saturday night. The accounts have not been cast yet, but it appears that enough money will be in the treasury to pay all expenses, refund to each exhibitor half the money he spent for space and will still leave $2,500 for a working fund.

The show was more economically run this year than last, but, thanks to good weather, to prosperity in the South, to the fine display of cars and to much publicity, and because it was given right at the start of the Southern buying season, it drew immeasurably larger crowds than ever before.

Senators To Hold Automobile Show

WASHINGTON, Nov. 25—Washington is to have an automobile show early in the new year which promises to eclipse any ever given in the national capital. T. Oliver Probey, president of the Michigan Motor Company, and proprietor of the Probey Carriage Company, will be the executive chairman of the show.

Committees will be appointed within the next 2 weeks to aid Mr. Probey in his work. The dates for the show have been decided upon. It will begin February 3, and last 1 week. The show will be given in Convention Hall. It has been 2 years since Washington had an automobile show.

To Oust Unhandy Manograph German Savant Builds Mechanical Indicator So Small and Rigid as to Shake with Motor but Never Alone—The Diminutive Diagrams Enlarged at Leisure—A Popular Pyroscope—Carbureter Construction

INDICATOR for High-Speed Motors—When the customary indicators are used for registering pressures and piston speeds in automobile engines the results are not satisfactory, and this accounts for the fact that these instruments are rarely used by automobile manufacturers, though they are found indispensable in the development of new designs or modifications of larger and slower motors. In recording pressures, the masses of the movable parts of the instrument—the pistons and the writing stylus—are subject to disturbing independent vibrations in the higher degree the larger and the more rapid the variations in pressure are in the machine under test. The shorter the duration of these independent vibrations, which are due to the intrinsic mechanical properties of the measuring instrument, can be made, the more accurately the true course of the variations of pressure can be recorded. To attain accuracy, the movable masses and their movements must both be reduced to a minimum. On this principle the change was made from the simple Watt indicator to the short-stroke instrument with a mechanically magnified movement for the stylus and finally to the optical indicators or manographs which work with exceedingly small masses. But with the latter it is necessary to use photographic registrations, and this feature renders them less practicable, as it is difficult to obtain sharp lines of even thickness, while the photographic plate is also underexposed when the light moves rapidly and overexposed when it moves slowly. Moreover, the whole process is laborious and does not admit of taking diagrams in rapid succession.

In applying the customary instruments to the recording of piston speeds, it has been considered most important to have a mechanism which could be attached quickly to the motor—as by belt drive—and one which was kinematically correct in principle, and less attention has been paid to the need of having it able to cope with the accelerations arising in its use at high motor speeds. Not only the drive must not break but it must also transmit the movements without gross errors. In order to meet this requirement the drive must be rigid.

Basing his efforts on these ideas Dr.-Engineer O. Mader, of Aachen, has aimed to build a new kind of indicator, which he terms the Mikro-Indicator, and the manufacture of it has been undertaken by Stärzl Brothers, 18 Kapuziner strasse, Munich. This instrument is supposed to be sufficiently accurate at motor speeds up to 2,000 revolutions per minute; to admit of taking diagrams in rapid succession; to produce diagrams which are visible at once, permanent and susceptible of manifolding; to be easily operated and not to be sensitive to rough handling. Different views of the construction are shown in Figs. 1, 2 and 3, while a diagram of the registering method is shown on a larger scale in Fig. 4. It is similar to the early indicators in this that the diagram is drawn direct from the movements of the indicator piston, and in this case by means of a sharp steel point which traces the curve on smoked glass, but the stroke of the indicator piston is reduced to a maximum of 2 millimeters, and the magnifying of the very small diagram thus produced is done subsequently under a microscope, thereby circumventing the disturbing influence of the motor move-vibrations on the magnifying process.

The drawing of the motor piston stroke is effected by a lateral movement of the light stylus. The indicator piston has a flat top A, Fig. 4, on which the circular disk forming the end portion of a small lever B may slide. The stylus S extends from the center of the disk. The other end E of lever B is drawn to and fro by the oscillation of a crankarm C on spindle D. A fine spring F holds B down to steady contact with A and obviates lost motion in the joints.

The indicator piston is guided below by the cylinder wall G, Fig. 2, and above by securing the hollow piston rod to the double, oppositely-wound spring H. These three parts—piston, piston rod and spring—form a unit and must be replaced as such, if it is desired to change the dimensions of the diagrams. The area of the piston is normally 1 square centimeter for pressures up to 30 atmospheres and proportionately smaller for higher pressures.

The stopcock J and a water-cooling chamber are built into the body of the indicator cylinder, the provision for cooling being needed only when the cooling system of the motor is inefficient at the point where the indicator is screwed in. By this compact design the tubular connection with the interior of the motor is made short and unobstructed, and the bore of it represents an addition of only 3 cubic centimeters to the volume of the motor under test.

The diagram-plate-carrier is a U-shaped frame pivoted upon a fixed shaft K and pressed by a spring L against a round eccentric cam M. Into this frame the smoked glass plate is inserted from above together with a backing plate, and both are held by leaf springs in any position given them. With one quick turn of the cam, by means of a crank, the glass plate is pressed lightly against the stylus and is again immediately drawn back.

If another diagram is to be taken, the plate is raised by turning the knob O. In this manner 24 diagrams can be taken on one plate in two rows, in 30 seconds if necessary. To start the second row, the plate is pushed to one side on the shaft K. The glass is a 28 by 48 millimeter plate, as commonly sold in the open market for microscopic preparations and germ cultures.

A simple drive with few joints is preferably used for actuating the micro-indicator; for example a walking-beam drive as indicated in Fig. 5. In this matter it is of the greatest importance that the bearings of the drive, as well as the indicator, follow all the vibrations of the motor. While the walking-beam drive is not kinematically uniform, the errors arising from this fact, and especially from the limited length of the beam, may be obviated largely by shortening the ecentric arm. In using this drive, it is advisable always to use the same crankarm length (45 millimeters), whereby the variations of the radius of the eccentric may be held within narrow limits (from 13 to 15 millimeters). The only parts which must be provided especially for each kind of motor is the driving crank, or eccentric, and the middle portions of the beam, for which parts, therefore, very simple forms have been chosen.

So as to be able to stop the movement of the writing lever—to replace a dulled stylus, for example—a coupling is provided for this lever which has no lost motion and which, it has been found, may be easily secured or released by hand even at the highest motor speeds.

The adjustment of the drive must be made with the greatest care, to avoid large errors in the diagrams. At a certain position of the piston—selected at the middle of its stroke and not at the dead center—the stylus must mark the same spot when going to the left as when going to the right.

THE ENLARGEMENT OF THE MINUTE DIAGRAMS

An ordinary microscope magnifying 40 times is used for obtaining an enlarged view of the diagrams. Mere observation of the diagram in the microscope is sufficient for guidance in the adjustment of valve cams and ignition. To permit the measuring of diagrams, however, they must be enlarged either by means of an ordinary enlarging-camera or by drawing an enlargement by hand with the aid of a special device furnished with the microscope. The latter is operated at an angle of 45 degrees, and the device consists in an arrangement of small reflectors in the under-part of the sight tube, near the ocular, by which the image of a blank drawing-surface—which is located directly beneath the ocular and conveniently to the operator's hand—is thrown into the plane of the enlarged image of the diagram, so that the operator sees both at the same time. This enables him to follow the lines of the enlarged image with a pen on the actual drawing-surface.

To define the scale of enlargement which has been used in representing the motor movements and pressures in the diagram, both the magnification and the resistance of the indicator spring are to be considered. The magnification is verified by a scale traced on glass, and it remains constant. The spring action is determined by a convenient pressure gauge operated with weights, as represented in Fig. 6.

The principal use for the micro-indicator lies in its handiness for determining the mean effective pressure and separating the thermic from the mechanical elements in the efficiency of a motor. The author refers to a number of determinations of this nature which he has made with the instrument of his design and by which its superiority in accuracy over old-style mechanical indicators is borne out. Its superiority over the manograph lies mainly in its convenience, robustness and the sharp and permanent lines of the diagram.

Among other uses, there may be mentioned the adjustment of valve cams and ignition, the determination of the time required for ignition and flame propagation, the measuring of compression and of possible leaks, estimates of strangulation in intake and exhaust pipes and valve ports, as well as of the nature of the combustion and the quality of the carbureter.—From excerpt in *Der Motorwagen* of September 30 of article first appearing in *Dingler's Polytechnisches Journal.*

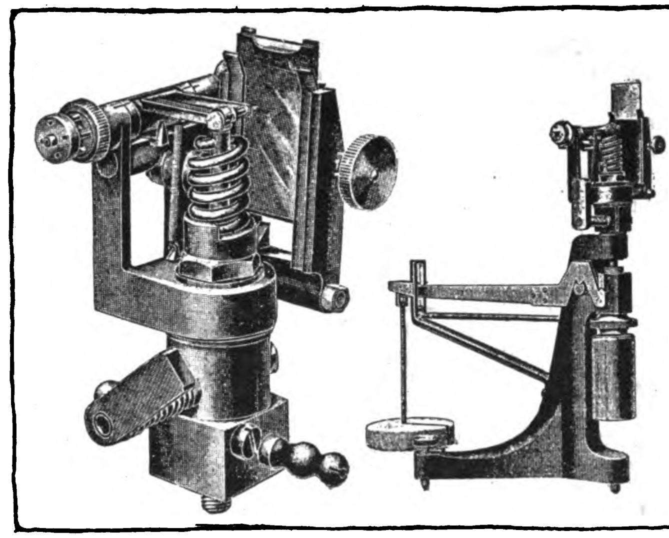
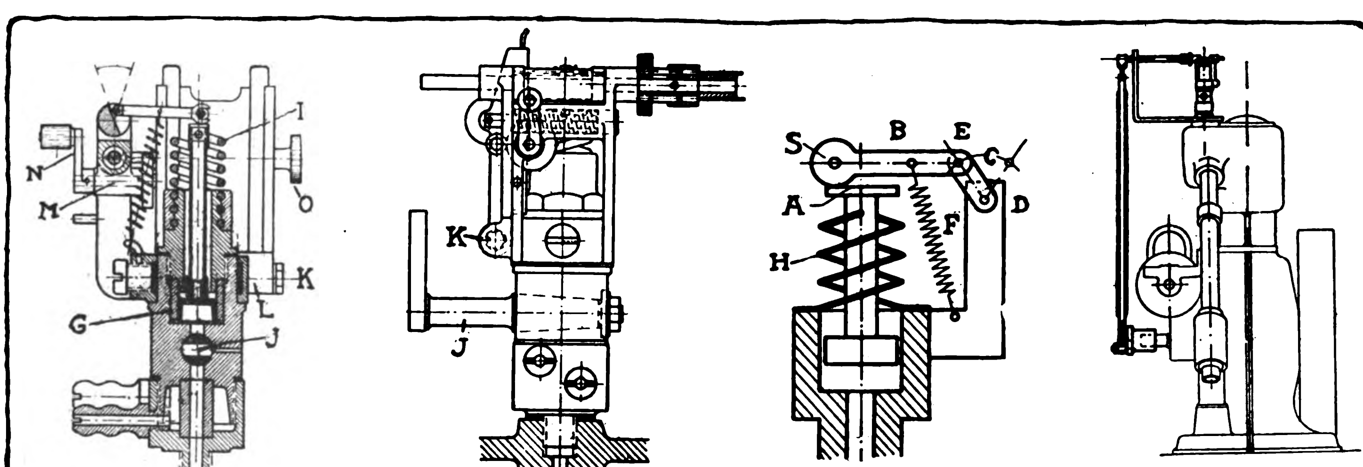


Fig. 1—Mader micro-indicator. Fig. 6—Spring pressure gauge

POPULAR Pyroscope—Among instruments which compete for ordinary industrial purposes with the scientific optical pyrometers, as well as with the electric instruments, one of interesting simplicity is mentioned as in use in some German factories. In general appearance it may be described as a kerosene lamp with a metallic and enlarged chimney to the side of which a short telescope is attached. The rays from the kerosene flame pass horizontally through a multiple diaphragm composed of a number of transparent films which are colored differently, so that the diaphragm as a whole presents a scale of colorations which in combination with the light from the kerosene flame correspond to the heat colors of steel from 650 deg. to 1650 deg. C. Obliquely in the telescope tube there is placed a small mirror which reflects the rays from the lamp, transmitted through one of the films, to the eye of the observer and makes this image appear as a round spot on the light image of the heated piece of work which is seen direct through the telescope. By turning a knurled disk the diaphragm is turned around until the particular film is in line which gives a light that disappears on the image of the work, for lack of contrast, and a hand is at the same time moved around on a



Figs. 2 and 3—Different views, partly in section, of Mader micro-indicator. Fig. 4—Diagram of the recording mechanism. Fig. 5—Mounting and walking-beam drive of Mader instrument drum inscribed with a scale of temperatures. The moment the correct position is found the temperature of the work can thus be read offhand. The accuracy depends upon the division of the scale, but also upon the constancy and light of the kerosene flame. Considerable attention must be given to the cleaning of the lamp burner and the regulation of the flame. The latter should have a certain height, for example 18 millimeters.—From *Der Praktische Maschinen-Konstrukteur*, September 19.

LATEST G & A Carbureter—Most of the design features in a new model of the Grouvelle & Arquembourg carbureter may be discerned by a glance at the accompanying illustration, Fig. 7. The large jet G is oblique, which arrangement facilitates adjustment and inspection and especially the adaptation of the same carbureter model to different motor sizes and motor designs, by modifying the holes at G. The additional air intake operates automatically by means of metal balls resting over the air holes, which means that the mixture is determined not only by the position of the throttle but also by the motor speed, and mainly by the latter. The throttle is closed completely when the lever M is in position 1, so that no gasoline is used when the vehicle is running downhill by gravity. In positions 2, 3 and 4 of lever M, the suction is switched by way of the groove *k* in the throttle body into channels *a* and F, drawing air from around the small jet *g* and gasoline from the latter. In position 4 the large jet also begins to act. The small tubular jet *g* passes through the middle of the float and acts as the stem for the needle valve. Two holes *r*, near the bottom of the float chamber, admit the gasoline to its interior. A hot-water chamber R, connected with the cooling-water system, assists in evaporating the spray from this jet.

The working parts of this carbureter are easily taken apart and reassembled without the use of tools. The wing nut L gives complete access to the main jet. By pressing down on the yoke N, against spring J, the tube F is released, and then, by the extension of the spring, the pin H is released also, permitting the yoke N to be turned around the housing of the priming-rod P. Now the cover of the float chamber comes off, and the jet *g* with the weights C and the float can be removed if desired. Also, with the cover removed, the action of the needle valve may be regulated, the weights being secured to the jet tube and not to the cover.—From *Omnia*, November 2.

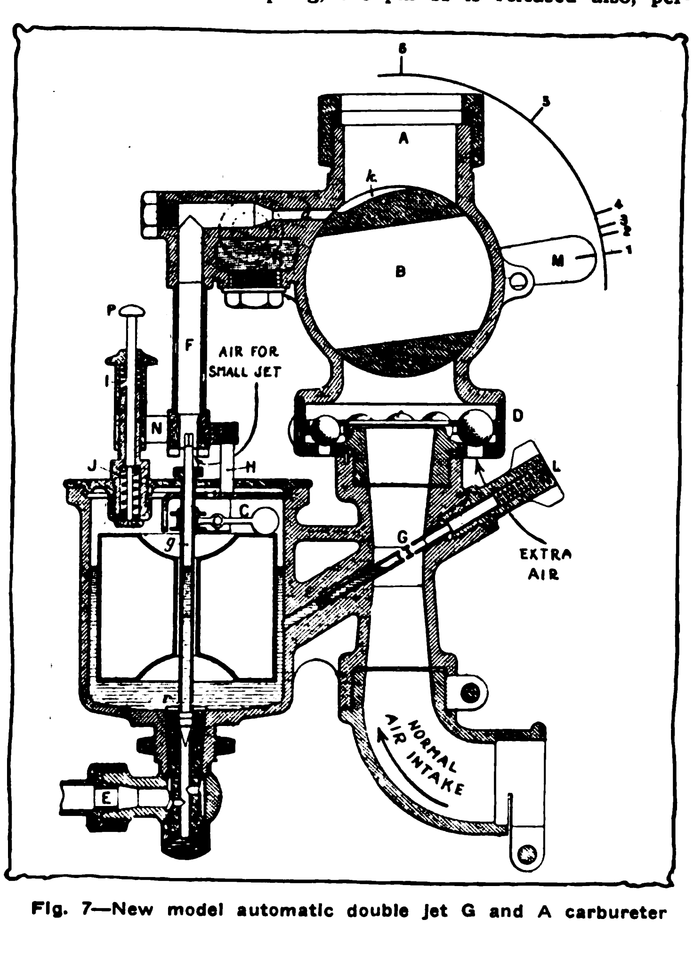


Fig. 7—New model automatic double jet G and A carbureter

MACHINES to Test Skill—As a consequence of the worldwide movement started by Frederick W. Taylor for increasing the efficiency of traditional working processes through analysis of the movements composing them, Professor Imbert, of the University of Montpelier, has devised a number of ingenious devices by which various kinds of common work may be measured with a view to determining what wages each of the working operations ought to command, and the French government has thereafter subsidized further experiments in the same line. Similar small machines have been made by which, for example, the skill of a workman who applies for a job may be put to a decisive and impartial test. In the case of filing or the cutting of metal sheets these devices furnish diagrams of the work done by each hand, of the vertical movements as well as of the horizontal ones and of the pressure exerted at any point of the stroke of the file or the shears, and by comparing the diagrams produced by a skilled workman with those produced by one whose skill is less well known the value of the latter as a workman can be gauged without the need of watching him. The speed is also recorded.—From illustrated article in *Werkstattstechnik*, October 15.

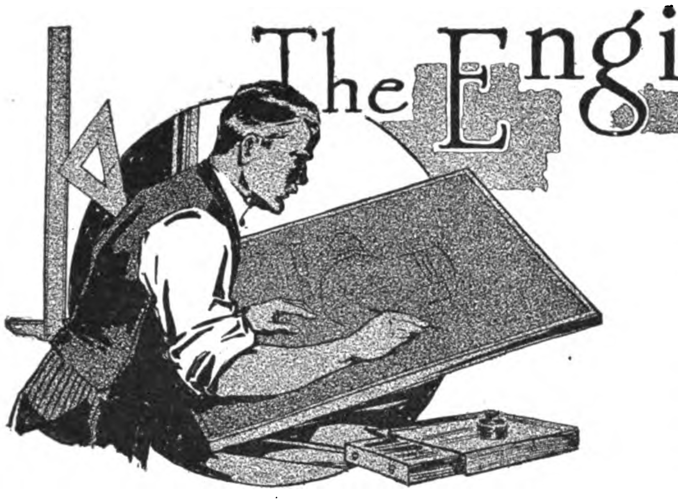
ALTERNATING Shows in Paris—The Association of French Automobile Manufacturers (*Chambre Syndicale de l'Automobile*) under the leadership of Marquis de Dion, has resolved that it is desirable to hold an automobile salon in Paris every year but that it is equally desirable that constructors in each main branch of automobile manufacture should not be called upon to develop and exhibit important improvements oftener than every two years, and that, therefore, one of two successive annual shows should comprise pleasure automobiles, vehicle bodies, bicycles, motorcycles and accessories, and that the other should be limited to commercial motor vehicles, motor boats and machine tools. If, however, the makers of accessories should express a preference for participating in both shows, the opportunity should be held open for them. The proposition is meeting with general approval though some dissenting voices are heard.—From *L'Auto*, November 7.

INTERNATIONAL Influences—At the Olympia automobile show there was seen on the stand for Charron cars one of these fashionable French vehicles equipped with a Lentz hydraulic transmission. The latter, according to *L'Auto*, of November 13, was considerably improved as compared with the form in which it first made its bow to the public. Though a German construction it was received with favor in England and by this route seems now to be in a fair way to win French approval. It was described in THE AUTOMOBILE of May 30.

GRAND Prix for 1913—The Automobile Club of France decided at a meeting held November 6 that a *grand prix* race shall be held in France in 1913, whether the number of entries received before December 31, 1912, comes up to the expectations or not. The decision was taken in order to justify manufacturers in making their preparations for the event well ahead of time.—From *L'Auto*, November 7.

SPLASH Guards—The second public competition for splash guards in Paris has been held, but the press refuses to take the new accessory seriously. It is not too much to ask that streets should be kept so clean as to render splash guard unnecessary, comments *Omnia*.

The Engineers' Forum



3-Point vs. 4-Point

Discussion of Relative Merits of These Systems for Supporting the Motor and Gearbox

Van Dervoort Lays Stress on Alignment—Birdsall Finds Both Systems Satisfactory

Part III

W. H. Van Dervoort Prefers Three-Point Suspension

Edward T. Birdsall Finds That Both Types Have Advantages

EAST MOLINE, ILL.—Editor THE AUTOMOBILE:—We started in at accomplishing what we now get in our three-point motor suspension—the alignment of transmission and motor by preventing the distortion of the frame as much as possible, through the use of the three-point spring suspension. We were among the first of the American manufacturers to adopt the unit power plant and with the adoption of this unit power plant we discarded our three-point spring suspension and went to the three-point power plant suspension, as in the unit power plant it is absolutely necessary to maintain perfect alignment of the motor and transmission shafts, and inasmuch as as it is not practical in the light-weight construction of automobile power plants to make the parts sufficiently rigid to withstand the severe cramping due to operating a car over unequal surfaces, the necessity for overcoming these strains as much as possible by the use of the three-point suspension for the entire power plant is apparent.

I feel there are some advantages to the four-point motor suspension when used in connection with an independent transmission, where perfect alignment between transmission and motor is not imperative.

In our earlier construction we used two points of suspension at the front end of the motor with a single point at the rear end of the transmission. Our present construction gives the single point of suspension at the front end of the power plant and the double point of suspension at the front end of the transmission, allowing the transmission to overhand the rear supports. This makes possible a very considerable reduction in the weight of the connecting link between engine and transmission, and inasmuch as we advocate an open flywheel housing instead of a closed flywheel housing, this is a point of considerable importance to us.—W. H. VAN DERVOORT, Moline Automobile Company.

DETROIT, MICH.—Editor THE AUTOMOBILE:—As to the relative merits of three- and four-point suspension I believe that three-point suspension is more necessary where a main frame construction is used than in the case of a subframe design. I rather favor the three-point for both pleasure and commercial cars, although I have yet to experience any trouble with the four-point, providing the strains are properly taken care of.

On commercial cars I would use the three-point suspension on account of the added assurance of freedom from possible trouble due to the gross misuse that the average truck gets from careless or ignorant drivers.

Then, again, there is the selling department's talking points to be considered, which often have a serious influence on design.

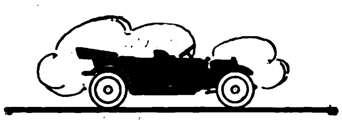
At the present time I have three pleasure cars and two trucks on the boards and they are all of main frame three-point construction.—EDWARD T. BIRDSALL, Consulting Engineer.

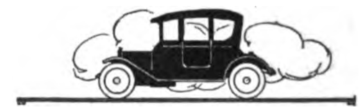
MARTIAN HEIGHTS, N. Y.—Editor THE AUTOMOBILE:—By triangulated trussing, stresses are transferred from joints to the material of struts and stringers, roughly speaking, but this undoubted virtue of the triangle wherever joints are most likely to constitute the weak points is not utilized much in automobile construction. The corner gussets of the frame are placed as disadvantageously as possible, for example. In my opinion 3-point suspension has no value apart from the construction together with which it is used. It may be advisable with one, inadvisable with another. If it were true that a 3-point cradle supporting the motor would conform to any position into which those three points in the automobile frame at which it is supported may be forced, a certain advantage relating to the protection of the motor would be realized, but, even when double-swiveled at one of the points, it does not do so. In the case of whipping or bending of the frame the mutual relations of the three points are changed, and the cradle is cramped to resist this deformation. It is only in the case of symmetrical torsion of the frame that the cradle hung at three points is relieved of stresses in higher degree than one hung at four points. The cradle must, then, after all be made strong enough to resist and prevent certain deformations of the frame, or else the suspension at the most exposed point, and possibly at two of them, must be made flexible in all three dimensions. On the other hand, a four-point cradle can more readily be made rigid against whipping and pitching stresses and can also be flexibly supported, with sufficient yield to allow for torsion, provided the frame construction and the spring suspension of the vehicle are designed with a proper degree of rigidity, considering the other purposes which they have to serve—for example that of carrying a vehicle body with doors and windows which should fit and operate flawlessly.

If it may be assumed that the art of automobile building has advanced to a point where it cannot be accepted as satisfactory engineering to protect the motor at the cost of neglecting other important requirements, it seems hard to find even an excuse for hanging the biggest weight in the whole construction at the smallest possible number of points. It stands to reason that, so suspended, it may contribute to the aggravating of frame deformation rather than to the checking of it, notably in all cases where the suspended unit rocks freely without being subjected to internal stress.

The subject is, however, much too large to be covered convincingly in a few lines.—UNATTACHED S. A. E. MEMBER.

Hansom Type Coupé for E.M.F. Chassis





Compactness and General Design Are Especially Suitable for a Runabout Chassis

By George G. Mercer

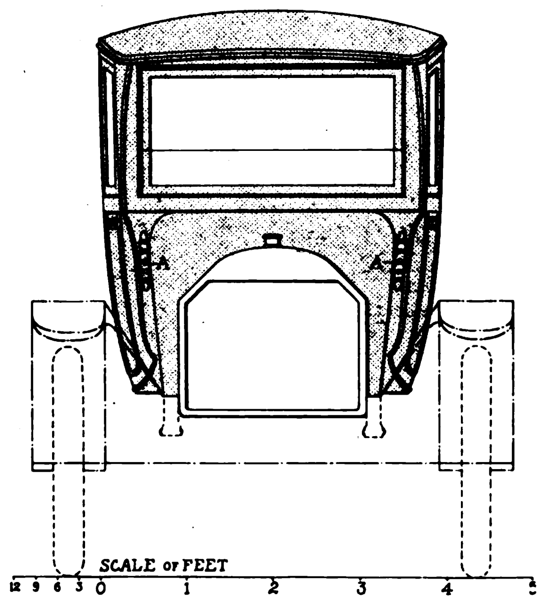


Fig. 1—Front view of E.M.F. coupé design

THE accompanying scale drawings show a light-weight coupé body adapted from the lines of the well-known horse-drawn hansom cab, and suitable for service on a small runabout chassis. Such a body design would adapt well to the chassis of the E.M.F. 30 roadster, and this car has therefore been chosen as a basis of illustration.

The hansom cab is probably the most compact two-passenger vehicle that has ever been generally used, and its general design is for this reason especially suitable for application to a small chassis where light weight is an important consideration.

The E.M.F. 30 has a wheelbase of 112 inches, with a 4 by 4.5-inch motor and tires of 32 by 3.5 inches. This car is regularly equipped with three or more styles of bodies. The illustrations show the roadster model with the body removed and the proposed coupé body set in its place. The gasoline tank, tool box and tire carriers remain at the rear undisturbed, and the wheel guards are also untouched.

In its standard form the E.M.F. runabout is arranged for right-side driving, and owing to the fact that the change gear and brake levers are set well within the frame for operation on the inside of the foredoor, no changes are necessary and therefore no expense is incurred in order to prepare the chassis for the reception of the new coupé body.

Fig. 4 gives a good general impression of the body mounted. It may be of interest to point out that in actual dimensions the body is smaller than appears at first sight, this effect being produced by a full extension of the roof at the front, and also by carrying the forward moulding at the bottom well in advance of the door. Constructed as shown, this body should not exceed the weight of the stock roadster body by more than 450 pounds.

All the most important measurements are indicated in the drawings. As shown in Fig. 4, the width of door over mouldings is 20 inches while the extreme length of the body from front to back on the belt line is only 39 inches. The distance from the dash to the front of the seat cushion is the same as on the roadster, as also is the height from the floor to the top of the cushion. The vertical distance between the cushions and the underside of the roof is 39 inches, and the width of the cushion, shown on the plan, Fig. 2, is 37 inches. The space between the steering wheel and the seat back is approximately 15 inches. These interior measurements afford ample accommodation for two average people.

The exterior dimensions of the body are: length 50.5 inches by 47 inches wide. The construction is combination wood and metal panels with wood framing, the lower body and door panels and the cowl being formed of metal. Steel can be used to advantage for all these panels except the cowl, though by so doing the weight of the body would be slightly greater than with all aluminum panels. The upper body panels, side and rear are .375-inch thick whitewood, and the roof panel is either pine sheathing or laminated wood roofing. The rounded corner at the rear is formed with the framing pillar, and the side and back panels, both upper and lower, do not follow around the corner and intersect, but terminate at the moulding line indicated on the two views Figs. 3 and 4.

As indicated by dotted lines in Fig. 4, the location of the levers permits of easy entrance from either side. The space on

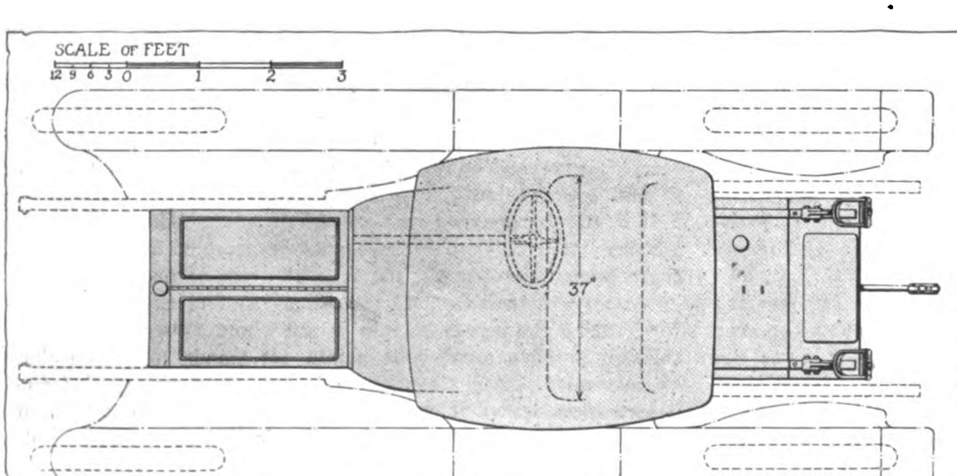


Fig. 2—Plan view of suggested E.M.F. hansom type coupé

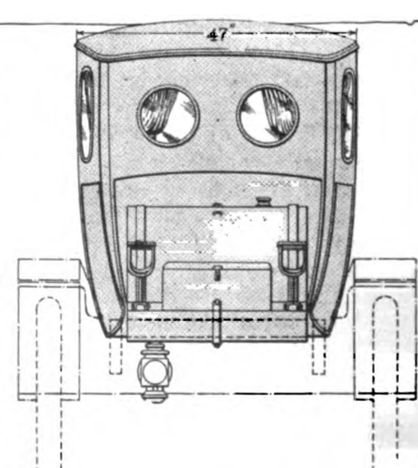


Fig. 3—Rear view of E.M.F. coupé

the chassis occupied by the body extends from the dash to the block that supports the tank at the rear without disturbing the latter. Regarding the dash, the best plan is to have this made integral with the body. It costs a little more for a new dash and installing it on the car, but it effectively prevents the rain leakage around the joint of the moulding, that is apt to occur if the dash is not built solid with the cowl.

Plate glass windows with mahogany wood frames, are fitted to the doors, provision being made for opening by dropping their full length. The oval lights on the sides and the round ones at the rear are made stationary and metal tee mouldings are used around the openings to keep the glass in position and to serve as a finish.

Ventilation is secured by dropping the door windows, or opening the front windshield visor which is indicated in Fig. 4. In addition there are two elongated openings, marked A on Figs. 1 and 4, that are controlled by shutters operated from the inside of the car.

The lamps used are those furnished with the stock car, the only ones disturbed in mounting the new body being the dash lamps, and these are reassembled on the car in their former positions. The horn is located under the engine hood and does not call for any interference.

For the exterior finish different shades of green combined with either yellow, or white or black are good suggestions, and some of the brown shades combined with black are also very suitable. Interior trimmings chosen to match whichever of these combinations is adopted will look and wear well.

The most economical color to use, however, will be the standard color on the stock car, as this well save repainting the chassis to match, provided the paint is in good condition. Assuming that this latter decision is made, the lower body panels and the cowl will be blue, as will also the recessed panel that forms the rounded corner at the rear. This will be blue the entire length from top to bottom and between the mouldings that mark the end of the side and back panels. The mouldings will be black and also the roof and the upper panels above the belt. Black should also be used for the underside of the roof where it projects forward of the windshield.

The exterior color scheme is therefore the same as the stock body, blue with black, hair line gray striping and gray wheels.

If a cloth is decided on for the interior finish a gray to match the color of the wheels and the striping could be introduced with pleasing effect. Cloth is certainly better for trimming the interior of a winter car body than leather, all things being equal. There is a coziness and warmth to cloth that no leather can give.

The most durable cloth materials in the lighter shades are the cords, either whipcord or the bedford cord and the latter seems to be most generally favored. Among the gray bedford cords it is common practice to use a fleck or marking of some darker shade, and a gray with a black fleck will suit admirably for trimming the seat, the sides and back of the seat, the body and roof. The broad lace used on the doors, and the finishing lace would of course be chosen to match the interior scheme of color, as also should the floor carpet. Suitable curtain material would be plain gray silk, the doors being mounted on spring rollers while those on the side and back windows could be draped and held in place with a cord.

The appointments will consist of silver mounted electric dome light in the roof, gray morocco covered toilet and card cases, and ash tray for the doors and pockets on each side under the cowl. All metal parts inside silver finished.

Though of compact form the inside dimensions of the body permit of ample thickness in the trimming of the seat back and sides and cushion. For the latter 6 inches is allowed for the depth. A driving cushion does not need to be made too thick. An excess of flexibility in the seat cushion used by the driver, due to the greater length of the cushion springs and consequently greater thickness of the cushion, is undesirable because it gives a rolling motion to the seat. The cushion should therefore be moderately firm and the trimming of the seat back should not be too far removed from the steering wheel. Both the seat back and the cushion should support the driver's body firmly in the position that he is obliged to assume in order to handle the wheel properly. The trimming of the passenger seat can be made more luxurious to suit a more reclining position.

The cost of a body according to the design and specifications above outlined will approximate an outlay of $900. This should insure first-class workmanship and materials and should be of a style and finish to satisfy any reasonably critical customer. This figure includes mounting the body on the chassis ready for service.

On the return of warm weather the old body can be replaced with little trouble, the only expense being that of the actual labor of making the change. By providing himself with this extra body the owner of a small runabout is therefore prepared for comfortable traveling all the year round.

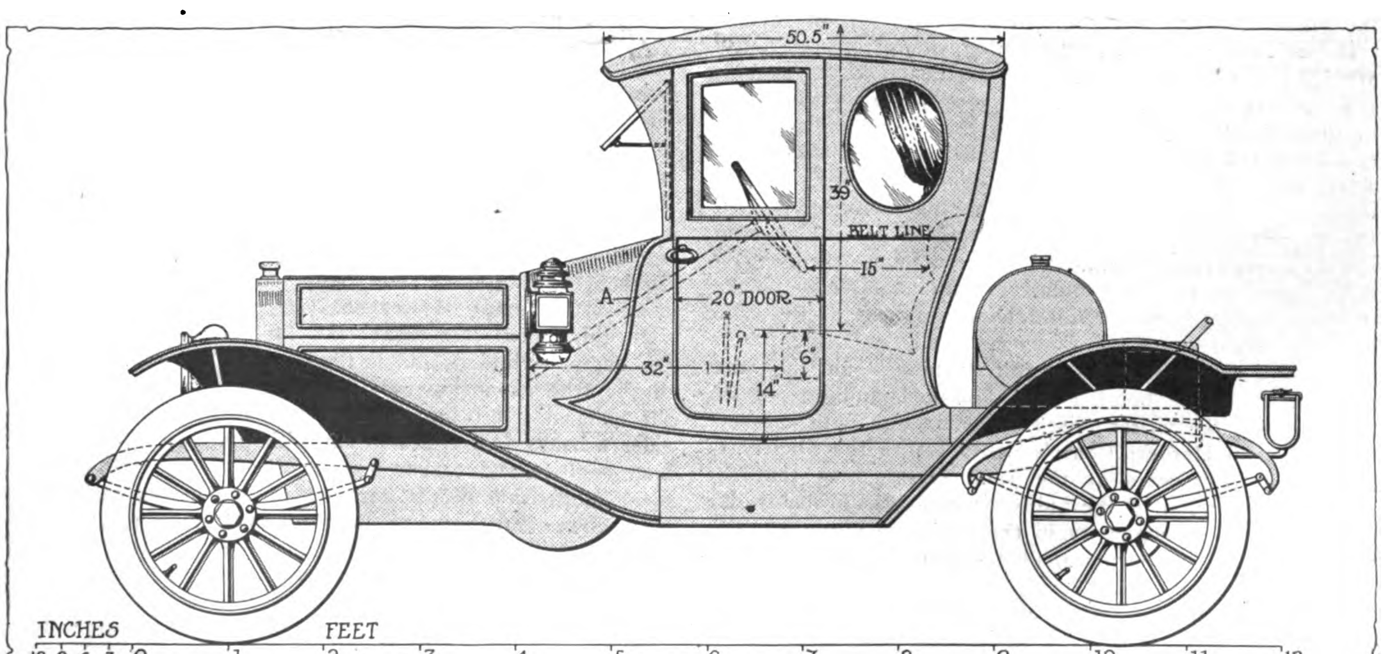


Fig. 4—Side elevation of the hansom type coupé design for E.M.F. 30 roadster chassis

Carburetion

Part II

by Robert W. A. Brewer

Subject Digest

Carburetion cannot be good unless the liquid fuel be divided into the most minute particles.

When the fuel is not broken into a particularly fine spray or mist the resulting mixture cannot be homogenous.

The particles of hydro-carbon at the center of a fuel globule cannot combine with the oxygen of the air and with a large globule it takes the air longer to reach the center.

Much of the fuel that goes into the cylinder in a liquid state passes out through the exhaust without being burnt. It is thus a dead loss of power and efficiency.

Precipitations are caused by a change in direction of flow; they are minimized by the application of heat.

The rate of flame propagation varies with the homogeneity of the mixture and is more rapid and regular when the surface to volume ratio of the globules of incoming fuel do not vary from one location to another.

IN Article I, published November 14, it was shown how the addition of heat is necessary in order to effect carburetion, and we will now more carefully consider the question of the homogeneity of an explosive mixture. It is essential that in a gas or vapor engine the working fluid should be supplied to the engine in as homogeneous form as possible, in order that the rate of propagation of the flame through the mixture may be uniform and of a maximum velocity. Particularly is this necessary in high-speed engines where the flame velocity has to be very great in order that the pressure should, as it were, keep up with the piston.

It has been found in practice that **where lack of homogeneity in the mixture occurs, the expansion of the burning gases is erratic, and produces humps on the expansion curve of the indicator card.** Sometimes these humps have been rather difficult to explain, but I think we may take it for a fact that they are due to variations in the stages of combustion of a liquid fuel due to the lack of homogeneity in it. We do not find these humps occurring in gas-engine practice to any marked extent, and where a hump has occurred it has been of a fairly regular formation, and may be due in some instances to the interchange of heat between the burning mixture and the cylinder walls.

We find, however, in an engine burning liquid fuel, that in some cases the hump is most marked, and one of the points which the writer raised in connection with a recent discussion on Herbert Chase's paper before the Society of Automobile Engineers at the June session was that the irregular formation of the indicator card was probably due to the lack of homogeneity in the explosive mixture which was produced by the particular carbureter fitted to the engine.

In further confirmation of this theory, Mr. Chase pointed out that the proportion of air to fuel was abnormally small for a high-class carbureter under testing conditions, and it is very probable that the mixture in this case was too rich on account of lack of homogeneity. That is to say, that certain portions of the mixture were abnormally rich in order that the other portion of the mixture should have the correct ratio of constituents.

It is difficult for our minds to consider the smallness of a molecule, but in the limit we may take it that an ordinary perfect gas is body divided into its finest possible particles. In a hydro-carbon mixture, gas with air, it is obvious, in order that the rapidity of combustion should be insured, that the hydro-carbons must be divided into the finest possible particles so that each molecule of hydro-carbon can combine at the critical moment with its necessary molecules of oxygen.

One of the objects of the carbureter is to break up the fuel into these finely divided particles in the limit into a gas or mist, and any variation from this ideà is a step in the downward direction in carburetion. **We come, therefore, to the question of surface to volume ratio, and it is a well-known fact that a sphere presents the smallest surface to volume ratio of any known shape.** If you study the formation which a liquid takes in issuing from an orifice or in moving through space or the atmosphere, you notice that the spherical form is always taken by the particles. **We have, therefore, as a peculiarity of nature, to deal with liquid which naturally presents to us the greatest difficulty with regard to its presentation of surface for the carbureting process.** We ought to divide these globules into the largest number possible in order to present a maximum surface of fuel from which evaporation can take place. **A simple law of mathematics shows us that the relations between the volumes of different bodies are to one another as the cubes of their diameters,** so that if we have a globule whose diameter is 1 in any particular units, and another globule whose diameter is 2, **the latter will contain eight times as much volume as the former.**

The importance of fine subdivision of the fuel in the carbureter itself is thus emphasized, as **it is obvious that those particles of hydro-carbon at the center of a globule cannot combine with the oxygen of the air until they are actually in contact with it.** This means that **the time element is proportional to the size of the globule, and where rapid carburetion takes place, either the subdivision of the fuel must be very fine, or an excess of fuel must be permitted to pass through the carbureter, the external portions of each globule only being correctly mixed with its necessary amount of oxygen.**

In this latter case either the fuel passes as liquid into the engine cylinders and is there burnt, causing distortions of the true expansion curve; or it passes away unburnt to the exhaust. It is my contention that **what I should consider a heavy fuel consumption with the majority of American engines and carbureters, is due to the lack of sufficient subdivision of the particles of fuel in the carbureters** themselves. Furthermore, in many cases, although this subdivision or spraying may take place in the first instance, its effect is nullified by obstacles presented to its path through the carbureter on the way to the engine.

We now come to a very important feature in carburetion, namely, the shape and condition of the flow path between the carbureter jet and the inlet valves. In the first place, there is undoubtedly an awakening in America to the advantages of the venturi-tube principle, which principle is a very old one in carbureter designs. I had a venturi-tube carbureter fitted on an early Decauville car 11 years ago. At the throat of this tube was a jet of the form of a mushroom valve. This instrument worked perfectly well when in adjustment, the upper taper of the cone in the venturi being 7 degrees.

A butterfly valve was fitted, which was fortunately very thin. **Here we come to the first possible source of trouble in an obstruction, as such an object right across the center of the flow path tends to cause precipitation of the finely divided particles of fuel held in suspension in the air.** At this early stage of the carburetion it can scarcely be said that the fuel is already evaporated, and it is my contention that even **a gauze screen does more harm than good.** Such a device immediately causes precipitation to start, affecting the homogeneity of the mixture by alternations of weakness whilst the liquid is precipitating, and richness when the precipitated liquid is dislodged by the air stream.

Such a state of affairs undoubtedly takes place whenever a change of direction in the flow path occurs, and it can only be minimized by the application of heat. **If heat is applied to a surface which tends to cause precipitation, the liquid on coming in contact with such a surface is evaporated. Modern carburetion owes much of its improvement to this fact,** and there is no doubt that the reason why certain six-cylinder block engines of modern type carburete more easily than the old induction-pipe engines is that very large heated passages are provided through which the carbureted air has to pass. Such passages, cored in the waterjackets of the engine, form ideal means for carburetion, by reason of the fact that the flow velocity is quickly reduced. A time element occurs in which evaporation can take place, and any precipitated liquid has an opportunity of diffusing throughout the whole mass.

A controversial point here arises, as to whether it is better to allow the mixture to enter the engine at practically atmospheric temperature, thereby getting the greatest weight of charge into the cylinders every time at full throttle opening, or to allow the mixture to reach a higher temperature, at which it is more perfectly carbureted, although the weight per charge is less.

I certainly am of opinion that the latter is the better state of affairs, as, although the weight of charge may be slightly less, due to its rise of temperature, the more homogeneous mixture in the latter case will burn far more efficiently. By this is meant that **the rate of propagation of the flame through a homogeneous mixture is more rapid and regular than is the case where the surface to volume ratio of the incoming fuel varies from one location to another.** It is a fact that with modern grades of petroleum distillates it is quite possible for the heavier fractions of the fuel to pass through the engine cylinders unburnt, but even if this ultimate state is not reached, retarded combustion takes place, resulting in an unduly high temperature.

(To be continued.)

Fundamental Principles of Carbureter Adjustment

ADJUSTMENTS on carbureters of all makes follow along the same lines. That is, there is a rational method of procedure, which, if followed, will permit of reaching the required result in a shorter time than if the hit-or-miss principles are generally followed. One cardinal point must be remembered in all carbureter adjusting, however, before anything else is considered and that is that a leanness of mixture should at all times be favored.

There should be three distinct points of adjustment: First, with the motor idling. That is, with the gears in neutral, the spark retarded and the throttle closed as far as possible. Second, at high speed with gears in neutral and spark advanced, and, third, accelerating on the road. The carbureter should function well under all these conditions and should not choke up or backfire when the throttle is opened and closed rapidly.

Start the motor going without changing the carbureter. If it is impossible to start the motor with this adjustment on the carbureter close the needle valve as far as it will go and then open two full turns on the screw that holds it. In general, on a carbureter it would be well to start with what looks like the medium adjustment on all the valves. The valves differ on all the carbureters on the market, and it is only desired to give a general outline of the process of adjustment so that any carbureter may be tuned up by simply carrying out the previously planned system.

When the motor is running, open and close the throttle several times with the spark set in different positions to see if any black smoke is emitted from the exhaust or if backfiring into the exhaust pipe occurs. **If backfires occur, the mixture is too lean and the needle or fuel valve should be opened slightly or the air valve closed.** Where the adjustments are made on the auxiliary air supply the tension on the spring should be loosened slightly so that the valve will open under less suction. If black smoke is exhausted the fuel valve should be closed. In the latter case the mixture was too rich and this is to be avoided carefully if the carbureter is to give the maximum economy. It is quite possible that too rich a mixture is being given without the exhaust of any black smoke and for this reason it is wise to close the fuel valve until the motor starts to backfire. The needle valve is then opened slowly until the backfiring just disappears.

When the motor appears to be running satisfactorily, try it idling as slowly as it will go. When it turns over smoothly, arrange the throttle valve-stop screw on the carbureter so that the throttle cannot be closed any further. This will prevent the motor from choking up and dying if left running at the curb for any length of time. Now speed up the motor and note if backfires occur. If they do, it will be necessary to tighten the air valve slightly. **In any case do not try to change the level of the gasoline in the float chamber for this is arranged at the factory and is in the best possible position for good results.** When the motor runs as well as it should on high speed, try it again on low, making whatever adjustments on the fuel and air valves that are necessary to secure smooth running.

The car is now ready to be taken out on a hill and given the final test. This is the accelerating powers on the hill. Start the car slowly on the hill and then press down on the accelerator pedal and note how it picks up. If the carbureter chokes and the motor hits on one or two cylinders and then starts to fire regularly, or perhaps continues to miss, the trouble is in the design of the carbureter or the mixture is too rich. **The carbureter should not be condemned, however, if it chokes when the pedal is pressed down as far as it will go immediately.** The accelerating should be done more gradually. When the pedal is pressed all the way down before the motor is moving fast enough to take care of the amount of fuel this will cause to be fed to it, the carbureter is almost sure to become choked.

It is very frequently found that the motor will hit on all cylinders at high speed but that at low speed it will miss badly. This is not due to carbureter trouble in a great number of cases, but to the fact that one or more of the sparkplugs have too large a gap between the electrodes.

Foreign Constructions Designs and Practices

The French School of Engineering

American Engineer Analyzes Features of French Designers and Makers—Delahaye Crankshaft Details—Gearbox Bearing Supports—Accessible Combustion Chambers—Well-Made Air Pumps—Gasoline Tank Locations

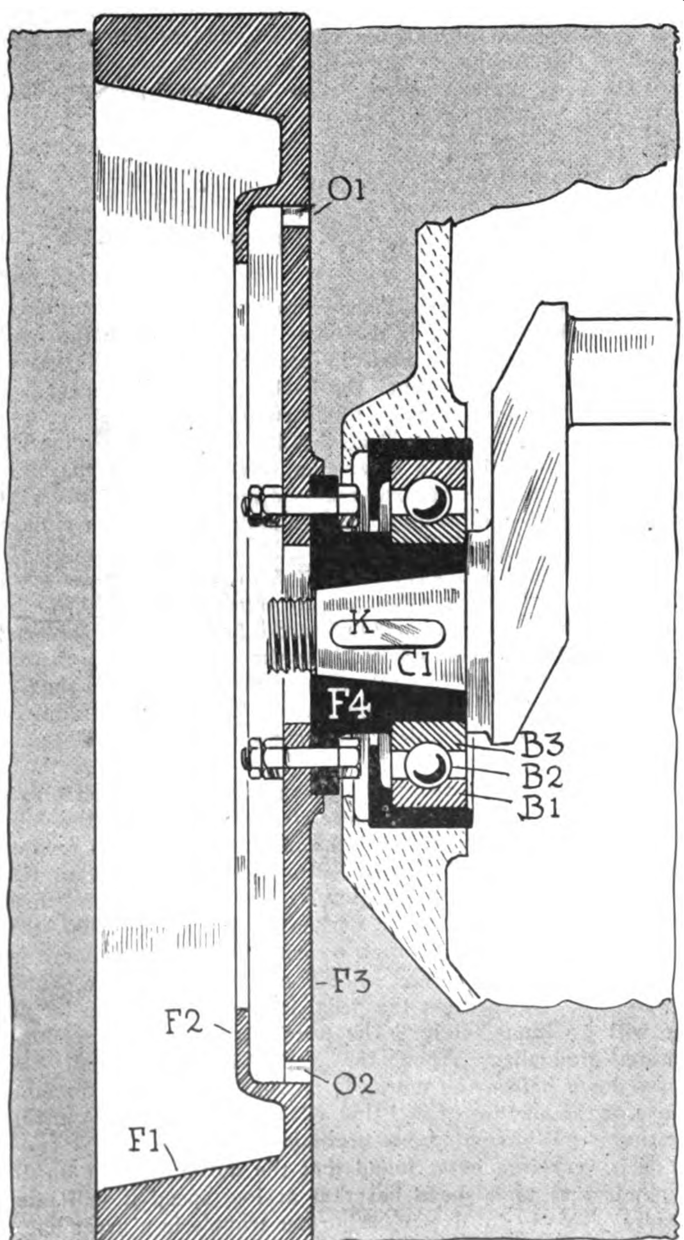


Fig. 1—Delahaye flywheel attachment to crankshaft

IT is in the detail that success or failure lurks. French engineers pride themselves upon their clear understanding of this point. It remains, then, to look at the French method of disposing of details, and learn by so doing how they think and what they accomplish. That there should be a profit in the enterprise must be true. If the French school of designing is far advanced it may be copied with profit. If there are glaring inconsistencies, to unearth them is advantageous; the process will help all around. Then, too, by open discussion, if through some lack of good understanding our appreciation of some of the French methods is to do them an injustice, it will be timely to listen to their explanations to the mutual profit of all parties.

That the French should explain the points that fail to satisfy our understanding must hold so long as French automobiles are offered to our purchasing public. Moreover, we expect to broaden our knowledge of the intricate detail of automobile designing by closely scrutinizing French effort, and it is only fair to them that any little misunderstandings should be wiped out.

With this brief introduction merely to establish the position that we take respecting the subject matter presented here, it remains to introduce the points to be enlarged upon, and for purposes of clearness resort is had to a series of sketches showing as closely as possible how French engineers do their work.

Attaching the Flywheel

Fig. 1 is a section of the crankshaft of a motor at the flywheel end, the flywheel and the crankshaft ball-bearing. showing the method used in assembling as it is brought out in the Delehaye motor of the type offered for use in the postal chassis. The flywheel F1 is of relatively larger diameter with more than the usual amount of metal in the rim. Means are provided for disposing of any lubricating oil which may fall on the flywheel. The flange F2, on account of centrifugal force, forces the oil in the diametral direction and, as it sweeps into the pocket formed by the flange facing the flange proper F3, it accumulates until a sufficient excess is stored, when this excess flows out through holes o1, o2, etc., drilled in the flange F3. The flange F3 is not dished. Since internal strains due to unequal cooling are set up in all castings during the foundry process, and, in view of the absence of any dishing to permit of strain compensation, it must be taken as true that the strains, such as they are, will reside in these flywheels so made, after the automobiles are delivered to users. It would appear, under the circumstances, that French foundry practice must be so perfected that, by a system of uncovering the metal, which requires precision of workmanship, the metal is cooled fast or slowly over the several zones in proportion to the ratio of surface to mass, sufficiently to save undue internal strains; otherwise flywheels so made must be regarded as bordering upon the unsafe.

The flywheel flange is bolted to a separate hub-flange F4, the latter being on a taper of the crankshaft end C1, and a key K is provided as a further means for preventing rotation of the flywheel on the shaft. It is obvious that the designer is a firm believer in flange-bolted fastenings for flywheels on crankshafts. The effect of this construction is contrary to the designer's express preference. The fastening, taking it as a whole, is that of a taper fit. It is easily seen why the benefit of a flanged fit is lost. The crankshaft is of the ball-bearing type, and in order to locate the ball-bearing it was found necessary to interpose the separate hub with its integral flange F4, and Fig. 1 shows how the inner rod B3 of the ball-bearing is clamped between the shoulders of the hub F4 and the crankshaft C1.

Method Aids in Assembly

The advantage of this method of assembling is one that the salesman can readily appreciate. After the motor is assembled and put in the chassis the casual observer will only be able to see that the flywheel is flanged and bolted to its mate-flange on the crankshaft; but there will be no way of telling that the flange F4 is separate and that, after all, everything depends upon a taper fit of the hub on the shaft end.

Referring now to the ball-bearing, it is true of this construction that it is of large diameter, and service conditions exact just this large diameter of ball-bearing. It is also true in service, as experience has adequately shown, that the inner race B3 of the ball-bearing must be clamped so tight that rotation of the race on its fit will be prevented. The design, however, makes no suitable provision for clamping because it is impossible, in practice, to make a taper fit that will be at once a tight fit and at the same time permit of a fixed travel of the hub on the shaft. If the hub fetches up on the taper of the shaft before it does against the shoulder on the hub clamps the inner race B3 of the ball-bearing, the latter will be free to thrash around, which it will not do for long without showing depreciation; but if the shoulder on the hub F4 fetches up against the inner race B3 of the ball-bearing this is a guarantee that the fit of the taper will be poor, if indeed, it may not be so bad that the key K will be left to do all of the work.

The outside raceway B1 is provided with a jacket of steel, the latter being a tight fit in the base of the aluminum crankcase. If the outer raceway B1 is a tight fit in its jacket of steel, then the axle alignment of the inner raceway B3 with the outer raceway B1 may be such that the balls B2 may be pinched, or the orbit of the balls formed by the two races may be elliptic—the result will take the form of damaged balls. On the other hand, if the outer raceway B1 is a sucking fit in the jacket, then, as experience tells, the race race will pound around in the jacket until some serious mishap sends the motor to the repair shop.

Good Engineering Indications

It will appear from what has been said that the designer in this example picked out a particularly difficult task for his day's work. It would be doing scant justice in this instance not to mention the excellence of proportioning, the eye to exactness, and the generally good completion of the whole undertaking. If there are questions to be answered they have to do with the scheme of design, the principles involved and the expediency of plan involved.

In order to gain further knowledge of French practice, Fig. 2, showing a part of a gearbox in section, is shown. This illustration raises two important questions: First, referring to silence or the reverse, noise; and, second, uniformity of design or, in its absence, there is the expedience of special grades of materials.

The design shows the shaft S1 in its relation to the stubshaft S2 with a ball-bearing intervening in the usual way, the latter being housed in one of a pair of connecting gears. The stubshaft is provided with a pair of ball-bearings B2 and B3, and they are far enough apart to assure a good result. The stubshaft S2 has four diameters, the largest diameter being in the ball-bearing B2, reducing to the diameter of the pore of the pinion P1 of the constant mesh or master gearset, which imparts rotation to the layshaft S3; then the stubshaft S2 is reduced in diameter to facilitate assembling and to accommodate the ball-bearing B3, and this shaft is again reduced in diameter to fit the universal joint member J1.

The plan of construction necessitates these reductions in diameter of the shaft S2, it being necessary to provide for the inner races of the ball-bearings among other points. It must be obvious to the reader that there is a striking lack of uniformity in the strength of the shaft in its relating sections. This defect is all the more significant if the mind reverts for a moment to the fact that the strength of a round solid section changes as the cube of the diameter.

Then there are three abrupt changes in the diameter of the shaft, and as a result, as many shoulders to serve as starting points for cracks, and these cracks are all the more likely to be experienced since the shaft has to undergo heat treatment, the latter being necessary to insure service of the clashing gear on the end of the shaft. True, the designer had no alternative in this case. To get away from the char-

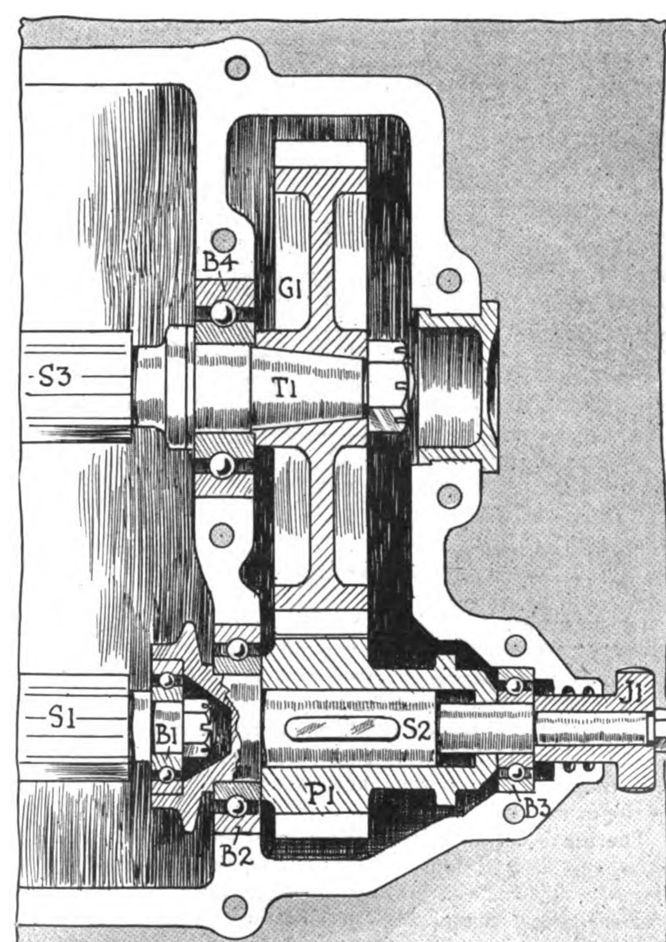


Fig. 2—Part section of Delahaye transmission gear, showing how the shafts rotate, details of design and fitting of relating members

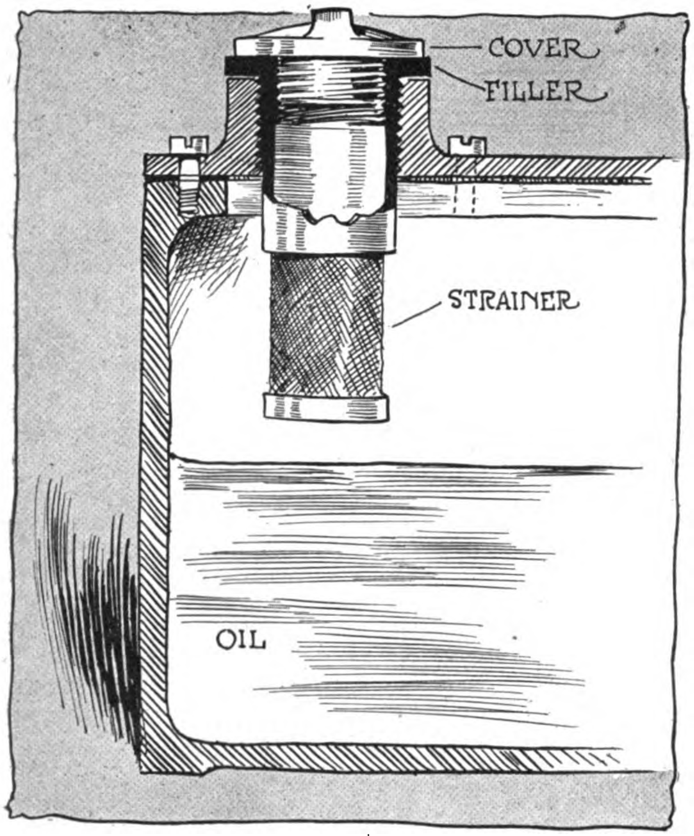


Fig. 3—Oil reservoir of Vermont motor, showing filters for the oil

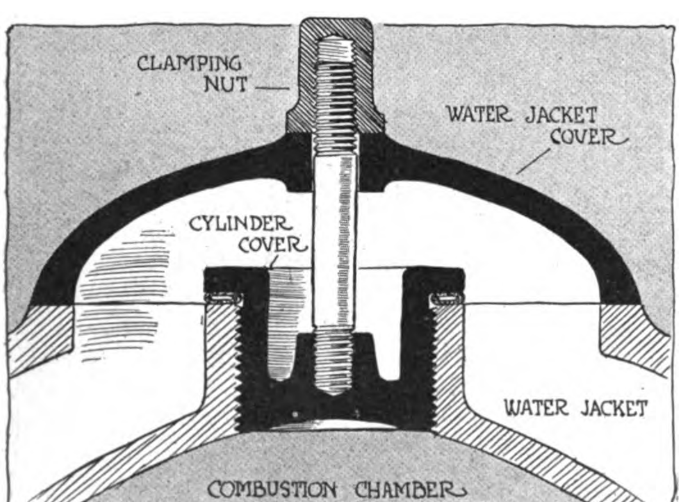


Fig. 4—Securing cylinder-head plug in Cottin & Desgouttes motor in 16-horsepower chassis

acteristics here brought it would be necessary for him to make a new start along more promising lines.

Referring to the important subject of silence, this condition must be difficult to fix in the type of gearset here illustrated, because the gear G1, on the layshaft S3, is pressed up on the tapered end T1 of the shaft, which overhangs the ball-bearing B4; the shaft, in consequence, is unsupported in the plane of the master gear.

There are certain details which receive excellent attention from this illustration, namely, the designer shows by the use of a taper T1 for the gear G1, on the shaft S3, that he has a liking for tapers. The question is, why does he so willingly give up the taper idea when he applies his skill elsewhere, as in the fitting of the pinion P1 on the stubshaft S2; and, too, in the fitting of the universal joint member J1 on the end of the same shaft? On the other hand, why

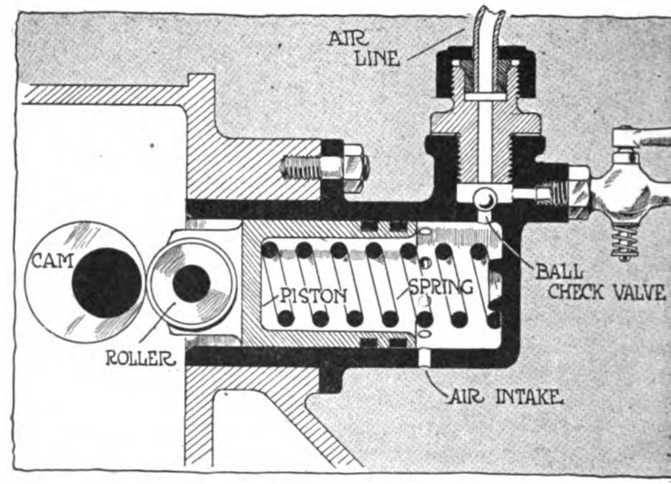


Fig. 5—Air pump in Panhard, showing the piston actuated by a cam and a spring for returning the piston

bother with a taper on the relatively unimportant end of the shaft S3, if a taper cannot be used for the universal joint member?

There are certain details which receive excellent attention in the French school. Fig. 3 will suffice for the moment to make the point. In this illustration the lubricating oil for a motor is shown in a sectional reservoir, partly broken away, and the filler is provided with a filter or strainer, so designed that the strainer may be screwed out, cleaned and put back into place ready for further service in a moment. The oil is put into the reservoir by unscrewing the cover on the exterior of the strainer shell to afford the desired opening and fine mesh gauze is wrapped around the exterior of the shell to serve as a filter. The oil goes into the shell, and, to get to the main body below, it must pass through the gauze. Any dirt is left behind in the shell.

Points in Cylinder Castings

There are certain details which receive excellent attention which are never above suspicion. Take cylinders, for illustration. The practice is to cast the cylinders with a core-hole in the head, it being desirable, if not actually necessary, to fix the core to keep it from displacing by means of a tapered core connection passing through the head of the cylinder, hence the necessity of hole in the cylinder head. **If a hole must be allowed for, the further reasoning is, why not make it large enough in diameter to accommodate the boring for which it is used in the process of rough-boring the cylinders during the finishing interval?**

But the hole in the head is, unfortunately, an opening in the cylinder wall just at the zone of greatest pressure and maximum heat-change, as well as highest temperature, the latter, in internal combustion motors, following as a matter of course. If the cover is not tightly fitted, or if it will not remain tight under service conditions, compressed liquid will escape during the compression and power cycles, and water will enter during the suction cycle. Either of these incidents will suffice to thwart the operation of the motor.

Leakage, due to defective cylinder-head plugs, is still a common trouble of motors, even after 20 years of practice, and French engineers, recognizing this fact, are still on the hunt for something more secure than either of the ordinary methods in vogue. Fig. 4 presents, in section, a cylinder of a Cottin and Desgouttes motor, showing how this firm of the French school approaches the subject. The cylinder-head cover, Fig. 4, is screwed into the cylinder. The water-jacket is provided with a separate cover. A stud is screwed into the cylinder-head cover and a clamping nut on the other end of the stud is screwed down against the waterjacket cover. The adjustment when made presses the waterjacket cover more or less firmly into place. But all of the pressure exerted by means of the clamping nut on the stud is offset by an equal and opposite force which tends to pull the head out of the cylinder. This pressure is in the same direction as the pressure exerted in the cylinder by the liquid when it is compressed, ignited and burned. These efforts combined tend to strip the threads of the cylinder-head cover and the mating threads of the hole in the cylinder head.

Good Airpump Design

It is not without profit that some of the French cars are examined. They conceal jewels of designing. Fig. 5, a Panhard airpump, shows one of these nuggets! This pump, shown in section, comprises a piston in a cylinder actuated by a circular cam eccentric to the camshaft of which it is a part. The roller, concentric with its pin, the latter passing through a pair of ears extending out from the piston head, is pressed against the cam by spring pressure from a stout spring located within the piston, bearing against the head of the piston at one end of the spring; the other end pressing against the head of the cylinder, the piston is inverted. Air enters through holes in the cylinder wall uncovered by the piston when the same is at the inner end of the stroke as shown. The air is compressed when the cam rotates, pressing the piston out against the spring. The ball check valve is lifted off of its seat by the compressed air which passes on through the air line to the gas line tank. The piston is packed tight enough to hold pressure up to the requirement. The pump is small, with simple construction features, and, in operation, is noiseless. **The advantage of clean air over foul liquid of combustion from the cylinders of the motor for use in the gas line tank is obvious.**

Panhard Clutch Coupling

An excellent piece of designing at a point where strength is necessary is shown in Fig. 6, a Panhard 18-horsepower gearset, showing, in section, the shaft detail as it extends forward to the flanged joint. Attention is called to the bell-shaped flange F1, integral with the fluted extension or hole H1, mating with flutings of the shaft S1, with a nut N1 of the castellated type on the end of the shaft, by means of which the flanged hub is forced against the shoulder S2 of the shaft S1, with an accommodation piece A1 intervening. The second function of the accommodation piece A1 is in conjunction with the thrust ball bearing B1, spacing it in its relation to the annular type ball bearing B2 and the relating mechanisms of the clutch, which, in this example, is placed within the same housing—the clutch is of the multiple-disk type.

But the point which it is proposed to bring out here lies in the excellence of the flanged connection and the generally uniform proportions of the parts. The flange, considering the use of an extension member reaching to a mating flange of the shaft extending back from the motor, affords ready means of removing either the motor or the gearbox unit from the chassis without disturbing the remaining unit.

Dash Gasoline Tank

The desire to place the gasoline tank in the space made by the overhang of the dash is strong. Not a few examples of this idea are bad. Fig. 7, of the tank, as it is located in one of the Delahaye models, corrects the trouble usually experienced. The tank is situated on the side opposite the driver. The pipe, as shown, has a goose-neck bend in it, which saves the pipe from the ills of vibration.

Where to put baggage, or how to do without it, is still on the list of pressing problems to be solved. Fig. 8 is a rough approximation of one man's methods. He was sitting on a mile-stone which indicated that it was 14½ kilometers to Paris when interviewed. The car was considerably encumbered as illustrated. The tourist, a well-known American, said, "I would be all right if I didn't have so damn much tire trouble." The ladies in the party voiced the same sentiment with their eyes.

(To be continued.)

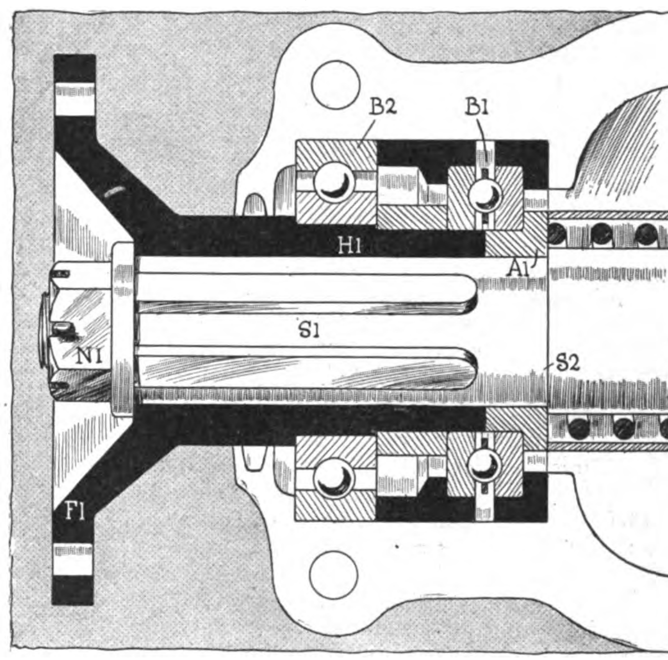


Fig. 6—Flanged coupling of gearset shaft in 18-horsepower Panhard. The motor or clutch shaft carries a similar corresponding flange

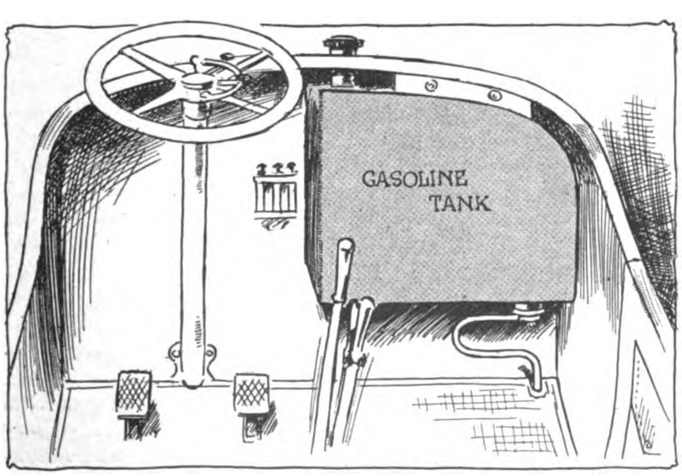


Fig. 7—A neat method of mounting a gasoline tank under the cowl or overhang of the dash

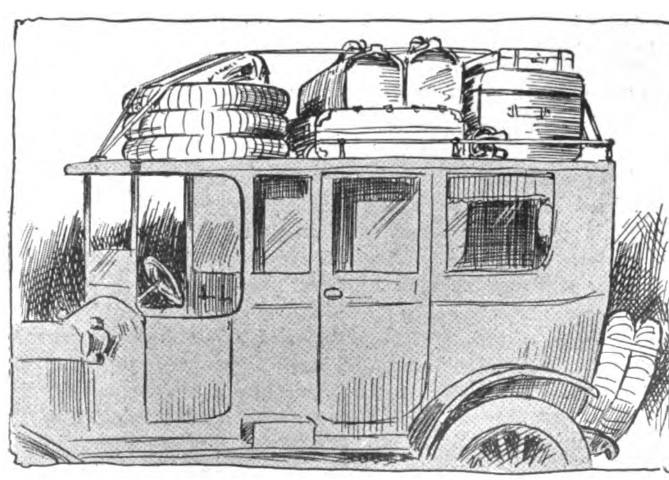
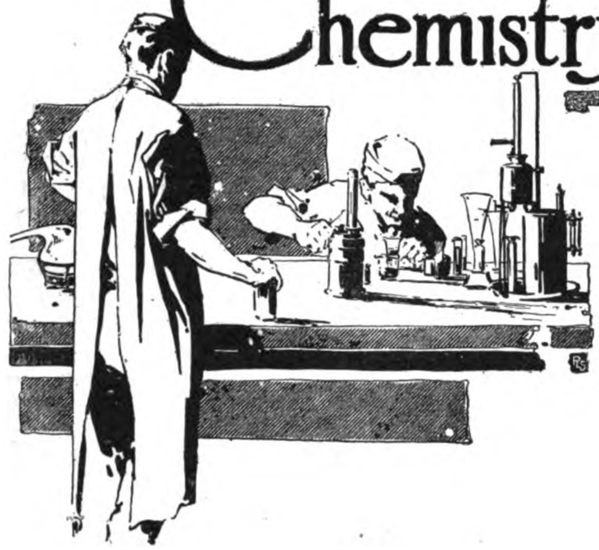


Fig. 8—Illustrating the tourist's limousine that did not have sufficient baggage space

The Chemistry of Cylinder Oils



Nomenclature Not Borne Out by Analysis in Heavy, Light and Medium Oils of the Same Make and Brand

Part V

Being the fifth of a series of articles on cylinder oils which will appear from week to week. Discussions are invited and the columns of THE AUTOMOBILE *are open to pertinent criticisms.*

By W. Jones

IN this article we give the analysis of 28 samples of oil. These samples were all obtained in Detroit, and, with the exception of the last three, or brand N, are supposed to be the same oils as those published last week. They come to us under the same name and grade. While the brands are all represented, the different grades are not all present. This is on account of it being extremely difficult to obtain samples of oil from dealers, for analysis. Just why this objection should exist, we do not understand, except that the oils being handled are not what they are represented to be. That this may be the case seems highly probable, and this view is well borne out when we compare the Detroit samples with the New York samples, or we may even say when we look over the table of Detroit analysis.

We will first make a little comparison between the two tables. In table B which appeared in the November 21 issue of THE AUTOMOBILE, and which shows the New York oils, we have in brand A, eight samples or grades, and these same eight grades are shown in table C, which gives the oil as obtained in Detroit. The gravities in these two lots of oils are fairly well alike, and we think as close as might be expected in commercial samples. When we come to the viscosities at 80 degrees Fahrenheit, more difference is shown; the two white oils being considerably thicker in table B than in table C. Coming to Nos. 1, 2 and 3, we find the reverse; table B being made up of thinner oils than table C. **But when we come to No. 6, the extra-heavy oil, we have a difference which is so great that we can hardly think it is the same oil, or anything like it.** This is also shown in the flash and fire points. However, taking this brand as a whole, with the exception of this last sample, these oils agree fairly well.

In brand B, there is only one grade of **this oil put up.** This oil is well represented as we have **two samples from** each city, but it is strange that in **New York the oil is** heavier than in Detroit, although the **first sample is about** the same as the second one in Detroit. **In this brand, the** first sample on the New York table is a **sample direct from** the works, and we therefore consider **this the correct oil.** This agrees with the second sample from **Detroit. The other** two are simply mixed oils and not this **oil at all, one being** lighter and the other heavier. Consider**ing the parties who** put these oils up, we think there is but **little doubt that it** can be obtained of the same quality all **the time, or very** nearly so.

In brand C, we have Nos. 1, 2 and 3, **or light, medium and** heavy, in duplicate from New York, **and the same three** grades from Detroit. The first three in the New York table are from the parties who put up the oils. The others are not. The second three New York oils are heavier, while of the three Detroit oils Nos. 1 and 3 are simply absurd imitations.

In brand D there is only one grade put up. The sample in the New York table is from the makers, and although a little thinner than that from Detroit, the two agree very well.

In brand E we have in table B Nos. 1, 2 and 3, and in table C only Nos. 1 and 2. The makers of this brand of oil in New York refused to give any samples for analysis. The samples, however, were obtained, with their labels (the labels of the makers) and as far as we could see came from their works. These are shown in the New York samples. **In these samples light, medium and heavy do not seem to mean much of anything, as the medium seems to be lighter than the light. Turning to the Detroit table, we find both No. 1 and No. 2 to be absolutely the same oil, which does not agree very well with any of the New York grades.**

In brand F, we have in table B three samples Nos. 1 and 2; No. 2 being in duplicate. They are supposed to be the same oil, with the exception that the second No. 2 has had an acid treatment, while the first has not. This acid was found in the oil, as it seems that it can never be wholly removed. The analysis of these two samples show them to be practically the same oil in all respects, but when we turn to the Detroit sample, there does not appear to be the least resemblance, except in the gravity, and we do not think it would take much stretch of the imagination to say that this oil is the same as the last two, or brand E in the Detroit oils.

In brand G, we have for comparison Nos. 1 and 2. In both cases, both New York and Detroit, the oils come through dealers, so there can be no certainty as to what we have. However, the three New York oils seem to run fairly well from light to heavy, and would appear to agree very well with the three grades in other brands. Turning to the Detroit table, we have Nos. 1 and 2, but do not find the least resemblance to the New York samples, while in No. 1 we again have the same oil as in the last two brands, No. 2 being a very different oil, as is shown by the gravity and the viscosity, and also by the fact that it does not contain any sulphuric acid, while all the others do.

In brand H we find three samples from the oil company in the New York table, and only No. 2 from the Detroit company. These two No. 2 samples we find to vary all the way through, and also find that the three New York oils have had no acid treatment, while those from Detroit have had it, ıd again we do not hesitate to say that this is the same ıl that we have had in E, F and G.

In brand I, we have three samples on the New York table, ·hich came from the oil company. **The viscosity in these amples show a wider variation than in any other oils we ave had.** In the No. 3, or what is marked heavy oil, the iscosity is 54.6428, and in these three oils No. 1 has had cid treatment and contains sulphuric acid, while Nos. 2 and have not been so treated. Now, when we compare this Vo. 3 oil with the No. 3 we have in the Detroit table, we ınd a viscosity of only 4.8214. This, at first sight we thought night be a mistake in the marking of the oil before being ·ent; but it does not agree even with No. 1, except in gravity.

In brand J, we are again not sure of our samples. The New York samples came through a large dealer, but were ıot original samples. Therefore there is doubt as to their ɔeing true samples. The two New York samples are very much alike, partcularly as to viscosity. The two from Detroit are also very much alike, but differ very much from New York, both in gravity and viscosity. Neither of the two New York samples contain sulphuric acid, while both samples from Detroit are full of it.

In brand K, we have only one oil for comparison, No. 2. These oils are very different, not only in gravity and viscosity, but also in that the New York oil does not show sulphuric acid, while the sample from Detroit does.

In the Detroit oils if we compare the brands I, J and K together, and note the fact that they contain about the same amount of sulphuric acid, it would look as though they were practically the same oils, and we will further say that we think they are **the same oils that we had in E, F and H, only mixed with a little lighter oil.**

Brand L, contains only one grade, and we have the same grade from both New York and Detroit, but as neither are original samples, again, we are not sure of them, although the New York sample came through a large dealer and we think is all right, and as we come to the bottom of the list, it is somewhat of a relief to have two samples from the two cities, which are very nearly alike, and without acid.

We notice two points in these two lots of oils. First, the carbon figures in the Detroit oils as a whole are lower than those we had in New York. This would seem to be largely due to the oils from brand E to K being practically the same oil, and an oil giving a low carbon.

The second point, which is due to the same cause, is the large number of Detroit oils which have sulphuric acid in them. We have in the twenty-eight samples fourteen which have the acid, while in the New York samples there are only eight out of forty samples carrying the acid, and in four of these there are only traces. This acid, of course, has been added in the treatment of the oil, and it seems that after this acid treatment, it is not possible to remove the acid entirely, by washing. This small amount of sulphuric acid does not appear to be any more harmful than to slightly corrode the cylinder, and this corrosion is not very heavy, but its presence is an easy means of deciding between an acid and non-acid treated oil, and if we are expecting to get a certain oil which we know is a non-acid oil and get one containing acid, we are certain we are not getting the oil we expected. It makes no difference if the dealer considers the oil just as good or even better. When a certain make of oil is called for, that is what we should get. That this is not always the case, may be shown in the following.

In the New York oils we have the acid, present only in the eight cases shown in the table, while in the Detroit oils we have it in many more oils which are supposed to be the same. The brands of oils in the New York table which show this acid also show it in the Detroit table, and in addition to these, the Detroit oils show it in the following brands where the New York table does not.

Brand A, No. 2; brand C, Nos. 1 and 3; brand E, No. 1; brand F, No. 2; brand G, No. 1; brand H, No. 2; brand I, No. 1; brand J, No. 1, and brand K, No. 2.

Here we have a list of ten oils, which by this one test alone cannot be the same oils as those obtained in New York under the same names. Therefore, unless you are dealing with a reliable party, it is useless to think you are getting what you want, or what you are paying for, and, as in the case of the Detroit oils, where without doubt many of the oils came out of the same lot or barrel, you may be getting the same oil you want as far as the label is concerned, and no more.

(To be continued.)

TABLE C—ANALYSES OF AUTOMOBILE CYLINDER OILS—BY. W. JONES

Brand A	Specific Gravity	Specific Viscosity at 80° F.	Specific Viscosity at 212° F.	Specific Viscosity at 350° F.	Carbon per cent	Flash Point °F	Fire Point °F
No. 1a	0.8650	3.5714	1.2500	1.0714	0.37	434	478
" 2a	0.8838	3.2143	1.2143	1.0535	0.36	404	448
" 1	0.8993	3.5714	1.3214	1.0892	0.31	388	452
" 2	0.9034	4.8214	1.3571	1.0357	0.58	406	468
" 3	0.8992	7.5000	1.3928	1.0535	0.75	422	474
" 4	0.8995	4.5714	1.3571	1.0535	0.52	410	470
" 5	0.9098	4.9642	1.2875	1.0535	0.75	406	458
" 6	0.8837	22.1430	2.0357	1.1250	1.05	478	536
Brand B.							
No. 2	0.8985	3.5714	1.2857	.....	0.95	408	454
" 2	0.9003	4.6785	1.3571	1.0357	0.80	406	456
Brand C.							
No. 1	0.8765	8.5000	1.3928	1.0535	0.76	432	488
" 2	0.8689	3.7143	1.2857	1.0535	0.40	434	494
" 3	0.8797	11.8571	1.5714	1.1250	0.94	460	518
Brand D.							
No. 1	0.8727	4.7857	1.3571	1.0714	0.51	436	510
Brand E.							
No. 1	0.8762	5.8928	1.3928	1.0714	0.45	434	508
" 2	0.8768	5.8928	1.3928	1.0714	0.45	442	594
Brand F.							
No. 2	0.8760	5.8571	1.3928	1.0714	0.42	448	510
Brand G.							
No. 1	0.8765	5.7142	1.3571	1.0714	0.48	446	506
" 2	0.8856	6.2500	1.4285	1.0714	0.39	452	518
Brand H.							
No. 2	0.8768	5.8928	1.3928	1.0714	0.32	442	506
Brand I.							
No. 3	0.8765	4.8214	1.3928	1.0714	0.32	442	506
Brand J.							
No. 1	0.8765	4.6857	1.3928	1.0535	0.30	442	500
" 2	0.8763	4.6785	1.3571	1.0714	0.42	440	506
Brand K.							
No. 2	0.8768	4.9285	1.3214	1.0714	0.33	442	508
Brand L.							
No. 1	0.8706	3.0000	1.2500	1.0535	0.40	410	460
Brand N.							
No. 2a	0.8669	4.6428	1.3750	1.0714	0.25	444	504
" 3a	0.8699	9.2857	1.5892	1.1071	0.30	456	516
" 2	0.8766	5.2143	1.3392	1.0714	0.50	440	502

The Joining of Metals

A Description of the Three Groups of Processes, by Means of Which Metal Parts May Be United

Ordinary Cementing, Autogenous Fusing and Cementing Under Pressure Are Applied in Different Instances

Extract from a paper read before the British Institute of Metals by Alexander E. Tucker, F. I. C.

THE methods in practical use for joining metals may be divided in the order of their importance as follows:

1. **By metallic cements,** such as tinman's or brazing solder, which have to be brought to the plastic or liquid state, and whose constituents should be capable of alloying perfectly with the metals to be joined.
2. **By autogenous fusing,** in which the two parts are heated and liquid metal of the same character run around the mass, or the parts are heated to fusing point, and the surfaces worked together by pressure or hammering.
3. **By the use of a cementing metal under pressure,** generally that of a rolling-mill, and at ordinary or only slightly raised temperatures.

In respect to the first method, it is obvious that the fusion point of the solder must be lower than that of the articles to be joined, and as, speaking generally, the higher the melting point the stronger the solder, it follows that **it is desirable that a solder or brazing spelter should be used whenever possible, the melting point of which is only a few degrees less than that of the metals to be joined. The solder should also have, if possible, the same characteristics, such as malleability, color and hardness.** Such conditions imply greater skill on the part of the operator, but the union will be the more perfect, and the process under such conditions more nearly approaches autogenous soldering.

Tinman's Solder—Field and Use

Tinman's Solder—In the use of this care should be especially taken to avoid the presence of zinc, and in certain cases even a trace of zinc is especially prejudicial; it thickens the solder, and probably on account of its liability to oxidation forms a superficial scum which the ordinary spirits of salt is incapable of dissolving. If the presence of zinc be suspected, the addition of a few drops of acid will help greatly. Antimony is frequently present in tinman's solder—this, by forming a cement of higher tensile strength, may, under special conditions, make a joint of greater strength. **In the use of solder—either soft solder or brazing solder—it is clearly the correct method to raise the work to the highest temperature that the solder and the work will stand, because under such conditions the penetration of the solder into the surfaces to be joined will be better, and further, the soldering medium may then be squeezed out to the maximum from between the surfaces by suitable means, and hence the requirement can be met, that the thinner the layer of cementing material and the closer the surfaces are together, the stronger the join. Additional strength, because of the additional intimacy effected, may be given to the work by rubbing the surfaces carrying the liquid solder together;** in the same way it is always well to rub the soldering iron, when possible, over the work when it is used, the wetting of the surfaces is then more perfect, and no stripping of the solder is possible when this rubbing is done. In order to obtain a lower melting point in tin solder, bismuth, and sometimes cadmium, is added. Such solders are used for delicate work, as is occasionally required for electrical fittings.

Bicycles have been built in which the tubing was fixed in the respective lugs with soft solder instead of the ordinary brazing. They stood every test.

The conditions here are very different from those in the case of the brazing of brass and copper, because it happens that all the metals employed in brazing and tinman's solders destroy the character of the steel they are intended to join if they are heated sufficiently with the steel, while they have no corresponding injurious effect when used for brass or copper work.

When soft solder is used the thin gauge tubing is not so likely to be spoiled by deteriorating action on the steel, or by being oxidized at the heat necessary for brazing; and, further, on account of the greater liquidity of the soft solder, it will, when properly applied, sink into the small annular space between the lugs, etc., and the tubes more completely than can be expected with the more viscous flux and brazing solder. The reasons that soft solder is not used for such work are, firstly, because the heat of the enameling stoves makes its use risky, and secondly, popular prejudice—a soft soldering frame sounding badly to the untechnical layman.

It is a common habit of workmen, and amateurs who have soft soldering to do, to depend on the ordinary bit, when they might **use a Bunsen or blowpipe. These, in many cases, would heat the work more generally than is possible with the bit, and would allow of the penetration of the solder into the surfaces, and the subsequent squeezing out of the excess of solder.** . . .

On the other hand, many forms of soldering bits are now in use, in which a Bunsen burner connected with a light flexible tube is employed to heat the bit, and the flame can be conveniently made to heat the work as well. This form of soldering iron has many advantages. One of the best fluxes I have found for ordinary soldering can be easily made by macerating flux skimmings from galvanizing pots with weak hydrochloric acid. On filtering, the solution is ready for use, and is an ideal flux, because of the chloride of ammonia present with the chloride of zinc. No iron or lead is dissolved if the acid added is not in excess. Solder is often used in the form of granules or strips of various sizes, and in this form is very convenient for routine work. In the case of spectacle frames or other light articles a large amount of work can be prepared, on each of which a small piece of solder, either in the form of a granule or a strip, is placed with flux on the part to be joined. The articles are then put in a tray, which is afterward taken to a muffle working at a convenient heat, or in some cases it is sufficient to put the work on a metal plate, heated by a gas flame or even a spirit lamp. Brass tubes are often made by bending the strip through dies and fixing a wire of suitable composition in the overlap with borax, or the borax may be mixed with finely granulated spelter. On passing the work through a furnace to raise it to a red heat, the spelter runs perfectly and a good join is made. The flux is then dissolved off the work and the tubes are finished by drawing through dies with or without a mandrel.

The best brazing, if it may be properly so termed, is done with "silver solder," thus the blading used in turbines is all fixed with silver solder. It is, of course, of the utmost importance that the small pieces used in the construction of turbine motors shall be immovably fixed and cemented in position, on account of the heat and centrifugal strain to which they are subjected. Various silver alloys are used, but they are generally about 60 of silver, 23 of copper and 17 of zinc, the flux used being borax, or borax and carbonate of soda. Such a mixture is remarkably liquid when in the molten state, and on this account penetrates interstices which ordinary brazing spelter would fail to fill.

Composition of Brazing Solder

Brazing Solder—**The composition of ordinary brazing solder ranges** within wide limits; the analyses of samples I have examined show **a variation from 61 to 33 per cent. of copper and 39 to 67 per cent. of zinc. The tin may vary from nil to 14 per cent. and the lead from nil to as much as 3 per cent. Any of such metals may be and are used for brazing, in accordance with the character and requirements of the work to be done. The higher the percentage of copper the higher the melting point, and the higher the percentage of tin the lighter the color.** We thus have a very large series of alloys available for very varied requirements. The presence of other metals when in small amounts is often of no consequence in the brazing of brass or copper, though obviously in all cases it is very desirable in important work, such as the brazing of high-pressure steam-pipes or where great strength is required, that the composition of the brazing metal shall approach as closely as possible to that of the metal to be joined, as only under such conditions can the maximum strength of the joint be obtained, and it is the non-observance of these conditions which has led to disaster. The skill of the workman is often limited to the fluxing of the solder, and seldom extends to an appreciation of its composition.

When, however, we come to brazing iron and steel the importance of purity is very much greater, and I have found the presence of tin in brazing solder intended for bicycle frames to be very injurious. The explanation is probably to be found in the extraordinary deleterious effect of tin on iron and steel. It is well known that a very small amount of tin scrap, if allowed to get into a bath of molten steel, will make it very red short, and when brazing solder containing as little as 0.5 per cent. of tin is used for brazing bicycle frames I have found that the joints are very unsatisfactory and unsafe.

An ingenious method of making a brazed joint is by connecting the two parts to be joined with the terminals of a suitable dynamo. On account of the local resistance the two parts become heated, and if suitable brass wire is wrapped round the object and the whole surrounded with a reducing gas, such as hydrogen or coal gas, a very perfect joint is obtained without any borax or other fluxing medium.

The reducing gas under such conditions will ensure the absence of any oxide of iron or other metal used, and no previous cleaning is required. Such method of joining has the great advantage that there is no borax to remove from the joint. On account of its great hardness this removal of borax is a serious matter, and much money has been spent on experiments to remove it by pickling and other methods. It is best removed by sand-blasting, the whole frame being so treated leaving an excellent surface, on account of its roughness, for enameling.

Liquid Brazing—Several patents have been taken out for details of apparatus in which a bath of brazing spelter has been kept liquid. The parts to be joined are dipped in the molten metal, the metal being prevented from adhering to the parts that have not to be brazed by applying a coating of blacking to them. The advantage of this method consists in the fact that less metal is used in making the joint, as so little is lost in applying it, and also the heat is general on the joint instead of being local, and I have no doubt that on routine work the consumption of gas for heating is less than when blow-pipes are used, and, of course, blast is not required.

Brazing by Copper-Wire Pieces

A modification of brazing is the use of copper in the form of sheet or wire. Under the Simpson patents tools are thus made in which the cutting part is a small piece of high speed or other steel, while the shank is mild steel or iron. In making, say, a lathe tool by this process, a bar of square mild steel is taken, and a channel planned or milled out on it in which a suitable square piece of high-speed steel fits. The two or three sides being clean, strips of copper are fitted in with a special flux, and the whole highly heated to the fusing point of the copper. After welding, the compound tool is cleaned up and treated for hardening and tempering in the ordinary way. There are some features about this process of building up tools which seem to have considerable merit. First, if ordinary brazing were used, the hardening of many tools implies such a temperature as would often destroy an ordinary brazed point. The zinc would possibly be volatilized, which is not the case when copper alone is used, the temperature of fusion of the copper being so much higher. Secondly, it is conceivable that the weld would be considerably stronger than with an alloy of zinc, because while copper alloys to a considerable extent with iron, the same cannot be said of zinc, which therefore under such circumstances would become a deteriorating element. Thirdly, the saving of expensive material, such as alloy steel, must be considerable in the case of heavy machine tools, as only a small portion of metal is ever in actual use. In a sense, therefore, the shank becomes a tool-holder without the disadvantages of the latter in respect to unsteadiness, difficulty of setting, etc. The process lends itself to many interesting applications, thus milling cutters may be made having a core of mild steel instead of tool steel. Hardening and tempering such cutters is a source of much difficulty and loss through distortion and cracking, and if the compound cutters can be so produced the possible economy should be considerable. There is no doubt as to the perfection of the join, as I have seen pieces of steel joined by the process which on splitting did not part at the weld, the original metal appearing to be the weaker material.

A process has been invented by F. Pich (Berlin) for the hard brazing of cast iron in a smith's hearth. The patent consists in the decarbonization during brazing of the cast iron surfaces to be united, and in bringing at the same time the molten brass solder into close contact with the cast iron surfaces which are decarburized, but without exposure to the air. For the decarburization of the surfaces copper oxide is used, which is mixed with borax, as a flux, until it has the consistency of a paste. This is applied to the surfaces to be joined, which must first be carefully cleaned. The cast iron pieces are then firmly tied together with wire and heated. The borax first melts, protecting the surfaces from oxidation, and taking up any oxide that may be still clinging to them. It also precludes the attacking of the copper oxide by the oxygen of the air. As the heating proceeds the copper oxide fuses and gives up to the now red-hot surfaces its oxygen, which combines with the graphite of the cast iron forming carbon monoxide and dioxide, while the metallic copper is set free in a very finely divided state. This alloys with the brass solder as it melts when strewn on, and the new alloy combines with the decarburized iron of the surfaces which it is desired to join.

Specimens of cast iron united by this method were prepared and subjected to tensile and breaking tests, and a **summary of all the results shows that when the brazing of cast iron pieces is carefully performed according to the details given by Pich, the strength of the pieces so joined is virtually equal to that of the solid material.**

As is well known numerous patents have been taken out, and numerous mysterious mixtures have been advertised for the so-called soldering of aluminum. In nearly every case the result is that, while fairly satisfactory for a short time, the join failed after a time, varying from a few days to some months. **One of the most severe tests to which such joins in aluminum can be subjected is that of warm steam. Joins which look well and are apparently mechanically strong, fail rapidly when submitted to this test.** In all soldering, it is obvious that the flux used must efficiently clean the surfaces of the metals to be joined, otherwise no alloying of the solder used with the surfaces is possible. In the case of aluminum very few materials adapted for such fluxes are available, the requirement being that they shall absorb oxide of aluminum. Another detail of importance is the great heat conducting power of the metal. A consideration of the results obtained with all the so-called solders of aluminum shows that the metal is so susceptible to electrical action and oxidation that the use of any metal in which aluminum itself does not preponderate is hopeless. The best results have invariably been obtained when the solder was of the same composition as the material to be joined. This condition involves the principle of autogenous soldering, which will be subsequently dealt with. The best flux used is a mixture of alkaline aluminum chloride, with the addition of fluorides, such as potassium fluoride or calcium fluoride. When these are mixed in suitable proportions and damped with alcohol, and heated on a strip of aluminum, the surface of the metal is cleaned perfectly. It therefore follows that if two surfaces of aluminum are so cleaned, and an alloy containing a high percentage of aluminum, with such addition of other melted metal as will reduce its melting point slightly below that of pure aluminum, applied with the flux named, that a very satisfactory join will be obtained. The heat such as from a spirit-lamp or Bunsen burner must, however, be applied from below the work. I have seen such joins made over a spirit-lamp which stood every test, including that of the steam test.

Difficulties arise from the presence of high percentages of aluminum in alloys in connection with soft soldering. These may be largely overcome by coating them electrically with copper. The following directions for soft soldering their alloys, containing from 5 to 10 per cent. of aluminum, have been issued by an electric smelting company:

"Cleanse well from dirt and grease. Then place the part to be soldered in a strong solution of sulphate of copper, and place in the bath a rod of soft iron, touching the parts to be joined. After a while a copper-like surface will be seen on the metal; remove it from the bath, rinse quite clean and brighten the surfaces. The surfaces can then be tinned in the ordinary way."

Uniting Lead Joints by Heat

It is obvious that these directions are intended to be used only where an ordinary electrotyping plant is not available.

The second method of joining metals referred to is that of autogenous fusion or running liquid metal of similar character on the surfaces to be joined, and in its simplest form is very old. It is illustrated in the case of repairing broken rolls and in lead-burning. It has been a practice for the broken surfaces of rolls to be cut away to give room for the new metal. The whole roll is then heated and hottest possible metal run into the intervening space, with suitable headers to allow of escaping gases. I have seen very successful jobs made under these circumstances, and the system is obviously applicable to many other cases.

In the wiping of lead joints for water services we have an example of semi-fusion welding, for, as is well known, the metal used, invariably a mixture containing a high percentage of tin—lead 33 and tin 67—is always in the plastic state during the operation. Great skill is shown by the workman who frequently makes his own metal, not only in so adjusting the addition of the tin that he can tell by its appearance whether he is right or wrong, but also in his use of it, because the heat at which he applies it has to be adapted to the work in hand, and judgment must be further exercised in seeing that the successive layers he applies are really melted or crystallized on to the preceding chilled ones without any "cold shutting." This process of wiping a joint looks very simple, but undoubtedly it requires a great deal of experience and observation for its successful practice, and many branches of plumbing in which the various pieces of lead are joined show a very high order of technical and manipulative skill. On the other hand, I am told by good practical men that if they had their choice there are many cases where they would not wipe the joints. Thus, if a union or cock has to be fixed in a lead pipe, the pipe can be coned or socketed and tinned inside, and if the union or cock to be fixed is also tinned and driven in the pipe, and tinman's solder with extra tin be melted in the annular space with a soldering-iron and finished with a blowpipe, a perfectly satisfactory join results. I think that this is so is obvious, as the bursting strength is clearly greater at such a point than that of the pipe itself. It is also obvious that the bursting strength of most of the wiped joints is unnecessarily greater than that of the pipe on which they are made, and so expensive metal is correspondingly wasted. Two ends of lead pipe may be joined perfectly by fitting one into the other and tinning both surfaces and using solder, as above mentioned. Such joints, however, are not recognized in England by public authorities, though I have often seen them, with variations of detail, on the Continent. Thus I have seen a tinned brass tube inserted in the two ends and the whole soldered up—this makes a very neat and cheap job.

History of Autogenous Fusion

The application of autogenous welding by acetylene hydrogen, benzol, petrol or other hydrocarbon vapor to commercial purposes has extended enormously during the past few years, and constructions and work are now possible by the use of such methods which could not be carried out by any other means, thus repair work of ferrous and non-ferrous metals is now done in every town of importance and tubes of all sizes are made on a very large scale. For branch pipe construction the process is quite unrivaled. For high-pressure steam-pipes the joints after screwing are often welded up, and metal vessels instead of being made with folded joints are now made with the blowpipe more cheaply and far more efficiently. **Lead burning forms an excellent practice for acetylene welding, as it is fusion welding in the simplest form. It is usually carried out with hydrogen and air, and if the workman can make a good joint with and without a stick of lead it is a very easy step for him to advance to making one of aluminum or steel, or any metal.** Lead burning, which at that time seems to have been also known as "autogenous soldering," was first introduced about 1833 by Mr. Mallet, although the invention was also claimed by Professor Daniel, of King's College, and Mr. Thomas Spencer, of Liverpool, read a paper "On the Theory and Practice of Soldering Metals," before the Liverpool Polytechnic Society in 1840, in which he also claimed the discovery of the process. The advantages of such soldering were at once appreciated, especially for chemical works. The objections to ordinary tinman's solder were the great local action set up by varied metals used; and further, the contraction and expansion of the solder under the influence of heat is different to that of the lead which it joins, and so leaks are much more likely to develop.

Fletcher, of Warrington, was the first to introduce autogenous welding. This was in 1888, but he had no commercial success, partly on account of the low heating power of the oxygen and coal gas which he employed, and, secondly, on account of the poor quality of the oxygen at his disposal. Further, the blowpipe used was very imperfect; there was great difficulty in maintaining a uniformly reducing flame. The first practical success with fusion welding was obtained by the late Felix Jottrand, of the Oxyhydric Company of Brussels, who also introduced the first commercially successful application of oxygen for the opposite purpose, namely, the cutting of iron with oxygen, a process also previously demonstrated by Fletcher.

Jottrand's success was undoubtedly due to the fact that the gas employed by him was made by the electrolysis of water, and so was of high quality, and his blowpipe, though complicated, was very efficient. It is still a disputed point whether under some conditions his method with oxyhydrogen is not better than oxyacetylene. In either case it is important that the oxygen used be considerably less than the theoretical amount required, in order that although only a lower flame temperature is available the flame will always be reduced in character. **Benzol, petrol and other hydrocarbons have been recently used in place of hydrogen and acetylene for autogenous welding, and their use would under certain conditions have advantages.**

In practice I have found that a proportion of four volumes of acetylene to five of oxygen gives much better results than the theoretical two volumes of acetylene to five of oxygen. So important is this detail that blowpipes are now generally constructed to consistently maintain a reducing flame. Such a blowpipe is that of the Drager-Greishiem. In this blowpipe the automatic reducing valves on the cylinders are fitted with gauges, which instead of being graduated to pressure are marked with the thickness of the material to be welded—all, therefore, that is necessary is for the workman to adjust the springs on both regulators, so that both gases indicate the same thickness. A simple mechanical mixer is arranged on the blowpipe, making the whole apparatus very practical and convenient.

A characteristic of the oxyacetylene flame is that it indicates the correct mixture, for when the acetylene is in excess a small green cap appears over the inner cone of the flame. On reducing the oxygen there is a point at which the cap disappears. The right mixture is just at this point, and the effect is so distinct that when working with acetylene the workman has no excuse for not getting the right proportion.

If temperature were the only consideration, the oxy-acetylene process would be used in all cases in the working of thin metal, but its use requires much greater skill than the lower heat of the oxy-hydrogen flame. Then again, when a fixed acetylene generator is not available, the risk and danger of a portable generator is considerable, and in such cases for oxy-acetylene welding "dissolved" acetylene only should be used. On the other hand, this is very expensive, and the apparatus is heavy, and it therefore follows that the oxy-hydrogen method with its complete portability is very often to be preferred, because hydrogen can be obtained in the usual bottles, and thus forms very convenient plant.

In welding metals other than iron, not only the melting point but the heat conductivity of the metal must be considered. Thus copper with its high conductivity and its low melting point can hardly be worked with the oxy-hydrogen flame. Indeed, for the same section as iron it requires a much more powerful oxy-acetylene flame. Brass, bronze, and indeed any metal, may be autogenously welded, and many require much less care than that for aluminum.

The conditions of success which apply to all welding with acetylene or other hydrocarbons are: (1) the use of pure gases; (2) the use of a metal rod of approximately the same composition as that of the work to be joined; (3) the thorough fusion of the inside surfaces before the additional metal is applied; (4) cleanliness of the parts, and when desirable the use of suitable dioxidizing and fluxing powders, such as charcoal and borax, and lastly, the use of a blowpipe capable of complete control in respect to size of flame and proportion of mixture. With extended experience in the autogenous joining of non-ferrous metals, it is to be expected that this method will replace ordinary brazing where quality of work is of the first importance.

Welding of Alloy Steel Described

It should be noticed that in consequence of the highly local heating action of acetylene, contraction strains are likely to be set up, which may be more serious than those occasioned when the whole work is heated and welded up in the smith's fire in the ordinary way. In the case of cast iron, it is very desirable that such strains should be avoided by making the weld first and then reheating the mass as much as possible, and cooling slowly. With respect to steel, it has been repeatedly shown that an acetylene or electric weld should not be hammered while the weld is being made. It is well known that cracks are likely to be made by hammering the metal at a black heat, a temperature occurring quite close to the point of fusion. The work, therefore, should be allowed to cool slowly and then raised to a high temperature in the ordinary way and not by the blowpipe; the weld can in this way be much improved both in shape and strength. A good fusion weld very seldom breaks at the point of welding—indicating, therefore, that this point is stronger than the neighboring metal. I believe this is the explanation of the paradoxical effect noticed with fusion welding, that thick sections never give as high a tensile strength as thin. I have figures showing this.

Thus .167 inch 3 per cent. nickel steel strips gave 97 per cent. strength, 1.25 inch gave 90 per cent., while 1 inch bars broke at 60 per cent. to 70 per cent., with the fracture clear of the weld every time. Again, welded .5 inch copper rods drawn down to .375 inch in the ordinary way gave regularly 95 to 97 per cent. as compared with the original drawn rod.

There is an interesting series of processes for the autogenous joining of metals, most of which are patented, which depend on the reducing power of aluminium. **Anyone who has seen the application of the Goldschmidt or**

Thermit process to the joining of the ends of tram-rails can hardly fail to be struck by its extreme beauty and simplicity. We have here a small steel foundry not much larger than a silk hat, from which the metal pours in a perfectly liquid state.

As showing the great heat obtainable when aluminium powder is used for welding, it may be mentioned that if a wrought iron plate 1 inch thick is placed under the crucible, the liquid metal when tapped will burn a hole straight through it, leaving a fairly smooth edge. Experiments show that the heat of the molten metal approaches 3,000 degrees Centigrade, the temperature of a Siemens furnace being about 1,600 degrees Centigrade.

It is very probable that in point of strength most Thermit welds are superior to those electrically made, because the volume of heat is greater if not more intense, and, again, there is less risk of the original surfaces being burnt or oxidized. The Thermit metal can also be adjusted to carry reducing media, which would quite eliminate any oxidizing influences.

A third system of autogenous welding is the electric, of which two methods are in use—namely, arc welding and resistance welding.

Arc welding is applied for repairing breakages and filling up flaws in castings, while resistance welding is rapidly being adopted for the working up of metal articles, and it is common to find electric plant in operation for sheet-iron working. Two forms of machines are on the market for this purpose, one known as the Spot-welding Machine, and another for Butt-welding. In the spot-welding machine the sheets are joined at spots instead of rivets, hence the name. The electrodes are shaped in accordance with the work to be done, and are put onto the work by pressure effected by a foot-lever, and the current, which is automatically switched on at low potential, welds the parts together at that point. After removing the foot-lever the work can be moved along for welding at a new point.

The entire process is so rapid that an unskilled workman is able to make 1,000 welds per hour on plain sheets, while in the same time an experienced hand could hardly put together a quarter as many rivets. The up-and-down movement of the upper electrode may be performed automatically by means of a motor electrically worked. The electrode then falls and rises at regular adjustable intervals, and the workman only has to move the pieces of work.

This machine may also be applied on water-tight welding. In this case the travel of the work takes place slowly, so that the points of welding lie close together, forming an unbroken seam. The edges of the sheets are completely softened, and are pressed together seamlessly. Similarly, when the sheets are not too thick, and irregular shaped sections do not have to be dealt with, the spot-welding machine makes a very satisfactory weld. Thus wheel rims for cycles and motor-cars can be joined perfectly by its means, while the advantage of this system for welding handles on covers, or for welding rings on cooking utensils, etc., are conspicuous. In the same way half-stampings, such as kettle spouts, make up to a very satisfactory job with seamless welding.

Spot-welding is coming into very extensive use for the manufacture of kettles, buckets and similar articles in which the surface is required to be joined only in parts.

In the case of kettles intended for enamelling the old form of riveting occasioned difficulties when the goods were enamelled, because the edges of the rivets and the edges of the sheet refused to take the enamel, or in such thin layers as to interfere with the appearance of the finished work. The difficulty has been avoided and riveting rendered unnecessary by fusing the parts which were formerly riveted by means of the electric arc. The two surfaces are fused together at the point at which the arc is applied, and the enamel can then be run on without any difficulty.

Again, in the manufacture of gas-stoves, where it is desirous to have a layer of air between two sheets in order to economize heat, spaced depressions are made by means of a blunt punch on the sheets, and the sheets put back to back. On applying the arc to the depressions the apices of the latter are fused together, after which the sheet or sheets are enamelled in the ordinary way.

The same process is applied to other goods in order to avoid riveting, and one other advantage is the one of greater permanency in point of mechanical strength, where the goods are alternately heated and cooled. Under this condition of heating and cooling, rivets were often becoming loose, and so occasioned trouble. Galvanized work can be spot-welded. The zinc volatizes off, leaving the iron exposed at the point where the dies come in contact with the metal.

The acting electrodes can be made into various shapes to suit special work. Thus, one can be made circular, freely movable on its axis, while the upper one may be formed of a circular piece of copper swung by a lever. Such electrodes are useful for welding short seams, such as triangular spouts of coffee pots, etc. As the pressure put upon the material is very high, it will be understood that there is hardly any difference in strength between the welded portions and the unwelded material.

Rubber and Carbon Dioxide

A GERMAN chemist, F. Steinitzer, has investigated the absorption of carbon dioxide by rubber and the passage of the gas through rubber membranes, from the standpoint of its use for the inflation of pneumatic tires. He finds that various qualities of rubber used for the purpose show different absorptive powers toward the gas, varying from about 25 cubic centimeters in the case of a heavily loaded gray inner-tube rubber, to 131 cubic centimeters in the case of a best red Para rubber per 100 grams of rubber. The samples were exposed in an atmosphere of dry carbon dioxide at a pressure of 1 kilogram to 1.5 kilogram per square centimeter for periods of from 5 to 8 days for the various tests referred to. Certain of the samples, notably the purer ones, became more or less tacky on absorbing carbon dioxide, and a decrease in tensile strength of from 12.6 to 27.5 per cent. was sustained. In the diffusion tests, the area of the test-piece was 22.3 square centimeters, and the pressure of the carbon dioxide on the high-pressure side 1 kilogram per square centimeter. Some time passed before diffusion began, after which its rate showed only a slight diminution in 10 days. The rate of diffusion increases with higher temperatures, being with sample No. 4 at 10 degrees, 15 degrees and 20 degrees, 0.00200 cubic centimeters, 0.00229 cubic centimeters and 0.00266 cubic centimeters respectively per square centimeter per hour. A solution of 10 to 15 parts of glycerine and 20 parts of glue in 100 parts of water is recommended for producing a thorough gastight coating on the inner surfaces of the tubes.—*Engineering*, Sept. 6.

Heat and Platinum Metals

IN the Proceedings of the Royal Society for 1912, Sir William Crookes gives the results of experiments suggested by his experience with an electric resistance furnace. He found in this apparatus, which consisted of a close helix of platinum strip around a porcelain tube, that the strip thinned and ultimately melted, and on the porcelain tube at the pont of rupture a deposit always occurred, which was found to consist of microscopic hexagonal crystals of platinum. He was thus led to examine the volatility of platinum and the allied metals at temperatures below their melting-points. The metal samples were heated in the electric furnace to 1300 degrees Centigrade for successive periods of 2 hours, when the loss of weight was found to be approximately proportional to the length of time of the heating.

After exposures to 1,300 degrees Centigrade, the platinum had not sensibly changed its appearance, the palladium gradually lost its smoothness and became crystalline with a *moiré* appearance, the iridium showed the same change in a higher degree, while the rhodium slightly darkened, but did not become crystalline. The ruthenium plate, which is very noteworthy for its high volatility, became dull black and was coated with oxide. With iridium, the amount of loss for equal periods of heating at temperatures between 1,100 degrees and 1,400 degrees Centigrade increased proportionally with the rise of temperature. With palladium the loss of weight was more rapid in the earlier stages and the blistered appearance of the metal indicated the escape of occluded gas.—*Engineering*, Sept. 6.

Lengthening the Wheelbase; Novel Valve Action Suggested; Why Five Cylinders Are Not Used; To Add Clutch to Ford Car; Changing Magneto and Camshaft to Chain Drive; A Tempory Spring Clip

Wants to Lengthen Wheelbase

EDITOR THE AUTOMOBILE:—I have a 1911 Regal Roadster which is 100-inch wheelbase and I want to make it 118-inch. The motor is 3 3-4 bore and 4 1-2 stroke. Kindly let me know how much additional power it will require.

Fitchburg, Mass. J. D. G.

—Your motor will have sufficient power to operate the car with the additional wheelbase. The change is not recommended, however, as it will be very expensive if done well, and if it is not done well will weaken your car to a considerable extent. Radical changes in a chassis which has been designed with the special intention of making the parts fit together in one harmonious whole should be avoided.

Running with Dead Cylinder

Editor THE AUTOMOBILE:—If in a four-cylinder four-cycle engine running at about 250 or 300 revolutions per minute with one cylinder disconnected, the petcock to that cylinder were opened, would it affect the speed of the engine, and, if so, would it increase or decrease the speed?

New York City, N. Y. L. E. HOWE.

—If the petcock were opened the speed would probably be decreased. This is true for the following reason. The opening of a petcock is so restricted that the cylinder on its upstroke would have to work against a large degree of compression due to the fact that the air could not escape through the opening rapidly enough. Were this compression maintained as it would be if the petcock were closed, the piston would be assisted on its downward stroke by the expansion of the air compressed on the upstroke. Instead of being aided, however, by the air the latter will have escaped to a large degree through the open petcock during the time the piston was near top dead center and going through the slowest part of the stroke. The result is that on the down stroke the piston will have to pull against a partial vacuum which will further retard its progress.

Wants Parts for the B.L.M. Car

Editor THE AUTOMOBILE:—Could you inform me where I can get parts for a B. L. M. runabout or who took over the stock of that company after they went out of business?

The office of this company was in Brooklyn and the car was made by three men by the name of Breese, Lawrence and Moulten. As far as I can find out this car was made abroad and assembled here. The car I have is the same as those that were entered in the Vanderbilt Cup Race held about 4 or 5 years ago.

Woodmere, L. I., N. Y. Q. F. DISHER.

—This concern went out of business and no one took over the stock or parts. P. H. Gill & Sons, 2 Lorraine street, Brooklyn, made a number of the parts for this car, however, and they may be able to assist you. The motor and several parts were made in Europe as you supposed and then assembled in this country.

Suggests Novel Valve Action

Editor THE AUTOMOBILE:—I have designed a valve action which is new and which I think would be silent as well as of long life. The method of actuating the valves is shown in the accompanying sketch, Fig. 1. It consists of a worm-driven transverse shaft upon which are located a series of eccentrics which are used for driving the rocker arms communicating motion to the valves.

On the end of the crankshaft is located a worm A which engages with the gear B, mounted above it. The gear B is mounted at the center of the transverse shaft C, and is keyed to the latter. As will be seen, the shaft C rotates in two long sleeve bearings and terminates with two cams or eccentrics at either end. The eccentrics D, E. F and G then operate the inlet and exhaust valves, as shown on the left side of the illustration. The eccentric T is connected in such a manner to R that the latter is free to oscillate and at the same time to communicate a reciprocating motion to the shaft S. Through the flexible connection M the bell crank lever O is actuated, moving the rocker arms L which in turn lift the push rods Q. The valve return is secured by the valve springs in the same manner as is customary when cams are used.

Philadelphia, Pa. J. M. WHITE.

Experience with Five Cylinders

Editor THE AUTOMOBILE:—For the benefit of some of your readers who wonder why five-cylinder engines are not used more extensively, I would like to tell of my experience with them and some reasons why they are not more popular.

A few years ago I had occasion to couple together five single cylinders and install in a cruiser. They were all mounted on a heavy cast-iron subbase with thin cranks set at a difference of 72 degrees. The forward cylinder retained its original balance wheel, the other being discarded. After installation I found that it was much superior to a four but in the same way that the four is superior to the three. I cannot say that it even equaled the six in any way whatever. (I am referring to four-cycle motors only.) It is true that in the five each explosion overlaps the next, but not sufficiently to produce the same constant torque that is produced by the six. The impulses in the six are numerous enough so that one does not finish its work before another has taken place and the piston on which it is acting is in a position to do its best, but in the five each piston arrives at the end of its useful stroke before the next one has taken a position where it can do much more than turn the balance wheel. For example, we will assume that we have a five-cylinder motor coupled to its maximum load, without a balance wheel, and we will create an explosion in a cylinder that has its crank enough past center (100) so that it could act. That explosion would turn the crankshaft 150 degrees where it would stop unless another explosion takes place to keep it moving. Now when the first crank passed the 144-degree mark another explosion will occur, but the second crank will not arrive at the 10-degree mark before the first one had lost its power, therefore it would not carry its load. In the six, however, on account of the impulses being only 120 degrees apart the load would be carried very easily, all other conditions being the same. The above figures, although not exact, illustrate a true condition. I think this proves that the five cannot equal the six for continuous torque.

There are other reasons why they are not more popular and I will mention the most important. The expense of manufacturing the crankshaft. When one stops to consider that the crankshaft is a pretty expensive unit and that two sizes can be turned out in the same time that one five can be turned out, he will not wonder why five-cylinder motors are not used.

For the benefit of those who might not understand why the six crankshaft is less expensive I will state that it has but three offsets on account of the cranks being paired together, while the five has five and cannot have any less.

Portland, Me. GROVER C. RICHARDS.

Wants Governor for Cadillac

Editor THE AUTOMOBILE:—Do you know of any governor that would be suitable for a one-cylinder Cadillac?

Niagara Falls, N. Y. R. N. PATTISON.

—An ordinary centrifugal governor could be used on a motor of this kind. Any competent machine shop can install one and the cost would be small. The governor could operate the throttle or it could be attached to the ignition and the motor governed by the hit-and-miss principle. That is to say, when the speed of the motor increases beyond what is required, the ignition is either switched off or short circuited so that there will be no explosion until the motor slows down again. The latter method is a little more expensive as to fuel because the charge is drawn in and exhausted without being burnt.

Lightness Lengthens Car's Life

Editor THE AUTOMOBILE:—Which is of longer life—conditions in both cases being the same, a roadster or a touring car, the chassis in either case being the same? Is not a roadster more economical in every respect, as regards upkeep, than a touring car? What is the most satisfactory arrangement of four forward speeds for country use?

Plattsburg, Mo. M. W. BOHART.

—Everything else being the same a car of lighter weight costs less to keep it up because the tires are not worn as quickly. A man who keeps a roadster and a touring car will find that at the end of year the touring car has cost him more because the expenses included in entertainment will have amounted to considerable more. Should it be necessary to carry three or more people, however, a touring car is necessary. There are many occasions where the owner of a roadster will be unable to accommodate guests whom he desires to take with him on a ride but as far as the expenses of running, such as fuel consumption, etc., are concerned, where the chassis are the same there will be no perceptible difference.

This is a question which has been provocative of lengthy discussion among very prominent engineers. You are referred to THE AUTOMOBILE of July 18, in which practice on this point was fully discussed. In specific answer to your question, however, it may be stated that the following ratios have given satisfaction:

Table No. 1

Speed	Trans. ratios	Ratios—engine to wheels
4	.86—1	3.01
3	1—1	3.5
2	1.76—1	6.16
1	3.4 —1	11.90
R	4.6 —1	16.10

Table No. 2

Speed	Trans. ratios	Ratios—engine to wheels
4	1—1	3.5
3	1.29—1	4.51
2	2.1 —1	7.35
1	3.76—1	13.16
R	4.57—1	15.99

The ratios given in table 2 are recommended because it will be seen that, when it is necessary to change from fourth to third, a speed is obtained which enables the car to go over the hill at a fairly good rate. The second in this is almost between the first and second of the others; consequently, if the car is fitted with a good clutch, the operation for all ordinary driving resolves itself down to a three-speed job (as the second can be used for starting on the level), leaving the extremely low first and reverse for emergency.

On Mounting of Ball Thrust

Editor THE AUTOMOBILE:—In your answer to J. J. Lessing, relating to mounting of ball thrust bearings in motor car clutch, in the issue of November 14 I perceived with some degree of interest the illustration, Fig. 2, showing a ball bearing in place, which you have, no doubt, intended to show your correspondent as a typical construction. The bearing shown is a single row type of the conventional annular pattern and merely supports the end of the shaft that telescopes into the hub of the clutch driving member. Bearings of this type are not suitable to re-

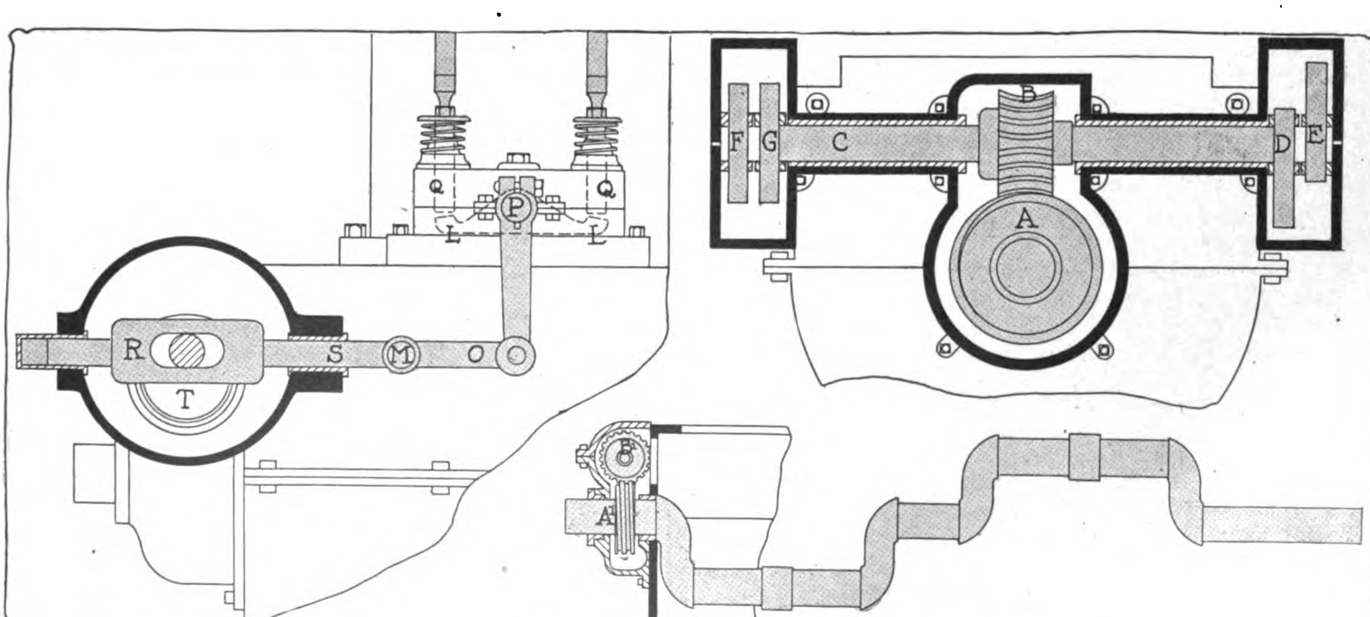


Fig. 1—Worm-driven valve action designed to silence motor. Three views are shown, end, rear and front

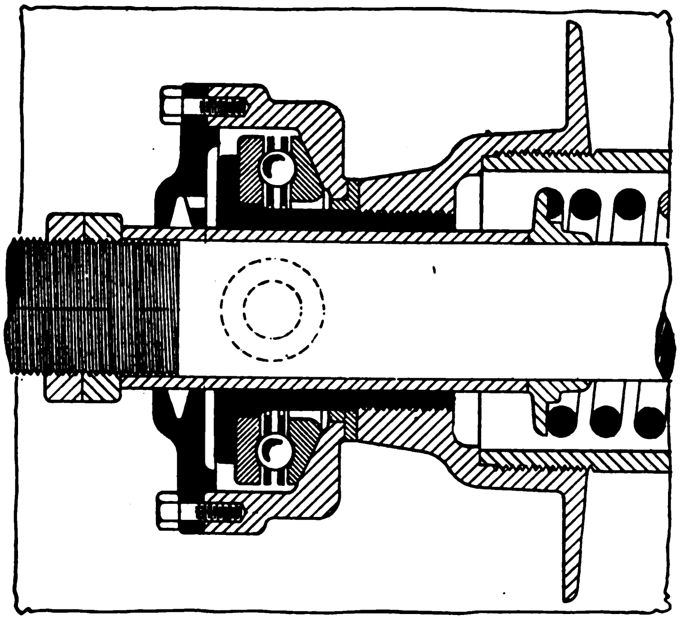


Fig. 2—Mounting of ball thrust on clutch explained below

sist end thrust greater than 25 per cent. of their radial load capacity, so it is difficult to understand how this bearing performs any other function than to support the end of the telescope shaft. No exception can be taken to the explanatory matter, but the illustration is misleading. In order to assist in making this matter clear, I am sending herewith illustration of a typical clutch and gearset assembly, showing clearly the application of a ball thrust bearing as ordinarily mounted. The clutch spring is usually installed so the thrust, when driving, will be self-contained; that is, the pressure of the spring does not exert any thrust against parts not turning with it.

In Fig. 5 you will note that the driving disks C are carried by a member E driven by the engine, while the driven disks revolve with a special member F keyed to the telescopic shaft and extending to the spring thrust abutment screwed on the extension. The clutch actuating spring is mounted outside of this extension sleeve as indicated. When the disks of the clutch are locked together by spring pressure, the spring thrust exerted directly against the abutment at one end, and the pressure member at the other is self-contained, because the parts are virtually locked together and revolve as a single unit. The spring presses against the disks, these in turn against the back plate, forming part of the member carrying the screwed on spring abutment. The ball thrust bearing G shown is under absolutely no thrust load when clutch is driving shafts of gearset. If it is desired to release the clutch, the clutch throw out yoke bears against the radax or cup and cone type thrust bearing outer race, then this member transfers the pressure (opposed to that of the spring) through the medium of the balls and inner race mounted on clutch spring enclosing annulus. This member is drawn back when the pressure applied exceeds that of the spring and as the spring is compressed, its pressure and consequently the degree of frictional adhesion between the disks becomes less until the driving contact is broken. It will be evident, therefore, that the ball thrust bearing is used only when clutch is released. The bearing for telescoping shaft is, therefore, subjected to very little, if any, end thrust.

In practically all clutch designs, the only time the ball thrust bearing is in use is when clutch spring pressure is relieved to break driving contact between clutch members.

Bristol, Conn. VICTOR W. PAGE.

Want Four-Speed Light Car

Editor THE AUTOMOBILE:—I wish to thank you for the stand you take regarding the introduction in this country of lightweight, small horsepower, flexible cars with four-speed gearbox equipped with wire wheels. I have wished to buy a new car for some time past along these lines, but so far have not found a single domestic manufacturer who makes a car along the above lines, and the price of a foreign car with the duty added is too expensive. I sincerely hope that before a great length of time that this sort of car will be produced, as there is already a great demand for it and I feel sure that there would be a ready sale. In the small town in which I live on Long Island I have several friends who would buy a car of this nature.

In case you know of any domestic manufacturer who is contemplating the manufacture of a car along these lines I would consider it a favor if you would furnish me with his name and address.

New York City. W. H. FALLS.

Wants to Add Clutch to Ford

Editor THE AUTOMOBILE:—I have a Ford model S roadster. I cannot keep the grease in the planetary transmission. I have tried almost every grease on the market. At present I am using Dixon's fiber grease. It certainly reduces the noise somewhat, but it slowly, but surely, works out. Would it be possible to put a positive clutch or a clutch that could be engaged gradually on the transmission in the place marked on Fig. 3 at A, so that the high could stay in while on neutral and just a few seconds before starting pull out the high, engage the proposed clutch and then again shove in the high. The object of this clutch is to eliminate noise while on neutral. Complication of control is no objection.

St. Louis, Mo. TRANSMISSION.

—You are running with a gearset which has become worn out. This accounts for the noisy action. It would be cheaper and more satisfactory to replace the worn parts than to attempt to fit the clutch, which would necessitate so many changes that it would be impractical. In order to prevent the working out of the grease you could have an aluminum casting made, such as is used in the model T. This would rest on the side members and would allow the gearset to set down within the bottom casting. Over the top of this would fit a coverplate that would enclose the gearset with an oil-tight gasket. In order that the fiber drums will not slip when covered with grease and cause lost motion, they should be removed and asbestos fabric substituted. The castings can be easily and cheaply made by your local foundry.

Changing to Chain Drive

Editor THE AUTOMOBILE:—Is it feasible to change the magneto and camshaft drive in a four-cylinder motor to the chain drive?

Hasbrouck Heights, N. J. F. W. HOBBS.

—This could be readily done, but it is doubted if the results would be as satisfactory as would be the case if you replaced your worn gears with others which fitted closely. The use of the chain entails the necessity of having a chain adjustment unless the center distances are exactly as required. This, taken together

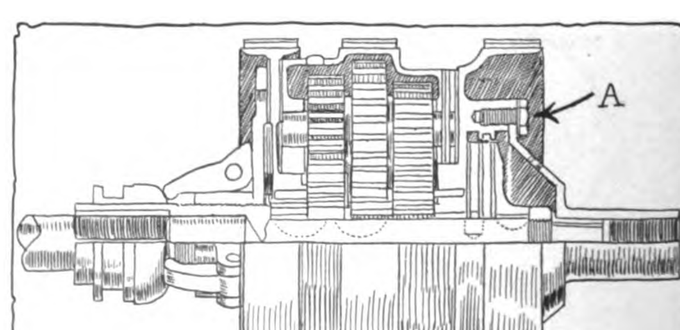


Fig. 3—Showing proposed location of clutch on Ford gearset

with the fact that the wheels would have to be replaced by others suited for the chains and that these wheels are wider by 100 per cent. in many cases, may render it impractical. On the other hand, however, it may be that the chain drive is well adapted to your car. The following data is necessary in determining if the chain drive would be applicable, and if so, what would be the size chain required:

1. Brake horsepower of motor at 1,000 revolutions per minute.
2. Maximum revolutions of engine.
3. Number of cylinders.
4. Pressure in pounds to lift each valve spring.
5. Will pump, magneto or fan be driven from crankshaft?
6. Ratio of motor to camshaft speed.
7. Ratio of motor to magneto speed.
8. Ratio of motor to pump speed.
9. Minimum bore of pinion to fit crankshaft.
10. Pressure per square foot of exhaust gas at opening of exhaust valve.
11. Diameter of valve head.
12. Weight of valve and tappet.
13. Profile of cam.
14. Details of any dimensions that are limited by conditions.
15. Rough sketch showing the disposition of the drives and the desired working center to be attached.

The above is a copy of the form sent out by the Coventry Chain Company, of England, which is represented in America by the Sarco Engineering Company, 116 Broad street, New York City.

Percentage of Slip of Wheels

Editor THE AUTOMOBILE:—Why are not speedometers attached to the rear wheels of a car? Is there no way of eliminating the complicated mechanism necessary for attaching the speedometer to the front wheels? What is the cause of the comparative inaccuracy of a speedometer? That is, why will one instrument measure a certain distance over a certain stretch of ground while another, mounted on a different car, will give a distance which is at distinct variance with the results given in the first case?

New Rochelle, N. Y. OSCAR WHEELEN.

—The mounting of the speedometer upon the rear wheel would be the cause of great inaccuracies because the rear whels have more slip than the front wheels and because the differential action would interfere to some extent. Henry Souther, former president of the Society of Automobile Engineers, compiled some useful information on the slip of rear wheels at the Brooklands track in England. The following tabulation prepared by him after carefully investigating this question throws considerable light on the matter:

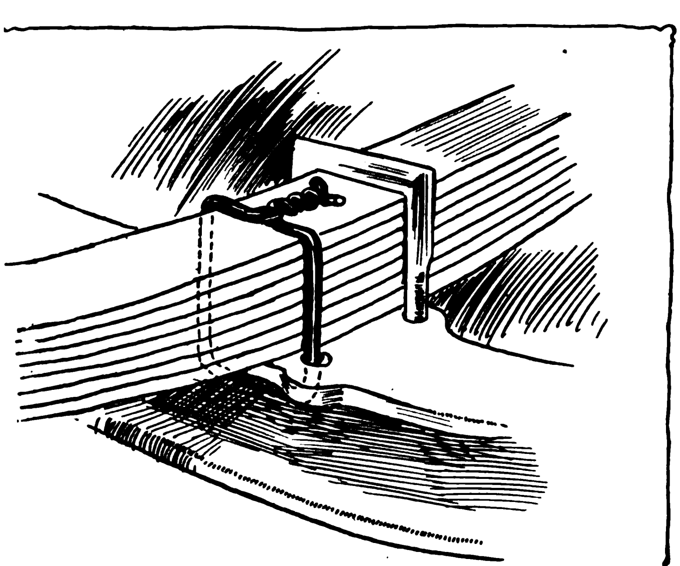


Fig. 4—Temporary repair replacing missing spring clip

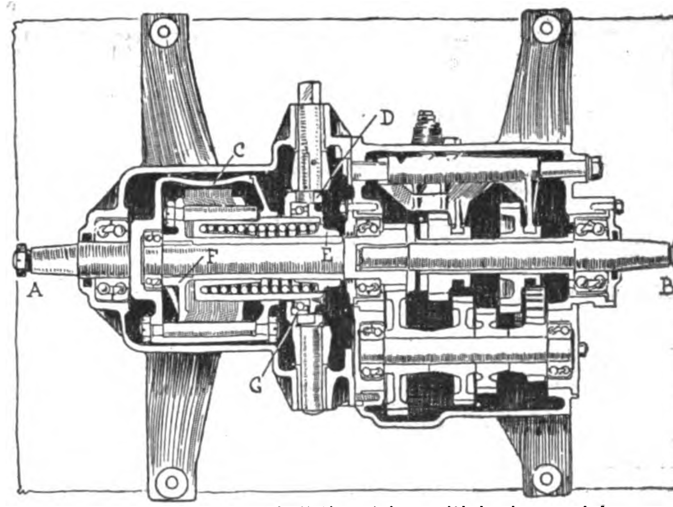


Fig. 5—Mounting of ball thrust in multiple-disk clutch

Percentage slip	Speed
.3	40 miles per hour
.6	50 miles per hour
1.1	60 miles per hour
1.8	70 miles per hour
3.7	80 miles per hour
5.4	90 miles per hour

It will be seen from the above table that traction is better at low speeds than at high. The tests were made with plain round tread tires. It was noted that the inner wheels slipped a little more than the inner while rounding a curve at speed, because the centrifugal force tended to remove the weight from this side. The Knox Automobile Company has mounted the speedometer upon the drive shaft for next year. This does away with the complicated mounting and enables the makers to place the speedometer where they desire without having any difficulties with the flexible shafting. The difference in two instruments may be due to many causes, such as inherent inaccuracies, improper mesh of gearing, rough roads, etc.

Tires Stick to Rims

Editor THE AUTOMOBILE:—I am going to put up my car for the winter season and I would like to know how to prevent an annoying trouble that caused me a large amount of distasteful work with emery paper this spring. The rims became so rusty that I could not put tires upon them until the rust had been removed. I live in a very damp climate and as the air is somewhat salty its action on metal is very rapid.

Freeport, N. Y. B. T. HAFF.

—The best way to avoid this trouble is to clean your rims thoroughly with kerosene when you remove the tires for the winter, and then to paint the rims with graphite paint.

Made Temporary Spring Clip

Editor THE AUTOMOBILE:—The other day, after I had accidentally discovered that one of my front spring clips was missing, I had a temporary repair suggested to me by a member of our party which proved of considerable value. In my tool kit I have always made a practice of carrying some stout pieces of wire for emergency. We took one of these pieces of wire, about 14 inches in length, and bent it into a U shape. This was slipped up through the holes used for the missing spring clip, as shown in Fig. 4. The two loose ends of the wire were then loosely twisted together and a strong screwdriver inserted in the loop and used as a tourniquet. By turning up tightly on the screwdriver the wire was brought strongly up against the spring and then bent down. We had a run of about 200 miles over rough country before we arrived home and the repair held excellently. I would advise any automobilist to do this rather than run any distance with a missing clip.

White Plains, N. Y. T. D. F.

The AUTOMOBILE

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Redesigning the Body

WE are trailing—Europe is leading.

The Englishman with his round-the-world reputation for comfort is to-day setting the pace in automobile body design. It is meet that he should fill this rôle in so far as comfort is concerned, but it is further true that he wears the rôle of leadership in design also.

At last the English designer, who is generally a French importation, has recognized the fact that **body design begins with the radiator and ends with the baggage rack or license light.**

Up to the present the body design started at the dash or ended with the tonneau. There was no harmony between the bonnet and the body. The same radiator or bonnet were used for the runabout, the berline, the coupé or the seven-passenger tourist. The same straight-line bonnet and radiator lines were used whether the body were a stream-line creation, a straight-line design, a combination curve and convex or a torpedo model. To-day nearly all American makers are still doing this, so are the majority of the European builders, but the end is in sight.

Art is entering into body building.

Because a man wears a cuff on his outing trousers does not call for such decorations on his evening suit. The red necktie may be correct in the business office, but it is, nevertheless, unpardonable at the banquet table. So with the bonnet on the car. It is an integral portion thereof and must be considered a part of the body design.

The days are passing when a maker will refuse to alter the bonnet shape or radiator design solely because he looks upon it as a recognized trade-mark or name-plate. While there is a stock-in-trade value in respect there is also a deterioration in appearance.

To date many body designs have been but compromises. The body builder, a graduate of the horse-carriage trade and hopelessly ignorant of the automobile chassis, set boldly at a task, a task which began at the dash and worked back to the rear end. He was not even permitted to make the bonnet. The buyer who purchased a chassis also purchased a bonnet, and while the carriage builder was given carte blanche in body lines he could not even alter the bead work of the bonnet or a line on the dash. The resulting body was a natural sequence—a two-part affair, one the radiator, bonnet and dash, the other the body proper.

The recent Olympia has demonstrated that the renaissance has begun. The designer has included the bonnet and dash in the body proper. Before him is no easy task. He has started valiantly, however. To accomplish the task has consumed space in some models. Space is needed to imperceptibly mold the body into the dash and bonnet. But even here economy is at hand, a gasoline tank has been taken from under the front seat or from the rear of the chassis. This leaves more available baggage space, gives shorter gasoline connections and makes gravity feed feasible. While doing all of these things it offers a solution of the hollow dash, a dash which forms a pleasing transition between bonnet and body.

But the end is not yet! **The top will have to be improved.** As to form, there is little certainty. It may be that when the top is folded it will disappear within a space in rear of the tonneau upholstery, so that a leather flap will hide it and give a completed finished appearance. Some day the spare tire and spare wheel problem will be solved. These will be concealed within the body, or, in other words, the body will be designed to contain them. More adequate baggage space must be provided.

Europe for 1913 is experiencing a return to the four-passenger body, as compared with the pronounced tendencies to five-passenger designs of the last 2 or 3 years. The onward march of the small motor has partially caused this, but it is also true that the four-passenger size has a broad field and is more comfortable for a load of four than a five-passenger style.

Many foreign countries are leading us in the vital question of weight reduction. American cars are to-day too heavy for their general design and also their requirements. A leading maker recently stated that carrying the two demountable rims with tires in rear of the tonneau was equivalent to two 200-pound passengers in the tonneau. This is an enormous load, carried as it is well in the rear of the axle where its side-slip, as well as its vertical whip, is maximum. Such a load racks the chassis, makes steering more difficult and wears out rear tires.

Manufacturing Success Points to Concentration

George W. Bennett's Address Before the N. A. A. M., Outlining the Subject at Greater Length Than Appeared Last Week Brings Out New Thought on Close Relationship of the Maker with Men Who Distribute His Product

THE trend of success in the automobile industry today is unquestionably pointed toward concentration, and concentration is not possible where the product is divided into several models. **Little doubt exists in my mind but that eventually the marked successes of the automobile business will lie in specializing, each plant making that which best fits its demand, and making that model in the quantities to which its place in the automobile market entitles it.**

To make several models in a factory which is equipped to make not more than one satisfactorily, necessarily restricts the output of that plant and divides the energies of its engineers, its operatives and its selling force into several small channels, all of them considerably below par in efficiency because of such division.

Experience has shown that there exists a market for a certain number of cars at a certain price, each of a different class, and each appealing to a different grade of buyer. The growth of the industry shows that the most prominent manufacturers have realized this and are catering to the class they can best supply.

I believe this development will become more marked and that in a very few years each factory will limit its product to one model, with perhaps several styles of bodies interchangeable on the chassis.

One Chassis Type Not Always Possible

It may not always be possible for one manufacturer to profitably restrict himself to one chassis, but it will be possible, if more than one is considered necessary, to make a large number of the parts interchangeable, and only in this event would the production of two models be warranted or likely to be successful. We are all familiar with the most striking success in the industry, who for the past 3 or 4 years has made practically no changes in his chassis, who makes his various styles of bodies fit that one chassis, and has limited himself to that one model, producing it in immense quantities.

I do not believe his success can be duplicated, since the existing product practically fills the market for automobiles of that price. Nor is it possible that any other manufacturer can compete with him, as the model in question is the culmination of many years' experience in building that particular type, and of daily and prolonged thought to economy in its manufacture.

I am fairly well satisfied there is no other equally large market available, the demands for cars of higher price being necessarily limited by the decreasing number of individuals whose incomes are sufficient to justify the greater expenditure. This decrease becomes more marked as the prices go up. It will take a cleverer statistician than I am to compute the possible markets along this line, although it must be clear to those who have given the matter any thought that the quantity market for each class of car is limited to the possessors of sufficiently large incomes to make the purchase. It is a point, however, that should be seriously considered by every manufacturer today. **Obviously there are more manufacturers of automobiles than there are classes of purchasers, and the process of elimination, which it must be admitted is working fairly fast, must in the near future determine that ratio.**

Furthermore, the subject of subsequent service is involved so much that where more than one model is built adequate service to the user is difficult, and consequently seldom satisfactory, and without that satisfaction complete success is impossible.

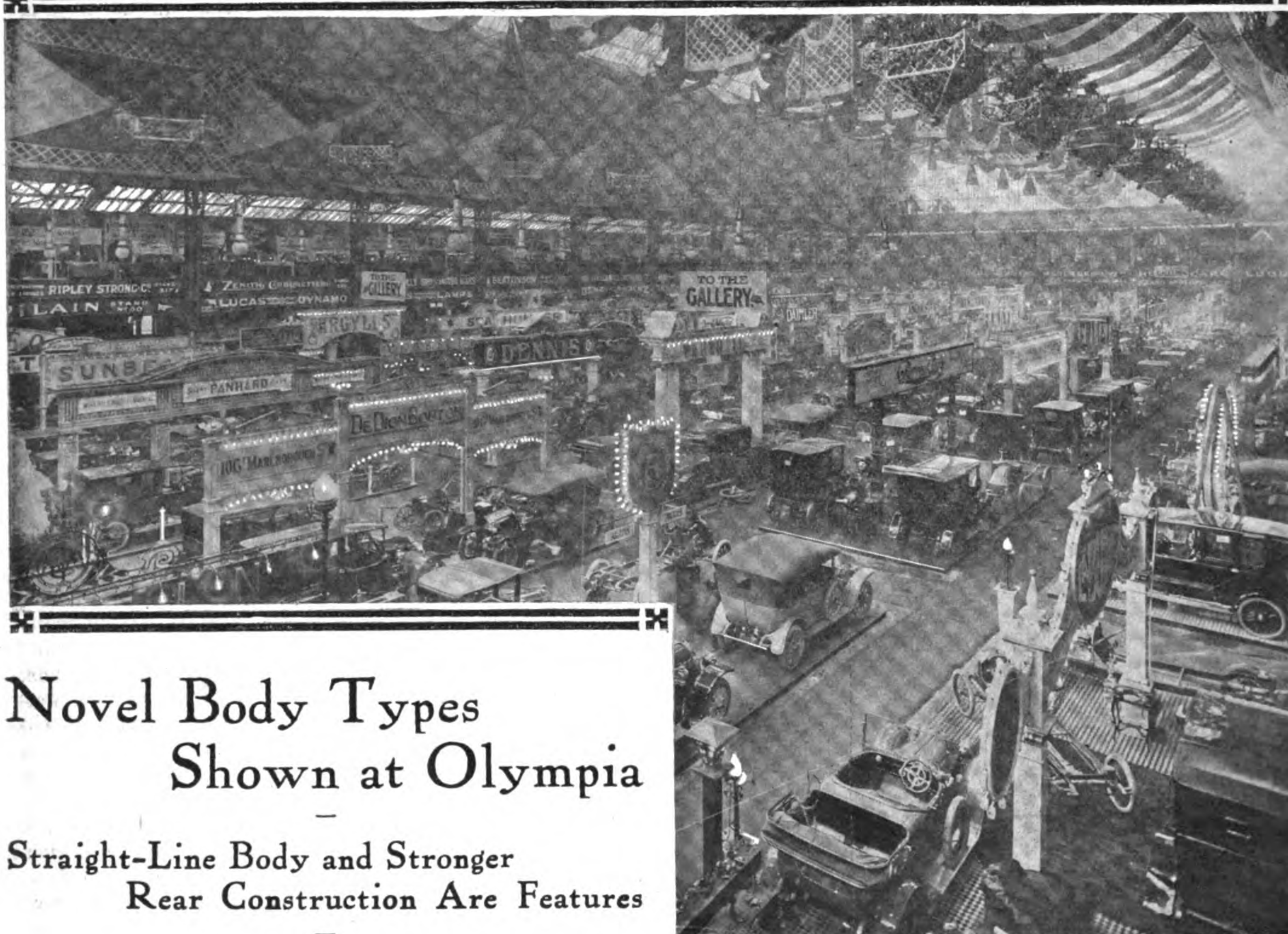
In view of the endeavor of the pioneer manufacturer to supply his dealer with a complete line, and admitting in the majority of cases his necessity, and further having in mind my remarks as to concentration by manufacturers, I think the same result will be accomplished by a different method. Dealers who are limited by their agreements with manufacturers to sell only the one line, are necessarily restricted in their markets and in their earnings. This course invites competition among dealers, adds to their number many who are irresponsible, and the final result is that but few of them at the end of the year show any profit. With the idea of concentration carried out by manufacturers, it would necessarily follow along to the dealers, and would result in each dealer having a line no two models of which would be competitive in price, or similar in general detail, and which would enable him to cater to more than one of his markets.

The manufacturer cannot be successful unless his dealers are successful, and their interests are so interwoven as to be identical and absolutely dependent each upon the other. I venture to assert that this phase will receive considerably more thought in the future than it has in the past.

It would be expecting rather too much to hope that we shall be able so to arrange the production of automobiles that all of us will prosper and each occupy his own niche in the industry. I believe, however, that this association, which comprises most of the manufacturers of automobiles in this country, is in a better position to accomplish approximately this than any other agency that can be imagined. We have no factions, no politics, no patents, and, so far as I know—and I speak with some authority as to the executive committee—every individual comprising the working end of the association is working for its benefit and for the harmonious operations of the industry.

Association Another Form of Concentration

It would be anticipating the millennium to believe that any of us—myself included—is going to bare all his inner thought to public gaze or even to that of his fellow members, but I am certain that the closer we keep together, the oftener we have these meetings, and the more freely we interchange ideas, the better it is going to be for all of us. We are all fairly experienced men of the world, and while, as I say, none of us is likely to speak with absolute frankness, I believe the lines of thought disseminated at such meetings as this, properly analyzed and considered—as they are likely to be by those hearing them—will have the effect of unconsciously shaping our plans to the desired end, so that eventually we shall all be moving along the line of least resistance and accomplishing that which we deem success.



Novel Body Types Shown at Olympia

Straight-Line Body and Stronger Rear Construction Are Features

By J. S. Critchley

Fig. 1—Bird's-eye view of Olympia during first week of the show

OLYMPIA continues to show the tendencies of European design as in previous years. Primarily an exhibition of expensive cars, it is only to be expected that luxuriant body work will be exemplified in the cars which are seen here. That this is true will be seen in the brief descriptions of some of the more noted types, given at the end of this article.

Last week THE AUTOMOBILE dwelt at length upon the developments of the motor, clutch, gearset and rear axle construction. Continuing a detailed study of these features before commencing the investigation of the body, some of the types which stand out on account of noteworthy design will be mentioned.

A few of the most important developments should be described, however, apart from the individual description. The worm drive is one of these features.

One of the questions which has not been fully decided in either English or Continental practice is whether the worm should be mounted above or below the gear. There are two reasons for this uncertainty on the part of designers. The first is the fact that when the worm is below the gear, lubrication is easy. The oil being in a pool in the lower half of the housing is generally of sufficient depth to submerge the point of contact between worm and gear teeth. The advantages of this are readily apparent. Wear is reduced to a minimum, the worm is rendered, if possible, even more silent in its action and the length of life of the bearing parts is indefinitely extended.

On the other hand, however, there is the question of road clearance. Foreign practice, while less exacting in this respect than American, still calls for at least a minimum of 7 inches.

Another point which attracts considerable attention is the mounting of torque members and the general distribution of stresses throughout the rear construction. It may be of interest in this connection to refer to Fig. 3, which shows a plan view of the four-cylinder, 15.9-horsepower Arrol-Johnston chassis. As may be seen from this illustration, the side channel frame members are swept in at the rear and firmly joined by a gusset plate which constitutes a horizontal web, thus producing a remarkably rigid structure at this point and one which would be practically impregnable against all ordinary racking strains. The torque tube is still in common use and there is no tendency for its abandonment, although the juncture of the torque tube to the frame and rear axle has been given more attention.

Springs, both in the mounting and shape, seem to be undergoing a process of development. The cantilever type of rear spring is increasing in popularity. The Rolls-Royce Company has changed to a spring of this type. The drive is taken through this spring and in place of the radius and torque rods a large, spherically ended torque and radius rod of circular section inclosing the propeller shaft is fitted. This means a decrease of weight, less expensive work and at the same time an equal amount of strength.

It is well known that in springs of the cantilever type means must be taken to prevent a lateral movement relatively to the rear axle. This is effected in the Rolls-Royce by collars formed on the rollers carrying the ends of the spring. Another interesting point in connection with this spring on the Rolls-Royce car is the provision of a safety stop which prevents the axle from leaving the frame should there be a fracture of the torque tube.

Brakes have not ceased to attract the attention of the designer. Improvements at this point have gone hand in hand with other efinements about the rear end of the chassis. Fig. 9 shows how he back of the Sheffield-Simplex car is constructed. The large ibbed brakes are a prominent feature. The wide face of the rakes will be noted also. This is illustrative of a general increase in brake sizes throughout European practice. With the icrease in body and chassis refinements, especially with the ixurious appointments of the former, an increase of weight as rendered necessary an increase in braking power. This has lso made it necessary to maintain an extraordinary rigidity irough those members which absorb the braking strain. For iis reason we see an increase of the strength of the rear axle ousings, torque members and, where the drive is carried hrough the springs, in the connections of the latter to the rame members.

Another feature for which perhaps the increase in braking ower is responsible is the increase in transverse stiffening members at the rear of the frame. Referring again to Fig. 9, the hannel connections at this point may be noted. The mounting f the gasoline tank between these members, while not really structural feature, is of interest.

Before leaving the subject of springs, the reversion to the nderslung rear under the Daimler car will be of particular iterest. As shown in Fig. 11, this form of mounting permits f a flat spring when the car is under load. In the illustration ist referred to it will be seen that the spring has a slight curvture. When under the load of the body and passengers this pring will be practically flat and horizontal. The use of the full liptic rear on the Arrol-Johnston should also be noted. It ill be seen in Fig. 5.

A complete gear is being fitted in place of the sector on many f the steering gears. The object of this is to provide for a change of the teeth which are in engagement with the worm as soon as they become worn. It is only necessary to revolve the gear through 90 degrees in order to secure a complete new set of teeth in contact with the worm. In this connection it would appear that the slight increase expense in manufacture was more than equalized by the increased possibilities of compensation for wear.

Before touching on a few mechanical features which were not in last week's article the marked developments in body work should be mentioned. In the higher-priced cars there seems to be no possible luxury that has not been incorporated. The convertible body, as it is understood in America, has not as yet forced its way on the British market. In place of this there is the cabriolet, which can be quickly changed from a town to a touring car. Landaulets, limousines and Berlines are meeting with considerable favor, although they are being modified more or less to follow the whims of fashion. Torpedo touring bodies, such as that shown in Fig. 10, are increasing in popularity. The scuttle dash also prevails to a noticeable extent. Dashboards, in the latest cars, are invisible, the upper end being flush with the straight-line body. Another marked tendency is that shown in Fig. 16, where there is no definite line to mark the junction of the hood and the scuttle dash. Bizarre types of body, while frequently seen at the exhibition, are not turned out in any of the manufacturers' stock models, being merely given as body maker's suggestions.

The bodies illustrated at the end of this article, other than the French diligence coach, are to be found in the regular stock bodies turned out by the car makers. The stripped chassis is disappearing and in its place the complete car is being marketed.

In the Vauxhall car both types of detachable wheel are in use, the wood artillery wheel and a double spoke wire wheel with the Riley locking device fitted. The same driving pegs are employed in each case. To revert to the axle itself, the main casting is steel, into which steel tubes are fitted. It will be seen at once that the entire weight is carried on these last mentioned tubes and not upon the axles, which have to take torsional strains only and are consequently fairly light in section, the diameter being 1 3-8 inches. Each hub is supported upon three ball journal bearings. The centers of the two outer bearings are 5 1-8 inches; the outer bearings have 3-8-inch balls and the inner and larger bearing 7-16-inch balls. At the inner end of each hub a substantial ballthrust bearing is provided, the balls being 7-16 inch in diameter.

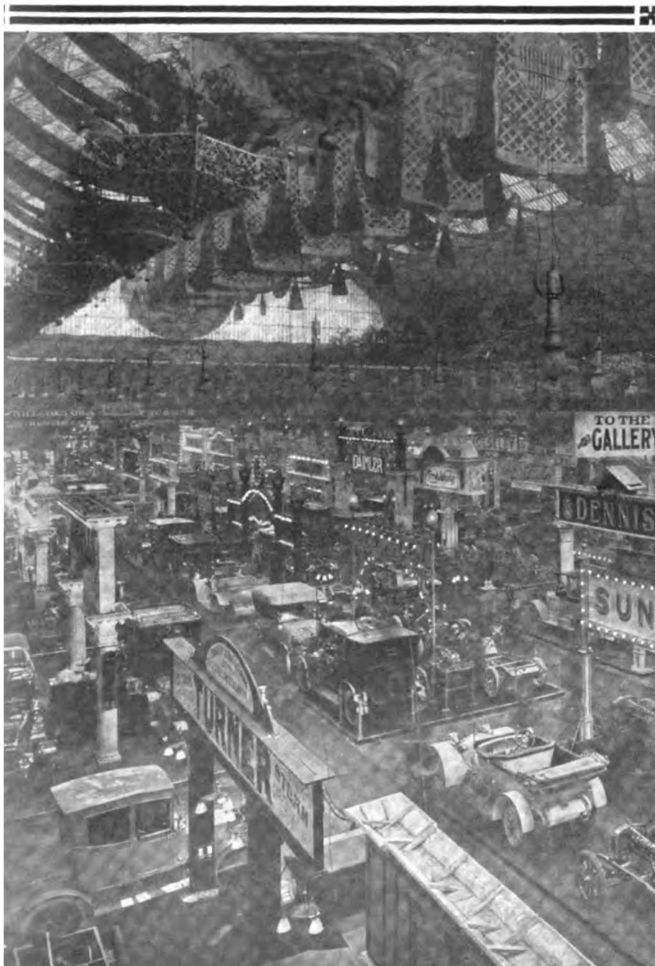
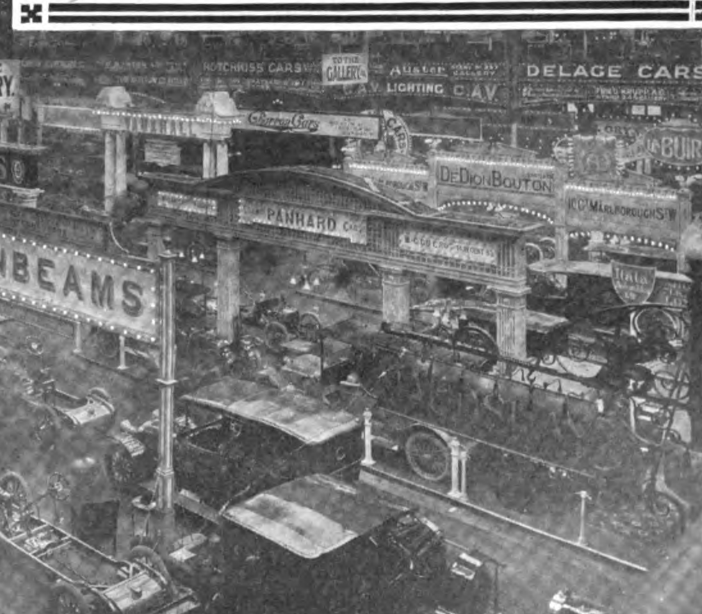



Fig. 2—Looking down one of the aisles of the English section of Olympia before the opening of the show

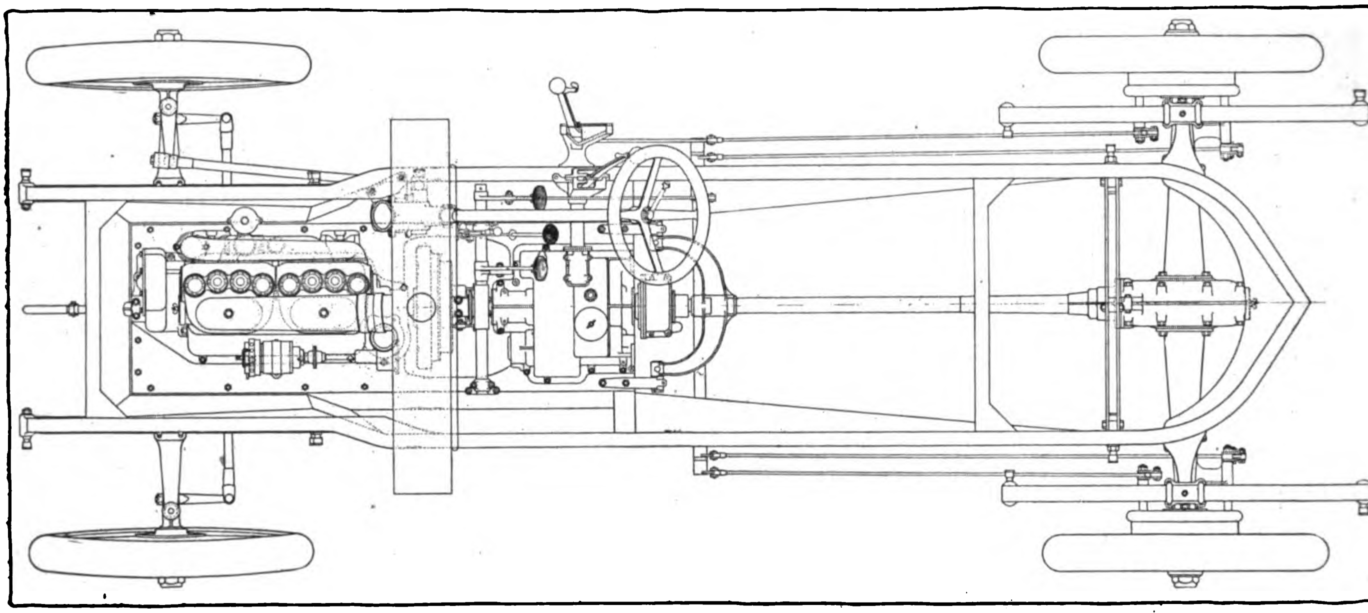


Fig. 3—Plan view of the four-cylinder 15.9 horsepower Arrol-Johnston chassis, showing the unique rear junction of frame side members

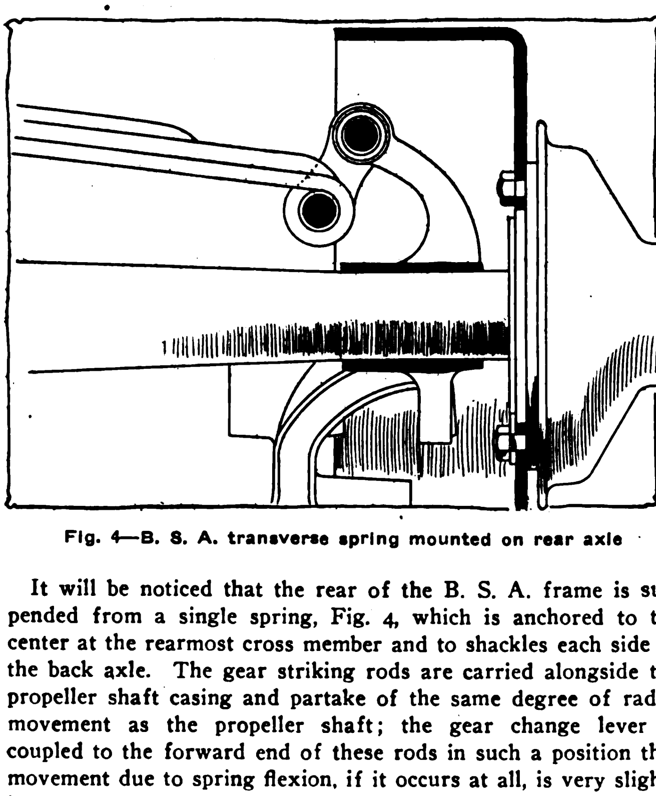


Fig. 4—B. S. A. transverse spring mounted on rear axle

It will be noticed that the rear of the B. S. A. frame is suspended from a single spring, Fig. 4, which is anchored to the center at the rearmost cross member and to shackles each side of the back axle. The gear striking rods are carried alongside the propeller shaft casing and partake of the same degree of radial movement as the propeller shaft; the gear change lever is coupled to the forward end of these rods in such a position that movement due to spring flexion, if it occurs at all, is very slight; in any case it has no effect upon the meshing of the gears within the box. The brackets for holding the back end of the engine are of good, substantial construction, and they can be clearly seen in the plan of chassis.

The chassis presents a very neat and simple appearance, the brake and other rods being all very direct, bell-cranks and such devices being conspicuous by their absence only.

Fig. 6 shows various views of the Belsize worm-driven back axle. The worm is of the parallel type and is situated above the worm wheel. This latter is a little unusual in its form. It has considerable width so that when bolted up in place it forms the outer casing of the differential box, the sides of the box being plain flange pieces with holes drilled to take the differential spur pinion. The construction is a very simple and cheap one, and does not appear to possess any bad points whatever, indeed each one of the parts is comparatively cheap to produce and therefore cheap to replace; there is perhaps a little more metal to the worm wheel than would usually be the case, but this is not a formidable objection.

It will be noticed that the differential spur wheels are cut solid upon the axles, which latter have a diameter of 32 millimeters. This gives a very strong sound job, but in the somewhat unlikely event of a spur tooth breakage it would be necessary to replace the entire shaft with its spur wheel cut upon one end and its other end splined to take the permanent hub. It is no very easy matter to decide how far to carry the once piece system in any design; carried too far it is an undoubted nuisance to the owner, in the case of breakage, and yet on the other hand the absence of any pieces fastened on, knocks out one possible source of trouble. It would seem that the particular piece of design referred to may be classed as good practice and not really objectionable. The greater part of the weight of the road wheels is taken upon the axle tubes, though there is a bending moment in the axle ends as well.

Means are adopted to prevent oil reaching the brake drums, for the screwed in plate that retains the ball journal bearing in position has at its outer diameter a V-shaped edge. Any oil flung from the edge of this when the wheel is revolving passes on to the light steel metal cover shown and cannot well reach the braking surfaces. The brake drums have a diameter of 10 inches and the shoe width is 1 3-8 inches.

The axle is braced by a steel tension stay 7-16 inch in diameter; this is attached beneath the spring seatings and passes under the axle casing. It will be noticed that instead of using a double ball thrust bearing at the back of the worm as is usual practice, single thrust bearings are employed and these are placed outside the journal bearings. Such an arrangement is perhaps conducive to cheapness, but it possesses the objection that if the worm and its shaft become at all heated—as it is quite likely to—the expansion throws an altogether unnecessary load upon the ball thrust. Perhaps the makers allow for this fact by permitting a trifle of end play for the worm shaft; if this is the case the matter must be attended to in the assembling as there is no possibility of after adjustment.

The Wolseley differential case is made of malleable iron and split vertically, being strengthened with an under tension stay. The worm and shaft can be removed without dismounting the axle, and the worm is of steel hardened and polished, with a worm wheel of phosphor bronze. The differential ends of the driving axles are mounted with ball bearings and the thrust provided against by ball thrust washers, and felt pads are employed to retain the oil. The drive is taken through the springs and torque rod is provided, the fore end of which is anchored to a ing mounted link secured to the frame cross stay. All spring nts are as a matter of course fitted with grease cups.

)n the Vauxhall car the lock nut used in connection with the ey wheel is of interest, inasmuch as in place of the usual double k with which it is customary to furnish a detachable wheel, re are in this case to all intents and purposes three locks. Two :he small spring catches in use can be observed in the figure, l over one of them is a pivoted cover or flap, which also serves purpose of a lock. Further details will perhaps be out of ce just here.

:he differential gear is of the strength spur-pinion type and is haps a little stronger in construction than is usual,. for the eels are of good sinze and have a pitch of number 6. The ball rnal bearing that supports the driving axle close against the wn wheel is a strong one and has balls 5-8 inch in diameter. ›se alongside it is a thrust bearing to take the thrust due to bevel drive. The bevel pinion which is one piece with its .ft is exceptionally well supported, as will be seen by an exination of the figure. There are here three journal bearings well as the usual thrust bearing. It would seem that through- the axle the designers have been at great pains to insure that ball bearing shall be overloaded, as not only are the bearings ge but in several cases they are in duplicate. In the whole e there are no less than fifteen ball bearings—a number that uld have been considered extravagant a few years back. The wn and bevel wheels have a pitch of 5 and the teeth are -2 inches wide. When necessary the bevel pinion can be reved by swinging the propeller-shaft clear and removing four s on the front casing. The axle casing is filled with oil ough a filler projecting at the back; the top of the filler uth corresponds with the correct oil level in the axle case, so t it is not possible to pour in more oil than is necessary. The r axle brake drum and the shoes can be seen in the drawing. as they are of fairly usual construction they do not call for special comment.

)n the steering gear a noticeable feature is that the worm ft is supported by roller bearings and it is presumed that substitution of roller bearings for ball bearings gives a ater freedom for the steering; if this is indeed the case then can well approve of the alteration. A complete worm wheel ısed in place of the perhaps more usual sector, and since only ›ve 90 degrees of the wheel comes into use from complete lock one direction to complete lock in the other, the wheel can be fted round a quarter of a circle when worn, thus giving ır separate positions to compensate for wear.

:here is a conveniently placed oil filler on the upper part of steering box, and it is of interest to observe that both the eel and the worm are of phosphor bronze.

Before leaving this very interesting chassis some particulars materials used in the construction of the more important parts l be cited, and it will be seen that the quality of the material could not at the present time well be improved, and this will be clear from a perusal of the table that follows:

Name of part	Materials	Ultimate stress. Tons per sq. in.	Elastic limit. Tons per sq. in.
Crankshaft	Nickel chrome steel	50	40
Gear shafts, propeller shaft and axles	Nickel steel	40	22
Gear wheels	Nickel chrome steel	108	102
Front axles	Mild steel	35	24
Stub axles	Mild steel	35	24
Crankshaft bearings	White metal	..	..
Gudgeon pin bushes and bushes generally	Phosphor bronze	..	..
Crankcase and gearbox	96% aluminum	13	
Cylinders	Hard cast iron	..	..
Levers	Mild steel	28	14
Hubs and brake drums	Mild steel	28	19

A bevel drive is used in the new Star back axle and the bevel shaft is supported by large diameter ball journal bearings placed 2 3-4 inches apart. The bevel pinion shaft has a diameter of 1 3-4 inches and it will be seen that there is a small ball journal bearing immediately behind the pinion so that the shaft is well supported. The width of the bevel teeth is 1 1-4 inches, rather a less width perhaps than is usual, but the wheels are both of good diameter. A bevel type of differential gear is employed, the shaft wheels being mounted upon squares. The axles are 1 1-2 inches diamter and do not take any part in supporting the weight of the vehicle, but serve merely as driving shafts. The wheels are mounted upon large ball bearings on the axle tube ends and a detachable wheel is used.

The design of the axle is throughout compact, but there appears to be some degree of unnecessary weight, more especially in connection with the bearing supporting sleeves which fit into

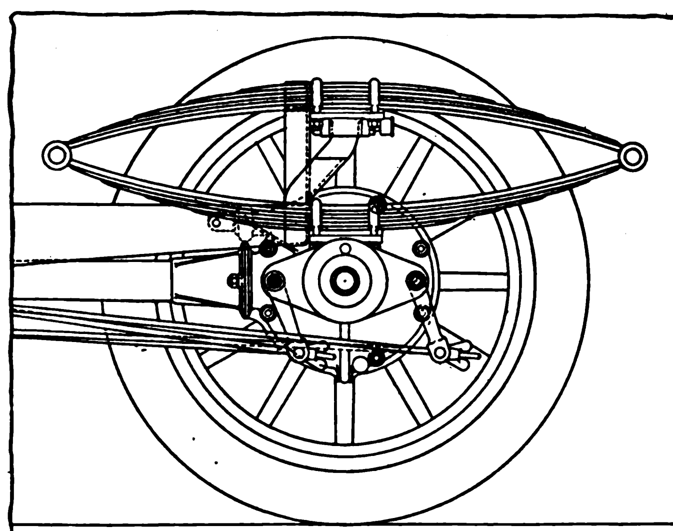
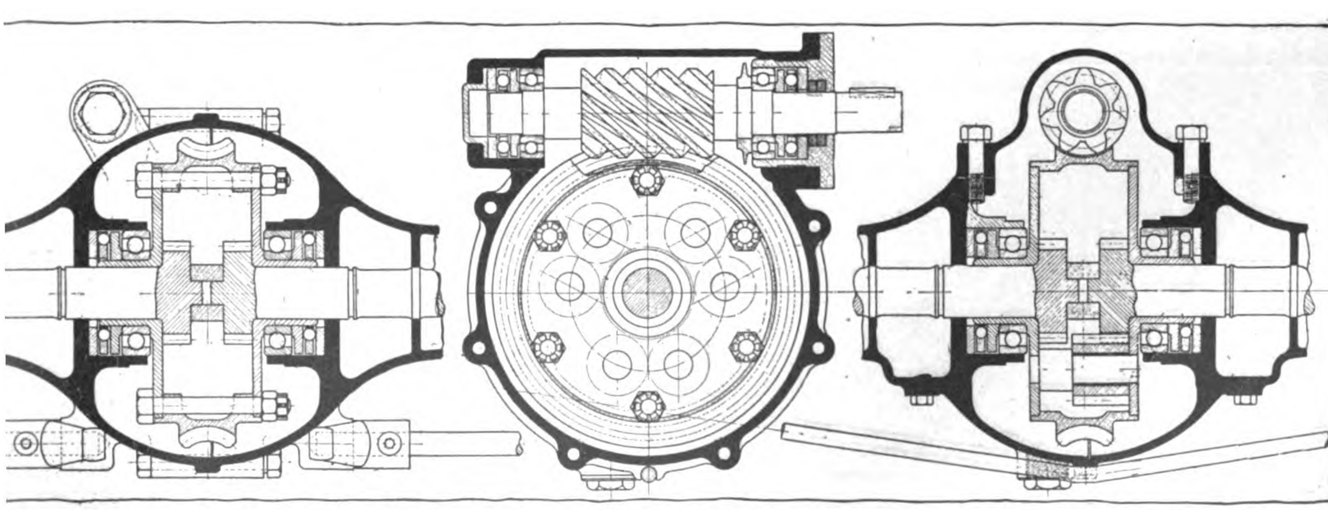


Fig. 5—Arrol-Johnston uses full elliptic rear spring



ig. 6—Belsize worm drive, showing ball-bearing mountings for worm and gear. Left and right views show end and center shows side view

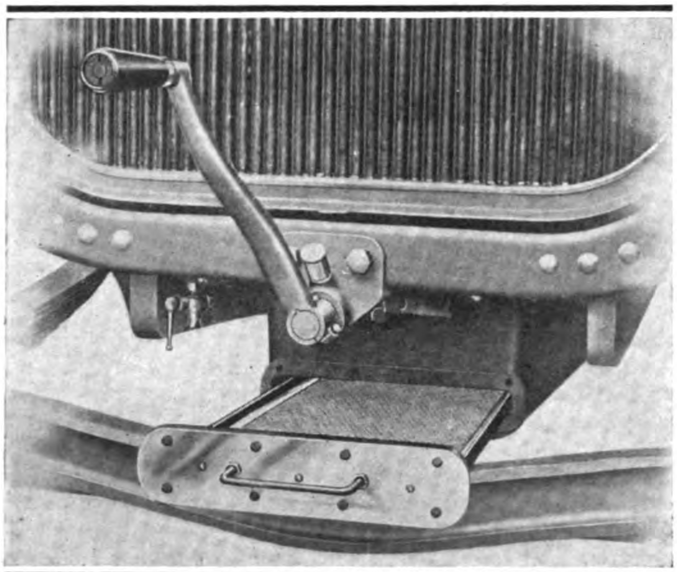


Fig. 7—Removable strainer pan in Vauxhall oiling system

the cast axle tubes. These, it will be noticed, are heavy and might well, one would think, have been made lighter without unduly decreasing strength. The axle tubes themselves, too, are perhaps a little heavy, though when using castings here a good deal of weight is difficult to avoid.

The brake shaft, which is 1 inch in diameter, is well supported by two bearings whose centers are 8 1-2 inches apart and the bearing brackets are strong. The bracket nearest the brake drum nearly always takes the form of a suitably ribbed disk, in some cases slightly dished; thus the chances of a breakage here are not at all considerable.

The Swift rear axle is of the floating type supported on load ball bearings throughout, the bevel pinion being carried on a separate unit bolted to the differential case and can thus be easily dismantled for inspection purposes. The differential case itself is split horizontally, thus insuring oil being retained. The torque of the bevels is taken up by a V torque rod with buffer springs hinging from the forward cross member of the main frame. The frame itself is of pressed steel inswept at front, upswept at rear, the inner folds of the side members being extended and pressed to rectangular section and thus forming an under frame for supporting the engine and gearbox. This is an expensive job but undoubtedly tends to ensure perfect rigidity and alignment. The steering is of the worm and nut type, the box itself being attached to the main frame by a circular flange, provision being made for a varying rake of steering post to be fitted. The springs are semi-elliptical front with three-quarter elliptical rear, the latter taking their support on the spring

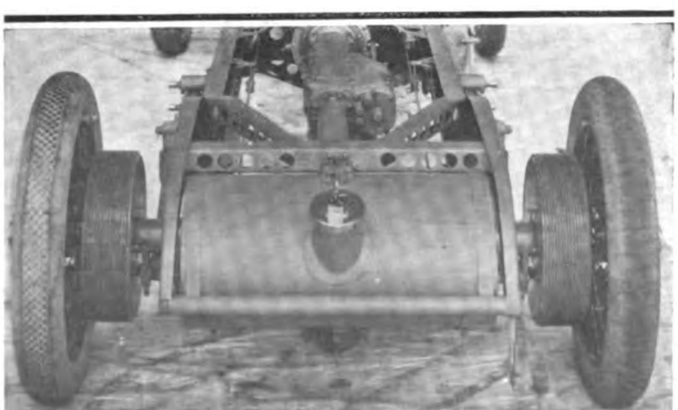


Fig. 9—Tank and brakes on 30-horsepower Sheffield-Simplex

block which swivels on a suitable bearing on the axle sleeve. Detachable road wheels, 760 x 90 millimeters, are fitted. Wheelbase, 9 feet, wheeltrack, 4 feet 3 inches.

The width of the teeth in the Briton bevel rear axle is 38 millimeters and the pinion is cut solid upon its shaft. Here again there is the before-referred-to combination of bearings for the forward end of the pinion shaft is supported in a phosphor bronze bush while at the after end there is a ball journal bearing. This latter bearing appears to be very necessary since the pinion overhangs its journal bearing somewhat owing to the interposition of a ball thrust bearing. The differential gear has bevel wheels and the driving wheels are mounted upon squares upon the axles. At their outer ends the axles have squares to

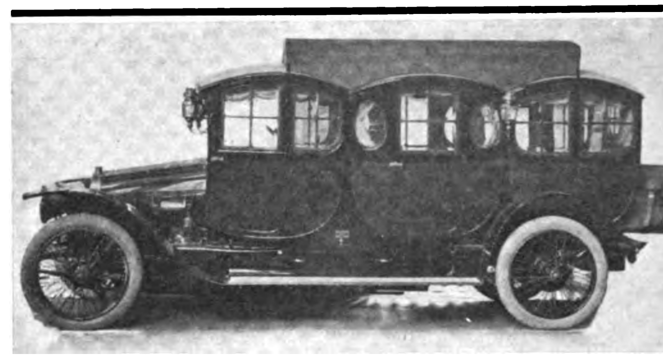


Fig. 8—Gregoire diligence coach seen at Olympia show

drive the wheel hubs and it will be at once noticed that the driving axles have to take the weight of the vehicle as well as the torque. The overhang of wheel to ball journal bearing has been reduced as much as possible in order to keep down the load on the bearing and prevent any possibility of a bending action being set up; thus the distance from center of wheel spoke to center of ball bearing is less than 2 inches.

The chief alterations of the Rolls-Royce cars for 1913 will be the employment of the cantilever type of rear springs and also the employment in place of radius and torque rods of a large spherically ended torque and radius rod of tubular section enclosing the propeller shaft.

Referring to the inverted springs, they are pivotally attached to the side members of the main frame by means of blocks each of which is attached to its spring at the point of maximum bending moment. These blocks engage with pins or shafts integral with or rigidly attached to brackets mounted on the side member of the main frame. The latter may be suitably stiffened at this point by cross members or other means. The front end of each of the springs is supported on the side member of the main frame by means of a link which is pivoted to a bracket formed on or attached to the side member of the main frame. The rear end of each of the springs rests on a roller mounted on a pin carried by a hanging bracket formed on or attached to the rear axle casing. Lateral movement of the springs relatively to the rear axle is prevented either by means of collars formed on the ends of the rollers or by causing the springs to engage with the inside faces of the brackets. A safety stop may be provided to prevent the axle from leaving the frame in the event of the tubular member enclosing the propeller shaft, breaking. The tubular member which is rigidly attached to the axle casing and envelops and encloses the propeller shaft is attached at its forward end to the main frame by means of any suitable form of universal joint, a convenient form of which is spherical and bears upon the outside of a hollow ball which is attached to the main frame either by means of trunnions or in any other suitable manner.

The action of this improved suspension is as follows: The axle casing and propeller shaft casing form a rigid transmission unit which is attached at its front end to the main frame of he vehicle by a suitable form of universal joint. This arrangenent together with the lateral rigidity of the inverted springs onstrains the axle to move only in a vertical direction relatively o the frame, said movement being controlled by the vertical esilience of the spring. It further allows either wheel to rise elatively to the other without straining the controlling mechaiism in any way.

Last year the Rolls-Royce Company stiffened up the frame of the chassis by introducing tubular cross members, with a iew to preventing the twisting of the frame and the setting up of strains in the body. This year the frames will be further tiffened up by the employment of tie rods from end to end. Other lines of improvement consist of a brake adjustment of he road wheel brakes which is now effected by finger nuts intead of spanner as heretofore. Louvres have been introduced nto the under-screen so as to carry away the heated air from he engine. Ventilators also have been fitted to the dashboard.

Provision is now made for driving a dynamo for electric lighting by means of a special pulley fixed at the front end of the ear box. The cone clutch has been improved by the use of a pecial fabric lining on the cone in place of leather as formerly sed.

The show indicates more than ever the tendency toward luxriant body work. Fewer chassis are exhibited, and on many of he leading stands, such as Rolls-Royce and Daimler, no chassis re exhibited, but merely completed carriages. The coach work s very magnificent, and the tendency of design of nearly every ype of body is in connection with the stream line order or toredo shape. Carriages of the limousine and landaulet order ke those of the touring types have sweeping scuttles to harmone with the sloping bonnets, and this with their lowness to the round, domed roofs, and sloping extensions adds much to heir elegance. The cabriolets are becoming more popular, due o the ease and quickness with which they can be converted rom entirely closed town carriages into completely open touring cars.

The landaulet type of car is becoming considerably modified. An example of the latest construction of this type is shown in onnection with the Delaunay-Belleville body.

This body is of the limousine landaulet type, and while

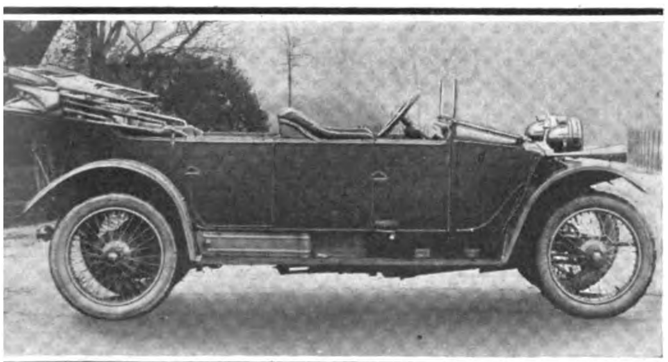


Fig. 10—Lanchester torpedo touring car. Note short bonnet

t has almost the appearance of a limousine it opens out in a imilar manner to the older three-quarter landaulet. Several examples of the latest type in body work are illustrated in onnection with Napier, Rolls-Royce, Delaunay-Belleville, Sheffield-Simplex, Daimler and other well-known makes. A study of the design of these cars illustrates the fashionable lines now prevailing.

The new special Daimler chassis has been designed to supply he demand for a car of the highest possible grade, and no effort has been spared to make it ideally suited for those who desire he best, irrespective of cost. Throughout the design there is no endency toward originality for its own sake; the chief features are on the lines proved best by past experience and every minor

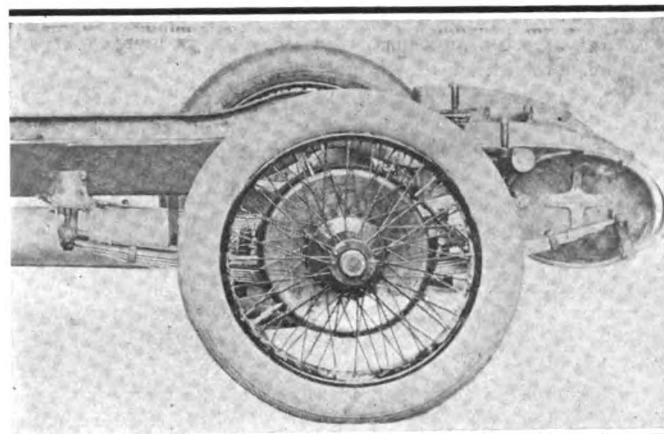


Fig. 11—Daimler gasoline tank swung between rear springs

detail has been perfected for the object for which it is designed.

The chassis has a wheelbase of 11 feet 11 inches, which provides ample accommodation for a body of the largest size. At the same time the steering gear has been so designed that the car can be turned round in a comparatively small circle and hence it is easily handled in traffic. The tread is the standard 4-feet 8.5-inch gauge, and the ground clearance is ample for all requirements, fully 8 inches being available at the lowest point.

Motive power is supplied by a six-cylinder Daimler sleeve valve engine of 101.5 millimeter bore and 140 millimeter stroke. This engine is amply powerful for all work and even in hilly country the car will take full load everywhere on top gear. A high speed average can be maintained without the slightest trouble or inconvenience to the passengers. Various special engine features, such as the offset setting of the cylinders and the arrangement of the carbureter, result in usually good slow running qualities. With full load on board the car will run at a slow walking pace and pick up from this to a speed of 60 miles an hour without any apparent effort or noise.

The transmission components include a leather cone clutch, having special springs beneath the leather to insure smooth starting, a four-speed and reverse gearbox and worm-driven rear axle.

A special feature to which attention may be directed is the withdrawal of the clutch by the side brake so that the clutch shaft and gears may be at rest when the car is standing with the engine running. But, to enable the engine to be used for braking purposes at the same time that the side brake is in operation, there is a second position of the latter lever, which thus has gate control, to secure the desired result.

The springing is a portion of the design which has been very thoroughly tested. The front springs are of the semi-elliptic type, broad and long, fitted with the Daimler swivel shackle at

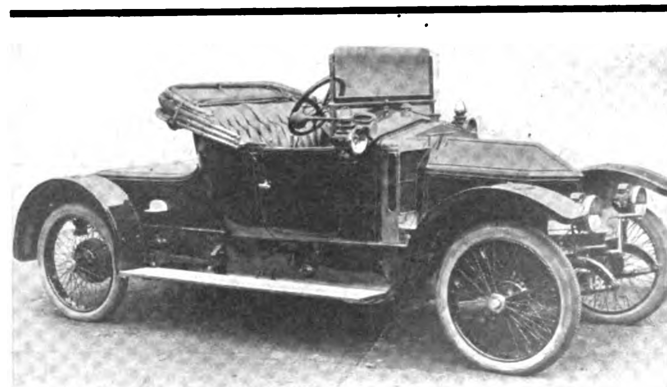


Fig. 12—Deasy two-seated runabout with convertible rear platform

the rear end, to prevent frame distortion. Three-quarter elliptic springs are used at the rear, Fig. 11, and in conjunction with the efficient shock absorbers fitted between the axle and the frame these completely insulate the body from all road shocks.

A high-powered car of this type requires very satisfactory brakes and it will be found that those fitted in the present case are strong enough for all requirements. In addition, they are well supported and easily adjusted, while, in the case of the rear wheel brakes, satisfactory equalizing mechanism is employed.

The Daimler Cranmore is a six-seater landaulet fitted to a 26-horsepower chassis. This body is of the low-built type introduced by the Daimler company, at the last Olympia show, and which has proved so extremely popular during the past year. There is ample room both in front and at the rear for all the passengers, while the seats are broad and thickly cushioned. The coloring is black with fine white lines, and the upholstery is black leather for the front seats, and black morocco with special dark gray cloth and laces inside. The interior decorations are of silver and rosewood.

The Compton six-seater limousine, fitted to a chassis known as the special Daimler, which is fitted to a six-cylinder engine, 101 by 140 millimeters. This carriage is colored gray, with a darker shade for the top quarter. The interior arrangements of this car have been carried out on a luxurious scale.

The Argyll car has a worm-drive back axle. The worm is cylindrical and is mounted over the wheel on a short length of splined shaft. These splined shafts occur frequently in the Argyll chassis and this method of attaching a part of a revolving shaft is undoubtedly a very good one, whether the part in question has to slide or is stationary. Splined shafts are generally considered somewhat expensive and no doubt they require special machinery and well kept cutters for their proper production, but for first class work they form an essential part.

A heavy double ball thrust has a position at the back of the worm as usual and the adjustment for this bearing is a good one, consisting of a nut with holes for turning and a castellated locking cap, the latter being locked in its turn by a steel spring finger piece.

The journal bearings for the worm are 7 inches apart and have balls 9-16 inch in diameter. A bevel type of differential gear is employed, having three planetary wheels. Single ball thrusts occur betwixt the differential casing and the back of the bevels and a small ball thrust collar finds a position where the driving axles would otherwise abut.

The driving axles have a diameter of 1 7-16 inches and are submitted to a torsional strain only, there being no bending action whatever. Once again the spline system is in use in connection with the driving of the permanent hub. The journal bearings of the road wheels are spaced 3 1-4 inches apart and are well protected from road dust by a packing groove. The plate casting which protects the brakes and holds the brake shaft and fulcrum pin has an annular recess cast upon its interior face to

Fig. 13—Austin landaulet with auxiliary chair upholstered to match trimming

catch any oil, and thus to prevent any detrimental lubrication of the braking surfaces.

At the inner end of the axles, outside the ball-thrust bearings, spring held disks are provided to prevent the escape of oil from the axle casing and in addition there are screw stuffing boxes with locked glands, so that even after a long period of time there should be very little loss of oil; thus adequate lubrication of the worm and its wheel is particularly well looked after.

A great amount of thought and consideration has been given to the design of the 38.4-horsepower, six-cylinder Napier royal saloon carriage, by the Cunard Motor & Carriage Company.

The body takes the form of a wholly inclosed car, with a glass division separating the driver's compartment from the main portion, with three entrance doors, and three windows in the body besides those in the doors, a wind-cutting glass screen over a deep scuttle extension of the dashboard and a roof with edges blended into the sides and back of the body.

Throughout the car, the predominant feature is the grace of the curves which harmonize one with the other wherever their outlines meet. The car is low and sleek in appearance, and appeals to one's sense of swiftness and elegance. The height inside, however, is ample for tall persons, and ladies with high hats will find that their convenience has been amply studied and the necessary head-room given.

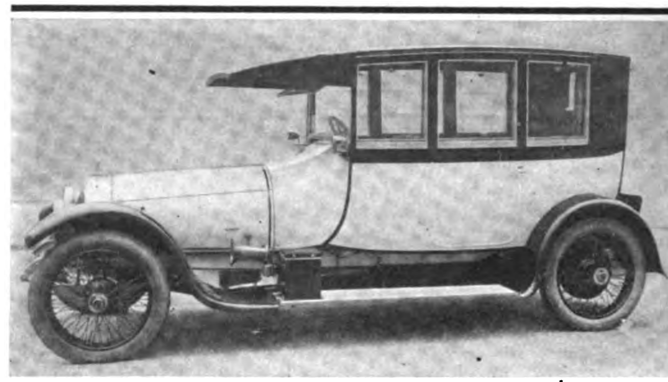


Fig. 14—Exhibition model of 30-horsepower Sheffield-Simplex berline

With regard to details, the four passengers in the rear interior are carried two on the main seat and two on folding seats with back rests, which latter are designed for comfort. Access to this part of the car is by a very wide door on either side. The driver's compartment is entered by a door on the near side and to give easy access to his seat; the passengers' seat is made to tilt up like a theater stall. This method of construction does not interfere in any degree with comfort, and arm rests are provided. The division at back of driver's seat consists of two windows arranged to lower, and at his side the window comprises two pieces of glass divided vertically one to slide over the other. Throughout the car the windows are frameless, of best plate glass, and those arranged to drop have new patent lifters which easily and securely fix them in any desired position and obviate the use of the usually awkward strap.

The windscreen in front of driver, carried on a deep extension rearwards of the dashboard is a V-shaped wind deflecting type which was introduced on the six-cylinder Napier car that gained the Grand Prix award at the Turin Exhibition. It has been improved since, and the rearmost vertical frame brought well back so that nothing now obstructs the line of vision of the driver Each frame of the V contains two glasses, the lower of which is fixed and the upper adjustable outwards to any angle—each window independently of the other.

Aluminum is used almost wholly throughout the construction of this body and every curved panel has been beaten to shape by hand. The decoration of the interior has been carried out to combine utilitarian purposes with artistic effect; inlaid satinwood has therefore been chosen, and the roof, sides, doors nd heelboards are comprised in the scheme. Exquisitely fig-red panels and plain panels with sections set out with the grain t varying angles add to the beauty. The upholstery is in cream ıorocco, and four electric lamps on projecting brackets are fitted ith shades of floral design. Metal interior fittings with their elicate tracery in siiver and dull gilt impart an air of refinement. very point that the most fastitious could demand has been udied, even to regulating the temperature of the interior, and a entilator is fitted in the roof with its opening adjustable at the ill of the occupants by a very ingenious cylinder and piston evice. A Hall flap is also provided to enable the passengers to ommunicate with the driver.

The finish of the exterior is a tasteful shade of cream with lack, the panels and bonnet being in the former color, while ıe roof and wings are black. The combination, notwithstanding s contrast, is particularly pleasing and harmonious.

The chassis has Rudge-Whitworth detachable wire wheels with

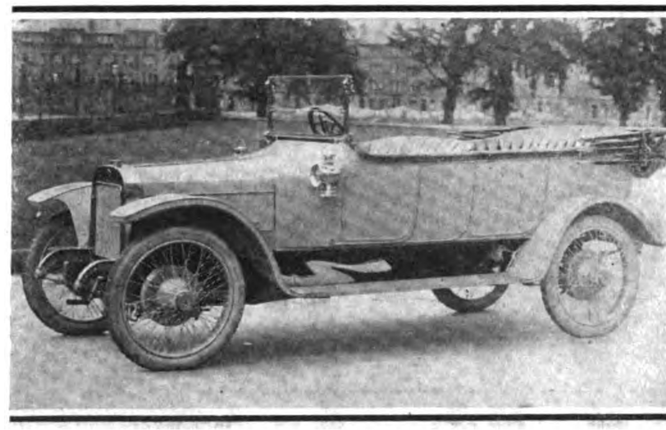


Fig. 16—Argyll 15-30 model made specially for Olympia exhibition

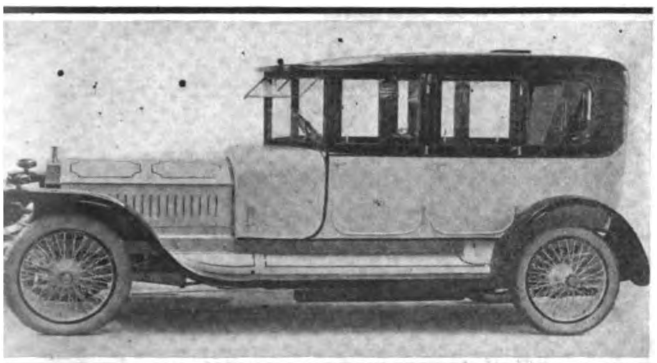


Fig. 15—Special six-cylinder Napier exhibited at Olympia show

95 by 135 millimeter tires all round, and the new wheelbase is ı feet 6 inches.

In the British high-price car the accessories are exceptionally ell taken care of. Electric lighting is fitted to all the makes and rnamental features instead of being treated as extras are fitted s a matter of course and the parts of the car that they are at-ıched to take the fittings in a rigid and substantial manner. his is especially true in the matter of the top. This is generally esigned to swing back of the body, as in Fig. 16.

Figs. 15 and 16 show the clear running boards and side ıembers. Nothing is permitted to mar the elegant appearance f the straight-line body. Tools, tires andother impedimenta are ept away from the body of the car and are placed to the rear of ıe chassis or beneath the passengers' and driver's seats.

Harking Back a Decade

FROM *The Automobile and Motor Review,* November 22, 1902:

The new type of electric delivery wagon being put out by ıe Vehicle Equipment Company carries 1 ton of freight and av-rages about 50 miles a day. This extraordinary mileage is ac-omplished by recharging the partially discharged batteries dur-ıg the noon hour.

Applicants for space at the Madison Square Garden Show are ill swamping the managers of that exhibition. The allotments ave been made and save for a change here and there, the late pplicants will have small chance to secure space. The show will e held January 17-24. The annual banquet of the N. A. A. M. ill be held January 21.

The worm has apparently turned. Theodore Havemeyer, an ıtomobile owner of Brooklyn, has instituted suit for damages gainst Charles Hart, a contractor, alleging that through the efendant's negligence in leaving an excavation unprotected, into hich Havemeyer's car plunged, injuring four persons. Litigation f the past has been practically unanimously against the automo-bile owner and the outcome of the present suit will be watched with interest.

Alexandre Ular has discovered, in an article published by *L'Auto Velo,* of Paris, that the Chinese had mechanical vehicles 1,600 years ago and used them extensively. In northern Mon-golia he found two huge locomotives employed in drawing gold ore over the highways. The wheels of these machines are 7.5 feet in diameter. Mr. Ular proposes to make the trip from Pekin to Paris with a machine similar to these locomotives, which the reader is made to infer are relics of the antique automobilism of the Celestial Empire.

If any proofs be needed that the present limit of speed for motor vehicles is far below all reasonable requirements of safety, it may be found in the record of the Reliability Run, in which, counting the convoying vehicles as well as those compet-ing, upward of 100 cars traveled a distance of 500 miles each without an accident to an outsider, much less to the riders.

No hill-climbing contest of real importance has yet been held in this country. The nearest approach to a national event was the climb of Nelson Hill last year, but blockades of the road were so frequent during the running that the results were deprived of comparative value.—Editorial.

Eagle Rock Hill in New Jersey has been selected as the course for the Thanksgiving Day hill climb, November 27. The hill is 1 1-8 miles and has an average grade of 14 1-2 per cent. There are a number of severe bends in the road. The early entries for the contest indicate that all the events will be well filled.

The Automobile Club of America now has 392 members, ac-cording to the annual report submitted by Secretary Samuel M. Butler.

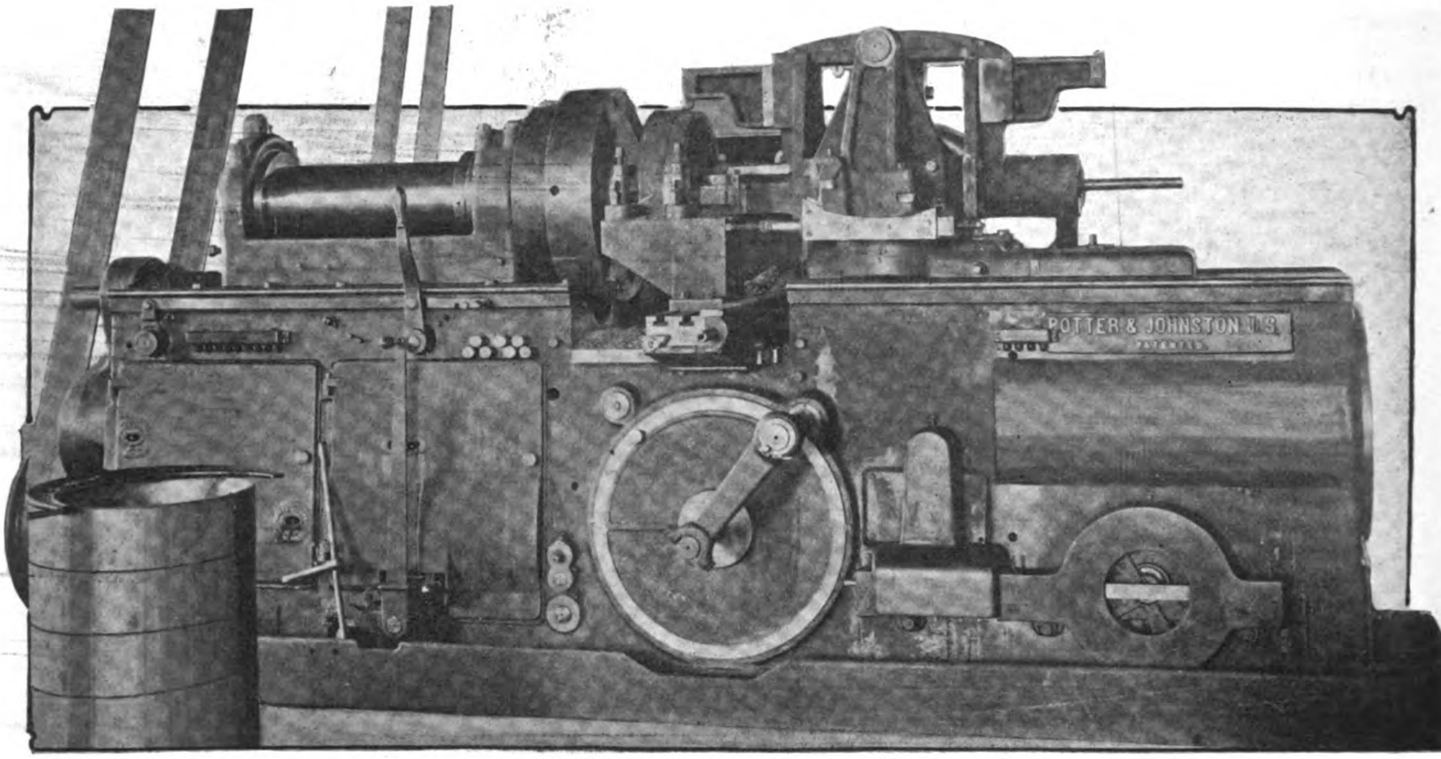
Henry Fournier has lowered W. K. Vanderbilt's world's record for the flying kilometer and Augieres has set a new mark for the flying mile. The cars used in each case by the record breakers were of Mors manufacture as was also that of Vanderbilt. Fournier's time for the kilometer was 29 1-5 seconds and that of Augieres for the mile was 46 seconds flat.

According to the estimates compiled by Winthrop E. Scar-ritt, president of the A. A. A., the 1903 production of automo-biles in America will be 35,000. He predicts that there will be 50,000 buyers who will try to supply their requirements. He does not say how the overplus of 15,000 customers are going to ride next year.

Barney Oldfield, who set fast marks for the mile and 5-mile distances in a Ford-Cooper racer at Detroit, never drove a car until 10 days before the race trials.

Directors of the A. A. A. have decided to give their support to the project of promoting a national highway from coast to coast. General Nelson A. Miles proposed the road and several bills to secure national co-operation have been presented to Con-gress. The A. A. A. has determined that none of the bills in-corporates exactly the right features and is preparing to draught a bill on its own initiative.

Factory Miscellany



Special Automatic lathe used in the factory of the Moline Automobile Company, East Moline, Ill., for turning down flywheels

MOLINE flywheels are turned down by the special machine shown above after they have been roughly cast. This is an automatic machine in that it requires no one to turn a turret or to reset the machine after every operation. It is only necessary to feed the unfinished flywheels. It takes one man only to do the work, and his duties are merely to keep the machine supplied with work and to see that the belting and lubrication of the machine are as they should be. It requires 1 hour and 10 minutes for the machine to finish one casting. This consists of grooving out of the oil ring and turning out the seating for the cone clutch. During the course of a working day the machine can turn out nine finished flywheels and the time required in changing over from the finished job to the commencement of the next is only 4 minutes. The work of changing consists in taking out the finished flywheel by simply pushing back on a lever, slipping in the new wheel and again starting the machine.

MOLINE FACTORIES BUSY—Moline, Ill., manufacturers of automobiles, Moline, Velie and Midland, will be up and doing during the coming year. During the past season 3182 machines have been built and marketed by the three local factories. Plans for 1913 are for the building of 5,900 cars, nearly twice the output of last year. During the coming year 3,500 Velie automobiles and trucks are to be put on the market, while 1,400 Midland cars are planned for next year. The Moline Automobile Company built 782 machines this year and will raise the mark to 1,000 during 1913.

Large Addition Necessary—The Belle City Brass & Iron Company, of Racine, Wis., has commenced work on a large addition which is made necessary by the tremendous rush of orders. All departments are working over capacity and overtime.

Doubles Capacity—The Racine File Company, Racine, Wis., has doubled its capacity and changed its factory drive to electricity throughout. Much new equipment has been added. The company does a large business with motor car and parts manufacturers.

Robinson Adds Truck—The Robinson Motor Truck Company, Minneapolis, Minn., has added a new model to its line called the Minneapolis, a four-cycle truck. The company will continue to make the Gopher, a two-cycle car. The new machine runs in 1 1-2, 2 and 3-ton capacities. The list price of the chassis is $2,500.

Buick Plant Inspected—With Michigan's new compensation law in effect, the Buick Motor Company, Flint, Mich., is setting about the organization of a vigilance committee to make the rounds of the entire factory with the idea of recommending changes which will end to reduce the danger of accident to a minimum.

Chatham Accessory Factory—Work will be started soon on the transformation of the Nellis building, Main street, Chatham, N. Y., from a garage into a factory for the manufacture of automobile parts. A third story may be added or the present building may be raised and a three-story brick structure erected in its place.

Building in Toledo—The last of five new buildings to be erected on Madison avenue, Toledo, O., for the sale of automobiles and automobile accessories is that of the Six Realty Company, which will extend the Madison avenue Auto Row westward. The five structures are either under way at the present time or are in the hands of architects.

Kelsey's Memphis Plant—The Kelsey Wheel Company, Detroit, Mich., will operate at Memphis, Tenn., a plant to manufacture automobile spokes and rims. Two buildings have already been completed of the three proposed. The plant will have a daily capacity of 25,000 spokes and 4,000 rims and machinery will be installed to cost $12,000.

Takes Over Patent Rights—The Columbus Auto Parts Company, Columbus, Ohio, a new corporation recently chartered with a capital of $25,000 has taken over the patent rights and plant of the Columbus Auto Parts & Machine Company. The concern now occupies a large new plant at Russell and Fourth streets, which contains 16,000 square feet of floor space. The company manufactures the Columbus Friction windshield exclusively and is very busy on large contracts to supply automobile factories. C. J. Krag is president; C. M. Klages, vice-president, and R. E. Klages, secretary-treasurer.

Moon Making Improvements—The Moon Motor Car Com-
any, St. Louis, Mo., plans to make further improvements
› its plant.

Ford's $250,000 Plant—The Ford Motor Car Company, De-
oit, Mich., has given a contract for a six-story assembling
ant, in Minneapolis, Minn., to cost $250,000.

Rex Plant in Nashville—The Rex Chemical Company, New-
ort, Ky., will establish a factory in Nashville, Tenn. The
ompany will manufacture polish for automobiles.

Rubber Company's Addition—Work was recently started
ı a two-story brick and steel factory addition, for the Port-
ge Rubber Company, Barberton, O., to cost $15,000.

New Plant at Dunkirk—Work was started recently on the
iagara Gasoline Motor Company's Building, Dunkirk, N. Y.
he building will be under cover before winter sets in.

Marathon Doubles Capacity—The Marathon Motor Com-
ıny, Nashville, Tenn., which has been making thirty cars a
eek, is to install equipment which will double the capacity
its factory.

Larger Tire Plant—The Automobile Tire Repair and Sup-
y Company, Philadelphia, Pa., has leased the building for-
erly occupied by the Auto Equipment Company in that
ty, and is using it for a vulcanizing and solid tire plant.

Purchases Atlas Works—J. W. Lyons, who recently pur-
ıased the Atlas Engine Works and a plant covering 65 acres
Indianapolis, Ind., has engaged J. Haltenberger, an auto-
obile engineer, to keep pace with the foreign experiments,
hich are being carried on by C. K. Knight at Coventry, Eng.

Firestone's Frisco Building—Work is now under way on a
:w building for the Firestone Tire & Rubber Company in
ın Francisco, Cal. It will be at Van Ness avenue and Aus-
ı avenue, with a frontage of 70 feet on Van Ness and 319
et on Bush street. The structure will be two stories in
:ight.

Negotiates New Scale—A representative of the Carriage,
'agon and Automobile Workers' organization has been suc-
ssful in executing a new agreement in Sacramento, Cal.,
hereby the carriage blacksmiths, trimmers, wood carvers
ıd painters will receive hereafter a substantial increase over
e wages received heretofore.

Whitesides Starts Factory—Colonel V. F. Whitesides has
vered his connection with the Whitesides Commercial Car
ompany, Newcastle, Ind., with which he has been associated
r 4 years in the capacity of designer and factory superin-
ndent. His intention is to come to Indianapolis, Ind., to
ıild a truck to be known as the Ironsides.

Kline's New Plant Opened—The Kline Motor Car Corpora-
on, Richmond, Va., has opened its new factory in that city,
here on a 15-acre tract the corporation has erected a mod-
n plant at a cost of more than $100,000. The new factory
ill have a capacity of 2,000 cars a year. When operated in
ll on one shift the plant will employ upwards of 750 men.

The Automobile Calendar

Shows, Conventions, Etc.

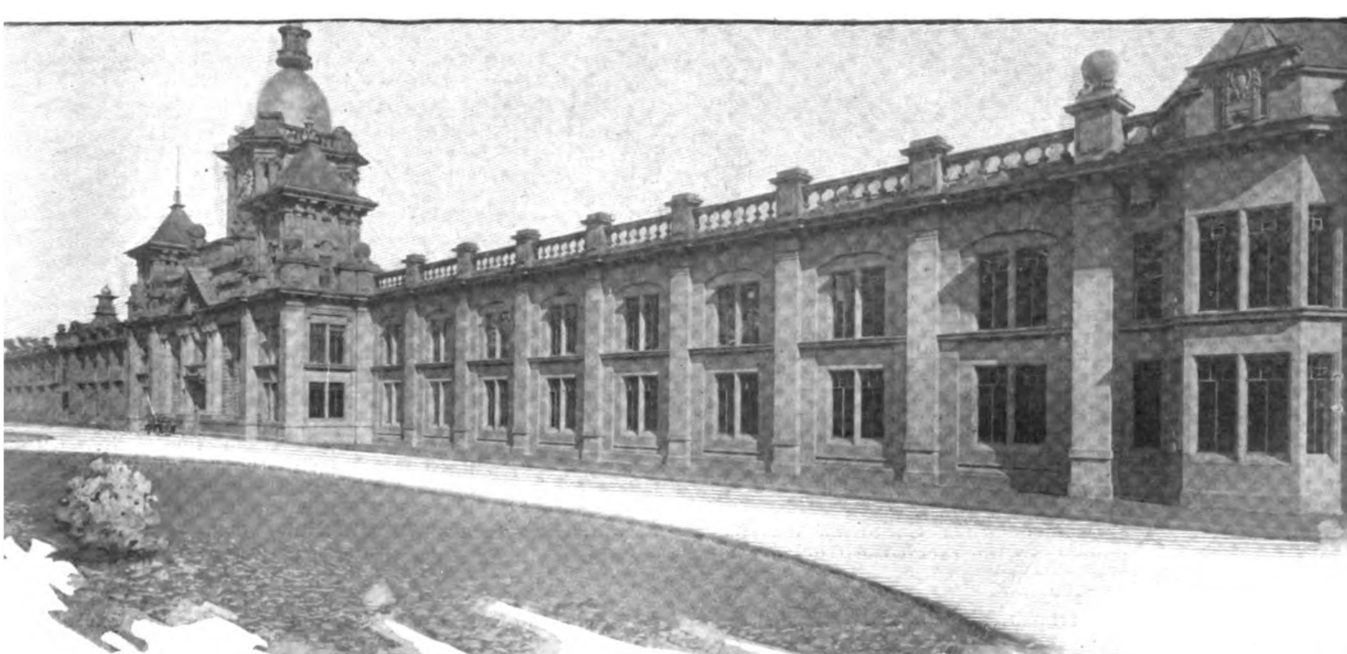
Jan. 2-10..........New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 4-11..........Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-18..........Milwaukee, Wis., Annual Show, Auditorium, Milwaukee Automobile Dealers' Association.
Jan. 11-25..........New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25..........Philadelphia, Pa., Annual Automobile Show.
Jan. 21-26..........Toledo, O., Annual Show, Exposition Building, Toledo Automobile Shows Company.
Jan. 22-25..........Geneva, N. Y., Annual Automobile Show.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Buffalo, N. Y., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27 Feb. 1.....Ottawa, Ont., Ottawa Motor Show, Howick Hall, Louis Blumenstein.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Jan. 30-Feb. 1.....Canandaigua, N. Y., Annual Automobile Show.
Feb. 1-8..........Chicago, Ill., Annual Automobile Show.
Feb. 10-15..........Chicago, Ill., Truck Show.
Feb. 10-15..........Minneapolis, Minn., Annual Automobile Show.
Feb. 11-15..........Ottawa, Ont., Annual Automobile Show.
Feb. 12-15..........Geneva, N. Y., Automobile Show, Armory, Louis Blumenstein.
Feb. 15-22.......... Newark, N. J., Annual Automobile Show, First Regiment Armory, New Jersey Automobile Exhibition Company.
Feb. 17-22..........Kansas City, Kan., Annual Automobile Show.
Feb. 20-22..........Canandaigua, N. Y., Automobile Show, Louis Blumenstein.
Feb. 24-Mar. 1.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1.....Omaha, Neb.. Annual Automobile Show.
Feb. 24-Mar. 1.....Paterson, N. J., Annual Show, Paterson Automobile Trade Association.
March 1-8..........Pittsburgh, Pa., Annual Automobile Show.
March 8-15..........Boston, Mass., Annual Automobile Show.
March 19-26..........Boston, Mass., Annual Truck Show.
March 24-29..........Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Nov. 29-30..........Richmond, Va., Track Races, State Fair Grounds, Richmond Automobile Club.
Dec. 4-6..........Tacoma, Wash., Meeting of Washington State Good Roads Association.
May 30..........Indianapolis, Ind., 500-Mile Race, Speedway.

Proposed Contests

Nov. 28-29..........Track, Richmond, Va., Richmond Automobile Club.
Nov. 28..........Road Race, Visalia, Cal., W. H. Lipton.



View of the factory of the Argyll Motors at Alexandria, Dumbartonshire, Scotland

News of the Week Condensed

Fleet of twenty Waverley electric light delivery wagons employed in the service of the Fleischmann Yeast Company of New York

CUTTING Launches Six—The Cutting Motor Car Company, Jackson, Mich., will soon be ready to announce the launching of a six, the first car of this type the Jackson factory has put on the market.

Prendergast Sales Manager—F. N. Prendergast has begun his duties as manager of the local branch of the Foss-Hughes Company, Washington, Pa.

Doubles Garage Capacity—W. S. Sandman, Cambridge, Mass., has doubled the floor space of his fireproof building. The garage now has a total floor space of over 7000 square feet.

Nelson Consulting Engineer—E. A. Nelson, the chief engineer of the Hupp Motor Car Company, has given up the active duties of that office and assumed the title of consulting engineer.

Hess Resigns—H. Hess has resigned as president of the Hess-Bright Manufacturing Company, Philadelphia, Pa., and has sold all of his holdings in that company. It is understood that no change in the policies of the company is contemplated.

Thomson Dixon Manager—A. G. Thomson has been made sales manager for the Joseph Dixon Crucible Company, Jersey City, N. J. He will represent the automobile department of that company.

Organizes Sales Company—J. G. Wolleager, Milwaukee, Wis., has organized the Molleager Sales Company to continue the business of the Milwaukee branch of the Studebaker Corporation of Milwaukee.

Robartes Represents Locomobile—F. W. Robartes has located in Washington, D. C., as resident manager of the Washington branch of the Locomobile Company of America, Bridgeport, Conn., with headquarters at 1124 Connecticut avenue.

Kissel Kar Station Finished—The new Boston, Mass., Kissel Kar station has been completed, adding one more to the chain of service buildings which are being erected throughout the country for the patrons of the Kissel Motor Car Company, Hartford, Wis.

Farmers Use Trucks—Farmers in California are using trucks to great advantage. On the ranch the truck is being used with a profit that cannot be surpassed in any other business. The Kissel Motor Car Company, Hartford, Wis., is busy filling orders for trucks from that state.

Must Stand Police Trial—A new police regulation was put into effect recently in Washington, D. C., whereby motorists and drivers of other vehicles who violate the speed and traffic regulations at the intersection of streets will not be allowed to forfeit collateral, but will be obliged to stand trial in the police court.

Recommends Automobile Apparatus—In a report covering a survey of the fire-fighting facilities of Indianapolis, Ind., the National Board of Fire Underwriters has recommended that all new apparatus bought for the department and all apparatus of companies making long runs on the first alarm shall be motor apparatus.

Automobiles in Venezuela—Automobiles are to be used in transporting passengers and freight around the rapids in the upper Orinoco River, Venezuela. The Venezuelan government has pledged a subsidy of $3,860 to the new automobile service, which will make better time possible on shipments from the rubber district via the Orinoco.

Birmingham's Speedway—Birmingham, Ala., is to have a $160,000 speedway modeled after the course at Indianapolis, Ind. This announcement was made by the directors of the Edgewood club recently. The movement is being supported by the Board of Commerce. It is planned to make Birmingham the center of winter racing in the South.

Investigating Maryland Arrests—The Washington, D. C., Chamber of Commerce has appointed a special committee to investigate the charges made to that body that Maryland constables are making unwarranted arrests of Washington motorists, and that the Maryland laws relating to automobile licenses are discriminatory against the District.

Taft Considers Road Plan—President W. H. Taft has taken under consideration a plan launched by Senator Martin and Representative Carlin for the expenditure of the $500,000 recently appropriated by Congress for good roads experiments on a model boulevard to be constructed from Alexandria, Va., to Mount Vernon, the tomb of Washington.

Regulations Extended—The regulations issued by the treasury department at Washington, D. C., on March 28, 1911, providing for the allowances of drawback on motor car top rubberized fabric, manufactured by the Archer Rubber Company, of Milford, Mass., with the use of imported mohair cloth and cotton mohair cloth, have been extended to cover motor car covering cloth manufactured by the International Rubber Company, of New York.

Locomobile Truck's Efficiency—Motor truck efficiency was recently shown by a Locomobile 5-ton truck, a product of the Locomobile Company of America, Bridgeport, Conn., which was working on a construction contract at Woodbridge, Conn. In order to facilitate the transportation of the different materials, a trailer of special design was built for them. This truck made several trips each day, over very rough roads, averaging over 10 tons to each load.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Anderson, Ind	Cole	Anderson Auto Co.
Baxter, Ia	Cole	Hager Bros.
Bayonne, N. J	Cole	W. H. Dykeman
Beloit, Wis	Abbott	L. Allen Co.
Blue Springs, Neb	Cole	A. H. Krauss & Co.
Brainerd, Minn	Luverne	J. Flanagan
Burlington, Vt	Cole	Churchill & Lockwood
Cairo, Ill	Cole	R. L. Hosmer & Co.
Canton, O	Cole	E. J. Quigley
Canton, Ill	Cole	G. Coleman
Cedar Bluffs, Neb	Cole	Ostrand & Lampert
Charleston, W. Va	Cole	J. R. King
Clarksburg, W. Va	Cole	C. S. Thompson
Clarksdale, Miss	Cole	W. E. Campbell
Clio, S. C	Cole	Covington & Smith
Columbus, Neb	Cole	A. J. Dischner
Columbus, O	Cole	Franklin Cycle & Supply Co.
Cortland, N. Y	Cole	Letts & Farrell Co.
Darlington, Wis	Abbott	A. C. Poole
Fort Smith, Ark	Cole	Boehmer & Sheridan
Fremont, O	Cole	J. R. Kiser
Grand Forks, N. D	Luverne	Dakota Auto Co.
Grand Rapids, Wis	Oakland	Jenkins Bros. Co.
Greenwood, Miss	Cole	W. S. Wright
Helena, Ark	Cole	B. L. Lyford
Howard, S. D	Luverne	D. A. McCullough
Hudson, Wis	Ford	Hudson Gar. Co.
Hudson, Wis	Overland	Hudson Gar. Co.
Itta Bena, Miss	Cole	Townsend & King
Janesville, Wis	Chevrolet	Janesville Auto Co.
Janesville, Wis	Herreshoff	Janesville Auto Co.
Johnstown, Miss	Cole	L. F. Weathersby
Kellogg, Ia	Cole	Craven & Hoberly Co.
Knoxville, Ia	Cole	L. L. Bybee & Co.
La Crosse, Wis	Cole	Elsen & Phillips
Lebanon, Ind	Cole	Lofland & Layton
Lexington, Miss	Cole	E. Norquist
Louisville, Ky	Cole	Mille Auto Co.
Macon, Mo	Moon	Macon Gar. Co.
Madison, Wis	Cutting	Albrecht M. Sales Co.
Madison, Wis	Herreshoff	Albrecht M. Sales Co.
Madison, Wis	Little	Albrecht M. Sales Co.
Marion, Ind	Cole	W. Hillsamer & Son
Marshall, Mo	Cole	Tipping Bros.
Marshalltown, Ia	Cole	J. H. Fisher
Mason City, Ia	Cole	Clover Leaf Co.
Mauston, Wis	Oakland	C. L. Sharp
Wheeling, W. Va	Cole	A. W. Lee
Meridian, Miss	Cole	E. S. Curtis
Meridi, Yucatan, Mexico	Cole	W. M. James
Mobile, Ala	Cole	Bloch Bros.
Moro, Ore	Cole	W. H. Moore & Co.
Mt. Pleasant, Tenn	Cole	J. M. Granberry
New Haven, Conn	Cole	The Knight Garage
New Haven, Conn	Moon	J. J. Laverty
New London, Conn	Cole	Lathrop & Smith
North Yakima, Wash	Luverne	E. M. Ernsdorff
Oakland, Miss	Cole	Crow & Marder
Oblong, Ill	Cole	Oblong Auto Co.
Oil City, Pa	Cole	C. H. Weaver
Oklahoma City, Okla	Cole	Oklahoma Motor Car Co.
Portage, Wis	Cole	A. R. Slinger
Portland, Ore	Luverne	G. A. Lovejoy
Providence, R. I	Cole	Pawtucket Auto Co.
Racine, Wis	Ford	Gunther & Laux
Rock Island, Ill	Cole	Treror & Snyder
Rosenburg, Tex	Moon	Rosenberg M. C. Co.
Schaller, Ia	Moon	E. F. F. Hasseler
Scranton, Pa	Cole	H. S. Smith
Sharon, Wis	Little	Anderson Auto Co.
Shreveport, La	Cole	M. Nulsen
St. Louis, Mo	Cole	Bagnell Auto Co.
St. Marys, W. Va	Cole	R. W. Russell
St. Paul, Minn	Luverne	A. G. Bauer Auto Co.
Summerville, Tenn	Cole	C. A. Oliver
Tarboro, N. C	Cole	J. B. Pennington & Co.
Taylor, Tex	Moon	Prewitt Auto Co.
The Dallest, Ore	Cole	J. B. Kirk
Van Meter, Ia	Cole	H. V. Van Meter
Winfield, Ia	Moon	Nesbitt Auto & Sup. Co.
Worcester, Mass	Cole	Palace Auto Station
Yankton, S. D	Luverne	Todt Bros.
Ypsilanti, Mich	Cole	Cary S. Davis

Klinger Chief Engineer—P. W. Klinger, who has served ie Speedwell Motor Car Company, Dayton, O., in the ıpacity of factory manager, has recently assumed the title f chief engineer.

A. J. Hoskin, the late Western editor of *Mines and Minals*, has resumed private engineering practice in Denver, ıllowing the closing of the Western office of the journal ith which he had been connected.

Oconto Falls Garage—The Oconto Falls Motor Car Comıny, Oconto Falls, Wis., distributers of Overland and Ford .rs, is building a $10,000 garage to be equipped with maıinery driven by electric power.

Reeves in Columbus—Two well-known automobile men ere in Columbus, O., during the past week, Alfred Reeves, eneral manager for the United States Motor Car Company, ıd J. I. McCloud, central supervisor for the same company. Thile in the city they visited the local agency.

Cobb Succeeds Luce—A. M. Cobb has been named to suced Norton H. Luce, resigned, as manager of the Velie Chigo, Ill., branch at 1615 Michigan avenue. Mr. Luce goes to ew York City in charge of eastern sales for the Marion otor Car Company of Indianapolis. He is at present candiıte for treasurer of the Chicago Motor Club.

Traveler Company Organized—The Traveler Motor Car ompany, Detroit, Mich., is one of the latest companies to organized in that city. It will issue a four-cylinder car lly equipped to list at $950. The Lavigne Manufacturing ompany, Detroit, Mich., is behind the new company, which ill manufacture the cars in the plant of that company.

Repair People Combine—The announcement is made that e Auto Exchange, at Park and Goodale streets, and the Combus Auto Inn, at Sixth avenue and High street, Columbus, ., have united and located at the latter place. A large reıir department and paint shop has been opened and general ırage work will be done. R. C. Shisler and M. E. Bedlack e the managers of the merged concern.

Indiana Road Convention—The program for the Indiana etter Roads Convention, Indianapolis, Ind., is rapidly nearg completion. The convention will be held December 11 to . The principal purpose of the convention will be to scuss bills for better roads, to be introduced in the State egislature when it meets in January. One of the prosed bills probably will provide for a state highway comission.

Licensed Chauffeurs Increase—There has been an increase 2,750 in the number of licensed automobile chauffeurs in hio within the past two years. In 1910 there was a total of 5,135. Last year the number was 6,402, which was at that time equal to any other state in the Union. But this year, with 30 days more before the records are closed, the number aggregates 7,885, and nets the state the sum of $15,770. The fiscal year ends on December 15, and it is expected that before that time the total number of licensed chauffeurs will exceed 7,900.

Akron Gets Apparatus—Bids were opened last week by Safety Director Dan P. Stein, Akron, O., for seven pieces of motor-propelled fire apparatus as follows: Tractor, Nott Fire Engine Company, $4,250; combination truck, Webb Motor Apparatus Company, unequipped, $5,072.50, equipped $5,400; 85 ft. aerial truck, unequipped, $10,509.75, equipped $11,300, Webb Motor Apparatus Company; combination hose wagon, Lange Motor Truck Company, $4,152.20; three combination pumping engines, Webb Motor Apparatus Company, unequipped, $7,915.80, equipped, $8,200.

New building of the Longstreth Motor Car Company, Philadelphia, Pa. The structure is of concrete with a terra cotta front. It occupies a space 65 by 125 feet and has a total floorspace of 24,375 square feet. The Longstreth company handles the Alco in Philadelphia and vicinity

Special type truck body built for J. S. Brown & Brother Mercantile Company, Denver, Col., by the Packard Motor Car Company, Detroit, Mich. Detached bodies may be rolled on channel irons in the truck platform.

Bartlett with Universal—L. A. Bartlett has become identified with the Universal Motor Truck Company, Chicago, Ill.

Mr. Frank C. Bowman, of Denver, is in charge of the metallurgical work of the New Reliance Company in the Black Hills of South Dakota.

Bonnell Manager Mitchell—H. W. Bonnell has been appointed manager of the Milwaukee, Wis., branch of the Mitchell Automobile Company.

Gregg with Michigan—E. E. Gregg has been appointed assistant sales manager of the Michigan motor branch with headquarters at Pittsburgh, Pa.

Stryker's New Position—A M. Stryker has joined The Stewart & Clark Manufacturing Company, Chicago, Ill. He is in charge of the advertising.

Rushmore Resigns—George D. Rushmore has resigned as sales manager for Neate & McCarthy, Portland, Ore., and has been succeeded by Harry Twitchell.

Roberts with Maxim—C. W. Maxim, manager of the Middleboro Automobile Exchange, Middleboro, Mass., has appointed L. H. Roberts as director of wholesale sales.

Huntington Leases Garage—Guy E. Huntington of Pulaski, Wis., has leased the Elert-Barton building at Owen, Wis., and will open it as a garage and salesroom on December 15.

Uruguay Postpones Competition—Due to unavoidable delays it has been necessary for Uruguay to postpone the International Competition of Agricultural Motor Vehicles until March 31, 1913.

Milwaukee Watching Delinquents—The Milwaukee, Wis., fire department is keeping a close watch on garages to discover violations of the city ordinance regulating the storage of gasoline and oils.

Will Make Ignition Apparatus—Edward S. Jacobson, Floyd A. Knight and John J. Whittlesey have formed the J. & B. Company at Pittsfield, Mass., to make ignition and other motor accessory appliances.

Langley Sales Manager—Replacing Britt Webb, who is now in charge of the Buick branch house at San Antonio, Tex., R. C. Langley is acting sales manager for the Buick Company at its Dallas branch.

Wolfe Resigns—M. C. Wolfe, for several years manager of the Columbia division of the United Motor Company, Dallas, Tex., has resigned to become manager for the Southwest of the KisselKar Company.

Is Manager—C. A. H. de Saulles has taken the managership of the United States Zinc Company, at Pueblo, Colo. Mr. De Saulles has been at Gas, Kan., for some time, managing the smelter of the Prime Western Spelter Company.

Puerner Sells Garage—A. E. Puerner has sold his garage and agency business at Fort Atkinson, Wis., to the Hofmeister Motor Company of Watertown, Wis., which will conduct it as a branch. Mr. Puerner retires because of ill health.

Alabama Registration Increased—An increase of 30 per cent. in the amount of license money paid into the Alabama treasury by automobile owners has been registered this year. The entire amount realized this year is slightly in excess of $40,000.

Toledo Falls in Line—Safety Director J. J. Mooney has requested the Council to authorize the motorizing of the Toledo, O., fire department, and that body now has the matter under advisement. The cost of the undertaking is estimated at $185,000.

Wants New Ordinance—Mayor S. L. Shank, Indianapolis, Ind., has asked the city legal department to prepare an ordinance forbidding automobiles to go around street cars on the left-hand side, when the street cars are stopping to receive or discharge passengers.

Automobile Bus Line—An automobile bus line is to be established between Louisville, Ky., and Richmond, Va. The Citizens' Motor Car Company is to operate the line, which, it is stated, will be in operation as soon as the equipment is received there from Cincinnati, O.

Installs Improvements—The Prange Garage Company of Sheboygan, Wis., has completed important improvements to its garage building, including the installation of more commodious offices, stock and store rooms, enlargement of the repair department and general renovation.

Library Uses Automobile—The Delaware State Library Commission is using an automobile to handle its traveling library in Kent County, Del., and finds that the results are excellent and the cost no greater than would be the case with a horse and wagon, which plan is followed in some other parts of the state.

Federal for Frisco—A Federal chassis equipped with a spacious body is now used in San Francisco, Cal., to carry stray dogs to the city pound. It has been in operation for six months, averages 1,000 miles per month at a cost of $1 a day. The wagon is operated by the Society for the Prevention of Cruelty to Animals.

Milwaukee's Automobile Funeral—The first exclusively automobile funeral ever held in Milwaukee, Wis., was that of Mrs. W. E. Allen, wife of the president of the W. E. Allen Company. The procession was led by the funeral director in an electric coupé, followed by an automobile hearse and the cars of Mr. Allen's customers.

Automobile Incorporations

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AUTOMOBILES AND PARTS

AUBURN, IND.—De Soto Motor Car Company; capital, $20,000; to manufacture automobiles and parts. Incorporators: L. M. Field, Hayes Fry, Glenn Fry, V. Van Sickle, H. H. Clark.

BARKER, N. Y.—Progressive Motor Car Company; capital, $30,000; to manufacture automobiles. Arthur H. Tersleeson, John B. Smith, Harry C. Schuhr.

CHICAGO, ILL.—Keeton Motor Company; capital, $60,000; to manufacture automobiles. Incorporators: L. C. Roberts, K. R. Roberts, W. C. Spenny.

DETROIT, MICH.—Tyro Manufacturing Company; capital, $5,000; to manufacture and deal in automobiles. Incorporators: Roy I. Wellington, William C. Stuart, F. J. B. Gerald.

DOVER, DEL.—American Motor Fire Apparatus Company; capital, $1,000,000; to manufacture all kinds of machinery and automobile trucks with appliances for fighting fires. Incorporators: P. F. B. Bithell, P. S. Chambers, Thomas L. Pfarr.

ELGIN, ILL.—Elgin Motor Company; capital, $20,000; to manufacture automobiles. Incorporators: Edward J. O'Beirne, E. J. Adamek, Charles D. Adamek.

FOND DU LAC, WIS.—R. C. Wells Manufacturing Company; capital, $200,000; to manufacture automobiles and accessories.

FT. WAYNE, IND.—Auburn Auto Company; capital, $15,000; to manufacture automobiles. Incorporators: Fred Eckhart, Adolph Schultz, Alfred M. Horstman, Lewis Watson.

GUELPH, CAN.—C. Kloepfer, Ltd.; capital $250,000; to manufacture automobiles.

NEWCASTLE, IND.—Rose City Auto Company; capital, $10,000; to manufacture automobiles. Incorporators: Frank E. Smith, Charles W. Mouch, William F. Byrket, Howard M. Van Matre, Gordon Cameron, Lawrence W. Bailey, Albert D. Ogborn.

NEWARK, N. J.—American Radiator Works; capital, $25,000; to manufacture automobile radiators. Incorporators: Max Steiner, Simon Goldstein, Abraham Marcus.

NEW HAVEN, CONN.—Stutz Motor Car Company; capital, $10,000; to deal in automobiles. Incorporators: P. H. Chandler, Edward J. Barlett.

NEW YORK CITY, N. Y.—Auto Exchange & Equipment Company; capital, $1,000; to deal in automobiles. Incorporators: Harry Lauterbach, Idella Lauterbach, Charles A. Spencer.

NEW YORK CITY, N. Y.—Joseph H. Penders, Inc.; capital, $25,000; to deal in automobiles and taxicabs. Incorporators: John H. Penders, Elizabeth Penders, Catherine Hahr.

PHILADELPHIA, PA.—Fortman Manufacturing Company; capital, $100,000; to manufacture and deal in automobiles.

RICHMOND, VA.—Colonial Beach Motor Company; capital, $5,000; to manufacture automobiles. Incorporators: F. W. Alexander, George Staples, H. W. B. Williams.

ROTTERDAM, N. Y.—General Vehicle Company; capital, $10,000,000; to manufacture automobiles. Incorporators: A. E. Jackson, S. L. Whitestone, J. F. Zoller.

SOUTH BEND, IND.—South Bend Motor Car Works; capital, $10,000; to manufacture automobiles. Incorporators: John D. J. Farneman, Alfred C. Mechlenburg, Hilton Hammond.

ST. LOUIS, MO.—Auto Products Company of America; capital, $25,000; to manufacture automobile parts and accessories. Incorporators: Warren W. Smoot, A. E. Smoot, Eugene B. Stinde.

WABASH, IND.—Sterling Absorber Company; capital, $10,000; to manufacture vehicle springs. Incorporators: M. Tillman, C. Huff, J. Kaiser.

Dr. J. A. Holmes, director of the Bureau of Mines, visited 'anama in November for the purpose of investigating the ıel supply on the canal.

Quincy Buys Kissel—The Kissel Motor Car Company of lartford, Wis., has made delivery of a combination hose and hemical car to the city of Quincy, Mass.

Johnson Manager—Charles R. Johnson has been appointed ıanager of the Kopmeier Motor Car Company, Milwaukee, Vis. Mr. Johnson succeeds John McDonald, who resigned n November 15.

The Company Moves—The Northwestern Shawmut Tire ompany has moved to 1210 Hennepin avenue, Minneapolis, linn. The company has taken the agency also for Warner ıstruments. A. J. Hunziker is manager.

Equipment Company Sold—The Motor Equipment Comany of Seattle, Wash., owned and managed by Edward J. trelau, has been sold to. Ballou & Wright of Portland. 'he new firm will take possession December 1.

Good Roads Compaign—A campaign against narrow-tired 'agons, particularly those designed to carry heavy loads, as been commenced by the good roads committee of the lilwaukee, Wis., Automobile Club, with special reference) Milwaukee county roads.

Louisiana's Road Improvement—Road improvement durıg 10 months of 1912 in Louisiana cost $2,310,976.81 acording to a report just issued by the State Highway Deartment. Over 500 miles of road was built or repaired. 'he average cost of new roads was $6,000 per mile.

Franklin's Annual Conference—At the annual conference f the district sales managers of the Franklin Automobile ompany held in Syracuse, N. Y., during the past week re-orts coming from all parts of the country indicate that the)13 season will be larger in point of sales than any other ı the history of the company.

Automobile Incorporations

GARAGES AND ACCESSORIES

APPLETON, WIS.—Lion Liner Company; capital, $5,000; to manufacture d market a patented inner liner for pneumatic tires. Incorporators: nton Scheurle, Edward Greve and Fred C. Goodman.

BELOIT, WIS.—Beloit Automobile & Machinery Company; capital, $10,000; conduct a garage. Incorporators: C. F. Brewer, Jerome Davis, R. J. ıvis.

BROOKLINE, MASS.—Coolidge Corner Garage Company; capital, $5,000: repair automobiles. Incorporators: S. A. Davis, F. O. White, Cyrus 'ewer.

CHICAGO, ILL.—Hanway Starter Company; capital, $75,000; to manufacre automobile accessories. Incorporators: J. D. Rourke, R. C. Nicholn, I. Goldstein.

DAYTON, O.—McVey Manufacturing Company; capital, $60,000 to manacture automobile accessories. Incorporators: J. L. McVey, Walter C. 'aine, A. N. Burkhart, R. J. McCarty.

NEW BRUNSWICK, N. J.—Middlesex County Garage & Sales Company; pital, $100,000; to conduct a general automobile business. Incorporators: A. Boyd, J. Mershon, C. A. Oliver.

NEW YORK CITY, N. Y.—Gross Auto Rental Company; capital, $5,000; to nt automobiles. Incorporators: Jacob S. Gross, Simon Gross, Herman rizver.

NEW YORK CITY, N. Y.—Auto Record Publishing Company; capital, 0,000; to publish automobile trade papers, etc. Incorporators: Chas. A. ıring, John W. Buckmaster, I. E. Buckmaster.

NEW YORK CITY, N. Y.—Twelfth Street Garage Company; capital, $60,-0; to conduct a general garage business. Incorporators: Wm. J. Devlin, .; Douglas G. McCotter, Geo. M. Hamilton.

TORONTO, CAN.—Bulldog Tire Company; capital, $300,000 to manufacre tires. Incorporators: Wm. J. Tubman, Jennie H. A. Blair, Irene ıuse.

WHITE PLAINS, N. Y.—General Rim Company; capital, $150,000; to sup-' motor vehicles and accessories. Incorporators: William Kaul, Robert Ashley, Frank Oberkirsch.

WILMINGTON, DEL.—Torkington Tire Company; capital, $1,300,000; to ıuire and take over the business of the Torkington Solid Automobile 'e Company. Incorporators: Isaac Fogg, Geo. D. Hopkins, Geo. W. llman.

WILMINGTON, DEL.—Zee-Zee Tire & Rubber Company; capital, $1,000,000; manufacture and deal in tires.

CHANGES OF CAPITAL AND NAME

CHICAGO, ILL.—Langer Auto Castings & Foundry Company; name changed Diversey Foundry Company.

CLEVELAND, O.—Peerless Motor Car Company; increase of capital from 000,000 to $10,000,000.

DETROIT, MICH.—Chalmers Motor Company; increase of capital from 000,000 to $5,000,000.

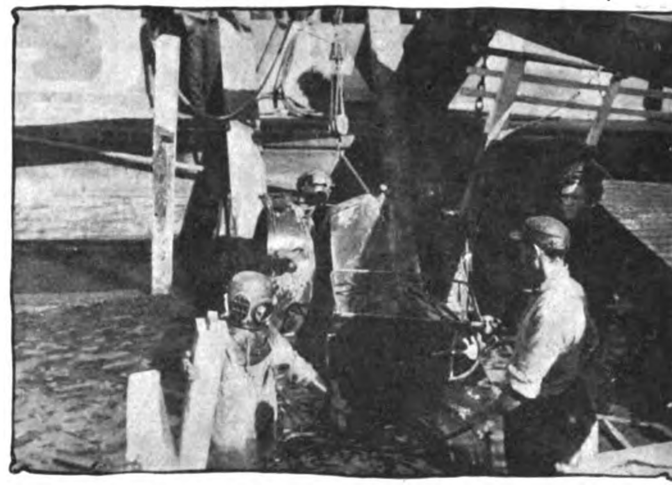
DETROIT, MICH.—Continental Motor Manufacturing Company; increase capital from $500,000 to $2,400,000.

DETROIT, MICH.—Hupp Motor Car Company; increase of capital from)0,000 to $750,000.

DETROIT, MICH.—Moyer Shaw Manufacturing Company; increase of cap-from $50,000 to $500,000.

LOUISVILLE, KY.—Wieland Company; name changed to Louisville Auto Wagon Company; capital increased from $6,000 to $10,000.

RICHMOND, IND.—Westcott Motor Car Company; increase of capital from 0,000 to $350,000.



Divers raising the Hupmobile of H. L. Watrous from the steam packet Josie which went to the bottom of Lake Ponchartrain, La., recently. Mr. Watrous took part in the Glidden tour

Convicts on Roads—Permission has been granted for the continuation of the policy of using convicts on road work in Louisiana. All convicts that can be spared from the penal farms will be used on the road during 1913 as they have been this year. It is hoped to improve at least 100 miles of highway with the convict gangs alone.

Sergeant Y. M. C. A. Instructor—Hugh M. Sergeant, chief draughtsman of the Racine Manufacturing Company of Racine, Wis., has been selected as instructor of automobile construction in the new motor school of the Racine Y. M. C. A. Mr. Sergeant is a graduate of the N. Y. Technical Institute and author of Practical Problems for Vehicle Machinists.

Builds $15,000 Garage—The Jenkins Automobile Company, owned and managed by Judge F. M. Jenkins, Chippewa Falls, Wis., is having plans prepared for a large garage building, which will be the home of the Mitchell, Paige and Regal. The building will cost in the neighborhood of $15,000 and will contain a commodious and well-equipped repair department.

New Indiana Automobile Laws—Senator J. J. Netterville, of Anderson, Ind., has prepared a bill providing an annual license fee for automobiles, new speed regulations, and that the money collected from the licenses shall be distributed among the different counties for road building and repair purposes. It is estimated the licenses scheme would net from $250,000 to $300,000 a year.

Automobile Nuisances Past—The days of the loud horn or whistle, the open muffler, the smoking automobile are numbered as far as South Bend, Ind., is concerned. At a meeting of the Council committee an ordinance was approved to govern these matters, and as the committee is composed of the entire Council the ordinance will become a law at the next regular meeting of the Council.

Boat Company's Garage—The Portage Boat & Engine Company, Portage, Wis., manufacturing manual and power boats and motors, intends to build a large garage at Portage beginning this winter. The building will have ground dimensions of 40 feet by 132 feet, one story and basement of fireproof construction. At present the motor car selling, repair and storage business is conducted at the boat factory.

Fire Apparatus a Success—The automobile fire apparatus used in Baltimore, Md., has proved such a success that the Fire Board has decided to ask the Board of Estimates to allow an appropriation for converting at least four engines into automobile steamers. It is also planned to replace the horse-drawn vehicles used by the district chiefs with automobile wagons similar to those used by the chief and deputy chief.

Stoughton Garage Completed—Thomas Oscar and M. O. Flom, owners of the firm of Oscar & Flom, Stoughton, Wis., have completed their new garage building on North Water street, but it will not be completely ready until March 1. The garage will contain a large repair shop, offices and storage rooms, and a 3-ton elevator will be installed. The building is 46 feet by 90 feet, two stories and basement, with a one-story addition, 26 feet by 35 feet.

K-W Lighting Generator

Low-Tension, Three-Magnet Apparatus Produces Enough Current for Two 15-Watt, 16-Candlepower Lamps

New Device Has No Brushes and Wound Armature—Is Driven from Flywheel or Fanshaft

THE K-W Ignition Company, Cleveland, has brought out a low-tension, three-magnet machine, Model LS, Fig. 1, which has sufficient capacity to light two 6-volt, 2.5-ampere, 16-candlepower lamps when driven at speeds of from 900 to 3,000 revolutions per minute.

The constructional features of the latest instrument are identical with K-W practice. Like its K-W low-tension generator the new machine in standard form is intended to be driven by a friction wheel which bears on the flywheel face. However, if the latter is inclosed, the magneto may be driven from the fan shaft by a pulley. There are three optional sizes of friction wheels, with 3, 4 and 5-inch diameters, respectively. Any size of pulley from 1.5 to 6 inches is furnished to suit specific conditions.

The new magneto stands 9.5 inches high, has an overall length of 7.5 inches and a width of 4.5 inches. The weight is 18 pounds. When used for ignition purposes, this magneto must be operated in connection with a spark coil which is supplied at an additional cost. The instrument is not intended for use in connection with any type of battery whatever, and further, it cannot be used for battery charging, since the current which it furnishes is alternating. The latter current is not adapted for storage battery charging.

Fig. 1 shows the mounting of the magneto in a special bracket on its side. This bracket is fitted with springs on which the front end of the magneto rests. The function of these springs is to hold the friction wheel in contact with the flywheel face.

The peculiar internal construction of the K-W magneto or generator is shown in Fig. 2, which is a view with the lower part of the base removed. The rotor, seen more clearly in Fig. 3, is mounted in two ball bearings C, Fig. 2, one at either side of the side pieces.

In the K-W patented construction, there are no brushes, or other sliding contacts and no wire-wound armature. Instead of the latter there is a stationary, flat spiral winding, Fig. 4. which is fixed as at A, Fig. 2. On the rotor shaft, there are two inductors or segments B, the axes of which are at right angles. These revolve between the poles or ends of the magnets, and in the brass case, which is practically waterproof when the lower portion is in place.

In revolving, the ends of these inductors B cut the lines of force passing from one set of poles of the permanent magnets to the other set, thereby inducing a magnetic flux in the stationary winding, the direction of which is reversed four times per revolution of the rotor, that is, every time the lines are cut by an end of one of the segments B. The current is conveyed to the binding posts at the end of the magneto through the terminals of the winding which extend up through the top of the rotor case, connecting with these binding posts.

New Maxi Carbureter

Low-Speed and Intermediate-Speed Jets Are Aided, at High Speeds, by Nozzles Bored in Arc-Shaped Member

After the Carbureter Has Once Been Fitted, No Adjustments by the User Are Required

A MULTIPLE-JET carbureter which does not require to be adjusted after having once been installed on a car and suited to its specific requirements, is made by the Maxi Company, 37 Wall street, New York City. The construction of the device is clearly seen from Fig. 4. Gasoline is admitted at A2, passes through a screen S and the passage P controlled by the needle N into the float-chamber which contains the copper float F. The operating principle of the float is conventional and requires no explanation; the priming device which is shown at P1 is equipped with two springs, the only ones used in the apparatus. The gasoline leaves the float-chamber by way of the exit passage E, after passing through a second screen S1.

Fig. 4 shows the carbureter with the throttle in the closed position used when starting. In this case, the gasoline flows from the float-chamber through F1, G2 and G into the low-speed nozzle G1 which protrudes through the throttle T, being surrounded by an air hole H. The latter, in practice, is so proportioned that the throttle when turned in the direction of the arrow clears G1. At low speeds, air is supplied principally through A, although a little enters through the open mouth A1 of the throttle tube. When the throttle is opened slightly, gasoline flowing up through G3 is sprayed at the mouth of G4, and when the throttle is opened still further, fuel rises through the pipes R, fills the horizontal pipe H and is atomized at the ends of the bores formed in the arc-piece A3 which communicate with H. These bores or high-speed nozzles come into action, as the throttle uncovers them on its downward rotation. The capacity of G4 is determined by the passage formed in the plug G3; likewise, G2 and G determine the capacity of G1, thus permitting the adaptation of the carbureter to the requirements of the motor. The low-speed gasoline nozzle is bored with a No. 55 drill, air hole H with No. 60, the passage P and that above G3 with No. 55, in the case of a 1-5-inch carbureter. This carbureter is 5.5 inches wide, 6 inches high and weighs 5 pounds. The carbureter is made in four sizes, 1, 1.25, 1.5 and 1.75 inches.

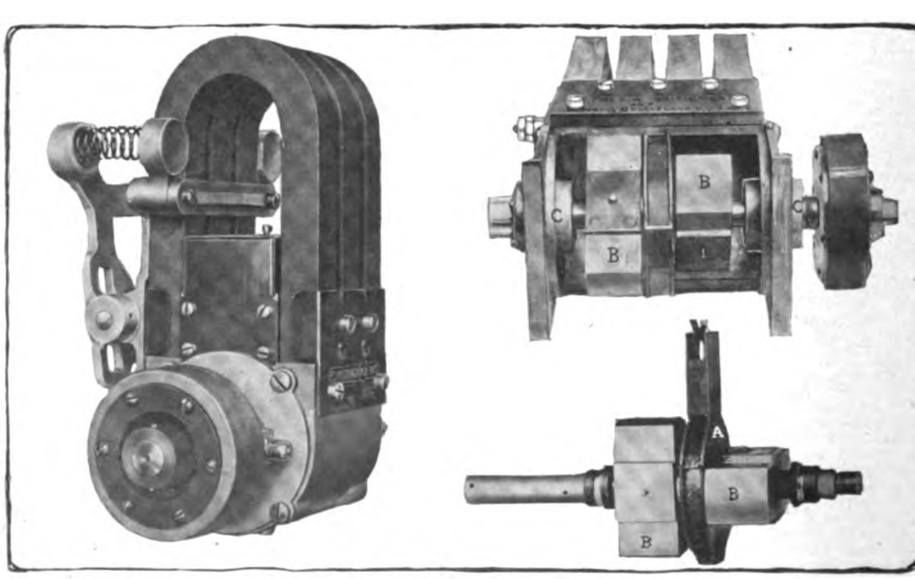


Fig. 1—K-W magneto. Fig. 2—Interior of device. Fig. 3—Details of K-W rotor

Merralls Compressed-Air Starter A Rotary Engine

Device Is Shaped Similarly to Centrifugal Pump, But Contains Six Pistons Working in Individual Cylinders Secured to Casing—Ingenious Operating Mechanism Controls Valves and Connects Starter with Crankshaft

The Air Needed for Starting Is Stored in a Tank Which Is Supplied Either by An Air Compressor Driven by the Engine, or by an Explosion Air Valve Operated by the Impulses in the Engine Cylinders

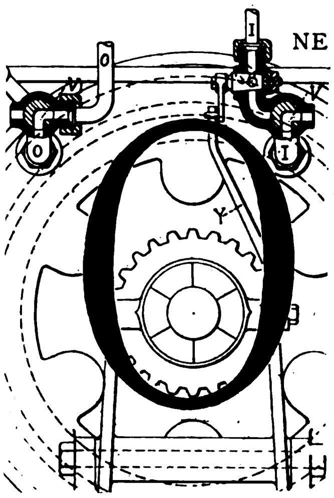
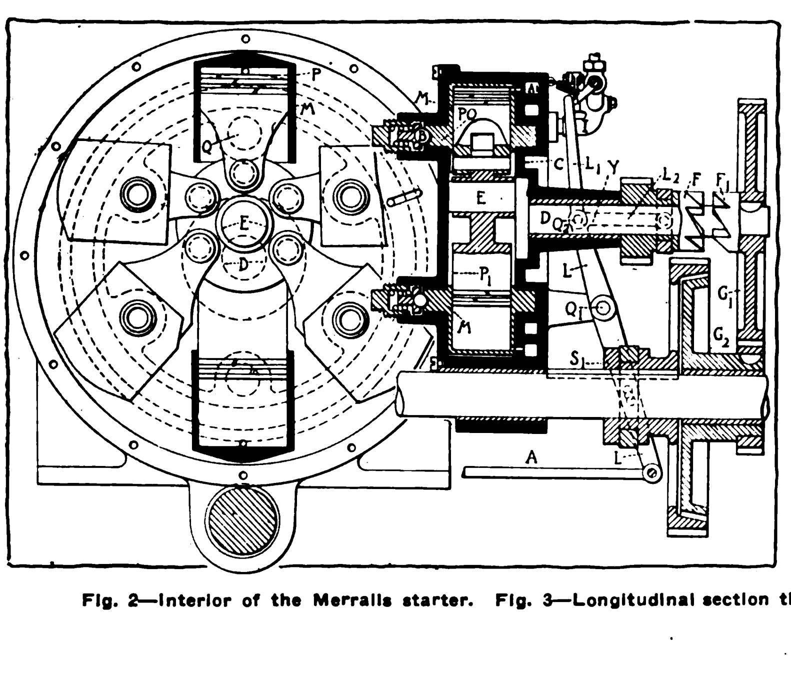


Fig. 1—Merralls starter

ONE more self-starter has been announced this week, which is of the rotary engine type and operated by compressed air, generated either by an air compressor or an explosive air valve, actuated in each case by the engine and storing the air in a tank. The Merralls starter consists of five small compressed-air motors of the reciprocating type which are inclosed in a circular casing and the connecting-rods of which actuate an eccentric mounted on the driving shaft of the starter.

The details of construction of the Merralls starter are shown in Figs. 1, 2 and 3. Fig. 2 is a view of the interior of the device, as seen after the front cover has been removed. Five small motor cylinders M are pivoted at Q to the casing, the pivots containing the ball bearings. The small working pistons P which are fitted into the cylinders M bear upon the eccentric E of the driving shaft D, which eccentric is formed integrally with piston P1 working at the bottom portion of the casing. As Fig. 3 shows, the inlet pipe I provides an admission passage for the air actuating the cylinders, which enters at the point where I connects with the casing C and passes through a bore in the same into spaces A1 opening into the interior of the six cylinders M. The bore being located at the outer ends of the cylinders, the compressed air forces the pistons in the cylinder toward the axis of shaft D around which the eccentric is revoluble. The pistons are so set upon the eccentric attached to E, Fig. 2, that each piston receives its impulse when positioned tangentially, relative to E. The impelling air exhausts through bores in the cylinders nearer to the center than the inlet bores, and thence it streams to the outlet pipe O, Fig. 1. Fig. 3 also illustrates the mechanism by means of which the admission of air to the starter is regulated and which incidentally throws the starter in and out of gear with the gear secured on the crankshaft for starting the motor. An arm A is connected to a handle or pedal in reach of the driver and is linked to a lever L fulcrumed at Q1 and pivoted at Q2 to levers L1 and L2. L1 is connected to a small lever which governs the inlet valve V, Fig. 1, which is operatively connected with the outlet valve V1, so that both are opened and closed simultaneously. Thus when A is pulled toward the left, referring to Fig. 3, air passes through the starter and the shaft D is rotated including the slidable dog F keyed to it. As the movement of A which admits air to the apparatus also moves the dog F away from the casing, F is brought into engagement with the dog F1 formed integrally with a driving gear G1 meshing with a driven gear G2 on the crankshaft; due to this engagement the gear is driven in counterclockwise, looking from C toward G1. As the engine is started and travels faster than the starter, F1 becomes the driving dog, and F, which carries no load, an idler which travels faster than F1 and is thereby thrown out of mesh. This moves Q2 toward the starter casing and shuts off the air valves. The starter may be made to suit various car designs, and fitted to the cars so as to drive a gear on the crankshaft or the flywheel. It is the invention of W. A. Merralls, New York City.



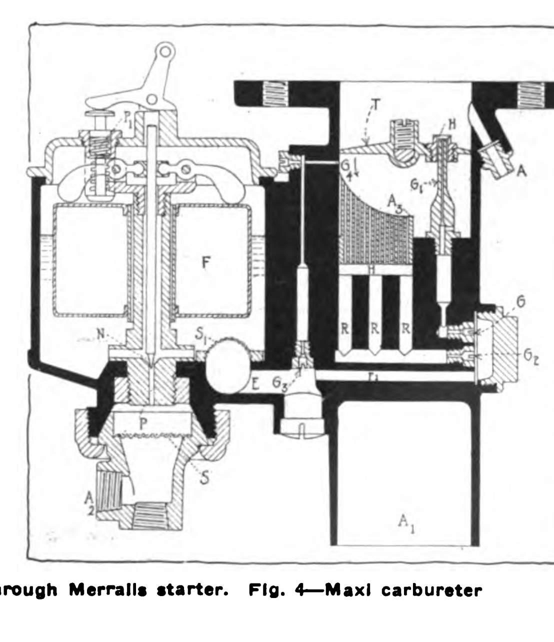


Fig. 2—Interior of the Merralls starter. Fig. 3—Longitudinal section through Merralls starter. Fig. 4—Maxi carbureter

Cahill Special Shock Absorber Designed for Ford Cars; Diamond Tire Sleeve and Repair Patch; Ionides Automobile Information Calculator; Emil Grossman Gradient Meter; Allen Radiator Cover for Winter Traveling

Cahill Shock Absorber for Fords

A CONSIDERABLE number of accessories announced during the past few months have been constructed especially to increase the comfort of drivers and owners of Ford cars, and the latest addition to the list of these devices is the shock absorber, or rather compensating shackle, Fig. 1, which is made by the Cahill Auto Works, Incorporated, 1700 Broadway, New York City. This device is constructed to take the place of the rear-spring shackle on a Ford car, each set of Cahill shock absorbers comprising two shackles which are dimensioned to fit in place of the standard, ordinary shackles. The latter are, as is well known, of the common shackle design, shaped a good deal like the links of a driving chain, and have one cross pin secured to the spring support and another to the longest lead of the cross spring. The Cahill shackle, on the other hand, consists of two pins, a pair of stems, a spring coiled around each stem and a cross-head connecting the upper ends of both stems. The two pins are secured to the spring support and spring end in the same way as the pins of the ordinary shackle, and the connection between them consists of the stems. which are fastened to the spring-end pin, and the coiled springs surrounding the stems and pressing against the top cross-head, which are secured to the pin carried by the spring support

Allen Winter Radiator Cover

With the approaching of the cold season the Allen Auto Specialty Company, 1926 Broadway, New York City, known as makers of tire covers and tire gauges, has added another accessory to its line. This new product is the Allen radiator cover shown in Figs. 6 and 7. Its front side is made of imitation leather while the inside which bears against the radiator front. is of robe plush, distinguished as a poor conductor of heat. The leather is cut to a size fitting a certain class of cars, ranging from 25 to 60 horsepower. The central portion of the cover is attached to the main body by a seam along its lower edge, so that the lowest portion of the radiator surface is always protected when the cover is in place. The central portion may be bent down along this seam and secured in place by any one of the three pairs of snap fasteners which are provided on the main body of the cover. Thereby, only the top or a greater portion of the radiator may be exposed to the wind created by the moving car, or the whole front surface may be covered if the weather is very cold. The lowest portion of the radiator, however, is always protected when the cover is in place. A strip attached to the top portion covers the uppermost part of the central part when the latter is fully covering the surface, preventing snow or rain from getting on the radiator. A flap formed on both sides of the cover and one on top adhere to the longitudinal surfaces of the radiator, and the top flap is cut in the center so as to fit around the radiator filler cap, while the bottom section of the cover attaches to the car by straps which may be drawn through the two eyelets provided in that part of the accessory. The straps are, of course, fastened to the car in the most suitable way, depending upon the make and design of the car. The appearance of the product is distinguished, while the materials used inspire confidence in its efficacy.

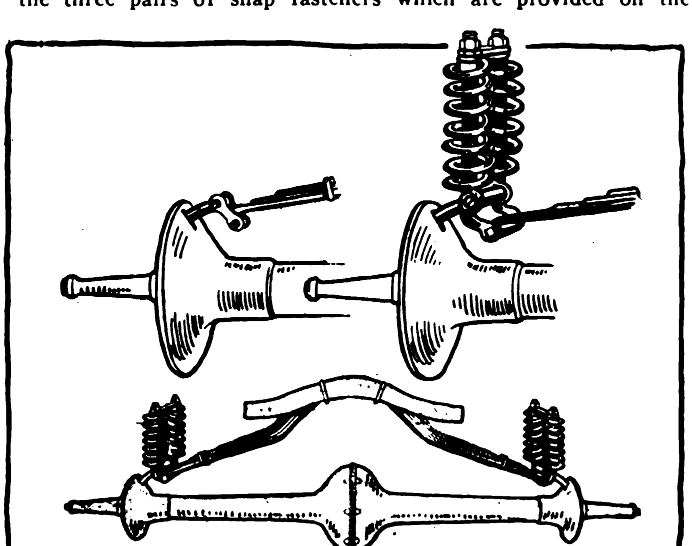


Fig. 1—Cahill shock absorber shackle for Ford cars

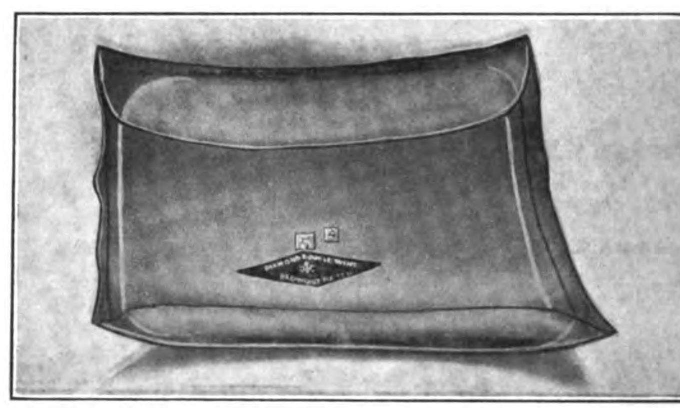


Fig. 2—Diamond tire inside blowout patch

Emil Grossman Gradient Meter

The Emil Grossman Company, 250 West Fifty-fourth street. New York City, has begun to manufacture a simple gradient indicator, the E. G., Fig. 5. This little device is made of nickel-plated steel and is of the shape shown in the illustration. To indicate the grade of the road over which the car travels, a curved glass tube is contained in the metal casing, and this tube is filled with alcohol and contains a metal ball which rolls on the glass track formed by inner surface of the tube. The ball naturally assumes at all times the lowest possible position, and by combining the glass tube with an indicator scale giving the gradient in per cent., the incline may be easily gauged by a simple look at the device. The latter is simply attached to a horizontal surface of the car, such as one of the side boards fitted to the driver's seat, being held in place by screws passing through two holes in the base plate of the casing.

Diamond Tire Patch and Sleeve

The Diamond Rubber Company, Akron, O., has increased its line of tire repair specialties by a blowout patch and a tire repair sleeve, Figs. 2 and 3. The blowout patch is made of several layers of Sea Island cotton frictioned together by Para rubber; the form of the patch is a rectangle differing slightly from a square. The inner portion of the patch is thicker than the peripheral one, which latter consists of only one layer of fabric and is formed with two flaps which are laid around the head of ıe casing, when the patch is put in commission between the ame and the inner tube.

Fig. 3 shows the repair sleeve which is furnished together with ıe inner patch shown with it. The latter goes between the ıbe and casing to tighten the latter at the place where it is reıforced externally by the sleeve. The patch is of a fine grade f cotton and made thickest in the oblog, central section, the xterior surface is made with a fine, rubber-like finish. The leeve itself is made of Sea Island duck and of high-grade ruber, in order to give excellent service. It is, of course, desired, o fit Diamond tires, and is thus made in a number of sizes /hich fit tightly around the relative sizes of tire casing, when he tubes inside the same are fully inflated. To put the sleeve ı place, the following process is carried out. The inner tube ; deflated and the patch placed between it and the casing at the lace where it is desired to strengthen the fabric of the latter. 'he rim portion of each side of the sleeve is fitted with four teel hooks designed to fit under the bead of the rim, between he same and the rim of the casing; it is an easy matter to put ıe sleeve in place by positioning the hooks,

Ionides Motor Calculating Device

A handy instrument by means of which automobilists may asily determine the speed of their engines or cars, as well as he ton mileage obtained per gallon of gasoline, is the Ionides ıotor calculator, Fig. 3. This device is the invention of A. G. onides, designer of the English Polyrhoe carbureter and works pon the principal of the circular slide rule; it has a thick cardoard base, 5 by 5 inches, to the center of which are secured six hin cardboard segments, marked with various values correponding to the dimensions or performances of the car which is ıe subject of the calculations. The following tabulation gives

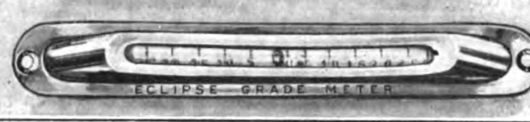


Fig. 4—Ionides motor calculator. Fig. 5—E-G gradometer

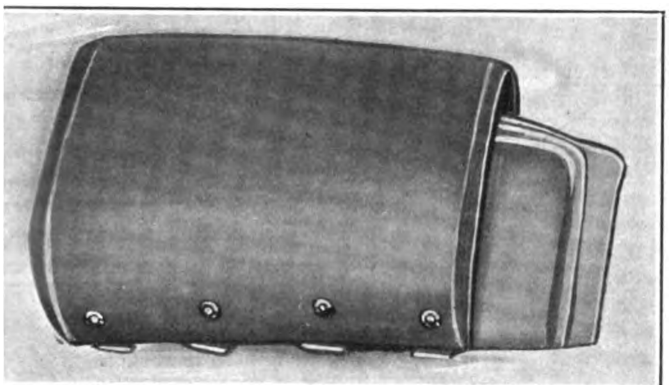
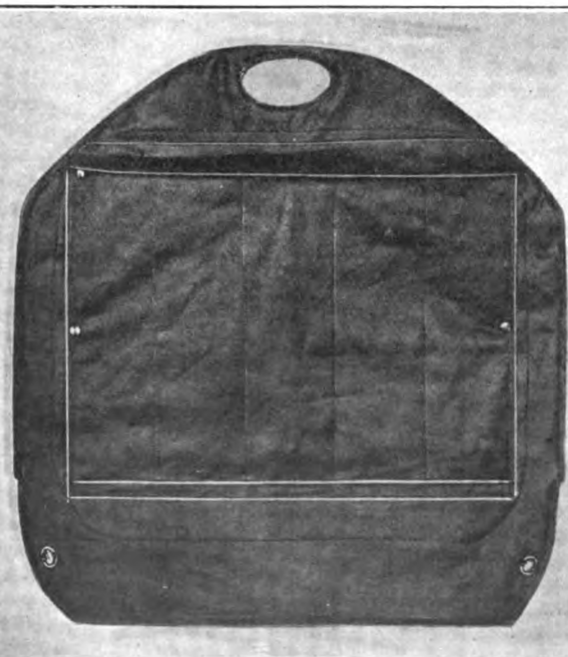


Fig. 3—Diamond clincher casing sleeve and patch

the number of bases provided on the board together with the subjects appearing on its face:

Base	Ton-miles per gallon and miles per hour.
1	Bore, weight, car-miles per gallon and R. A. C. horsepower.
2	Number of cylinders.
3	Stroke of cylinders.
4	Engine speed and number of driven teeth on axle.
5	Number of driving teeth, miles per hour and road wheel diameter.

The segments are independently turnable around the central fastener and by bringing certain points of information to register, others may be read on certain scales. For instance, if one desires to find the ton-miles per gallon the weight of the car is set against an arrow marked for this purpose on the first segment. If the ton-mileage per gallon is known, which may also be calculated by means of this device, the car-miles made per gallon of gasoline may be readily fixed, an arrow in the base cardboard pointing toward a scale marked on the first segment. The Ionides calculator is made by the Motor Calculator Syndicate, Bank Buildings, Kingsway, London, W.



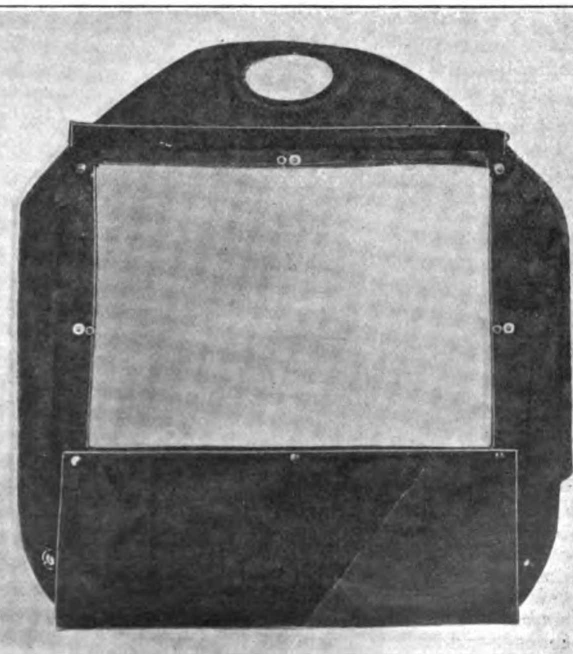


Fig. 6—Allen radiator cover fully closed to protect surface. Fig. 7 —Allen cover two-thirds opened

AUTOMOBILE **Carbureter**—In which a valve operated in conjunction with the throttle regulates the flow of the fuel.

This patent has reference to a carbureter, Fig. 1, in which a mixing chamber C is formed with an air inlet tube A and an outlet passage O; A is fitted to C as a downward, central extension and its communication with C may be interrupted by the valve V which is fitted over the top edge of the inlet tube and is shaped as an obtuse cone. A valve stem fitted centrally to the upper surface of V bears in a bored portion of the carbureter cover, and is surrounded by a spring S which ordinarily presses V against its seat. Fuel is supplied to the carbureter through a jet projecting upwards out of a vessel D fitted to lateral extension of C. Fuel enters at G, which is a short pipe ending immediately above the bottom of D, and fills this vessel to a certain height. A tube T is fitted into D and projects up into the lateral extension of C, the outlet of T being controlled by a valve V_1, adjustable on its seat through a knurled screw C_1. The valve stem of V_1 is connected to the throttle valve V by connecting means M fulcrumed at F, the fulcrum being adjustable from the outside of the casing and having a fork supporting the stem of V_1 resting on it.

No. 1,044,314—to Frank C. Watson, Des Moines, Ia. Granted November 12, 1912; filed February 5, 1912.

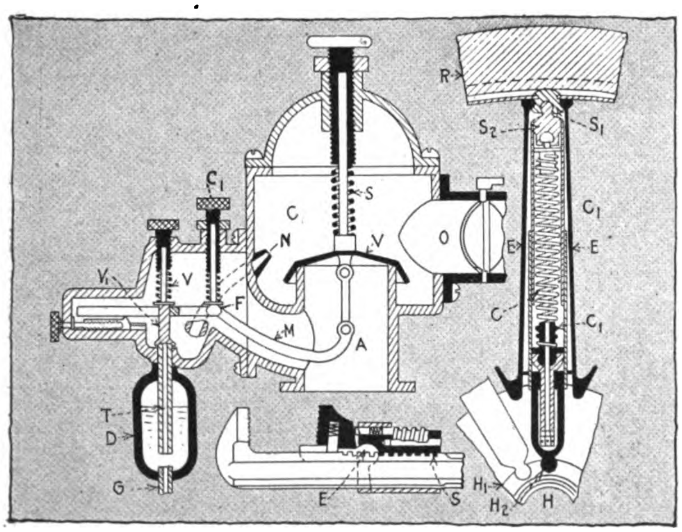


Fig. 1—Watson positive-working carbureter. Fig. 2—Mossberg pipe-wrench design. Fig. 3—Wilkes automobile spring wheel

Pipe-Wrench Construction—In which a frictional contact between the relatively movable parts is used to keep them in fixed relation.

A wrench, Fig. 2, is the subject matter of this patent. It consists of a long rod or shank on which a jaw D is fixed and on which operates a sliding member. The latter is provided with a jaw J pivotally mounted on it, and carrying a pin which is in contact with the rod.

No. 1,044,069—To Frank Mossberg, Attleboro, Mass. Granted November 12, 1912; filed November 2, 1911.

Automobile Spring Wheel—In which sockets fixed to rim and hub carry the spring ends.

The wheel, Fig. 3, has a rim R and a hub H, and telescoping spokes S. Socket pieces S_1 with sockets S_2 are fitted to the rim, while the hub is equipped with sockets H_1 in which heads H_2 are pivoted. Both sets of sockets are fixed to the spoke tubes S which are enclosed in elastic sheaths E and contain a coiled spring C each. Every spring is fixed to a detachable head fitted to each rim and hub socket.

No. 1,044,324—to Paul Wilkes, Cleveland, O. Granted November 12, 1912; filed May 20, 1909.

Adjustable Electric Headlight—In which the lamp socket is fixed to the casing and the reflector movable for focusing.

The lamp, Fig. 4, described in this patent comprises a casing C into which a post or socket P for a bulb is fitted. A sleeve movable on P is fitted into the apex of a parabolic reflector R which is in place inside the casing C. The rim of the reflector is formed with a cylindrical flange F which engages slidably a corresponding flange F_1 formed on the casing. A screw adjustment S piercing the casing C permits of moving the reflector sleeve on P, thereby altering the focus of the light.

No. 1,044,791—to William F. Anklam, Detroit, Mich. Granted November 12, 1912; filed May 16, 1912.

Rotary-Cylinder Valve—A cylinder slotted with passages registering with the ports in the engine-cylinder heads.

The subject matter of this patent is seen in Fig. 5. A valve, which serves for the inlet and exhaust of a multi-cylinder engine, is composed of split shells S fitted into a cylindrical casing C. The ends of the shells are beveled and engaged by terminally conical members formed so as to prevent axial displacement of the shells. The latter are formed with ports P registering with the cylinder ports. A spring S_1 presses the shells securely together.

No. 1,043,816—to Gilbert R. Elliott, Boston, Mass. Granted November 12, 1912; filed August 23, 1911.

Gas Engine Design—In which the fuel supply passage is periodically opened to the atmosphere.

This patent refers to an engine, Fig. 6, which has an inlet valve capable of being opened to the atmosphere and being properly actuated. An exhaust valve is operated by a cam on a shaft which carries another cam, and by means of moving the shaft alternately in a lengthwise direction, both exhaust cams are alternately brought into play.

No. 1,044,289—to John D. Taylor. Granted November 12, 1912; filed April 25, 1910.

Combination Automobile Signal—In which a bulb or an electric motor produces the sound

This patent refers to a signal comprising means for producing sound either by the action of an electric motor striking a diaphragm at intervals, or by a reed and trumpet which latter opens into a projector extending forwardly from the diaphragm mentioned above. The walls of the projector are diverging and open into a bell mouth, whereas the other end of the projector is attached to the diaphragm which affects the sound waves emerging from the open end of the projector.

No. 1,043,704—to Miller Reese Hutchison, New York, N. Y. Granted November 5, 1912; filed May 4, 1910.

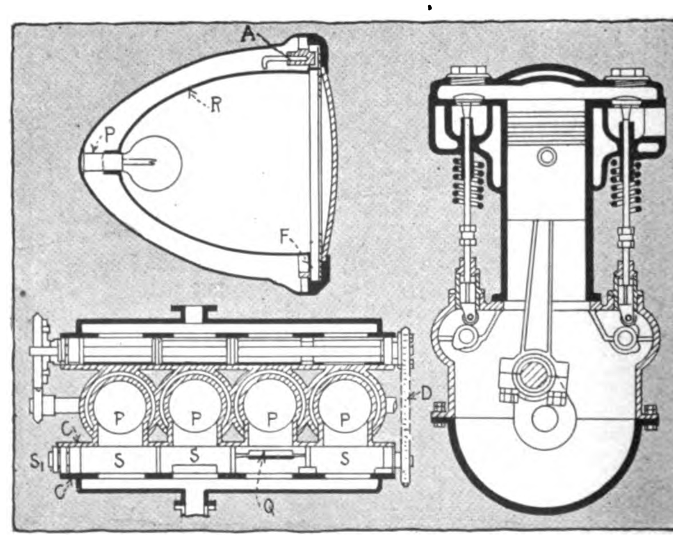


Fig. 4—Anklam adjustable headlight. Fig. 5—Elliott rotary cylinder valve. Fig. 6—Taylor internal-combustion motor

VOL. XXVII NEW YORK—DECEMBER 5, 1912—CHICAGO NO. 23

The AUTOMOBILE

Gotham Building 45 Fire Houses

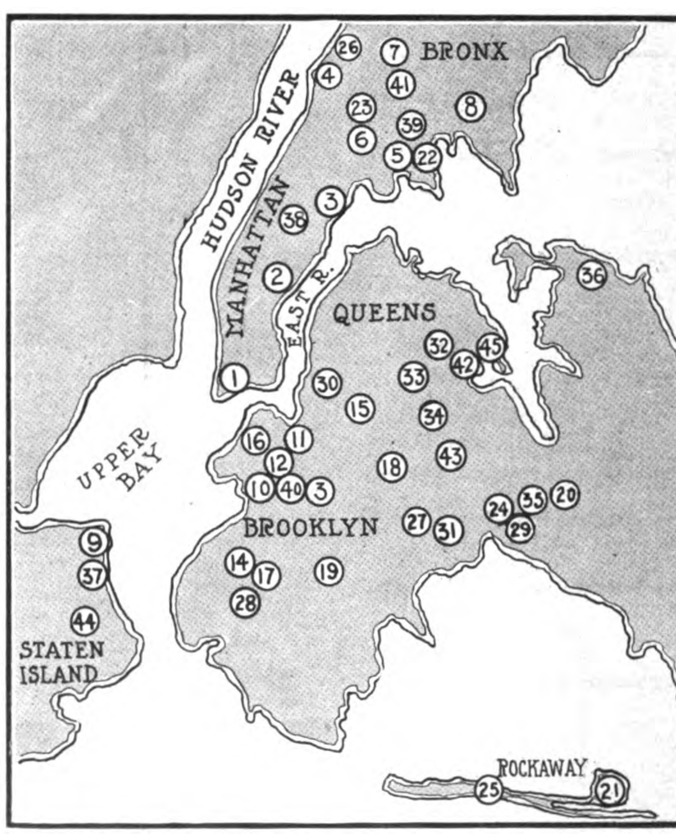
All of Them Will Be Equipped with Motor-Propelled Fire-Fighting Apparatus, Some of Which Is Now Delivered—No Horses Displaced by Present Order or in Near Future

Department Considers Project in Light of Giant Experiment Despite Investment of $700,000 in Equipment—Motorization Is to Come Later

WHEN bids were opened at Fire Headquarters November 26 it was learned that twenty-five out of the twenty-six new aerial trucks which will constitute a part of the fire aparatus to be installed in the forty-two new fire houses had fallen to the American-La France Fire Engine Company in two lots. The other truck went to the Seagrave company.

The trucks will be furnished as follows: Seventeen 65-foot trucks, American-La France Company, at $125,698; eight 75-foot trucks, American-La France Company, $63,152, and one 85-foot truck, Seagrave Company, $8,210.

The other motor-driven fire equipment now contracted for consists of thirty-one combination chemical and hose wagons and high pressure hose wagons, which contract was let July 16 to the International Motor Company, manufacturers of the Saurer, Hewitt and Mack trucks.



How the new fire houses are distributed in five boroughs of Greater New York, showing twenty-eight on Long Island, three on Staten Island and the rest in Manhattan and the Bronx

The tractor-drawn steam pumping engines will be furnished by the American-La France Company to the number of twenty-eight. This contract was let August 15 and with the above item was chronicled at the time in THE AUTOMOBILE.

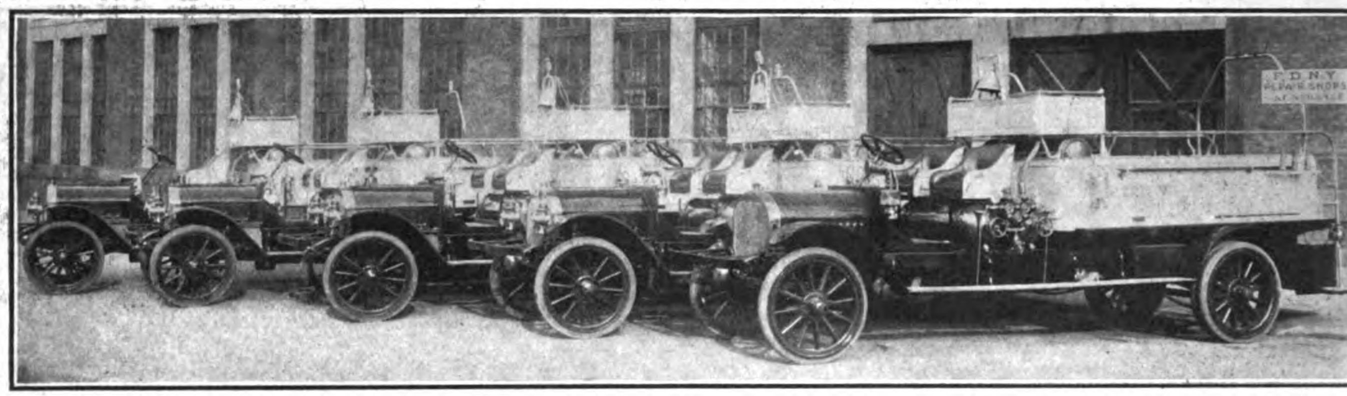
All told the expenditure represented by the eighty-five pieces of new apparatus amounts to about $700,000 and the appropriation is just about exhausted. What the future holds in the way of additional thews and sinews, in other words funds with which to buy more apparatus, is in the lap of fate—nobody knows. In a large measure it depends upon the character of the showing made by the new apparatus.

New York to date has in service four trucks, two water towers, one gasoline pump, two tractor-drawn steam pumps and eleven hose wagons, all motor propelled. The hose wagons and some of the trucks have been thoroughly tested and have proved satisfactory. They are all installed in houses that used to be occupied by horse-drawn equipment and consequently have been subjected to some disadvantages that will not be laid against the new pieces.

By the first of the year or shortly thereafter, twenty of the forty-five new fire buildings will be turned over to the department for occupancy and the completion of the rest is scheduled for various times during 1913.

Taking up the subject of the houses first and the apparatus afterward, the following description of the New York Fire Department outlines the situation as it is at present.

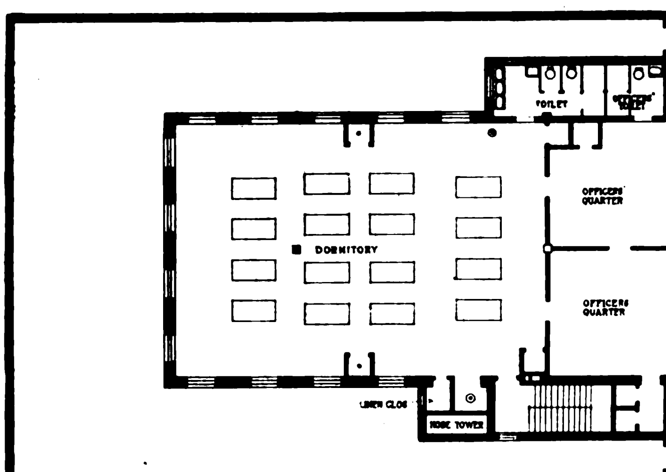
The budget for 1913 calls for $8,945,945, of which about $8,000,000 is for salaries and wages. No permanent additions and im-



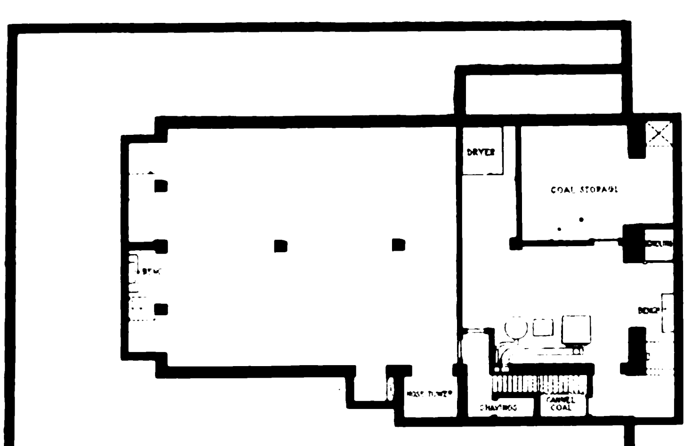
First delivery of combination chemical and hose wagons by the International Motor Company on the present order for apparatus

provements, including apparatus, is considered in the budget and the only item of much importance to the automobile equipment of the department is an item of about $26,000 for maintenance and repairs and another of $12,000 for gasoline. Of course the manufacturers' guarantees provide for certain kinds of replacements, but the item for maintenance and repairs seems inadequate, especially when such a large number of new pieces will be placed in commission during the period covered by the appropriation.

The purchase of fire house sites, building of the houses and their equipment is provided for by the sale of municipal stock and has all been settled. The houses provided under the last sale of stock number forty-five and are located as shown in the accompanying map of New York. Manhattan Island is to have six; Bronx, eight; Brooklyn, fifteen; Queens, thirteen, including two at Rockaway, and Richmond, three.



Dormitory floor, showing sleeping quarters of company



Basement plan of same house, showing storage space

Of these houses forty-two are to be fully equipped with fire apparatus. The other three are to be telegraph and signal stations.

There will be sixty-one full companies stationed in the various houses and some of the houses will have as many as three companies assigned to them.

One fact should be constantly borne in mind in considering the fire department situation in New York. The horse has been displaced in only a very limited degree. The twenty pieces of apparatus now in service displaced horses and the departmental officers who use passenger automobiles in place of the time-honored buggies have displaced horses, but the new apparatus will not take a single job from a single horse.

That is to say, the new houses equipped with motor apparatus will be extensions of the department and not in any sense substitutes of motor equipment for horse-drawn equipment.

If the giant experiment proves to be successful, then the horse will be gradually rooted out until the department is completely motorized.

Of the forty-two fire houses, thirty will be for the accomodation of one or more pumping engines and a truck; four will be occupied by hook and ladder trucks alone and the other eight will house single engine companies.

The total cost to the city will be $2,153,800 and the motor equipment will cost an aggregate of $1,259,000. Of this sum about $700,000 has been covered by the present contracts.

New Houses Last Word in Construction

The new houses have been designed by three firms of architects, Frank J. Helmle, Hoppin, Koen & Huntington and Morgan & Trainer. They represent the last word in fire-house construction and constitute the first attempt of the New York Fire Department to comply with the law covering the storage of combustibles. To the outsider it seems rather strange that the fire department itself, operating a number of establishments that are in legal effect garages pure and simple, should violate the law covering garage construction. This, however, has been the case since the enactment of the combustibles law as applied to New York structures.

In the new houses the law is strictly observed. This point alone caused the department much anxiety, but the plans submitted cover the situation rather ingeniously. The law provides that gasoline shall not be stored within any building where the fumes may come into contact with live fire such as is required to keep up steam in the boiler located below the station of the fire engine. The way the department gets around the difficulty in building the new houses is to provide no direct communication between the basement in which the boiler is located and the apparatus floor upon which the automobile fire engine stands with its tanks full of gasoline.

Thus the openings from the basement are not by stairways to the apparatus floor, but by stairs that open on the street. The arrangement of these stairs cuts pretty close to the letter of the law, because when an alarm of fire is sounded it is the duty of every man connected with the company to accompany the apparatus to the blaze. Of course, when men are off duty the rule is modified. Suppose that at the moment an alarm strikes in, one or more of the members of the company are in the basement attending the fire under the boiler or engaged in some other duty. To report to their officers is their first duty and unless they have a handy means of egress from the basement they may be unable to take their places on the apparatus. Excuses and explanations are at a very material discount in the fire department and consequently the architects in framing the plans for the new buildings have provided easy stairways opening toward the front of the house upon the street, so that men caught in the basement at the moment of an alarm can catch the engine, truck or hose wagon as they dart out of the house. At the same time the majesty of the law is not assailed.

As a general thing, the new houses are narrower than houses designed for a similar amount of horse-drawn equipment. The reason for this fact is that the motor-propelled apparatus does not require as much room as is needed for stalls in addition to a similar amount of space for the horse-drawn apparatus. Thus where the department has purchased a number of 50-foot lots the general width of the new double-houses is 42 feet. This means a saving in structural expenses and gives opportunity for better sanitation, more air and added economy in maintenance.

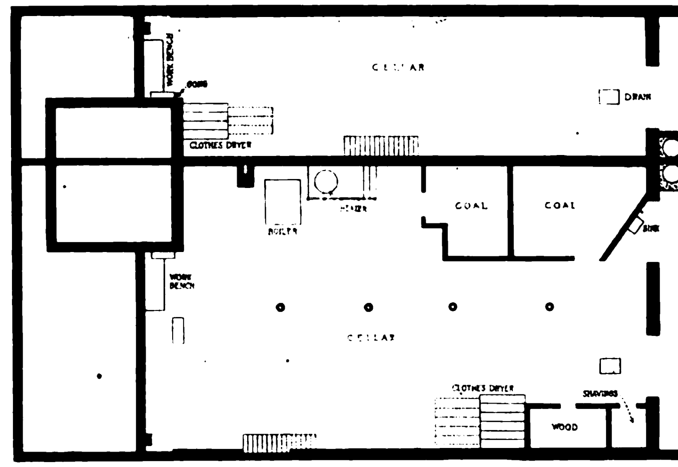
Brick, stone and concrete are used and the various types of buildings now under construction are far more sightly than those in service.

Improvements Embodied in New Buildings

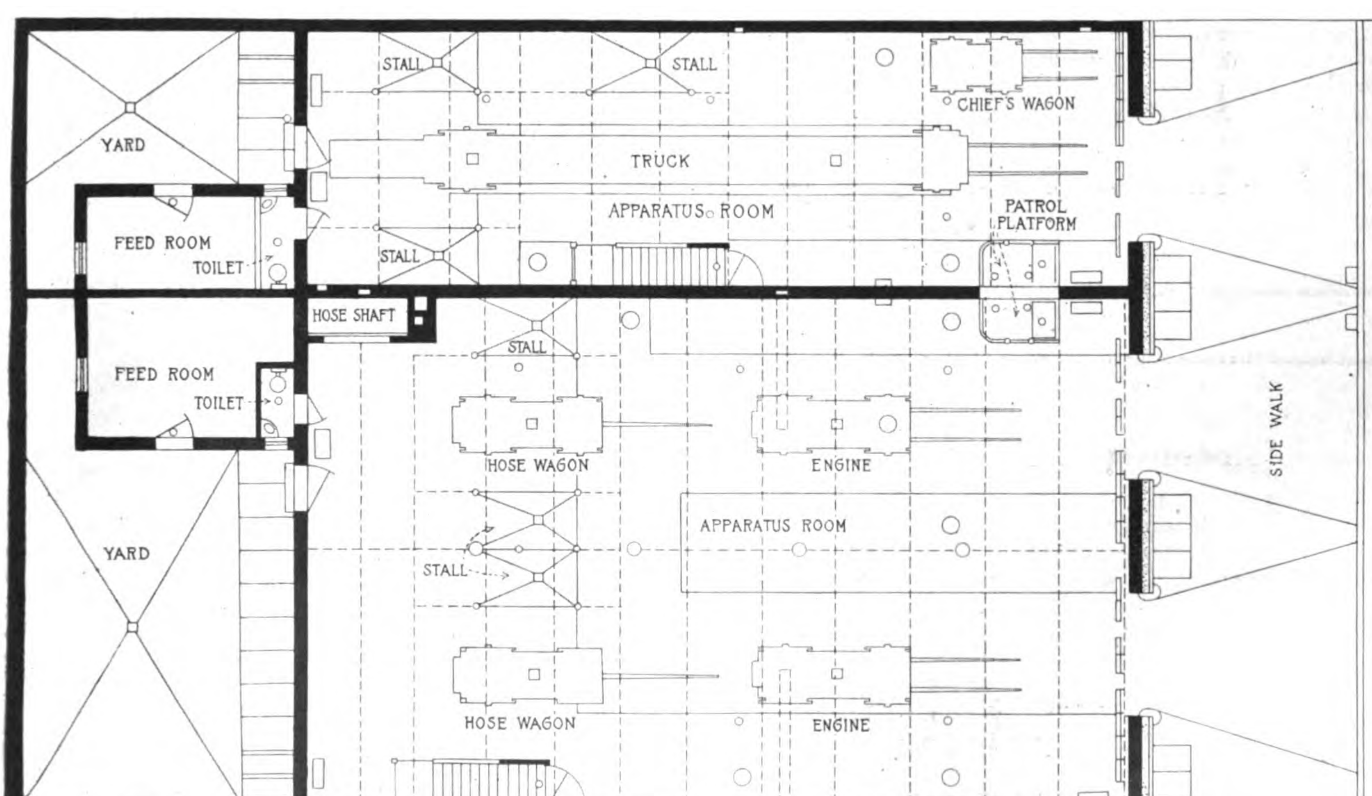
The houses are more compact than those of older styles. The basement and apparatus floors are of cement, the latter being tilted slightly for the purpose of facilitating drainage. The apparatus will be stationed in files. Take the new house on West One Hundred and Eighty-first street as an example. This house is one of the largest under construction and will have five pieces of motor apparatus, not counting the powerful runabout that will be used by the staff officers stationed there. The apparatus will include one of the new aerial trucks, which will be located on the right side of the house, well back from the entrance. In front of the truck will be the staff officer's runabout. Poles connecting the dormitories and officers' quarters are to be located in appropriate places near the truck and the runabout. There is no boiler in the basement on the right side of the house, as neither the runabout nor the truck require steam pressure. There are water connections for use in washing down the apparatus and flushing the floors. The middle section of the house will have one of the new American-La France tractor-drawn steam pumps, with poles, water connections and the other paraphernalia. This will be well toward the front, while at the rear will be one of the International Motor hose wagons with its pole and house equipment. Boilers will be placed below the steamers in the basement to maintain pressure when not in use.

The left side of the house will duplicate the middle section. There are to be three doors opening upon the thoroughfare and it has been estimated that the apparatus can be started away within 30 seconds of the time required to determine the location of the alarm box.

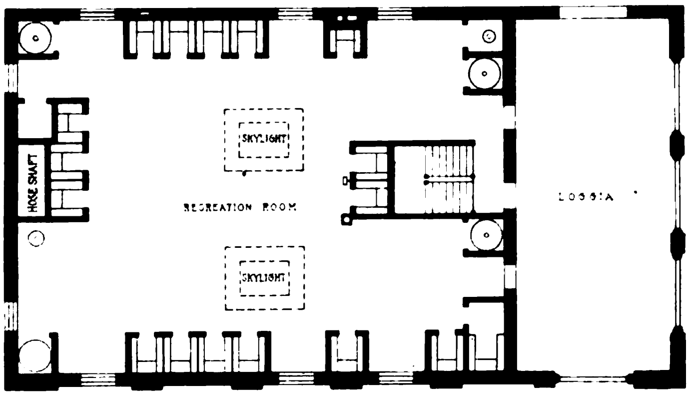
The second floor is devoted to sleeping quarters for the men and for offices and quarters for the officers. The officers are



Cellar plan of triple house, near Washington Bridge



Apparatus floor of Manhattan house, showing stations of six automobiles, five of which will be used for fire-fighting



Recreation floor of a Bronx house, comfortable and open

housed in front and the men in the middle and rear. The poles connecting the dormitory with the apparatus floor are located in such a way that sleeping men can be awakened, slip into their emergency clothing and shoot to their stations in an astonishingly short time. In some of the old houses specially trained companies have been able to start to a fire from deep sleep in a trifle over a minute after the first stroke of the alarm bell, but the average is not nearly so rapid. By the new arrangement it is predicted that this record will be reduced by at least 15 seconds.

The sleeping quarters differ in only small details from the generally accepted practice. The requirement of the law so far as it applies to the number of cubic feet of air space allotted to each occupant of the dormitories has been complied with, leaving a big margin on the side of safety and comfort, despite the fact that the narrowing of the houses has limited the size of the sleeping rooms.

On the other hand, the numerical strength of a company assigned to operate a piece of motor-propelled fire apparatus is less than is required to use a corresponding piece of horse-drawn equipment and therefore the accommodations need not be framed on such broad lines as have been usual in the past.

The upper floor is given over to the recreation quarters. As a general thing the front portion of the floor is finished off as reading and lounging rooms. In some of the houses, particularly those of the very latest pattern, the rear half of the third floor is used as a kind of roof garden. The side and rear walls are not continued to their full height and the space is arranged for rest and recreation of the men.

The third floor is connected with the second and apparatus floors by various means of quick transit from one to the other. There are no poles from the roof garden to the lower floors, but the finished portion of the floor opens with swinging doors to the outside section and men who are enjoying the open air can reach the dormitory floor in case of alarm in 20 seconds or less and be at their stations on the apparatus in 30 seconds. As it requires an average of 40 seconds to receive and identify the alarm numbers, it will be seen that the new houses lend themselves to a high degree of speed in making response.

Manhattan Additions Supplementary

As to the location of the houses it may be said that the new stations on Manhattan Island are either supplementary to the existing horse and motor companies in the older sections or are intended to cover the newer northern sections of the island. The immense house on West One Hundred and Eighty-first street is an example of the second class.

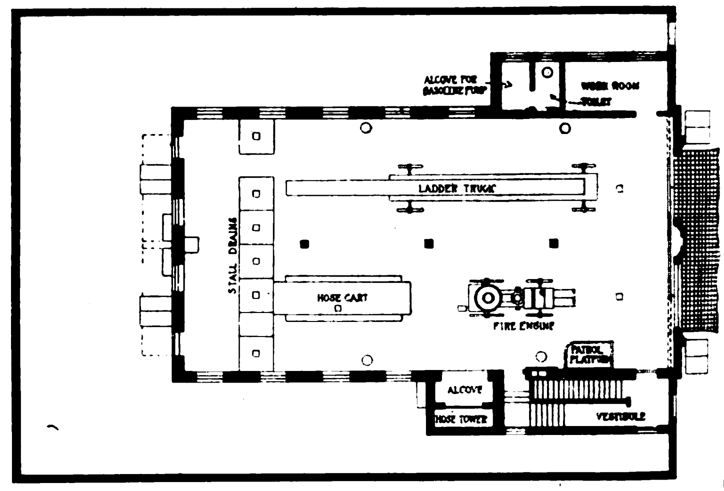
That house is located in the center of a densely populated district heretofore covered by horse equipment in large part. It is directly in touch with the wealthy West Bronx district, using Washington Bridge across the Harlem, and will be available on second call or subsequent alarms from Kingsbridge to Fort Washington and south for 2 miles.

The big hill at One Hundred and Fortieth street is usually considered as marking the division line for fire companies, but under the specifications for the new equipment it will be possible to take the hill and work still further south.

In the Bronx eight new houses are being built. They are purely supplementary to the existing horse equipped stations.

Brooklyn has the largest number of new houses under the present contracts and fifteen stations are under construction in that borough. They will serve the fast growing districts of the borough and supplement the present equipment.

The new houses in the Borough of Queens are somewhat different. Queensboro has an immense territorial area and is poorly covered by the fire department at present. The distances are excessive, particularly with horse-drawn apparatus.



Apparatus floor of typical double house in Queens

A winter fire in Queens, where the property involved or threatened is of considerable amount, is a terror to the department. It has been quite common in the past to answer alarms at a distance of as much as 4 miles. At the very best possible speed horses can cover such a distance, drawing a big steamer, in from 16 to 20 minutes. The average would be considerably higher, probably approximating 30 minutes. The physical exertion of the horses is such that no matter what the weather conditions they are covered with sweat and in a state of exhaustion near collapse upon arrival.

In big Queens fires of the past the loss of horses has been appalling. Also the fire losses have been heavy. Experts in the department say that one 4-mile run to a fire in cold weather is often enough to ruin the usefulness of a good horse, even if it does not serve to end his life. The whole modern theory of fire-fighting is based upon the utmost speed in reaching the seat of action and in Queensboro the territory expanse makes the horse prohibitively expensive and inefficient.

Queens Houses Serve Wide Territory

The new houses are located at various strategic positions where dangerous localities can be reached with concentrated effort in the shortest possible space of time. The companies will occupy single houses as a general rule; that is, the companies will have in charge a single piece of motor apparatus. Like the new houses in the Bronx, the combination chemical and hose wagon will be commonly used in Queens. Of course there will be steamers and a few trucks, but the real effective mechanism that will be installed in Queens is the combination chemical wagon.

The Richmond equipment will be contained in three new houses on the east side of Staten Island. These will be similar in general character to those in Queens.

Aside from the motor equipment now in service and that which has been ordered, the fire department has 182 steamers, 183 hose wagons, 99 hook and ladder trucks and 3 water towers, all horse-drawn. Some of it was manufactured over 30 years ago, but a large percentage of the apparatus is of the latest and most efficient types.

A tremendous amount of effort is spent to maintain the horse-drawn apparatus at top notch service efficiency, and even the older steamers show by their spick and span appearance and the avidity with which they attack their duties that they have been well kept. But still further, the care that has been expended upon the horse apparatus is an earnest of what will happen when the new motor equipment is installed.

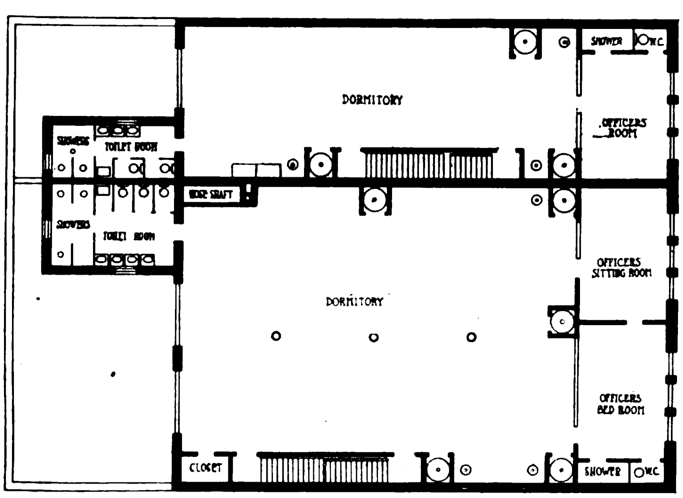
Fire departments have ample labor, money and time to maintain apparatus. On the other hand, the service is exceedingly severe when the call sounds and the factor of safety in the construction of fire engines must be liberal or the life of the piece will be short despite the care and attention that is given to all fire apparatus.

The subject of present and future motor apparatus for the New York department is of the widest importance. The present equipment is actually small compared with the size and importance of New York. Save in a very few instances the apparatus now in service was produced at factories that specialize in fire apparatus and not automobiles. Whether it be a consequence or no of that condition, it is nevertheless a fact that the New York fire department has had an enormous amount of trouble with its motor apparatus so far.

Of course it would be inconceivable to suppose a case where a great municipal department could change from horse-drawn equipment to automobiles without experiencing some sort of trouble and the New York department has had plenty of it.

Department Faced Many Difficulties

The legal regulations that surround the acceptance of any material thing have served to protect the department from money loss on account of the failure of some of the apparatus tendered for test, but those regulations have not prevented a series of blood-letting delays that followed the rejection of certain offered apparatus upon which high hopes had been built. For instance,



Triple company house, showing arrangements for sleeping

a gasoline pumping engine, motor-propelled, was submitted not long ago and according to predictions before the test it promised to revolutionize the whole system of fire-fighting. But the engine failed. It was an excellent automobile but a bad pump, under the rules of the fire department.

Complaint has been made that under the specification framed by the engineering board of the department automobile makers could not participate in the business because the specifications provided for apparatus that was essentially different from the stock product of the companies. Thus, big automobile makers did not bid for the jobs because the specifications provided for a different type of frame, axle, motor, steering gear or other essential or non-essential element not included in their stock product.

This objection might have been just under the old system, but the new apparatus was certainly ordered under about the most wide open set of specifications ever devised for such a big job. That automobile companies did not succeed in getting the whole order must be due to some other reason than that of tightness in the specifications.

An example of this breadth can be seen in the specifications submitted for bids on the thirty-one hose wagons. In the introductory paragraph the following note is published.

"For the sake of clearness it shall be understood that throughout these specifications wherever reference is made to the chassis it is intended to include the assembled automobile in each case without the body of whatever kind and before the finish is applied. It will be likewise understood that the chassis when referred to as such shall not include the mud-guards or the equipment, the latter being enumerated according to custom including lamps, tires, irons, generator, tool kit, registration and rubber tire kit.

"Whenever the body shall be referred to it shall be understood here and after that the mud guards shall be a part thereof and the running boards or steps, of whatsoever kind, shall also be classed with the body, but the mud apron or other protective devices placed to save the machinery equipment and the chassis from harm shall be considered as a part of the chassis.

Specifications of the Wide-Open Kind

"The fire-fighting equipment, as referred to hereinafter, shall include all the fire-fighting apparatus equipment, units or parts related thereto of whatever kind, all of which shall be hereinafter more particularly mentioned and described."

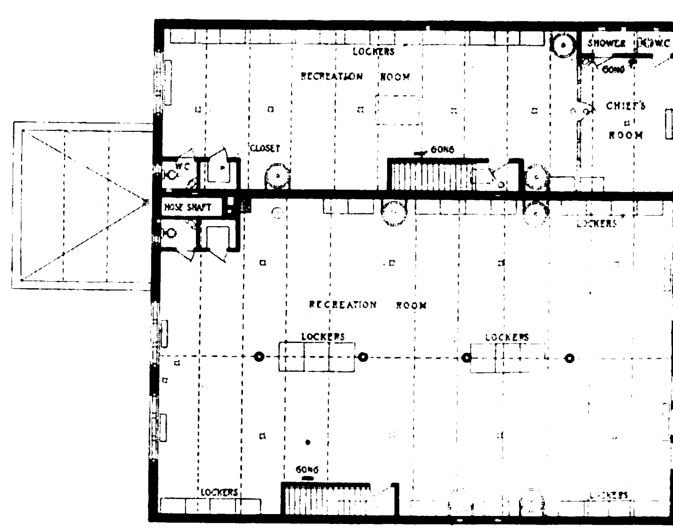
The specifications then go on to enumerate the size, quality and style of the various elements that go to make up the type of hose wagon approved by the department, particularly emphasizing the necessity of following the standards recommended by the Society of Automobile Engineers. In fact the specifications are so worded that the contractor must use the S. A. E. standards under a strict construction.

They are made to apply to the kinds of steel to be used in the various parts to the power plant, specifically providing for a motor with enough power to deliver a maximum of 30 miles an hour with full load and a maintained speed of 20 miles an hour for at least that period; to the frame, engine parts, valves, wheel dimensions and fastenings, tires and all the functional elements of the automobile where covered by the standards.

Throughout the specifications the same spirit prevails and the new hose wagon appeared to be such a thorough automobile under the regulations that the International Motor Company went into the matter with care and landed the whole job.

The first of the hose wagons is due 120 days after the signing

(*Continued on page* 1188)



Chief's quarters and recreation room, same house

Flanders Creditors Meet

Merchandise Men Who Supplied Manufacturing Company with Material Confer About Prospects

Extension of 90 Days Asked—Majority Sign Agreement Giving Committee Power to Represent Them

DETROIT, MICH., Dec. 3—(*Special Telegram*)—Statement of the affairs of the Flanders Manufacturing Company, of Pontiac, Mich., was heard by the merchandise creditors representing 70 per cent. of the total indebtedness of the concern at a meeting held at the Pontchartrain last week. A committee of three was appointed to devise ways and means of continuing the business.

This committee, which was composed of G. W. Rogers, Goodyear Tire & Rubber Company, Akron, O.; S. T. Douglas, attorney for several of the largest stockholders, and W. S. Thomas, Wagnor Electric Manufacturing Company, St. Louis, represented the largest creditors and was instructed to report to a committee of seven composed of creditors next in order of magnitude. The latter was to act as an advisory committee to confer with the directors of the Flanders company.

The Flanders Manufacturing Company has a merchandise indebtedness of $500,000 and outstanding notes to the amount of $350,000, totaling $850,000. Assets including the electric vehicle plant, the motorcycle factory and other holdings of the company amount to $2,135,000. The company's financial difficulties are all through lack of working capital and the indebtedness, only $40,000 of which is held by concerns having credits under $2,000, can evidently be squared away in the event of the closing out of the business. Many of the creditors, however, are of the opinion that by raising about $200,000 it will be able to profitably escape from its difficulties.

The electric car plant has always been a money maker and the other holdings have been responsible for the present lack of working capital.

A meeting of the directors of the company will be held December 3.

A notice of the creditors' committee proceeding was sent to every creditor together with a forbearance agreement which he was requested to sign, thereby agreeing to waive the enforcement of his claim for a period of 90 days unless in the opinion of the committee earlier action was deemed advisable.

To date about 150 creditors out of the 500, besides the principal ten, have signed this agreement which extends to the committee an exclusive authority to act for the signers.

The committee now has control of the majority of the credits and can act with authority when conferring with the directors.

Crude Rubber Advances Slightly

The fortnightly auction in London which began Tuesday saw slightly better prices for the plantation grades, and while the Para grades did not respond, the tone was stiffer all around. The amount of rubber offered consisted of about 750 tons, 25 per cent. of which was from Ceylon. Smoked sheets rose to $1.08 1-2 and pale crêpe to $1.05 1-2. Up-river held its advance of last week after the first auction day, standing at $1.07 1-2.

General Vehicle Expands Capital

Changing the form of its business organization and enlarging its capitalization the General Vehicle Company has been reincorporated under New York laws for $10,000,000, divided evenly between preferred and common stock. The company has always been more or less of a close corporation and its character will not be changed by the new move. The present stockholders will be offered the option of taking the new issue, or as much of it as shall be issued at par. The present capitalization is $1,000,000.

The reasons for the increase are that the company requires more liquid capital to finance its plans for the immediate future. These plans include the installation of a huge factory for the manufacture of Mercedes trucks and also another large factory for the making of electric vehicles. The foundation of the new six-story building at Long Island City is completed.

The General Vehicle Company has been ultra-conservative until recently when it branched out into the gasoline field. It has been tentatively announced that there will be some additions to the present line of electrics and possibly some changes in the roster of officers.

W. C. & P. Leaseholds Sold

Leaseholds on the property occupied by Wyckoff, Church & Partridge, Inc., at Fifty-sixth street and Broadway, including the garage and supply store, have been sold by order of the United States District Court to H. M. Swetland, for the Swetland Operating Company. It is understood that negotiations are under way to transfer the property to a garage and selling concern, or to an operating company.

On Saturday the transfer of the property to the purchasing syndicate consisting of Messrs. Ellis, Griswold and Dickinson

Automobile Securities Quotations

Movements in the list of automobile securities during the past week were irregular. Some advanced; some stood still and some declined. Trade was not impressive in volume and the fluctuations resulted from the preponderance of buying or selling orders in a small market. Firestone was the strongest element in the list, scoring a rise of 13 points. Goodyear failed to hold its extreme advance to 450 and fell back 10 points on some small sales for profit taking. There was ample margin for such operations, as the stock has advanced $200 a share, practically without a setback. American Locomotive preferred rose sharply $4 a share, while General Motors, Goodrich, International and Studebaker sagged. The preferred issue of International broke rather sharply and on Tuesday showed a loss of $7 a share.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	180	191
Ajax-Grieb Rubber Co., pfd	..	..	99	101
Aluminum Castings Co., pfd	..	..	98	100
American Locomotive Co., com	35½	36	46	46½
American Locomotive Co., pfd	102½	103	107	107½
Chalmers Motor Company	..	..	125	145
Consolidated Rubber Tire Co., com	7	11	11	14
Consolidated Rubber Tire Co., pfd	10	20	50	60
Firestone Tire & Rubber Co., com	175	180	303	310
Firestone Tire & Rubber Co., pfd	107	109	105½	107
Garford Company, preferred	..	..	101	102
General Motors Company, com	37½	38½	37	38½
General Motors Company, pfd	77	79	77½	79½
B. F. Goodrich Company, com	..	..	69½	70
B. F. Goodrich Company, pfd	..	..	106½	107
Goodyear Tire & Rubber Co., com	235	240	440	445
Goodyear Tire & Rubber Co., pfd	104	106½	104½	105½
Hayes Manufacturing Company	..	..	..	90
International Motor Co., com	..	..	17	20
International Motor Co., pfd	..	..	67	71
Lozier Motor Company	..	..	..	45
Miller Rubber Company	..	..	150	153
Packard Motor Company, pfd	104½	106	105½	106½
Peerless Motor Company	..	..	115	120
Pope Manufacturing Co., com	40	44	27	29
Pope Manufacturing Co., pfd	66	68	70	71
Reo Motor Truck Company	8	10	9	9½
Reo Motor Car Company	23	25	20	20½
Rubber Goods Mfg. Company, com	85	95	100	..
Rubber Goods Mfg. Company, pfd	100	105	105	108
Studebaker Company, common	..	..	41	42½
Studebaker Company, preferred	..	..	93½	94
Swinehart Tire Company	..	..	100	100½
U. S. Motor Company, com	*1/16	*⅛	†‡8	†‡10
U. S. Motor Company, 1st pfd. (new)	..	..	65	70
U. S. Motor Company, com	*1/16	*⅛	†‡8	‡10
U. S. Motor Company, pfd	*¼	*½	†§30	†§35
White Company, preferred	..	..	105	108

*Old. †New. ‡Common. §2nd preferred.

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.19	....
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.96	....
.35	—.15
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.00	....
.76	....
.90	+.05
.69	—.01
.07	....
.35	—.02½
.87½	+.05
.90	....
.70	+.20
.09⅞	....

N. A. A. M. Car Bureau

Detroit Branch Will Strive To Keep in Touch with Automobile Freight Cars When Away from Home Lines

Peak of the Load Apparently Was Passed Earlier Than Usual and Shortage Is Slightly Less

THE National Association of Automobile Manufacturers has installed its service bureau at Detroit, according to announcement made by James S. Marvin, traffic manager of the association. The purpose of the new bureau is to facilitate the efforts of automobile makers to secure a supply of freight cars during the shipping season. The methods to be used will be largely precautionary. For instance, when a shipment of automobiles leaves the manufacturing center, the numbers of the cars are listed, together with their ownership and official designations. This list is forwarded to the railroad which will make delivery of the freight, with a letter requesting the terminal road to protect the cars and to see that they are promptly returned to the railroad from which the shipment originated.

A system of daily car reports has been instituted which will show the location of automobile freight cars, and thus tend to decrease demurrage and delay.

It has been found that fully 30 per cent. of the inefficiency of automobile freight cars arises from the withholding of foreign cars by terminal railroads under the present unsatisfactory system of demurrage. The association hopes to decrease this percentage to a material extent by the operation of the car service bureau.

The freight car shortage has turned the corner and a quick recovery to normal conditions is looked for in the traffic world. The peak of the load was passed about November 18 and the fortnightly tabulation issued by the American Railway Association covering conditions up to November 21 shows that the net shortage for that period was 51,112. As compared with the preceding report, this shows a lessening of the shortage by fifty-seven cars.

As an evidence of the strenuousness of the situation it may be said that at the corresponding period of 1911 there was a net surplus of freight cars amounting to 23,110. The peak of the load, however, was not passed in 1911 until a considerably later date.

The box car situation improved to a marked extent, the shortage decreasing from 44,000 to 38,465, and as the automobile industry is interested in the supply of a certain type of box cars the announcement has been well received. The greatest increase in the shortage was noted in the supply of coal cars.

The recent storms have not served to check the movement of grain and other agricultural freight which still continues in unprecedented volume. During the past 10 days, however, signs have developed indicating that the movement is due for a check in the near future.

Grain Moving Is 1912 Crop

Reports have been circulated that the grain that has formed the bulk of the movement so far is largely from the 1911 crops. This, however, is not borne out by investigation, as it is well known that the high prices of last spring caused the farmers to ship their grain and left the barns practically bare before the bumper crop of 1912 was harvested.

Orders for 13,500 cars were placed during the past week by the granger railroads serving the Middle West. Inquiries for 30,000 cars were made by other roads during the week. The Santa Fé and St. Paul roads contemplate spending $20,000,000 for cars and equipment in the immediate future.

Accidents of the Year On New York Streets

Vehicular Traffic Cost Lives of 486 Persons on Highways and Byways of Metropolis

Report Covering First 11 Months of 1912 Shows Total of 2710 Persons Killed or Hurt, Half By Automobiles

According to the report covering the first 11 months of 1912, issued this week by the National Highways Protective Society, of which Colonel Edward S. Cornell is active head as secretary, vehicular traffic accidents in New York City since the first of the year have been reported as follows:

Kind of casualty	Killed	Injured	Total
Automobile	201	1260	1461
Trolleys	121	667	788
Wagons	164	297	461
Total	486	2224	2710

Of the automobile fatalities ninety-three were children under the age of 16. Many of the cases reported were those of children skating or playing in the streets. The operation of toy wagons and pushmobiles was another source of accident. These two factors in the situation indicate that lack of adequate playgrounds for the children is accountable for at least fifty of the fatal accidents. It may be noted that one of the objects of the National Highways Protective Society is to secure adequate playgrounds.

But the fundamental protest raised by the society is against the reckless and illegal driving of a certain class of automobile owners and a certain class of chauffeurs.

Col. Cornell holds that when a fatality occurs, the license of the driver should be suspended automatically and that it should be reissued only upon due cause being shown for such action.

"The difficulty," said Col. Cornell, "lies in the single fact that certain owners and certain chauffeurs feel that they must exceed the limits of the law, good taste and good sense in order to attract attention to themselves and their cars. It is perfectly sure that the man who has owned high-grade automobiles since the beginning of the industry will not take undue chances and it is equally sure that the man who saves $1,000 and buys a car for the use of himself and family will be cautious and law-abiding in its operation. But the man who suddenly achieves wealth and who loses his perspective of life and the rights of others is the fellow who is a menace to the automobile as well as to the general run of citizens."

In referring to the chauffeur, Col. Cornell said that greater care should be used in granting licenses, but that such care would be useless unless some more stringent measures were used in preventing second offenses. He cited the situation in Connecticut to illustrate his point.

"During the past year," he said, "there have been eighty-six licenses revoked in Connecticut, thirty-four of which were held by owners of cars. Needless to say that casualties in Connecticut are not so numerous as they are in New York, despite the fact that the automobile law is more liberal in many respects than it is here.

"There is one thing upon which we can congratulate ourselves, however. Not a single non-resident of New York has been killed on the streets this year. The reason for this state of affairs is simple enough when one comes to look a trifle under the surface. For instance, when a resident of Prunty Corners starts for a trip to New York, his wife will caution him at the front gate, saying: 'Now, John, you know how fast the taxicabs run in New York and how crowded the streets are, so do be careful John.'

"And of course, John is careful. That helps some, but the curbing of reckless driving and the provision of playgrounds for the children will do more. Accidents will always happen so long as man is a finite creature but their number can be reduced by a general, decent regard for the other fellow's rights."

Among the fatalities tabulated above there was one in November where a horse car ran over and killed a child. This will probably prove to be the last accident of that kind in the city as the last of the horse cars will be seen soon.

In New York state eighty-nine persons were killed and 123 injured in grade crossing accidents. A large part of this appalling list resulted from the running down of automobiles on crossings. During the period of 11 months, forty-seven cars were struck and fifteen persons were killed. The society is opposed to grade crossings and is constantly doing a lot of active work to eliminate them by law. Of all the accidents on the list those at grade crossings appear to have the least basis of excuse or explanation.

According to the report the vehicular accidents in Vienna during 1911 resulted in sixty-four deaths and the injury of 2,169. Of these, the automobile fatalities numbered twenty-four.

In Berlin the vehicular fatalities were 129, of which those charged to automobiles numbered twenty-eight.

In Paris 236 were slain in 1911, of which 103 were charged to automobiles.

In London 410 met death in vehicle accidents and 262 were charged to automobiles and motor busses.

In 1911 the report shows that 417 persons were killed by automobiles in London, Paris, Berlin and Vienna and that in 11 months of 1912, 201 persons met death in New York City through the same means. Carried out for the full year, the estimated casualties by automobile in New York City will be about 220.

French Exports Increase $8,000,000

Paris, Nov. 23—For the first 10 months of the present year France exported automobiles to the value of $34,709,280, compared with $26,443,800 for the corresponding period of the preceding year. Increased business was done with all nations with the exception of five—Italy, Turkey, Russia, Austria and Switzerland.

The total value of foreign cars brought into France is $2,245,800. America is responsible for practically the whole of the increased imports. The official returns for the export of automobiles from France for the first 10 months of 1912 are as follows:

Country	1911	1912
Great Britain	$8,591,880	$9,537,600
Belgium	4,981,980	7,966,140
Algeria	1,906,980	3,052,980
Germany	2,204,040	2,698,560
Argentine	1,345,680	2,314,600
Brazil	972,900	1,716,960
U. S. A.	474,120	857,820
Spain	501,000	808,560
Switzerland	922,620	769,020
Italy	760,320	445,140
Russia	449,880	382,840
Austria	380,880	174,780
Turkey	284,400	120,660
Other countries	2,661,180	3,861,600
Total	$26,443,800	$34,709,280

Exports Take Another Big Jump

Washington, D. C., Dec. 2—According to a preliminary report of the bureau of Commerce and Labor, exports of automobiles and parts for October amounted to $1,583,812 and for the first 10 months of the calendar year, $19,836,111. The comparison between 1912 and 1911 is as follows:

Exports	October	10 months
1911	$1,043,093	$12,608,127
1912	1,583,812	19,836,111

Imports during October included seventy-eight automobiles valued at $170,410.

Northway Bids High for Ohio Property

Officers of New Concern Offer Top Price for Assets of the Embarrassed Factory Plant

Court Orders Sale Consummated Upon Deposit of $30,000, Making the Full Settlement with Mortgage

CINCINNATI, O., Dec. 3—(*Special Telegram*)—That the Northway Motor Company, headed by Ralph Northway, formerly prominent in Detroit motor circles, will take over the $1,000,000 assets and property of the Ohio Motor Car Company at Carthage, was definitely settled today when Receiver Edward Schultz, of the Ohio Motor Car Company reported to Common Pleas Judge Cushing that the best bid received by him for the assets of the concern was that made by William Pabodie, of Hartwell, and Ralph Northway now of Wyoming, O., who offered $60,000 as a lump bid. They agreed to pay $5,000 cash down to bind the sale, and to give a $25,000 mortgage on the plant and $30,000 additional cash when the sale is ordered. Judge Cushing ordered that the sale be made and it will be confirmed as soon as the remaining $30,000 is deposited.

Pabodie and Northway represent the Northway Motor Company, recently incorporated under the laws of West Virginia, with a capital stock of $600,000, and it was for this company that the purchase was made. Mr. Pabodie stated today that the new company will manufacture motors, this being the main part of the company's industry, though it will continue the manufacture of the Ohio car, the automobile which was put out by the Ohio Motor Car Company. The plant, valued at nearly $1,000,000, controls 10 acres of ground, about 3 acres of which is now under buildings but the new company expects to have to increase the accommodations within a short time.

Mr. Pabodie stated that the company will start in as soon as the court matters are settled and that it already has some 8,000 orders on hand. Mr. Northway will be the president and general manager of the new concern.

CINCINNATI, O., Dec. 1—Cincinnati is to have a new company to manufacture automobiles. The Northway Motor Car Company, which was just recently incorporated in West Virginia, with a capital of $600,000 will begin to produce here about the middle of December. The Chamber of Commerce is now making an effort to find a suitable location for the company. It is said that if this cannot be accomplished, an entirely new structure will be erected. Ralph Northway, of Wyoming, O., formerly connected with a large automobile firm in Detroit, will be at the head of the corporation. W. D. Furste, Edward Deckebach, of Cincinnati; F. W. Enslow, of Huntington; William Pabodie, of Hartwell, O., and Ralph Northway are the incorporators.

It is planned to employ 200 men at the beginning. No name has been selected for the car. At first it was rumored that they would take over the Ohio Motor Car Company at Carthage, O., but that concern seems to be getting along pretty well under the hands of a receiver, who, it is expected, has not very much longer to fill in at that position.

Electric Men Discuss Operative Costs

Several hundred electric vehicle men attended the meeting of the Electric Vehicle Association of America which was held at the Engineering Societies' Building, 29 West Thirty-ninth street, on Tuesday evening, November 26. Arthur Williams of the New York Edison Company, the new president of the association, presided for the first time in his new capacity.

The greater part of the evening was spent in a discussion of the papers which were read at the third annual convention held in Boston in October. In one of the papers dealing with the cost of electric vehicle operation it was stated that a 1,000-pound wagon effected a saving of $400 a year over a 1,000-pound horse-drawn vehicle, and that a 5-ton electric truck effected a saving of $1,100 a year over horse equipment capable of doing the same work.

President Arthur Williams stated that the New York Electric Vehicle Association will probably soon take its place as a section of the Electric Vehicle Association of America.

A standard design for an official garage sign was adopted. It consists of white letters reading "Electric Vehicle Charging" on a blue background, with the emblem of the association in the center. The sign is to be 4 feet long and 2 1-2 feet wide. It will be sent to garages everywhere in the United States which have electric vehicle charging stations.

Southern Roads Would Raise Rates

The meeting of the Southern Classification Committee will be held in Washington this week, and among the subjects that will be considered will be the contemplated changes in the classification of automobiles shipped over Southern railroads. The plan proposed by the railroads is to raise the classification of automobiles to double the present rates and to cut down the minimum car load requirements to half the present weights.

If adopted, the new rule would work a big hardship on the automobile shippers. As an illustration of its working it may be said that where, for instance, the rate applying between certain points is $1 per 100 pounds with a minimum weight per car load of 10,000, the cost of shipping an automobile weighing, say, 7,000 pounds would be $100. This is reckoned on the minimum weight at full tariff. If the classification shall be raised to double first-class, or, say, $2 per 100 pounds with a minimum weight requirement of 5,000 pounds, the shipper would have to pay $140. Of course, if the automobile weighed only 5,000 pounds or less the cost of shipment would be the same as it is at present.

Studebaker Sued on Flusher Patent

Suit has been entered in the United States District Court by the St. Louis Union Trust Company, as assignee of the Ottofy patent 795,059, covering a street flushing device which may be motor-propelled, against the Studebaker Corporation, charging infringement of the patent and asking for an injunction, accounting and damages.

The Ottofy patent has been adjudicated in an action in the Eighth Circuit of the United States Circuit Court of Appeals and held valid.

According to the bill of complaint, the defendant company has made a large number of street flushers which are alleged to infringe the patent in suit.

The Studebaker Corporation has until the January Rule Day to put in its appearance and its defense will develop later. The amount involved is said to be material.

Mercedes Radiator Patent Sustained

LONDON, Nov. 24—Justice Joyce has rendered an opinion in the suit brought on the Mercedes British patent 3235 covering a type of automobile radiator, against the Fiat Cab Company. The decision supported the patent. An injunction was granted by the court, but a stay was granted pending application for appeal. Under the British law it is customary when infringement has been found against a defendant to have the decree so framed that the infringing devices must be yielded up for destruction. In this case the Fiat Cab Company has several thousand cabs in service. The order of destruction has been stayed along with the injunction.

A. A. A. Is Flourishing

All Bills Paid and $3,293 in Treasury—Enos Succeeds Hooper as President —Chairmen Appointed

Rincon Road Opened by Automobile Run—H. W. DuPuy President of Pennsylvania Rubber Company

CHICAGO, ILL., Dec. 3—The annual meeting of the American Automobile Association, held for the first time in many years in the West, was interesting which was marked by only one fight—the Ohio clash. It also saw the retirement of Robert P. Hooper, of Philadelphia, as president, and the installation of Laurens Enos, of Buffalo. The national organization was shown to be in a flourishing condition, with $3,293 in the treasury and all bills paid, while the good roads cause was given the expected boost.

When William Schimpf, chairman of the contest board, took hold of the office there was a deficit, but he was able to turn over $5,000 to the treasury, report all bills paid and a small surplus in his bank. The board granted 132 sanctions. Twenty more tracks than ever before were licensed and the number of meets held during 1912 has been a record-breaker. There were ninety-four. In 1911 there were only fifty-two and in 1910 seventy-two. Nineteen of the 1912 dirt track meets were on 1-mile tracks and twenty-two on 1-2-mile ovals.

Not one fatality occurred at dirt track meets sanctioned by the national organization. While a few drivers have been injured, none was seriously hurt, while the records show that not a spectator was injured during the year.

The contest board took in $13,225 in sanction fees; $1,140 was collected in drivers' licenses; $100 was paid for stock car certificates and $320 was paid over for track licenses. The expenses of the board amounted to $8,170.

Chairman Batchelder, of the executive committee, made a brief report in which he told how the association now has 451 clubs allied with it, 148 more than the A. A. A. had a year ago. There are forty-four active state associations.

The Ohio Automobile Federation desired to be recognized as a state association, whereas the Ohio State Automobile Association already has the franchise. The Ohio State Automobile Association was opposed to the recognition of the federation, but the matter never came to a vote.

The new officers are as follows: President, Laurens Enos, Buffalo; first vice-president, John A. Wilson, Pennsylvania; second vice-president, Dr. H. M. Rowe, Maryland; third vice-president, R. W. Smith, Colorado; fourth vice-president, F. L. Baker, California; fifth vice-president, Asa Maine, Minnesota; secretary, J. N. Brooks, Connecticut; treasurer, H. A. Bonnell, New Jersey; chairman executive committee, A. G. Batchelder, New York.

It was decided to open a branch headquarters in Washington.

There was a lively fight for the next annual meeting, participated in by Buffalo, Texas and Virginia. The last named won out and the next session will be held in Richmond.

CHICAGO, ILL., Dec. 3—(*Special Telegram*)—At the meeting of the new executive committee today, President Enos announced the reappointment of the following chairmen; Contest, William Schimp; Good Roads, George C. Diehl; Touring, Howard Longstreth; Legislative, Charles T. Terry.

Tourists Pour Over Rincon Road

SANTA BARBARA, Nov. 25—The opening run over the Rincon sea-level road, which shortens the distance between this city and Los Angeles 9 miles and overcomes the Casitas pass, exceeded all expectations.

More than 150 automobiles made the 100-mile trip from the southern city, and it was estimated that more than 500 cars were driven to the Rincon yesterday, when 2,000 persons enjoyed an old-fashioned Spanish barbecue, provided by the Santa Barbara chamber of commerce.

The chamber of commerce committee in charge of the celebration was treated to its first surprise Saturday evening. It was predicted that not more than 100 cars would come north, but when a check was made at the Potter and Arlington hotels late at night, it was found that more than 150 had made the trip, carrying nearly 600 persons, thus breaking all state records for a run of the century distance.

The cars from the South all bore pennants, "Santa Barbara Rincon Run."

The visitors remained here over night, journeying southward again the following morning.

DuPuy Heads Pennsylvania Rubber

At the recent annual meeting of the Pennsylvania Rubber Company, Herbert DuPuy retired from the presidency in favor of H. Wilfred DuPuy, still continuing as treasurer of the company. The new office of chairman of the board was created, to which the retiring president was elected. Re-elected to continue in their same offices as formerly were: Charles M. DuPuy, vice-president; Seneca G. Lewis, general manager; George W. Shiveley, secretary; Charles G. Morrill, assistant treasurer.

Herbert DuPuy for some time past has been unable to take an active part in the management of the company on account of his increased responsibilities as chairman of the Board of Directors of the Crucible Steel Company of America.

Contracts with distributors now in hand assure an increase for the year of 100 per cent. over the business of 1911. The entire production at prevailing capacity is already sold for the ensuing year.

Dealers Order Charter Application

Application for a charter for the Motor Dealers' Contest Association, of New York, will be made immediately as the result of a meeting of the members of that organization on Tuesday. A temporary board of directors was chosen consisting of fifteen with J. C. Wetmore at the head. A general meeting of the association will be held December 13 at the Elks' Club at which the program for the annual meeting in January will be outlined.

Madison Square Garden, the scene of many a circus sensation, has added one more to its list. Automobile polo is the latest, and as a spectacular feature it is a distinct success. The efforts of Messrs. Hankinson and Marine, the promoters, brought together a crowd of 6,000 on the first night and it is predicted that the game will grow in popularity because of its thrilling features.

Cars parked at Rincon Point on the day of opening the road

Elgin Races Next August

This Year's Compact Between Elgin Road Race Association and Chicago Automobile Club To Be Continued

Limit of 450 Inches To Be Adopted—Much Business Transacted at Grand Rapids Show

CHICAGO, ILL., Nov. 30—Announcement is made that the Elgin road races will be run in 1913 and that the compact entered into this year by the Elgin Automobile Road Race Association and the Chicago Automobile Club will be continued. The meet will take place the latter part of August as usual and it will be marked by the adoption of the 450-inch limit, an idea originating at Indianapolis and intended to encourage the competition of American manufacturers.

The 1913 plans were discussed last Tuesday night when the Elginites gave a dinner to the members of the contest committee of the Chicago Automobile Club. It was agreed that the partnership be continued and the prospects were declared to be rosy. An innovation decided upon was to have only one race each day instead of two or three as has been customary. The first day will be given over to a non-stock race for cars 300 cubic inches and under, while the second day the one event will be for cars 450 cubic inches and under. The promoters have decided to make the distance in both races the same—about 300 miles—in order that comparisons may be drawn as to the relative speed abilities of the two classes. Heretofore it has been customary to hold the small cars down to short distances.

Private owners are to be encouraged to enter and with this idea in mind there will be a special trophy offered. B. C. Patterson, who tried hard to import the Peugeot team last summer, has pledged himself to make an entry. It is thought he has in mind trying for an English Sunbeam.

The meet will mark the re-entry into competition of a famous trophy which has been on the shelf since 1910—the Cobe cup. Ira M. Cobe, president of the Chicago Automobile Club, has agreed to turn the trophy over for the Elgin meet, provided the name be changed. Therefore, it is to be called the Chicago Automobile Club cup and it probably will be offered in the first day's race. It is hoped to have the Elgin National for the second day, provided an agreement can be made with the Chicago Motor Club, which holds the deed of gift.

Simplex Sets New Track Mark

RICHMOND, VA., Nov. 30—The raising of the "outlaw" ban on the mile circular dirt track of the Virginia State Fair Grounds, where today and yesterday, under the sanction of the American Automobile Association, the Richmond Automobile Club conducted a professional automobile meet: the lowering of the track record on the two successive days by Louis Disbrow, driving a Simplex, and a Kline Kar, driven by William Morton, flying the track twice in one afternoon while traveling at 50 miles an hour without other damage than ripping away tires, were features of Richmond's first automobile meet in which drivers of national and international reputation competed.

Big Sales at Grand Rapids Show

GRAND RAPIDS, MICH., Nov. 30—With an attendance record of 30,000 marked up to its credit during its 4 days and 5 evenings run, Grand Rapids' fourth annual automobile show ended most happily tonight.

In interest, attendance, value and variety of exhibits, and in everything but number of sales direct to ultimate consumers the show far eclipsed its three local predecessors. Upwards of eighty lines in 140 odd models, all represented by local dealers, were shown on the floors of the exhibit space, while everything in the line of accessories was shown, beside all motorcycles sold in this market.

The buying trend noticeable seemed heavily toward the medium and higher grades of cars. The Cadillac and Rambler lines, strongly represented, did heavy business. Several sales of $5,000 cars were effected, these including Packards, Kissels and Whites. The best single sale was of a White big six for $5,225. The Overland company exhibit, including every model of that line, the Marmon, Federal truck and Standard Electric, was turned over to the sub-agents of that company, twenty-four of whom were in almost constant attendance receiving their prospects.

Road Builders Meet in Cincinnati

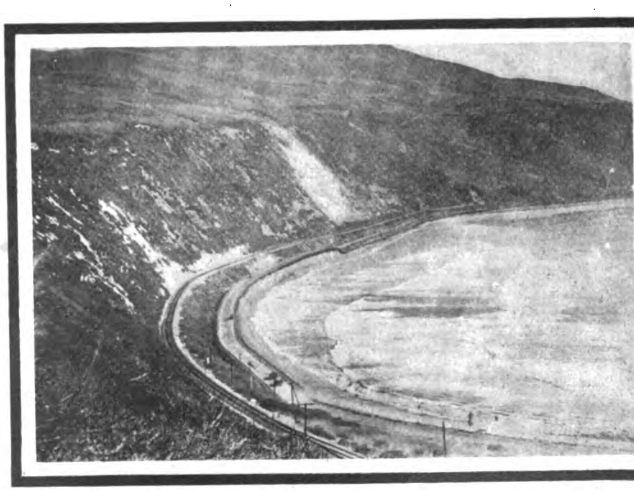
CINCINNATI, O., Dec. 2—The ninth annual convention of the American Road Builders' Association and the third American Road Congress will be held here at Music Hall starting Tuesday, December 3, and running to Friday. Men from all parts of the country interested in the good roads movement will attend. The program which has been mapped out is extensive.

A special feature of the convention will be a big entertainment given in honor of the visitors at the Business Men's Club, December 4. It is expected that there will be an attendance of between 1,500 and 2,000. Addresses of welcome will be made by Congressman-elect Stanley Bowdle, by Mayor Hunt on behalf of the city; by Prosecuting-Attorney Pogue, on behalf of Hamilton County, and by President Walter Draper, on behalf of the Chamber of Commerce.

Machine Tool Show Definitely Fixed

The project of holding an exhibit of machine tools in connection with the annual New York show has been definitely settled. The exhibition will be held as a portion of the part two period, beginning January 20. Assurances of co-operation on the part of the Machine Tool Builders' Association as a body and also from individual members representing large companies have been received and a large and varied exhibit has been promised.

THE KELLS MOTOR RADIATOR COMPANY, capitalized at $650,000, has been incorporated to manufacture and deal in automobile radiators and motors. The incorporators are H. R. Bingham and A. F. Garbe of New York and C. A. Cole of Hackensack. The company is closely related to the W. J. Kells Manufacturing Company, of New York.



View of the Rincon 2,000-foot causeway just opened to tourists

Simplified Handling of High-Speed Steel Problems Developed in Large Shops of Parisian School of Pyrology—The Use of Compensated Modern Planimeters for the Testing of Motors in Experimental Departments of Industry

TEMPERING and Selection of High-Speed Steel—The method developed by Taylor and White for tempering high-speed steel still remains the best devised for rough-turning and planing of mild, medium and hard steels. It consists in the following operations: (1) Slow heating in furnace to 800 deg. C., (2) rapid heating in furnace or forge fire to near the fusion point, (3) dipping of tool in a lead bath of 640 deg. C., (4) cooling—slow or rapid—from 640 deg. to atmospheric temperature, (5) annealing the tool in lead bath of 640 deg. (6) cooling—slow or rapid, at option—from 640 deg. to atmospheric temperature, (5) annealing the tool in lead bath of 640 deg., (6) more or less deformed and deteriorated by oxidation, and it is necessary to grind away several tenths of a millimeter to get to the sound metal.

For this reason this method is not so well adapted for drills, half-rounds, taps and milling-cutters in which the exact form of the cutting edge should be protected against the effects of oxidation, which become marked when the metal is exposed to the air at above 900 deg. C. At the Central School of Pyrology in Paris it has been found preferable to heat this class of tools in a bath of barium salt kept fused at a constant heat by means of a tri-phase electric current, and the following method for treatment of the tools has been developed:

(1) The tool is heated slowly to about 600 deg. in one muffle oven and then to about 900 deg. in a second muffle oven. To avoid oxidation in these ovens, pieces of incandescent charcoal are placed at the entrance of each of the muffles.

(2) When taken from the 900 deg. muffle the tool is suspended by means of tongs above the chloride of barium bath with only that part of the tool which is to be hardened immersed in the bath. The temperature of the bath is measured with a Féry pyrometric telescope and is maintained constant, with a tolerance of plus-minus 10 deg. C., by means of a rheostat placed in the inductor field of the generator used for producing the tri-phase current. The tool is left in the bath until it has taken the temperature of it.

(3) When leaving the chloride bath the tool is immediately plunged into a lead bath of 640 deg. and is kept there till it has reached the same temperature.

(4) Thereafter the tool is thrown into a trough with oil where it is cooled slowly to atmospheric temperature.

(5) Annealing, if there is occasion for it, is obtained by placing the tools in a muffle oven maintained at close to 600 deg. C., and white-hot charcoal is again placed at the entrance to obviate oxidation.

(6) Thereafter the tools are cooled in oil.

This method is modified in the case of tools intended for working upon tool steel, chilled cast iron or 25 per cent. nickel steel, for which work the temper produced by the method is too soft. For this class of work the cutting edge is quenched in oil, and annealing is omitted.

For work on brass and similar soft metals the method is also modified, as these metals are worked at a speed sometimes exceeding 100 meters per minute and the slightest hitch between the tool and the work causes the breakage of the former if it has received a too-high temper. Tools for this class of work are air-hardened. When the tool is taken out of the barium bath the tongs which hold it are hung above an air current produced by a blower. This modified method, which would oxidize completely a tool heated in a furnace, does not in the least deteriorate a tool heated in a salt bath as it is protected from oxidation by the layer of chloride which covers it. After the air-cooling the tool is annealed at a heat ranging toward 600 degrees C., as by the ordinary process, and is cooled in oil.

DETAILS AT VARIOUS STEPS OF THE PROCESS

It is not necessary to preheat all work before plunging it into the chloride bath. Practice shows that small tools of 5 millimeters thickness or less may be plunged into it directly. Only, they should be withdrawn three or four times, so as to make them take the heat more slowly. For pieces thicker than 5 millimeters it is important to have two muffle ovens, one heated up to 600 and the other up to 900 deg. C., so as to render the tool's absorption of heat gradual. It is, in fact, during the preliminary heating that large pieces warp before hardening. The pieces should not be taken from the first oven till they have reached 600 degrees, nor from the second to the chloride bath till they have reached 900 degrees.

The chloride of barium bath should hold about 3 liters and be about 200 millimeters (8 inches) deep. The container should be hollowed out of a refractory stone capable of withstanding the high temperature. To start the bath, the cavity of the container is brought to red heat by means of a gas flame. While this is being done, the chloride of barium is placed in a refractory crucible and is melted in a furnace. When fused it is poured rapidly into the red-hot container and the tri-phase current is at the same time turned on. Thereafter the temperature rises rapidly and when it has reached the degree wanted for the steel under treatment the rheostat is adjusted to maintain the temperature constant. When the work on hand is done, the bath is tipped into the refractory crucible, and the container is cleaned with an iron scraper to remove all detrition.

The Féry pyrometric telescope is permanently installed above and to the left of the bath. The galvanometer which is connected with the telescope by a double wire is placed in full daylight, so that the displacements of the hand may be easily and accurately observed.

The following method is used for determining the most favorable temperature for hardening in each case. A piece of high-speed steel about 3 millimeters thick is shaped as a half-round at one end with a very sharp thin edge and this is immersed in the barium bath for at least 3 minutes and is then quenched rapidly in water to dissolve the chloride. If the edge has retained its sharp angles, the temperature of the bath is raised 20 degrees, and the experiment is repeated. After a certain number of trials one finds in this manner the temperature at which the cutting edge begins to melt and which is designated as the fusion temperature of the steel in question. The number of degrees indicated by the pyrometer as corresponding to this temperature varies with different instruments but remains constant for the same instrument.

So as to be sure of not injuring any tool the heat of the bath is kept 50 degrees below the fusion temperature, and all tools are raised to this heat whether they are to be tempered in air, lead or oil.

The tools should remain from 2 to 5 minutes in the chloride bath, according to their size. In order to be able to temper several tools at the same time a number of wires are strung horizontally above the bath, one above the other, and the tongs which hold a tool are hung from one wire or another according to the length of the tool, so that in each case only the part to be hardened dips into the bath. In this manner four jobs may be done at the same time. When one tool is ready to be tempered it is withdrawn from the bath and replaced by another. Tempering two tools per minute is a speed easily reached, and this can be increased when several tools of the same kind are hung from the same tongs, which is the usual practice for small tools.

When the tools have been tempered and annealed they are covered again with a layer of barium chloride, and when the tool is to be used this layer may be easily removed by leaving the tool for some time in boiling water.

GETTING A TRI-PHASE CURRENT FROM SIMPLE DYNAMO

At a place like the Central School of Pyrology in Paris where several hundreds of machine tools are in use, the wear of tools is so much reduced by the use of high-speed steel that regrinding and tempering is required only once a week. Under these conditions it is not necessary to install a special tri-phase current dynamo. One of the generators working with continuous current, either for lighting or for power transmission purposes, will furnish the required current while the hardening is going on. The 220-volt current passes through a transformer which reduces it to 15 volts.

To maintain a 3-liter bath at the fusion temperature for high-speed steel, a current of 300 amperes for each phase is required.

TESTING HIGH-SPEED STEEL FOR ACCEPTANCE OR REJECTION

Most of the many high-speed steels in the market give good results for work in soft and medium hard steels; a smaller number work well with hard steels, but only a few choice marks give satisfactory results for crucible alloy steels, chilled cast iron and 25 per cent. nickel steel. In order to avoid stocking up with high-speed steels which are not suitable for all kinds of work, the Central School of Pyrology has gone into considerable research work on the subject and has arrived at a certain testing method which is simple, inexpensive and in the main satisfactory. The proceeding is as follows:

Select from each shipment a certain number of bars. Cut from each of these a piece of steel from which there can be forged or machined a piece about 150 millimeters long by 12 millimeters square. Harden these pieces as stated in the foregoing and mount them to work in a tool-holder of a filing machine. Determine the average weight of shavings from 25 per cent. nickel-steel obtained between two successive mountings. Compare this weight with that which a good high-speed steel should give, and accept or reject in accordance with the result of this comparison.

In order that this test may be justly decisive it is important that the conditions should always be identical. The rules adopted in this respect at the Central School are as follows:

The tool is mounted as a simple planing tool. All forms are calipered to measurements, so that the tools always have the same cutting angle, rake and clearance, as well as the same rounding of the cutting part.

The tool-holder may be of any form, provided only that the tool when placed in it always extends in the same direction with relation to the axis of the holder.

Any filing machine of medium power and in good condition may be employed by modifying, as described below, the control rod for the tool-holder slide. This modification, which can be applied to all filing machines, has a double purpose; namely, (1) to render the charge of the tool less brutal and (2) to permit stopping the test when the tools have reached the same degree of wear.

The modification consists in making the control rod in two pieces telescoping one into the other and united by several pairs of washers. When the cutting edge reaches contact with the work-piece the washers are compressed gradually, allowing the tool to take hold without violence. The compression of the washers increases with the wear of the tool. An index hand, the point of which moves over a graduated sector, amplifies and measures the compression of the washers. Each test is stopped when the hand reaches a certain mark on the scale.

The average linear speed of the tool during the test work is close to 12 meters per minute. The depth of the cut is 1 millimeter. To make sure of it, an index hand is secured upon the movable part of the tool-holder moving over a millimeter scale on the head of the slide-rest. The feed is approximately 1-4 of a millimeter which corresponds to one tooth of the gear pinion controlling the displacement of the tool-stock. The test is stopped when the index hand during the work shows a high compression of the washers by brusque oscillations beyond the stop-mark on the graduated scale.

Evidently other rules may be substituted for these, the main requirement being the safeguarding of an equality of the conditions under which the tests are made.

The nickel-steel used for the tests should analyze between 20 and 25 per cent. of nickel, and untreated test pieces of it should give at least the following figures for tensile strength: Elastic limit average 35 kilograms per square centimeter, minimum 32; ultimate strength average 95, minimum 90; elongation average 35, minimum 32.

Tests made under these conditions with a good high-speed steel, hardened as described, give regularly close to 1 kilogram of shavings between two successive adjustments of the tool. To obtain a clear showing, it is necessary to make at least three consecutive tests with the same tool, remounting it several times, and to take the average of the results obtained.

This testing method is much simpler than that defined by Taylor but does not serve the same purpose. Taylor sought to determine the best method of tempering, with a view to obtaining the highest efficiency for roughing tools. For this purpose his method remains the best.

The method here outlined has for its object to make sure that the high-speed steel put in stock is of very good quality and can give good results in work with the most difficult metals and alloys.—From article by P. Gorgey, captain of artillery, instructor at the Central School of Pyrology, in *Technique Moderne and Revue Pratique des Industries Métallurgiques*, September and October.

CORRECTING and Utilizing Planimeter Readings—In the measure as competition in the manufacture of automobiles and motors becomes keener and the necessity becomes more apparent for combining quality with quantity in production, the means for ascertaining just what a motor or a carbureter, or the two in combination, will do throughout their range of adjustments are getting to be more and more a subject for serious practical consideration in the experimental departments of manufacturers. Dynamometer tests are required to be verified by diagrams obtained from manographs or indicators—and obversely—and all expedients for simplifying these testing methods, and at the same time removing the causes of possible errors in their application by employes of average attainments, begin to spell dollars by the thousands, in as much as their use or non-use eventually comes to mean a reputation or a lack of reputation for that freedom from little nettling flaws and troubles in the operation of a car which the public appreciates above all else, once it has been demonstrated to be within reach through the painstaking work of the technical leaders in the industry. To reconcile such painstaking work, which is largely in the nature of applied science, with the requirements of economical production is a task to which European and perhaps especially German engineers are now devoting a large portion of their energy. The Sternol oil-testing machine (mentioned in THE AUTOMOBILE of January 11), machines for verifying the cut and efficiency of gear teeth (THE AUTOMOBILE of Dec. 21, 1911), the minimeter devices (THE AUTOMOBILE of May 2), Brinell and other testing methods (THE AUTOMOBILE of Feb. 29, March 14 and July 4), machines for polishing test pieces (THE AUTOMOBILE of April 4), the accelerometer (THE AUTOMOBILE of October 10), other transmission dynamometers (THE AUTOMOBILE of October 24) and the micro-indicator (THE AUTOMOBILE of November 28) exemplify this movement by which Europe expects to render mass-production methods technicaly as well as economically satisfactory.

THE PRINCIPLE OF ORDINARY PLANIMETERS

The verification of planimeter readings comes in the same line of efforts, because the measurement of the area of an indicator diagram, or rather the measurement of many such diagrams, constitutes an indispensable method for ascertaining and recording the inner workings of a motor. The planimeter was invented in 1854 by Jacob Amsler and his construction has not been improved till lately when the compensating planimeter was introduced, by which errors due to wear or flaws of the instrument may be easily corrected. The ordinary planimeter is composed of two rigid arms of which one carries the angle-pole or fixed point P, Fig. 1, and the other the tracer T. A universal joint permits all relative displacements of these arms, and a roller M placed at the opposite end of the tracer rests on the level and either rolls or slides on the paper in following the movements of the tracer. To make use of the instrument it is only necessary to stick the pole pin into the paper at one point and to follow the contour of the area with the tracer. The revolutions of the roller, as recorded on a scale, then constitute a measurement of the area. Mathematically it can be proved, in fact, that the area of any figure whose perimeter has been followed by the tracer equals the area of a rectangle whose base is the length of the tracer arm and whose height is the distance travelled by a point on the circumference of the roller.

If L is the tracer arm, M the circumference of the roller, n the number of its revolutions and nM consequently the distance travelled, the area S equals L multiplied by nM, and as L and M are constant factors, at any one adjustment of the tracer arm, this can be written: S equals Kn.

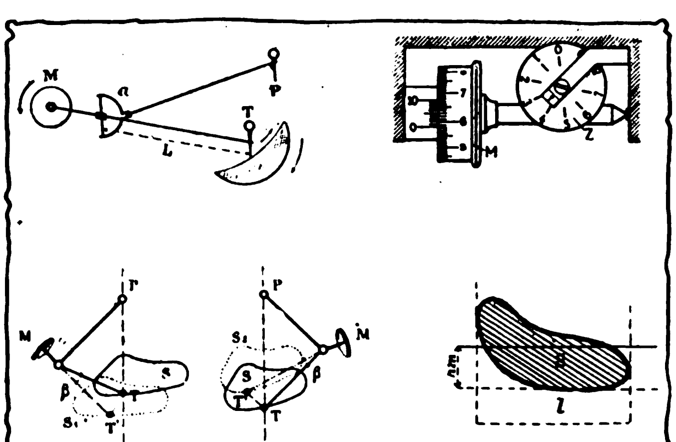
In practice, the unit of measurement is not the surface ML, but a 1/1000 part thereof. It is this unit of the graduate scale which we call K, and n is the number of K-movements made by the roller. The absolute value of K depends, then, on the length of the tracer arm, which in turn is determined by the point at which the joint a is attached to this arm. The instrument has therefore on this arm marks which give the value of K according to the point of attachment of a. In most instruments the value of K varies between 2 and 10 square mm.

K being fixed, only n remains to be measured, and this is done by a watchwork of the type indicated in Fig. 2. The tracing is always done "with the clock." Thus, if the watchwork showed, for example, 3,500 at the beginning of the tracing and 3,584 at the end of it, and the value of K is 10 square millimeters, the area traced is 10 × 84, or 840 square millimeters.

The accuracy of this reading depends, however, essentially upon the parallelism between the axis of the roller and the mathematical tracer arm, which is not identical with the visible tracer arm but is a straight line from the center of joint a to the point of the tracing stylus. If this parallelism is not accurately materialized in the instrument—and rough handling may easily disturb it, even in good instruments—all the area measurements will be more or less faulty.

That non-parallelism has this effect is easily understood. Assume that the two parts of Fig. 3 have been traced with an instrument in which the deviation from parallelism is represented by the angle beta (β). The roller now does not measure the area of the surface S which has been circumscribed by the material tracer T but that of a surface S_1 and S_2 which would be the one followed by a hypothetical tracer T_1 situated exactly in the prolongation of the roller axis. By placing the planimeter in two symmetrical position around the same pole, as instanced in Fig. 3, and outlining S_1 and S_2, it is readily proved that S equals S_1 plus S_2, divided by 2; that is, as the same error is committed in one case to the positive side and in the other to the negative side, it disappears when the mean of the two measurements is taken. The error is "compensated."

On this principle, in order to rectify a planimeter, one should make it trace a perfectly known area, preferably in two symmetrical positions from the same pole, and either determine the exact length of the arm L at which K will correspond to reality or else correct the obliquity of the instrument by means of a compensation-device adjustable by a screw. These corrections cannot be made, however, with ordinary planimeters. A special construction is necessary to permit the symmetrical reversal of the instrument, and a special screw for adjusting the axis of the roller is required. In practice such compensating devices are quite necessary, as the errors in the use of a worm planimeter may be relatively large and the results of elaborate tests of motors often depend upon the measurements taken of a few diagrams of small size and produced at different times. In the experiments of the author the Ott compensating planimeter is used which he considers the most modern and perfect of the instruments actually in the market.



Figs. 1, 2, 3 and 4—Illustrating the utilization of compensated planimeters

FINDING THE MEAN INDICATED PRESSURE

Some hints with regard to the practical use of planimeters may not be superfluous. The object of measuring the area of an indicator or manograph diagram is to determine the average height h_m of the indicator spring displacement from which the mean indicated piston pressure of the motor is computed. By two tangents to the diagram, as in Fig. 4, its length l is determined; let k be the unit of area corresponding to the adjustment of the instrument, n the distance traveled as marked in figures on the scale. The area S equals nk. We then have:

$$(1) \qquad h_m = \frac{S}{l} = \frac{nk}{l}.$$

FINDING HORSEPOWER BY THE PLANIMETER

If one has a large number of diagrams to measure, all taken from the same motor, precious time may be gained by making the planimeter give directly the indicated horsepower.

(Continued on page 1187)

Those Counterspring

Forrest R. Jones Scores Against Editorial Opponent in Mathematical Correctness of Counterspring Theory

But Opponent Maintains That the Bare Theory Though Correct Is Misleading in Practice Unless It Is Amplified

IT was the mathematically supported contention, in an article by A. Contet, which was translated in THE AUTOMOBILE of Sept. 26, that the addition of a counterspring to an ordinary vehicle spring results in a compound spring which is less flexible than the original vehicle spring, although the vehicle load is supported by the latter alone, and it was stated by Mr. Contet that, for this reason it is common practice, whenever a counterspring is added, to remove one of the leaves of the original spring, so as not to impair the flexibility. It was also noted that springs doctored in this manner show signs of weakness in practice. The correctness of the theory was doubted in an editorial note, contesting the correctness of the mathematics on which it was based. Then a communication was received from Mr. Forrest R. Jones, upholding Mr. Contet's theory and giving new mathematical proof for its correctness, and this was published in THE AUTOMOBILE of Oct. 31 Concurrently therewith an editorial note again gave expression to dissent on the ground of an alleged fault in the application of the mathematics.

Promptly, under date of Oct. 8, another communication from Mr. Jones was received in which it is stated that "In Editor's note, Sept. 26 [should be Oct. 31], every sentence, as a whole, presents a statement that is in error, except the first sentence and the last paragraph. The old stumbling block of negative values seems to have tripped him." The communication also contains much additional matter tending to prove that the theory expounded by Mr. Contet and by Mr. Jones is truly correct, but the length of this additional reasoning and the fact that it merely confirms what had previously been set forth very adequately by Mr. Jones, and gives no new viewpoints on the practical importance of the theory, militate against its publication *in extenso* in this issue. The editorial commentator has seen the light. The theory and the mathematics are correct. The compound spring, in which the counterspring forms a part, IS less flexible than the simple spring from which it is built up. The object of discussion is strikingly attained in this admission.

Nevertheless the fact, as noted by Contet, that this theory leads to the practice of eliminating one of the leaves of the original spring, in order to restore the lost flexibility, shows that it is vicious and academic, unless the reason for the reduced flexibility is specially explained.

In reality the compound spring is less flexible than the original spring only because its construction involves the imposition of an extra load on the original spring, and because this extra load is not considered when the flexibility is calculated from the deflection caused by a given load. The compound spring is constitutionally deflected to start with, and this initial deflection is not counted. The reduction of flexibility is not of the same kind as that obtained by an extra leaf. On the contrary it is obtained by putting a load into the spring itself in the form of the counterspring's downward pressure, thereby adding to the burden of the original simple spring and weakening it proportionately. The amount of vehicle load which can be placed upon it with safety is reduced by the amount of the load which the counterspring imposes.

In the accompanying illustration, Fig. 1 shows the original spring R and the counterspring R_1, both unstressed. The supposition is that a stress of, say, 500 pounds is required to flex R_1 three inches and that the same stress will flex R only one inch. When the two springs are clipped together, as in Fig. 2, the open of R will thus be reduced from four to three inches, while the counterspring will be flexed three inches. Now, when the unloaded compound spring (Fig. 2) is put under load of 2000 pounds, acting solely at the eyes of R, it will assume the shape shown in Fig. 3, because in this position the counterspring has ceased to act and 2000 pounds will bend R four inches. Considered as a compound spring-unit it has undergone a deflection of only three inches, however, and this is the fact which is considered in the mathematical theory. The deflection of R shown in Fig. 2, which is one inch, is omitted from consideration, because it is not technically the result of a vehicle load. And thus it may be contended successfully that the compound spring is less flexible than the original spring R, since it is deflected only three inches under the same vehicle load which deflects the simple spring R four inches. A practical limitation to the mathematical theory is illustrated in Fig. 4, which represents the position of the compound spring under a load larger than 2000 pounds. In moving from the position of Fig. 3 to that of Fig. 4, the original flexibility of R has of course been restored, technically and otherwise, simply because every counterspring in practice has a limited range of action, which fact is unconsidered in the mathematical theory.

This leads to the only really important question in the whole matter, which is: How may countersprings be used to advantage? It is seen that they stiffen and at the same time weaken a spring. In order to obtain, then, the advantages which they may offer in the way of a brake on the rebound, it is required that the original spring should be stronger and more flexible than ordinarily necessary for its load. In other words the counterspring may be used as a moderator for an extraordinarily long, strong and flexible spring. Beyond the counterspring's range of action—under very severe shocks—the full advantage of the long spring's strength may then be enjoyed, while its excessive flexibility under ordinary conditions is reduced.

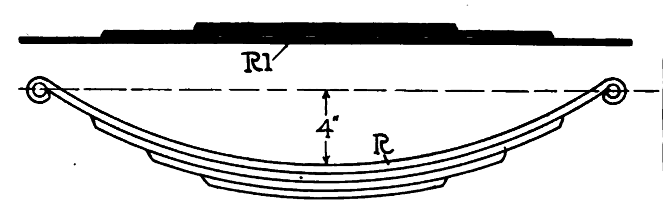


FIG. 1

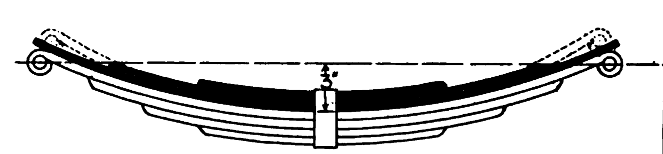


FIG. 2

FIG. 3

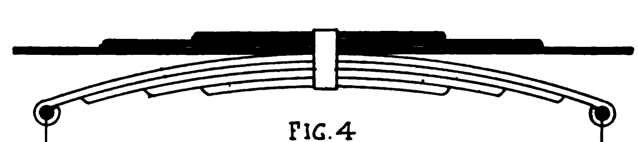
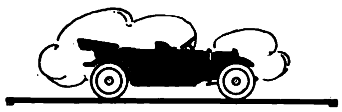


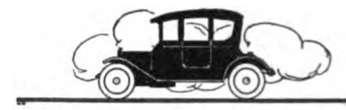
FIG. 4

An example illustrating counterspring action

Coupé Body for Ford Runabout Chassis



Possible Combination of Two and Four-Passenger Design for Winter Travel



By George G. Mercer

THE body design here illustrated is made to fit the chassis of a Ford model T runabout. It is designed to occupy the same space as the runabout body, without disturbing the base or platform to which the gasoline tank, tool box and body are fastened. As with previous designs in this series, the original car is interfered with as little as possible so that the runabout body can be replaced on the return of warm weather without trouble or unnecessary expense. The change speed lever, being located in the center in this model, no alteration is necessary in this connection when adopting a closed body.

The Ford model T runabout has a wheelbase of 100 inches; the tires are 30 by 3 inches in front and 30 by 3.5 inches in the rear, the motor being 3.75 by 4 inches and as the manufacturers furnish a larger stock body than the one illustrated on the same chassis, the question of overloading need not be taken into consideration.

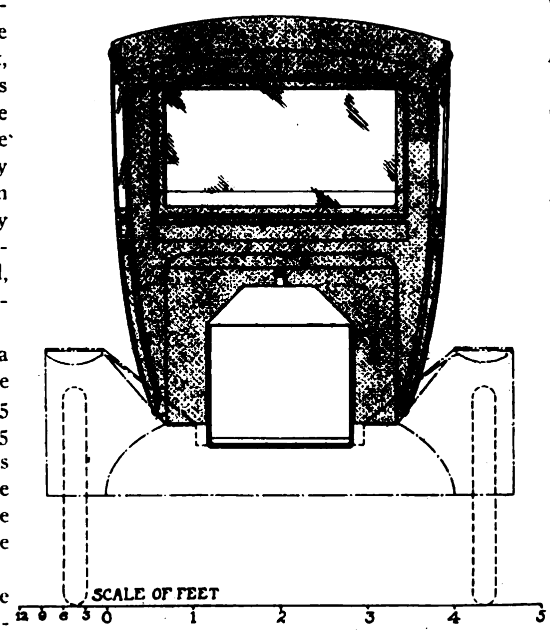


Fig. 1—Front view of Ford coupé design

Fig. 4 is the side elevation of the suggested winter body, having the general lines of a miniature brougham. This body can be mounted and secured to the platform that rests on the chassis frame, the door and the framing around the door being of greater width than the platform, so as to overhang a distance of 6 inches. The object of this straddle-wise mounting is to create a more balanced appearance in the car as a whole by having deeper doors. A dotted line carried across the body in this illustration shows the upper surface of the platform. Below this line the door is of course simply a dummy, so far as its use is concerned. In the rear view, Fig. 3, the relative positions of the door and the platform are more clearly shown. The pillar projects beyond the sides of the platform. The body is very light, weighing approximately 550 pounds.

From back to front, Fig. 4, measures 41 inches; the width of the door opening is 18 inches and the extreme width of the body, Fig. 2, is 46 inches. Notwithstanding these small exterior dimensions, those of the interior are fair proportions for two averaged sized persons. The size of the cushions, etc., are indicated on the three views, Figs. 2, 3 and 4. A considerable sweep is given to the line of the roof, Fig. 4, producing a lower general appearance without making the vehicle inconvenient in any way, as height is not necessary at either front or back. The windshield glass at the front is protected by a small leather bonnet stretched over a metal frame. Wood panels and framing are used throughout the design. The construction is identical with that used on horse drawn carriages and all framing is made as light as safety will permit. The windows of the doors and sides are made to lower for ventilation, while the rear pane is stationary. In order to obtain a rain visor, the front window is provided with hinges at its upper edge. Plain plate glass and mahogany frames are used for the windows. The cowl can be formed in either steel or aluminum. It is fastened to the back of the dash, rubber packing being inserted to prevent leaking. By not having to change the dash, the dash lamps remain undisturbed in position when the bodies are changed.

The most suitable colors for painting the body are the stock blue used on the runabout for the lower body panels, cowl and

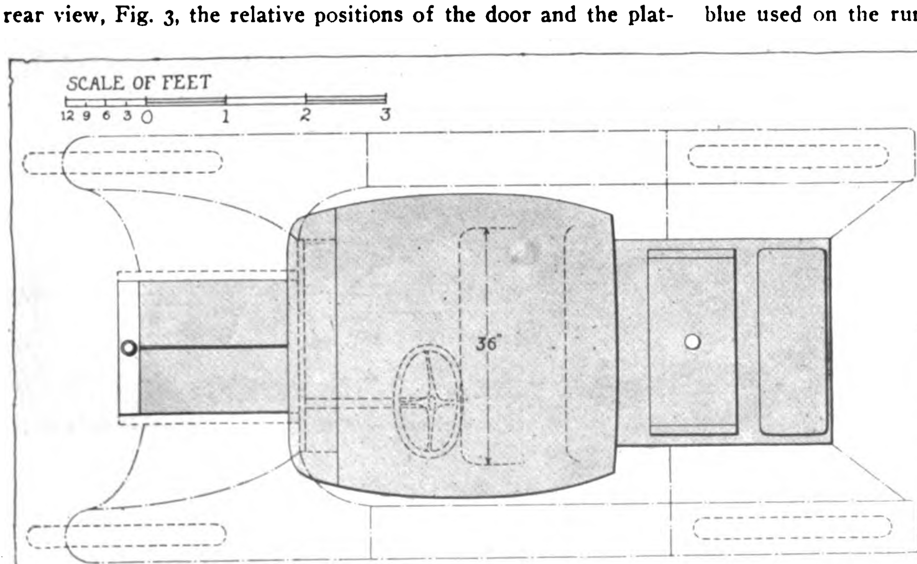


Fig. 2—Plan view of coupé suggested for Ford runabout

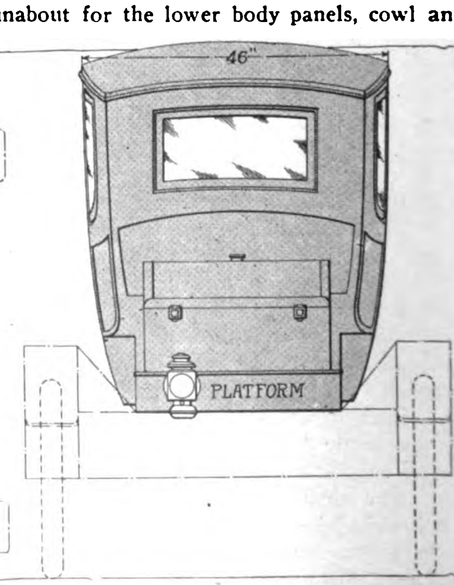


Fig. 3—Rear view of Ford coupé

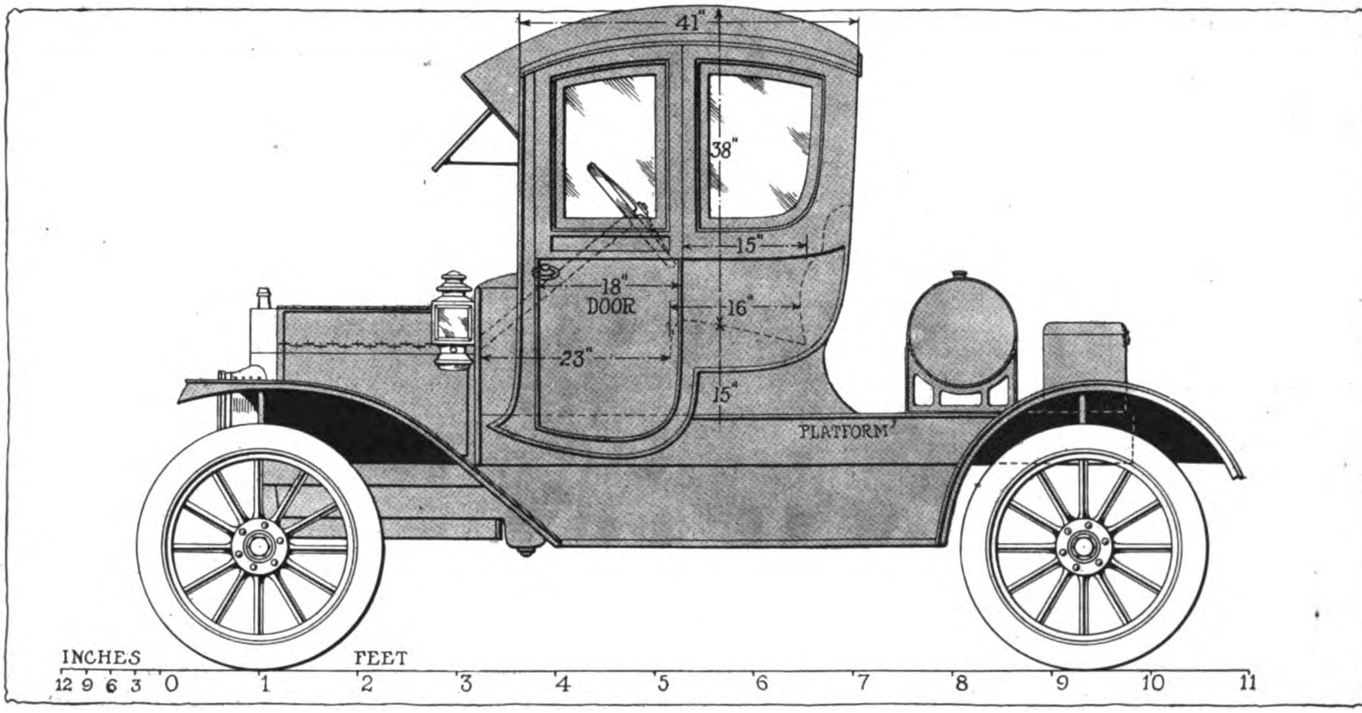


Fig. 4.—Side elevation of coupe body mounted on platform of Ford runabout

fore-body, with black mouldings, and black for the upper panels above the belt line and for the roof.

Leather may be used for the interior trimming. The material that is furnished in large skins as imitation morocco is very serviceable and as little liable to crack as the genuine article; in fact, it is a question if it is not a trifle more reliable in this respect. A suitable finish would be blue broadlace for binding on the doors, etc., blue carpet and blue silk curtains.

Inside, the appointments would be the customary silver-mounted electric dome light in the roof and very simple card and ash cases on the doors.

A further use to which the new body can be adapted is shown in Fig. 5, where it will be seen that the coupé body has been moved to the rear of the platform and a fore portion for the driving seat added. On general principles a combination body is not desirable, but in the present case, as there are no moving parts with hinges, all being easily and firmly attached to the platform no real objection can be raised. The fore-body is provided with side doors and a windshield is mounted on the cowl. A larger bonnet is fastened to the front of the body to protect the driving seat and from the front of this to the windshield is stretched a leather flap, that serves as a watershed and is also removable. Side curtains can be added that will entirely close the front when required. Leather trimming of the usual type would be found suitable for this part of the car.

The addition of this fore-body necessitates the removal of the gasoline tank and tool box from the rear and the placing of a tank under the front seat.

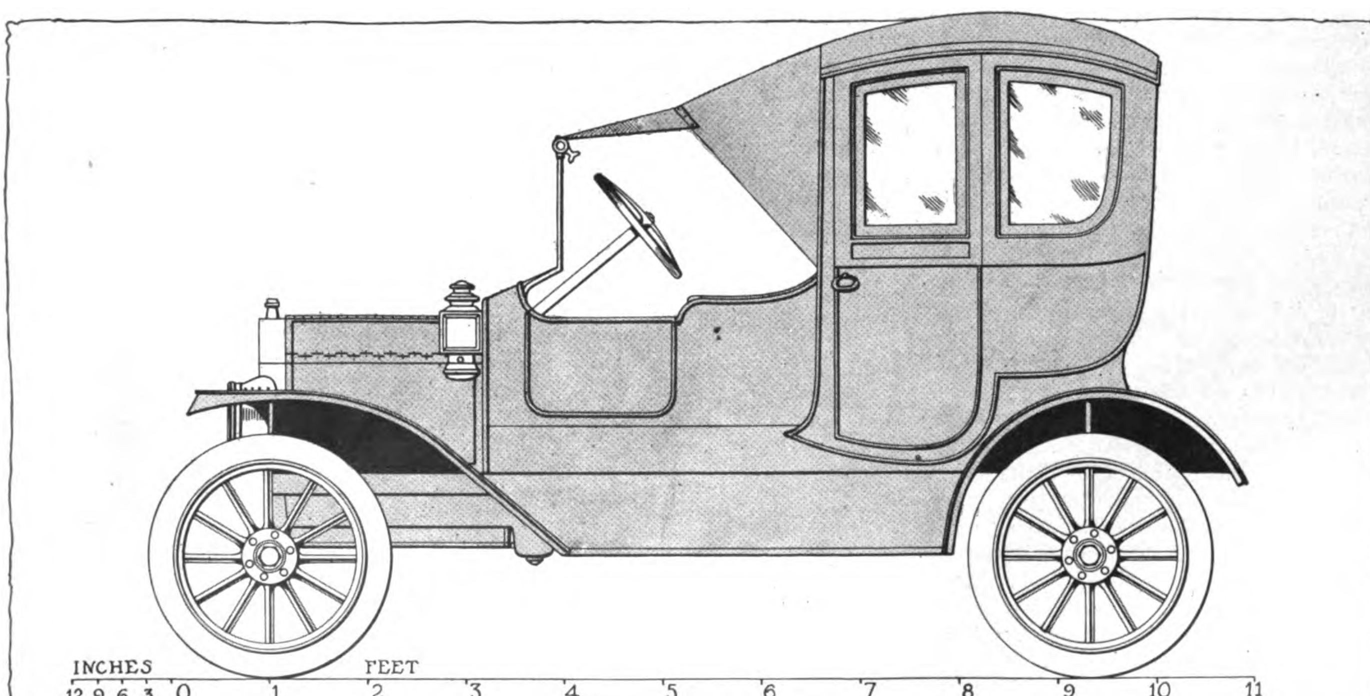


Fig. 5.—Same coupé body moved back on the chassis to permit of the addition of a fore-body

Gimbel Brothers' System of Delivery

How Ninety-five Freight Automobiles Serving 5,000,000 New Yorkers Are Handled Efficiently

Private Service Department of the Gotham Store Employs Fifty Men and Uses Ten Forms for Recording

MINIMUM standard cost of unit of work is the goal of modern industry and commerce. Forgetting for a moment that industry and commerce again serve a purpose, filling the needs of mankind, the attainment of that minimum cost of economic operation is the center toward which strive every man and woman who contribute to the work of the world. Every individual attempts to realize the condition maximum effect with minimum of effort in his or her personal work; so that, as soon as the interest of the individual actually becomes identified with that of the whole, a very high and efficient standard of the world's work may be a reasonable expectation.

At this moment, when the study of economic efficiency is but a babe and hardly past the embryonic stage, few people realize the importance of the problem outlined above. These people are generally those who see the differences of efficient and inefficient work, because they come in contact with huge bodies of labor, because upon their shoulders rest immense responsibilities, because through their hands streams the well-regulated current of the wealth of the planet. Little reflection is necessary to arrive at the conclusion that the processes adopted by these people in handling their work are the expression of supreme commercial intelligence at work today. They are, therefore, worthy of more than passing consideration of the progressive business man.

Delivery System for Stores

Department stores in large cities, which are the main centers of distribution, are today well ahead in respect of efficient operation. Much has been said about the concentration expended by store managers upon the increase of sales and the most advantageous methods of begetting these; yet, the transportation of the wares, after they are sold, is no less worthy of admiration. To carry it out, in the most profitable fashion, three things are necessary:

(A) Exact records must be kept of the goods shipped from the store;

(B) Exact records of the cost of delivering the goods sold must be kept;

(C) Conclusions drawn from the figures afforded by the above information must be used to devise ways and means to further reduce the cost of deliveries.

(A1) The records of the goods leaving the store are part of the store organization proper and are handled by the charging and shipping departments, who also arrange the outgoing packages, according to routes, so that the drivers may take the parcels out of bins and spaces assigned to them, individually, and distribute them over their delivery route. The charging and shipping records are, later on, checked against the delivery records of the drivers. From day to day, or from week to week, the company is thereby enabled to prepare digests of its business, as represented by the number of packages delivered. The results are the following values: packages delivered per day, week and month; packages delivered per wagon, per unit of time; average sales value of every package delivered.

135675

Battery No.

Amp-Hr Meter

Amp-Hr Needle

TIME	VOLTS	AMPS.	REMARKS

Fig. 1—Battery-charging record used in Gimbel garage

Form No. 1 C

GIMBEL BROTHERS 24th ST. GARAGE

REPAIR TICKET

MAKE OF CAR ______ JOB NO. ______

DATE ______ CAR NO. ______

REPAIRS

CHARGE TO

SIGNED ______

Fig. 2—Repair tag with which cars are sent to the shop

(B1) The following items make up the cost records of delivery: Direct and indirect maintenance cost, incidental expenses and loss. This information is carefully prepared, giving attention to every item, referring to every car operated by the company. Thus an exact history of every car is kept on record. Besides, average costs of various items per car may be arrived at. These averages divided in the average work done by a car give average delivery costs. These represent the final result of cost-keeping, so far as records go.

(C1) It is left for experts in the various departments of the delivery work and the automobile operation to improve on the operating figures.

The proposition (B) forms the sole subject of this article. It is proposed to show in the following the manner in which the delivery work of one of the greatest stores of the world is carried out. This refers to the New York store of Gimbel Brothers, the Philadelphia and New York merchants. This corporation effects the delivery of wares sold in the Manhattan store through the service of 127 automobiles, of which ninety-five are kept in the main garage in West Twenty-fourth street. The rest are stationed partly at the 183rd street garage of the company, with the exception of several trucks operating solely in suburban fields. The fleet of the company is made up of eighty-nine electrics and thirty-eight gasoline trucks, the electrics taking care of city work only, while the gasoline trucks serve as transfer wagons to railroad depots and distributing centers of the company, about half a dozen of which are located in close proximity to New York.

The ninety-five automobiles stored at and operating from the Twenty-fourth street garage are served by fifty men, besides a driver and a helper for every truck. These fifty men are mechanics, repair shop men and garage hands. The system of using cars is as follows: All automobiles leave the garage at a specified time in the morning, starting for the store, where they are filled with packages to be delivered. As soon as a wagon has finished its route it returns to the store and is reloaded, time and again; in the evening it returns to the garage and the driver rings in his time on the clock as the working day is finished.

Delivery-record forms are ten in number. They cover every necessary point of information relating to the delivery itself, the maintenance of each car and the cost of both. The forms may be divided in three groups: (I) Time-record blanks, giving the distribution of the working times of the trucks. (II) Maintenance forms for recording gasoline or current, repair work and parts used and expended on every truck. (III) Cost-compiling forms which give the expenditures in dollars and cents, both for all machines and for every individual truck.

(I) The time of start and finish being recorded on a clock card which is kept at the garage, a form for the distribution of working time has been prepared, Fig. 4. This blank, 6 inches wide by 11.75 inches high, is printed black on tan paper. Each trip of every driver is recorded on this blank which is sent in the evening to the garage, where it forms, together with the clock card, an exact account of the driver's time for the day. The details of every trip appear on the delivery-and-receipt forms, not shown here.

(II) To keep the truck in running condition it requires fuel or current, lubricants, tires, as well as repair work and material which become necessary from time to time. The gasoline trucks draw for fuel upon the gasoline tank which is installed in the garage, and the fuel delivered to them is recorded on a duplicate roll of paper, such as used in many small stores. A copy of the record is kept in the garage and a duplicate given to the driver, who later on turns it over to the superintendent. In the case of electrics, a charging card, Fig. 1, is used every time a battery is charged. This card is 3 inches wide and 3.25 inches high, printed black on thin, white cardboard and ruled with blue lines. The degree of charging when the battery is turned over to the driver is recorded and a space for the odometer reading just before charging is allowed on the reverse side of the card.

Repair Forms Described

Repairs require a comparatively large number of records, due to the variable nature of this work, and following the example of up-to-date service departments, Gimbel Brothers in their garage have provided an elaborate cost-keeping system for this phase of their delivery organization. Repairs are undertaken either upon the request of the driver who notes a defect in his truck and brings it to the attention of the garage superintendent, or when the defect results in a breakdown in the street; likewise, if the truck meets with an accident. If the driver causes a repair to be taken up, he fills out the Motor Defect Card, Fig. 3, which affords space for ten items on one side, while the blank reverse side may be used if the remarks do not find space on the face side. This card is 7 inches high and 3.5 inches wide, printed black on thin tan cardboard. After the card is filled out, it is handed to the foreman on duty who represents the superintendent on the floor and who directs the necessary work to be done. If the truck, however, is disabled on the road, the driver telephones to the garage, and the message, which is taken in the office of the superintendent, is recorded on Emergency Call Card, Fig.

MOTOR DEFECT CARD.

INSTRUCTIONS: Drivers must report on this card, upon each return of car to Garage, all defects or other trouble with car occuring on date stated below, and, before leaving the premises hand same to Foreman on duty, using reverse side if necessary.

Cab or Truck } No.............. Date.............. 191....

Time.............. A.M.............. P.M.

By.............. (Driver)

STATE BELOW PARTS REQUIRING ATTENTION:

1 ....
2 ....
3 ....
4 ....
5 ....
6 ....
7 ....
8 ....
9 ....
10 ....

Received by.............. Time..............

Repaired by..............

Examined by..............

Date.............. 191.... Time..............

GIMBEL BROTHERS, NEW YORK

Fig. 3—Motor defect card used by drivers to report trouble

Dept.............. Date..............

TIME CHECKING SHEET

EVERY EMPLOYEE in this Department will enter their NUMBER, NAME AND ACTUAL TIME of arrival in the Department in the morning and EACH TIME THEREAFTER they leave or arrive in the Department during the entire day. There are no exceptions to this rule.

GIMBEL BROTHERS.

WRITE PLAINLY

Number	NAME	IN	OUT	Were you late? Say YES or NO

Fig. 4—Time checking sheet for recording drivers' trips

6. The latter is 11 by 8.5 inches in size, printed black on tan paper and kept in the office of the superintendent. When a driver calls up, his name, the number of his truck, his locality at the time of trouble, the number of the telephone used by him and the help required are recorded in the proper spaces; furthermore, all particulars relating to the relief car sent to aid find space on this form. In a corner of the card the used materials and their actual cost are noted.

Emergency Work Anticipated

A car which meets with an accident is either put in working condition on the road or hauled in to be repaired. Whenever a truck undergoes a repair, a repair tag, Fig. 2, is filled out. This tag is 8 by 5 inches in size, printed on tan cardboard of medium thickness and is filled out by the foreman with the particular repair jobs required on the car. When the tag has been filled out, it is attached to the truck, which is turned in the repair shop by the foreman. There labor and material used in the repair work are recorded on suitable blank, as they are in service department. As a matter of fact, the repair department of the garage may be well referred to as a private service department. The time ticket, Fig. 10, is filled out by every man who works on a car, the order numbering identical with the job number appearing in Fig. 2. The work being finished, the ticket is turned over to the foreman, who O. K.'s it. Of course, time-clock cards are also used for all people employed in the garage. As to the material used for repairs, a requisition of the same size as the time ticket, namely, 7 by 4 inches, is used. This requisition, Fig. 9, like Fig. 8, is printed black on thin white paper. It is used for all material kept in the stock room, including lubricants, and the cost of everything taken out is recorded on the requisition. Before anything is delivered to a shop man or driver, the requisition must be signed by the foreman on duty. After the respective materials have been delivered, all requisitions are filed away in the stock room, to be delivered to the superintendent's office in the evening, after which the account of every car is charged with the supplies or repair parts used on it.

When a repair job is completed, all the time slips and material requisitions are put together and a digest of them is made, the record being laid down on the cost card, Fig. 8. Every time a repair is done, this happens, and the various repair cost cards thus obtained are secured by means of clips to the monthly operating-cost record, Figs. 5 and 7.

The cost card blanks, which are used for the recording of gasoline and current, respectively, tire, repair and incidental expenses, are shown in Figs. 5 and 7. Fig. 5 is a monthly operating-and-maintenance cost sheet, 16 by 10.5 inches, affording a line for every day in the month, upon which the following information is entered: The number of the driver operating the truck on each day, the number of the battery—in case of an electric—as well as the current used; in this space the amount of gasoline is recorded in case of a gas truck. These points give the operating cost, or daily charges, against which the odometer reading is posted every day. Under maintenance charges are recorded the expenses incurred in the upkeep of the individual car, such as tire and battery repairs and replacements, giving the number of the repair job, or of the tire and battery installed.

Itemized and Totaled Costs

The average share of garage repairs and other general labor charges borne by every truck in the garage appear under the heading Other Charges; while standard information relating to the car is recorded at the head of the sheet. Space for a short description of repair work done on the car is provided in the left portion of the sheet.

General information abstracted from these detailed accounts is recorded on the reverse side of the form, the items being arranged from top to bottom as they are from the left to the right on the face side. The difference between the figures on the two sides is, of course, that the reverse side gives the totals

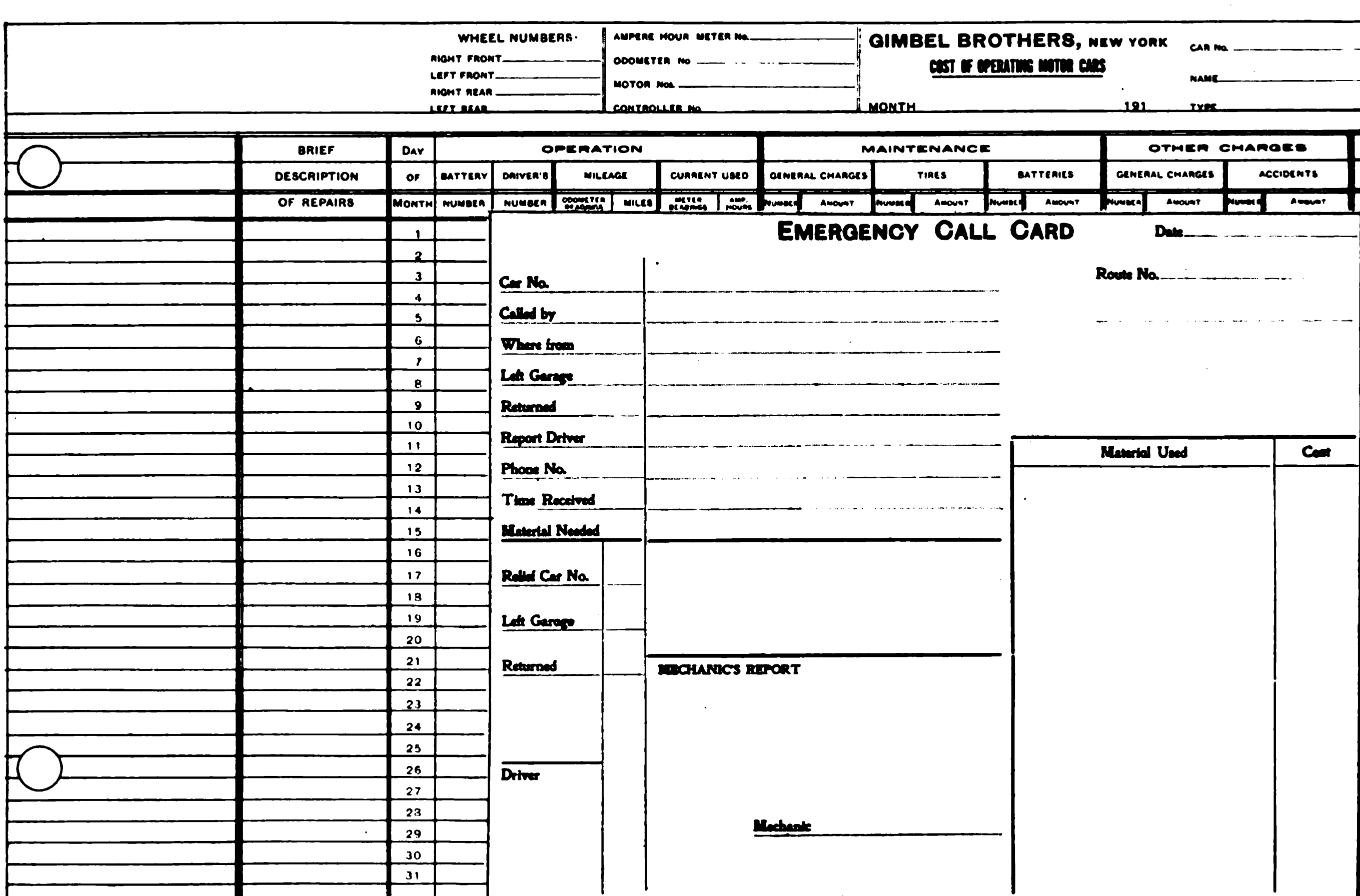


Fig. 5—Monthly record sheet for keeping track of expenses of individual trucks day by day. Fig. 6—Emergency card used at the garage for recording the cases of drivers meeting with trouble or accident while on the road

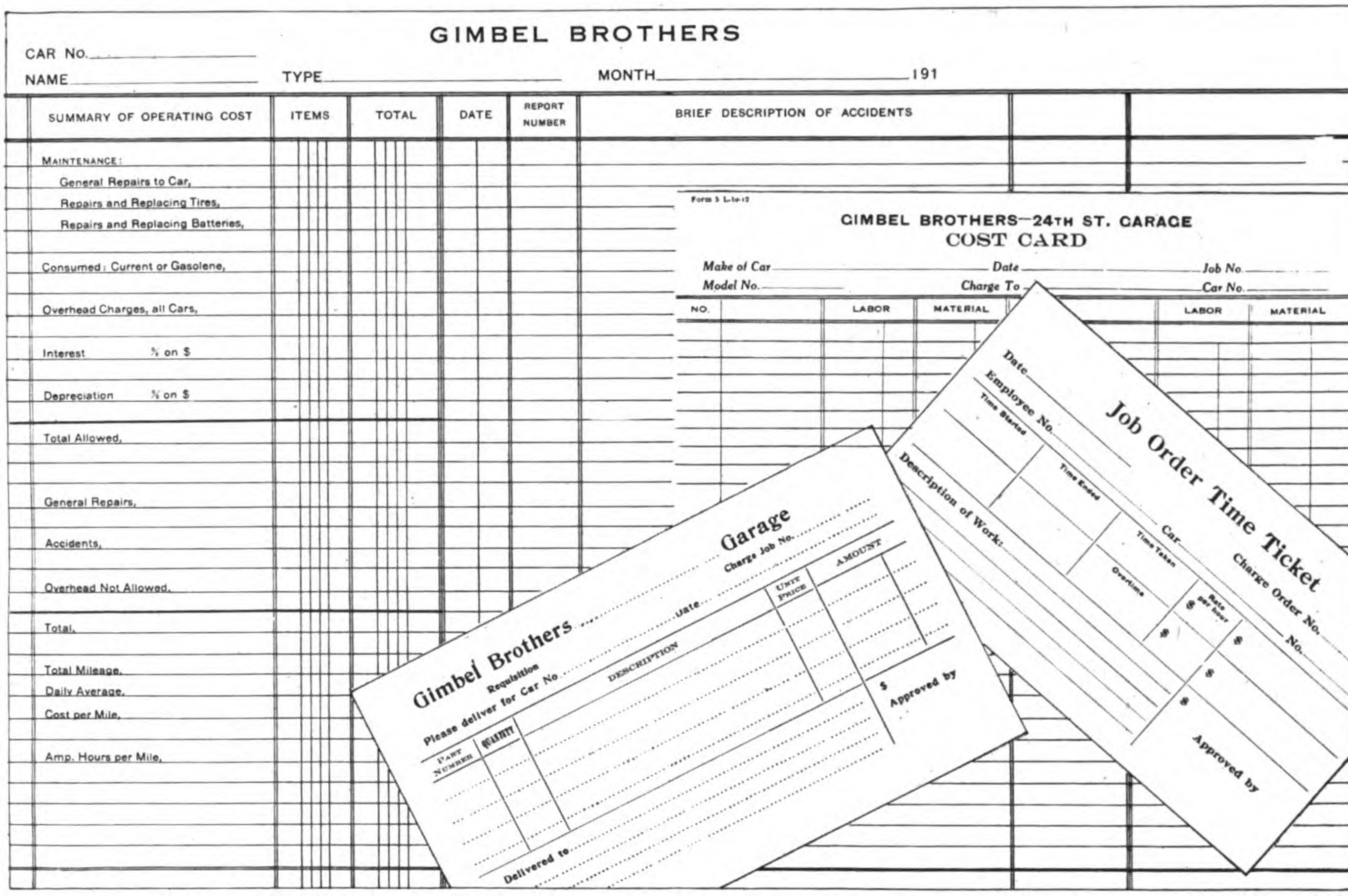


Fig. 7—Reverse of Fig. 5, being a monthly summary of truck cost. Fig. 8—Cost card for recording the labor and material expended on truck repairs. Fig. 9—Requisition. Fig. 10—Job time ticket for shop work

for the months, referring to the several items, which are obtained by footing the respective columns on the face side. Fig. 7 shows that the total of maintenance charges also includes the interest on money invested in the truck, the depreciation of its value specified in the guarantee and the salary of the garage superintendent appearing under Overhead Charges, All Cars.

Allowance Made for Each Truck

The total of the first group of items makes up the expenditures allowed by the company normally for every truck. To this garage repairs and overhead expenses, including the wages of the various employees, are added, making up, with the cost of accidents and insurance, as well as light, heat and power, the total expense charged to the car. The total mileage traveled by the truck during the month, the daily average mileage, also the total operating cost per mile and the ampere-hours per mile are recorded on this sheet.

The grouping of expenses in Fig. 6 under two classifications, maintenance and operation, corresponds to the financial scheme introduced by the Gimbel company for its delivery department. Gimbel Brothers allow this department a fixed expenditure including the items named under maintenance, driving energy, average part in the salary of superintendent, lost interest in the investment and depreciation of the truck. The classification of these expenditures as allowed is due to the fact that they may be closely calculated beforehand. On the other hand, operating expenses which include garage repairs and expenses, light, heat, power, accidents and garage wages may not be calculated closely in advance; these figures, therefore, call for even greater attention of the auditor and efficiency managers than the items of the first group, and it is they that are subject to continued attempts toward a reduction.

Besides the extent to which the drivers, foremen, mechanics and shop men are involved in the handling of the cost-keeping blank, and which is incidental to their principal work, two persons are required to handle this system in the office, to segregate the time and cost records and to put them in a shape in which they may be easily referred to. The men in charge of the delivery system are positive that the latter, although it seems elaborate to outsiders who understand nothing of the handling of such a big organization, pays very well; or, rather, as the delivery trucks and the garage are necessary parts of the department store business, the best thing possible is to conduct these parts of the organization as economically as possible. That this is being accomplished in the case of Gimbel Brothers' system is beyond doubt. Of course, there is more than one detail of great importance in the successful handling of such a system. One of the principal points is that the stockroom clerk or man is absolutely exact and reliable and does not permit of any material leaving his department unless on a requisition. Likewise, waste time must be guarded against in every field of the work to make success complete.

Drivers Co-operate with Company

To court all-around alertness of their employees and increased activity in all departments, Gimbel Brothers encourage their workers in every respect. They induce them to do their best, by making it clear to them that by doing so they help both the firm and themselves. One of the aims evidenced in the company's inside policies is to keep its employees content, remembering that the personal welfare is a considerable factor in the work done by any individual. At the same time no attempt is spared to educate every man or woman working for the company so as to impregnate him or her with a certain becoming dignity which is bound to make a good impression on the patrons of the store. This is proof of the fact that men in whose hands the enforcement of high operating efficiency lies, view the matter in an entirely practical light and consider system merely as a means to an end, and not as an end in itself, as is the case with less broadminded managers.

Cure for Slipping Cone Clutch; Kerosene Not a Good Non-Freezing Solution; Five Cylinders Defended—National Company Makes Own Rear Axle—Some Remarks on Carbon Trouble—Volumetric Efficiency Explained

Leather Clutch Slips on Hill

EDITOR THE AUTOMOBILE:—My car, which used to be very good on hills, now fails me in this respect. There is a hill which I used to pride myself that I could take at 20 miles an hour on high. Now if I attempt to climb it on high the motor speeds up while the car slows down and I am forced to change gears. A friend of mine has told me that this is due to my clutch, but I doubt this as it has never given me trouble and I have had the car three years. In order that you may explain the difficulty to me, however, should it be the clutch, I will state that it is a leather-faced cone with flat springs placed beneath the leather to give a gradual engagement when throwing on the power.

Pittsburgh, Pa. N. T. FUCHS.

—A leather-faced cone clutch will slip when it becomes covered with oil or glazed. The trouble is due to one of these two causes. Should it be due to the oil the remedy is to have some one pull down the clutch pedal, or you may block it down with a piece of wood, while you pour a pint or so of gasoline over the surface of the leather. This will cut away the oil and leave you clutch. An alternative of gasoline is fuller's earth, which is sprinkled over the surface of the leather, absorbing the oil. The gasoline leaves the surface of the leather cleaner than does the fuller's earth, and hence it is better. Should the clutch be dry and glazed, the surface may be again softened by the application of a thick coating of castor or neats foot oil. Another frequent cause of the slipping of a leather cone clutch is the fact that the leather is worn down and exposes the head of one of the copper rivets. This gives a metal-to-metal contact of the clutch seating and hence causes a slip. The remedy for this is to either rivet below the surface of the leather or to replace the leather itself should it be worn too far.

Kerosene a Bad Cooling Agent

Editor THE AUTOMOBILE:—We would like to know if there is any reason why kerosene oil cannot be used with better results than other agents for cooling a gasoline motor in an automobile. Do you know of any objections to its use for this purpose?

Pierson, Iowa. G. P. MCGRAW.

—The use of kerosene in the radiator as a combination non-freezing and cooling agent is an annual suggestion. It is the opinion of many who have studied the matter that while it might be a success in the very far north, it is a failure in our latitudes. In the state of Iowa there are occasional warm days even in the winter. During these periods a motor would tend to overheat readily because the kerosene would evaporate quickly and because the specific heat of the kerosene would not permit it to carry away the necessary heat of the combustion chamber per cubic foot of fluid circulated. Kerosene also rots the hose connection. It cannot be mixed with water and possesses an unpleasant odor at high temperature. For these reasons it is unsatisfactory.

Still Prefers Five Cylinders

Editor THE AUTOMOBILE:—In your issue of Nov. 28 Mr. G. C. Richards calls attention to two objections to the use of five-cylinder motors, the first being that the five could not possibly produce as steady a torque as the six, and the second that the manufacturing cost of a five-cylinder crankshaft would be greater than that of a six. Granting that both these objections are well founded, it is still the writer's opinion that they are of secondary importance and that no good and sufficient reason has yet been put forth why five cylinders would not constitute a successful motor, which would be far superior to the four, even if it did not equal the six in the continuous torque which could be obtained.

Mr. Richards himself says that he found a five-cylinder "much superior to a four." He points out that a five would not operate without a flywheel. Granted. But do not all gas engines use comparatively heavy flywheels, irrespective of the number of cylinders?

I fail to see why the five would not give practically if not theoretically a continuous torque, since the explosions would overlap each other to the extent of 72 degrees on each revolution of the crankshaft, while in the four they do not overlap at all.

As to the greater expense of a crankshaft with five offsets instead of three, I submit that dispensing with the sixth cylinder, with all its accessories, would more than make good the cost of the five shaft over that of the six shaft.

To sum up the advantages of the five-cylinder motor as compared with the six:

1. The five would be less complicated.
2. It would weigh less.
3. It would require a shorter hood.
4. It would consume less gas and oil.
5. It would cost less to manufacture.
6. It would operate with less vibration and a steadier pull or torque than any four-cylinder motor that can be built, and I am confident that it would lose little if any advantage in these features when compared with a six.

Has THE AUTOMOBILE any information regarding acetic acid as a carbon remover or spark plug cleaner?

East Canaan, Conn. D. C. CANFIELD.

—Acetic acid is a solvent of organic substances and will aid in breaking up carbon deposits as will acetone, another product of dry distilled wood. A few drops of gasoline, however, will thoroughly clean a spark plug.

Distribution Affects Traction

Editor THE AUTOMOBILE:—I have noted your comment on the subject of traction. I think you do not fully grasp the facts. The friction coefficient's importance practically disappears when the load is all on the driving wheels. Friction is needed when there is a load to push. But a load can be carried with practically no friction. Put on roller skates and try to push a load in front of you. You cannot do it unless you get friction by placing the skates more or less crosswise. But throw that load on your shoulders and you skate away with it just as freely as if you did not carry it. The folly of present automobile construction is that the motor and heavy mechanism is generally at the front where it is hard to propel and where it causes slipping of the rear tires with consequent skidding and faulty steering.

Surely you can see that a four-wheel drive does not have much bother with skidding or lack of traction. Then why should a two-wheel drive if its drive wheels carry all the weight? And it can carry so nearly all of it as to remove most of the troubles.

The cars of the future (whether far or near I do not know) will carry its main load on the drivers. I doubt if it will be a four-wheel drive because this adds needless complication. But it may and likely will be a three-wheeler because this drives two-thirds of the wheels which may carry most of the weight and need very little friction to push the lightly loaded front wheel. Why people will continue to skid into trees and telegraph poles and kill themselves I do not know. Certain it is that they can buy cars practically free from skidding.

Saginaw, Mich. CHAS. E. DURYEA.

National Makes Own Rear Axle

Editor THE AUTOMOBILE—Will you please tell me who makes the rear axle housing brake drums and hubs for the National Motor Vehicle Manufacturing Company, of Indianapolis, Ind.? I would also like to know if the same people make the differential. I am not quite sure what year car I am trying to get the information for, but it is likely that this same make of housing has been used for the past 4 or 5 years on all cars made by this company in that same length of time.

Marlboro, Mass. H. E. M.

—According to the Poertner Motor Car Company, of New York City, which handles the National car in the East, the National company has always made their own rear axle while the gears are made according to National design by the Brown-Lipe Company.

Care of Fixed-Spark Magneto

Editor THE AUTOMOBILE:—Kindly advise me the best way to find defects in operation of a Bosch high-tension fixed-spark magneto. How to get to the bushing and points. If possible, show me some pictures of them. The care and how to adjust them.

Shreveport, La. OLD READER.

—Contrary to general rule, the best care the average owner can give a magneto outside of a drop of oil occasionally, is to let it alone. Fig. 3 shows the exterior of the Bosch fixed-spark magneto. The breaker box cover A can be removed by taking out the screws which hold it in place. This exposes to view the breaker mechanism, which is shown from detail in Fig. 1. The two platinum points may be dressed off with a very fine flat file should they be pitted. The points are then readjusted by turning up a long screw holding the lower platinum point. This adjustment should not be made unless absolutely necessary. The only other attention you can give your magneto is to put a drop of very fine watch oil into the two oil holes shown in Fig. 1 every month. In the illustrations used here, Figs. 1 and 3 of the variable sparks magneto should illustrate the point, since the construction is practically the same.

Carbon the Root of Trouble

Editor THE AUTOMOBILE:—Can you suggest a remedy for my car? I have a 1907 type XV Pope-Toledo and believe it has run over 20,000 miles. Cylinders and rings are in splendid shape. In fact, the whole machine shows excellent material throughout, but it doesn't seem to develop power as it should and will knock and pound and fire back when the spark is thrown off. A month after being overhauled, and after having the carbon cleaned off, it will have absolutely no compression. On those occasions it is very difficult to start the motor, especially after being hot. I have tried different kinds of oil and don't seem to be able to get away from carbon formation, which I think is the root of my troubles. I keep my valves in pretty good shape, although the exhaust valves pit easily. My compression is pretty high, although I believe there are several cars at the present day with just as much. Perhaps you are familiar with the construction of the Pope cars at that time and can help me out.

Do you think it would be advisable to reduce its compression?

Rocky River, O. A. MORTON.

—The fact that you are continually bothered with carbon trouble and that the compression in your motor is high shows the backfiring, etc., is due to nothing more than an accumulation of carbon. The carbon will become deposited in a conical heap upon the head of the piston or other points in the combustion space, and the result is that the apexes of these small cones become incandescent under the influence of the heat to which they are exposed. The gases in the cylinder, being under a high compression, are very easily ignited, hence the backfiring through the intake manifold is due to the fact that the mixture is sometimes ignited as it is rendering the cylinders, causing the fire to penetrate into the intake manifold.

The proper cure is not the frequent removal of the carbon, but the removal of the cause of carbon deposit. The principal causes of this are: 1—too much oil; 2—poor ignition; 3—bad-fitting piston rings; 4—failure to drain out old oil in crankcase. These may be taken up individually and the proper steps for removing these causes pointed out.

1. This is due, in splash-lubricated cars, to the fact that there is too much oil in the crankcase and hence the connecting-rods dip too deeply and throw too much oil up into the cylinders. The cures are: 1—the shortening of the scoops on the connecting-rods; 2—filing the sides of the troughs which contain the oil so that they will overflow earlier; 3—the installation of a baffle plate in the lower part of the cylinder, which will prevent the oil from working its way up into the combustion chamber. This baffle plate takes the form of a common angle piece bent in a circle around the lower end of the cylinder. The vertical flange is fastened to the cylinder wall below the bottom of the piston stroke by means of small screws, while the horizontal flange forms the baffle. It is necessary, of course, to cut two slots in the baffle plate to permit the connecting-rod to work without striking same. In all these cures it is necessary to be extremely cautious so as not to cut down too far the supply of oil to any cylinder, as the results of this would be far more serious than an over-supply of oil. In other words, the changes made in the length of the scoops or the depths of the troughs should be

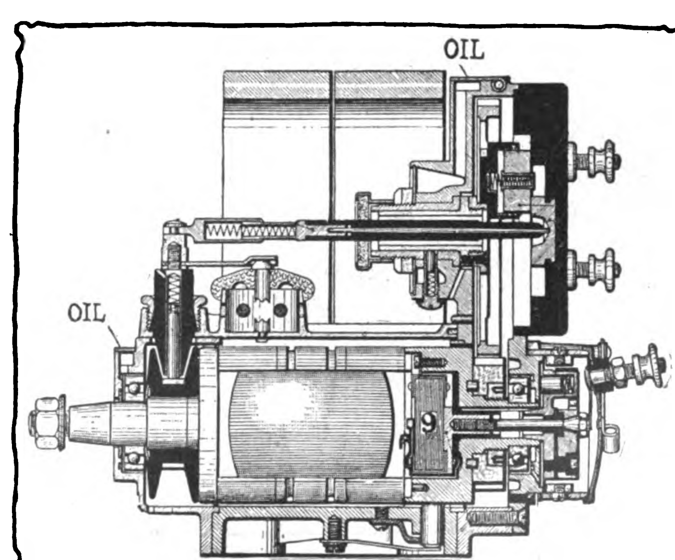


Fig. 1.—Section through Bosch magneto with two oiling points indicated

very minute at first and enlarged only after experiment. The baffle plate should be small at first, and made larger only if it is seen that the supply of oil which reaches the cylinder could be still further curtailed.

2. Poor ignition may cause carbon trouble indirectly. Whenever a misfire occurs a certain amount of oil which would otherwise be consumed by the heat of combustion is permitted to remain in the combustion space. Should the misfire endure for five or six explosion strokes of this particular cylinder and then be followed by an explosion on the succeeding stroke, the large quantity of oil which would be deposited in the combustion space during the strokes upon which the misfire occurred would be partially consumed, leaving a heavy black residue of carbon which would be deposited on the cylinder walls, the piston head and other spots, where it would be likely to cause the premature ignition as explained above.

3. Ill-fitting piston rings cause carbon deposits because they allow the oil to get by the piston and up into the compression space. The accumulation of too much oil in the combustion space causes trouble in the matter pointed out under 2. The cure for this is to replace the worn rings in the same manner that the cure for 2 would be in going over the ignition, locating the seat of trouble and removing it.

4. In the circulating splash system the common mistake made by many automobilists is the failure to drain out the old oil in the crankcase. This is no doubt due to the fact that it is rather unpleasant work, necessitating crawling under the car and removing drain plugs or opening up drain pipes that are rendered inaccessible because of the presence of the mudpan. Removing the mudpan itself and replacing it is no little work in itself. Oil which is circulated through the lubricating system of internal combustion motor becomes charred and waxy, rendering it after a time unfit for cylinder lubrication. For this reason it should be made a rule that the old oil be drained out thoroughly and the crankcase flushed with kerosene oil every 1,000 miles before the new supply of oil is put into the crankcase.

Meaning of Volumetric Efficiency

Editor The Automobile:—What is the meaning of volumetric efficiency, and has it any relation to mechanical efficiency in an internal combustion engine?

Bronxdale, N. Y. Gustave Mittenzwei.

—In a gasoline motor the piston never draws in as much gas as is represented by the volume of its displacement. The amount of air or gas actually drawn in in one stroke divided by the actual displacement of the piston is equal to the volumetric efficiency. The volumetric efficiency decreases as the motor speeds up, and also varies directly with the size of the inlet valve. It is affected also by the valve timing and the temperature of the cylinder walls. The Society of Automobile Engineers in the transactions for January, 1911, reports a paper presented by Professor R. C. Carpenter showing that a Franklin 4 by 4-inch air-cooled motor fitted with 1.375-inch diameter poppet valves, opening 5 degrees past upper dead center and closing 30 degrees past lower dead center, had, when driven by an electric motor at 1,000 revolutions per minute, a volumetric efficiency of 82 per cent. At 1,500 revolutions per minute the volumetric efficiency dropped to 68 per cent. When run under its own power with the same valve timing the volumetric efficiency at 1,000 revolutions was 68 per cent. with applied phosphor bronze cooling fins, and 62 per cent. with cast-iron integral ribs. At 1,500 revolutions per minute the percentages were 63 and 56 for the phosphor bronze and cast-iron ribs, respectively. This shows the effect of the cylinder-wall temperature on the volumetric efficiency, as the engine was old when run by the electric motor, and was cooled to different degrees by the phosphor bronze and cast-iron ribs.

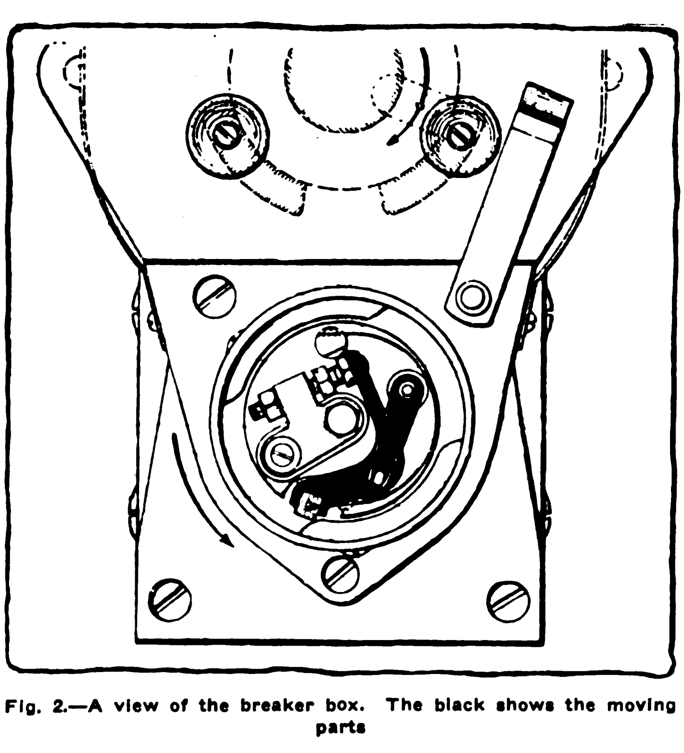


Fig. 2.—A view of the breaker box. The black shows the moving parts

Correct Temperature of Vulcanizing

Editor The Automobile:—Would you please tell me to what temperature rubber should be raised when vulcanized? Is there a wide range of temperature or should it be held within 1 or 2 degrees of a given heat?

Holyoke, Mass. B. Z. Cruger.

—The correct vulcanizing temperature ranges between the limits of 250 and 300 degrees Fahrenheit. There are thermometers on the market which are just graduated through the range used in vulcanizing and which are of good use in this connection. Many of the patented vulcanizers are so designed that the temperature cannot rise above what is proper for vulcanizing. This is necessary because where the temperature gets above 320 the rubber structure is broken down by what may be called a form of destructive distillation, while below the vulcanizing range the action is not thorough enough to give good results.

Underinflation Causes Tire Cracks

Editor The Automobile:—I have recently bought a second-hand car upon which the tires were stated to be in good condition. Upon close inspection of the casings I find that the walls are filled with a series of cracks. Would you please tell me if this is due to any fault in the tires or because the former owner of the car did not give them proper care?

Houston, Tex. P. P. Moore.

—The cause of cracks in tire casings is underinflation. If you will keep tires pumped to a pressure equal in pounds to 20 times the cross-section dimension in inches you will have no trouble. Assuming that your tires are 4 inches in diameter the correct pressure would be 80 pounds, or, for a 4.5-inch tire, 90 pounds, and so on through the gamut.

The Best Non-Freezing Solution

Editor The Automobile:—Would you please tell me the solutions that are commonly used in preventing the water from freezing in the radiator.

Detroit, Mich. Carl Schneider.

—In the issue of October 24, the question of non-freezing solutions was fully taken up and the merits of all the solutions was explained. A digest of the remarks in that issue follows:

—There are three well-known anti-freezing compounds which have been used extensively and which have proved themselves to be valuable for this work. They are alcohol, glycerine and calcium chloride. Besides these there are many others that are good, but they nearly all have some drawbacks that prevent them from being as useful as would otherwise be the case.

About the most popular of all the solutions to use in the motor is the alcohol. Wood alcohol or denatured may be used. The cost is small; denatured alcohol may be purchased for 60 cents per gallon and the price of wood alcohol is about the same. The advantages of alcohol are that it is very easily handled and that there is no action on the metallic parts of the circulating system.

Taking wood alcohol alone the following solutions may be used:

Freezing Point	Wood Alcohol	Water
+ 5 degrees Fahrenheit	20 per cent.	80 per cent.
0 " "	25 " "	75 " "
— 5 " "	27 " "	73 " "
—10 " "	31 " "	69 " "
—15 " "	35 " "	65 " "
—20 " "	38 " "	62 " "

When using denatured alcohol the freezing point will be different. In tabular form for temperatures between 5 above and 20 below zero Fahrenheit, the denatured alcohol solutions will be as follows:

Freezing Point	Denatured Alcohol	Water
+ 5 degrees Fahrenheit	24 per cent.	76 per cent.
0 " "	29 " "	71 " "
— 5 " "	32 " "	68 " "
—10 " "	34 " "	66 " "
—15 " "	37 " "	63 " "
—20 " "	40 " "	60 " "

Glycerine possesses many characteristics which would seem to stamp it as the ideal non-freezing agent. The boiling point is high and, as many experiments have proved, does not change the boiling point of the mixture regardless of the percentage added to the cooling water. Glycerine reduces the freezing temperature materially when added to the water, but does not do so as rapidly as wood or denatured alcohol.

When reducing the freezing temperature to such an extent that the water will not freeze in a cold climate it is necessary to add so much that the water tends to become gelatinous and for this reason it has been mixed very often with wood or denatured alcohol in a very successful attempt to combine the merits of the two. When glycerine alone is used the mixtures that are required for different temperatures will be found in the following table:

Freezing Point	Glycerine	Water
+28 degrees Fahrenheit	10 per cent.	90 per cent.
+15 " "	30 " "	70 " "
+ 5 " "	40 " "	60 " "
0 " "	48 " "	52 " "
— 5 " "	54 " "	46 " "
—10 " "	58 " "	42 " "

When the glycerine and alcohol are used together they are used in equal quantities. This mixture, which is purely mechanical, has not as great a tendency to rot the hose connections as a pure glycerine solution would have. It has more water in it than would the latter and is thus more free to pass through the radiator and other parts of the circulating system without doing harm. On the other hand, there will be less alcohol in this solution than there was in the pure alcohol solution and the result of this is that there will not be so much evaporation and necessary replacement of the cooling fluid after the motor has been run for a time. The glycerine and the alcohol are stirred up together and added to the water in the following proportions:

Freezing Point	Mixture	Water
+20 degrees Fahrenheit	15 per cent.	85 per cent.
+15 " "	20 " "	80 " "
+10 " "	24 " "	76 " "
+ 5 " "	27 " "	73 " "
0 " "	29 " "	71 " "
— 5 " "	30 " "	70 " "
—15 " "	32 " "	68 " "

We now come to calcium chloride, $CaCl_2$, and water. This compound has been recommended by many and is very good, although it has its dangers in the difficulty of securing the chemically pure article. In buying the calcium chloride for use in the cooling system of an automobile the crude article costing about 10 cents a pound should not be purchased. The chemically pure article costs about 25 cents a pound and is very satisfactory. The objections to the use of the material is its tendency to set up an acidic action in the radiator. Chloride of lime, which should be kept out of the radiator, is often a constituent of the commercial calcium chloride and care must be used in getting the chemical from a reliable concern which will guarantee the purity of its products. With the calcium chloride solution the percentages are given by weight instead of volumes as are the other tables:

Freezing Point	Calcium Chloride by Weight	Water by Weight
+10 degrees Fahrenheit	15 per cent.	85 per cent.
+ 5 " "	17 " "	83 " "
0 " "	19 " "	81 " "
— 5 " "	21 " "	79 " "
—10 " "	22 " "	78 " "
—15 " "	23 " "	77 " "
—20 " "	25 " "	75 " "

The above is reproduced from THE AUTOMOBILE of November 21 in order that it may reach many automobilists who at this time of the year are very apt to be careless. The weather is down below the freezing point in nearly all the Eastern States at this time of the year and to leave the radiator without some non-freezing solution is to court disaster. All the mixtures mentioned in this list are practical and have been given the stamp of approval by a large number of motorists.

Caught With Short Fuel Supply

Editor THE AUTOMOBILE:—I wish to relate my experience of last summer, when an excessive grade found me short of gasoline and remote from supply. A party of us were making the Sonora Pass, leading over the summit of the Sierras at an elevation above 9,000 feet. We came to a short, steep grade which shut off the gas. It was near lunch time and 40 miles from a garage. We lunched and talked over the predicament. I finally suggested that we detach the feed pipe from the tank and place it in a perpendicular position from the carbureter. This was tried, and, much to our satisfaction, it would hold enough juice to place us safely over the grade. This may help some other man in a like predicament.

Gardnersville, Nev. W. M. MAULE.

—It is good to turn around and back up in a case of this kind. Another expedient which is sometimes resorted to under these circumstances when the road is too narrow to permit of turning around to back up the incline consists of closing the gasoline pipe at the bottom of the carbureter and then filling the float chamber of the carbureter. One filling will generally enable the car to reach the summit of the hill.

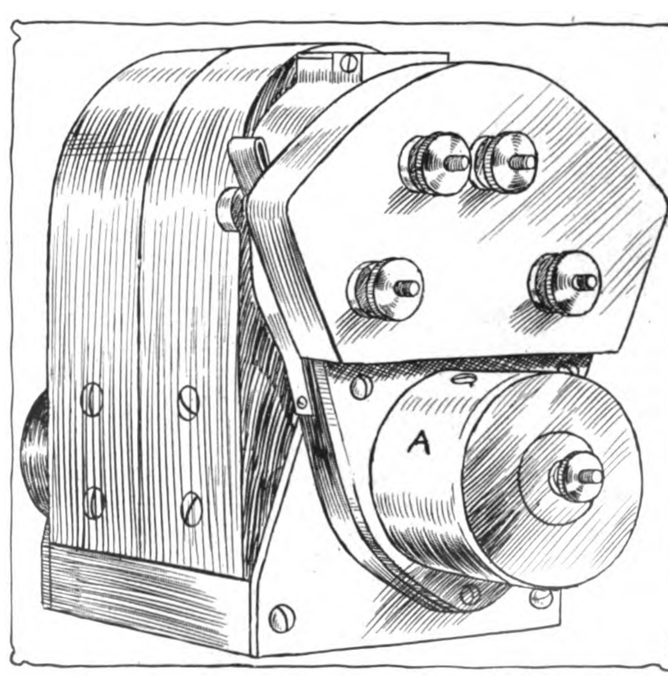


Fig. 3.—Exterior of the fixed spark magneto showing cap A to be removed

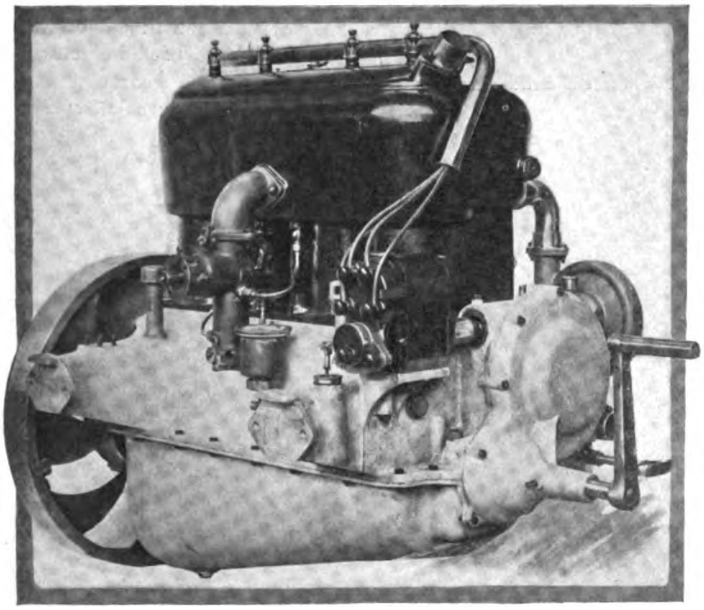


Fig. 1—Carbureter side of the new model 55 four-cylinder motor

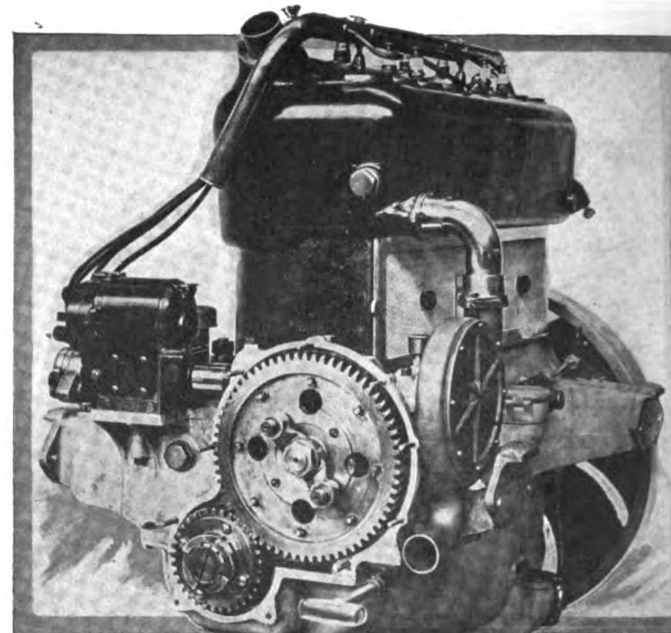


Fig. 2—Timing gears and magneto mounting of the new Fiat motor

Four-Cylinder Model Added to Fiat Line

Three Models Now Turned Out at the Poughkeepsie, N. Y., and Turin, Italy, Factories Are Identical

Italian Engineering Staff at American Factory Insures Uniformity—Stampings Imported from Parent Factory

FOR next season the Fiat company from its American factory at Poughkeepsie, N. Y., and its foreign factory, Turin, Italy, will market three chassis types, two fours and a six, namely: Model 54, four-cylinder, 110 by 150 millimeters or 4 2-5 by 6 inches bore and stroke; Model 55, four-cylinder, 130 by 170 millimeters or 5 1-8 by 6 3-4 inches; and Model 56, six-cylinder, the same bore and stroke as Model 54. These three models represent different years of Fiat development, in that the small four Model 54 was brought out 2 years ago, Model 56, the six, last year, and the new model 55 for next season. All three chassis are alike in general details, showing that the principles of construction in the Fiat factory were well outlined and settled several years ago.

The American factory turned out its first car in October, 1910, and since that time has been producing Fiat models of the same design as those made in Italy. The parent company furnishes the engineering staff, working drawings, and some of the materials and parts. The processes of construction are identical in Poughkeepsie with those in Turin, an Italian engineer living at the American factory to be certain that every detail of the foreign factory is incorporated in the American product. Several of the parts of the American car are imported from Italy, an example being the steel stampings constituting the housing for the rear axle and torque tube, which come direct from the patent factory. The materials entering into the other parts of the cars are of the same analysis as those prescribed by the Fiat engineers in Italy.

The Fiat motor, a block casting, in the four and six-cylinder models is shown in Figs. 1 and 2, these being reproductions of the new Model 55. The design is simplicity throughout, having as cardinal merits the block casting, inclosed valves, and the transverse forward shaft driving the pump and magneto. The carbureter is located on the non-valve side and connects with the casting through a brief elbow, the remainder of the intake manifold being within the water-jacketed casting, thereby guarding against mixture condensation.

The aluminum two-piece crankcase is a product of the factory foundry at Poughkeepsie, as are the gearbox and other aluminum castings.

Fig. 5, end and side sections of the motor, shows the compactness, due to the use of a block casting. This casting for the six-cylinder car has an overall length of 37 inches, is 13.75 inches high, and 11 inches wide. In the Model 55, the large four illustrated, the casting has an overall length of 28.5 inches. Bo : elevations show how the engineers have aimed at avoiding parallelism in the interior water-jacket walls, and also show the efforts at W to adequately water-jacket that part of the casting adjacent to the valve stems. At W1 is shown the intake manifold crossing between the second and third cylinders and also showing its water-jacketing.

Silencing the Valve Action

Every care has been used to obtain quietness in valve actuation, and also the maintenance of this. In Fig. 4 is shown the valve system. Each valve is a three-part one made up of an 18-20-point carbon steel stem, a 30-35 per cent. nickel steel head, and the beveled portion a cast iron ring. This has been done to give the necessary strength in the valve head, and also that freedom from pitting on the beveled seat which is obtained by cast iron. The seats are beveled to 30 degrees instead of 45, this being done to give a quicker and wider opening. Valve tappets are hardened and ground and small allowances used between the tappet T and its guide G, the permissible allowance being .004 millimeters minimium and .006 millimeters maximum over or under size. The camshaft has cams mounted by keying and pinning on the shaft, the cams being in pairs, intake and exhaust for each cylinder. By using detachable cams it is possible to use non-split bushings for the shaft.

On Model 55 a compression release is used, this taking the form of raised cams integral with the regular cams. To use these it is necessary to slide the camshaft endwise, and to make this possible without moving the timing gear, the shaft carries a two-arm yoke driver Y on its forward end, and this driver connects with the timing gear through a pair of hardened and ground pins S which the gear carries. These pins are of greater length than the driver thickness so that when the camshaft is moved forward, the yoke slides on them. The driver has hardened and ground bushings. The movement of the shaft is effected by a collar C into which works a conventional yoke operated through a pull lever extending to beneath the radiator.

In mounting the transverse shaft driving the magneto and pump spiral gears have been used. The shaft, Fig. 3, is carried on two races of ball bearings with a thrust. It has its driver G formed integrally, and meshes with a bronze gear. The teeth are cut at 45 degree angle. The shaft couples with the magneto and pump by flexible coupling K. The drive is entirely inclosed, and is well lubricated. This illustration shows a compact coupling in connection with the magneto drive, which is carried from front to rear through the motor crankcase. From the breaker box a vertical link L enters the crankcase arm and transmits through a cross-lever L1 to the horizontal shaft S extending to the rear of the crankcase, where there is a short coupling to the control parts on the steering column.

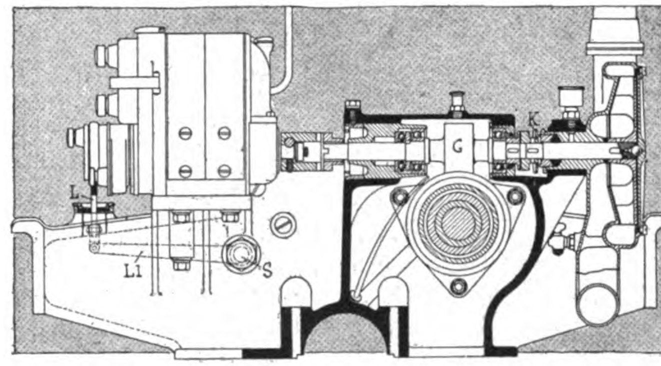


Fig. 3—Ball bearing magneto and pump drive used in Fiat cars

Chrome Nickel in Crankshaft

Every care is used in the manufacture of the moving parts. The crankshaft in all models is of chrome nickel alloy carried on three bearings in the four-cylinder models and four in the six. It is hollow to facilitate force-feed lubrication, not only to the lower connecting-rod bearings, but also to the wrist pins. The crankcase is heavily webbed internally and to insure adequate rigidity reinforcing plates are used to support the bearing caps, these plates being carbon steel forgings held by four alloy steel studs.

Lubrication is force-feed and non-splash. A small gear oil pump mounted on the rear end of the camshaft raises the oil from the reservoir and delivers it to a horizontal copper pipe inserted during the casting process in the crankcase, of which it extends from end to end. Branches lead from this duct to the three main bearings. From these bearings the oil flows through a drilled crankshaft to the crankpins and thence through copper pipes attached to the connecting-rods to the wrist pins. To prevent an excess of oil being misted into the cylinder from the throw of the crankpin, integral baffle plates are formed in the top of the crankcase. The crankcase has a capacity of 4 to 5 gallons.

An interesting detail is the mounting of the oil pump on the rear end of the camshaft. Its position is shown in Fig. 6, as

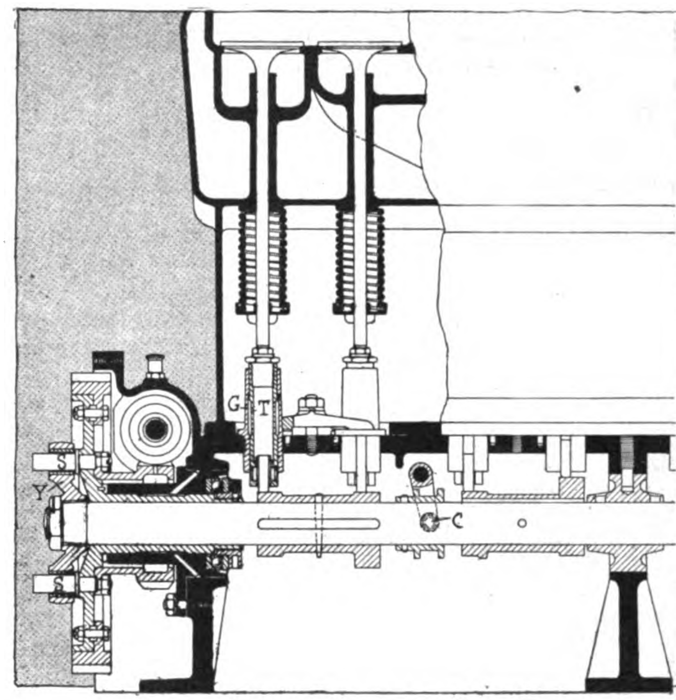


Fig. 4—Camshaft and valve lifter mechanism in partial section

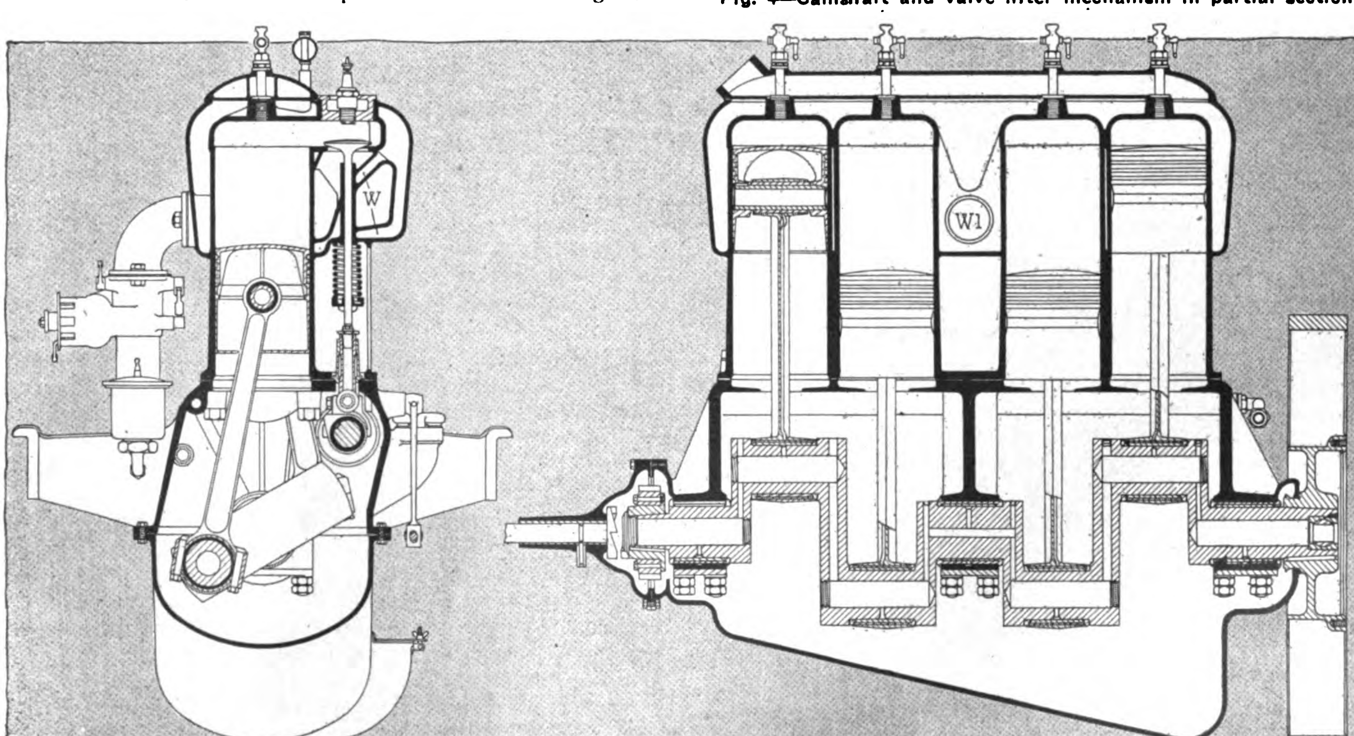


Fig. 5—Transverse and longitudinal cross-sectional views through the four-cylinder Fiat motor, illustrating oiling system

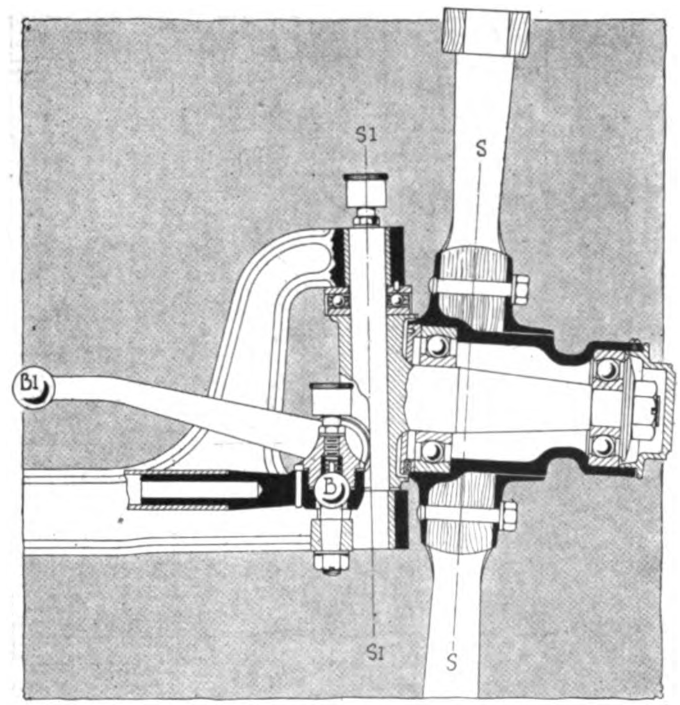


Fig. 6—Ball bearing steering knuckle and spindle. Note wheel slope which is measured by the converging lines through the center of the steering knuckle and of the road wheel designed to give minimum tire wear and easy steering

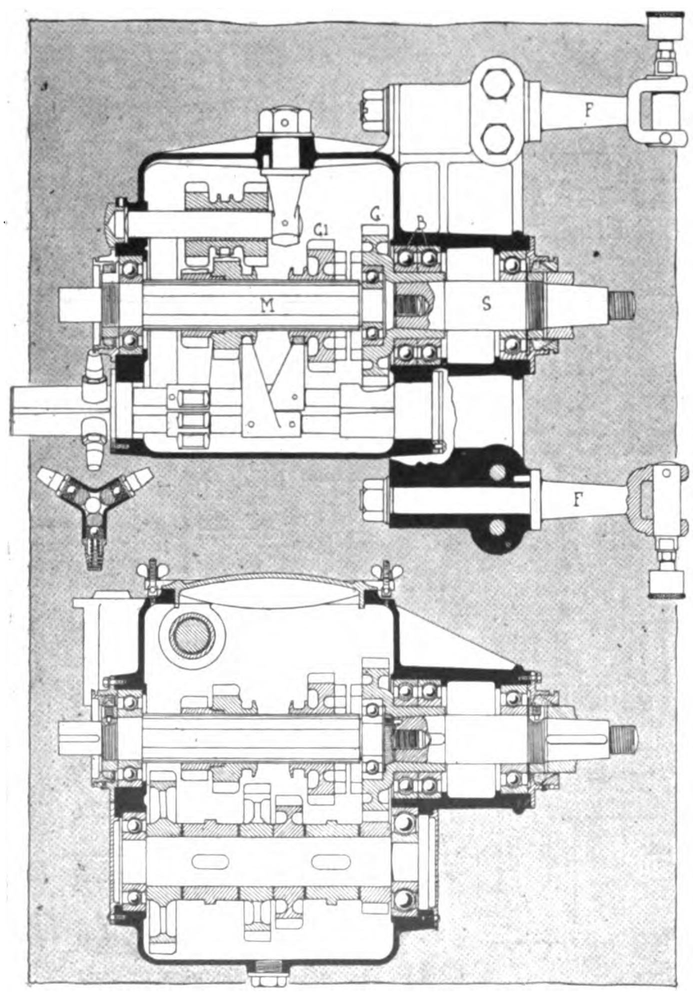


Fig. 7—Sectional plan and elevation of the Fiat gearset, showing the arrangement of the shifter dogs and the mounting of the shafts on single and double ball bearings. The mainshaft extends practically throughout the length of the case

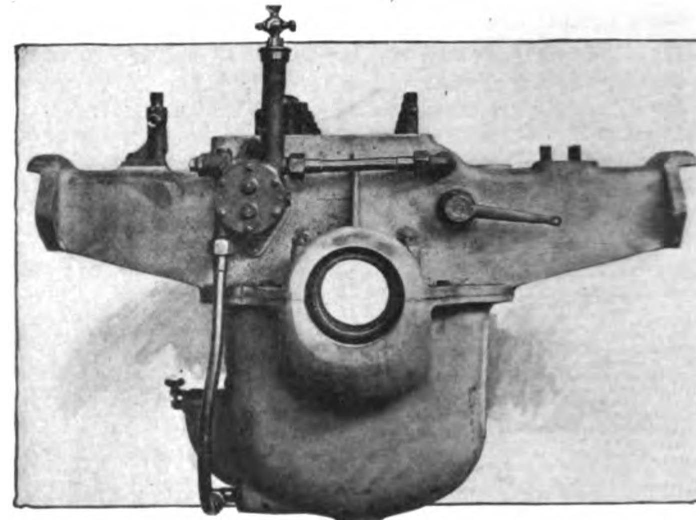


Fig. 8—End view of crankcase, showing the external oil leads

well as the vertical pipe through which it lifts the lubricant from the reservoir and the short horizontal pipe through which the oil flows to enter the copper tube extending from end to end of the crankcase. In Fig. 3 the master gear G of the oil pump is shown attaching direct to the end of the camshaft K, through a hole drilled in the end of the shaft. Into this hole the nut is threaded, this nut having a square center to receive the shaft of the gear. The oil pump housing bolts direct to the end of the crankcase. By this unique coupling the necessity of additional gears or shafting to drive the oil pump is eliminated.

For convenience the Fiat transmission system may be considered in three units, the multiple-disk clutch, the four-speed gearset and the combined rear axle and torque tube. The multiple-disk clutch, Fig. 10, consists of sixty-five steel disks in sets of thirty-two and thirty-three. The carrier C mounted on the forward end of the shaft connecting with the gearbox is insured of alignment in that the forward end of the shaft extends into the recess in the crankshaft and is supported through a spherical bushing B in turn mounted in another bushing B1 threaded into the end of the crankshaft. This gives a ball-and-socket support. The prevention of oil leaking from the clutch housing is dependent upon a packing P. The company furnishes two other types of packing for this position, both illustrated and designated P1 and P2.

Compact Four Speed Gear Used

The four-speed gearbox Fig. 7 is especially compact, measuring 10 inches from the center of the front bearing to that of the rear. The gearset is a reverse design over that in common use, in that the mainshaft M, which connects with the clutch, extends practically throughout the length of the case, and the stubshaft S protrudes through the rear and couples by universal joint with the propeller shaft. Shafts and gears are of alloy steel and supported on seven ball bearings, there being three braces supporting the stubshaft, a double race B immediately in rear of the integral gear G on this shaft, and a single race 3 inches further to the rear and mounted in a continuation or neck of the gearbox. The mainshaft has four integral splines and carries two sliding units.

The gearbox is a two-part aluminum casting, with the mainshaft mounted in the top portion, and the bearings for the countershaft located between this and the bottom part. The top is a large coverplate. The opposing faces of halves of the gearbox are milled to prevent oil leaks. The gearbox has a heavy horizontal web at the rear in which are carried the two forgings F forming the trunnion supports for the yoke of the torque.

Adequate packings for the prevention of lubricant leaking from the gearbox are mounted at both ends of the mainshaft, these packings being held by a threaded nut. The lubrication of the gearset is looked after in every detail to the extent that the reverse gearshaft has a spiral oil groove cut in it and the reverse gear is fitted with a bronze bushing. Supporting the rear end of the mainshaft in a ball bearing within the gear G facilitates lubrication at this point.

The rear system is not illustrated or described herewith, but is the subject of a special article in a succeeding issue. This axle is a special Fiat design in which the housing for the axle and propeller shaft is made from two stampings bolted together. One stamping forms the upper half and the other the bottom half.

Ball Thrust on Steering Knuckle

In the running gear the Fiat rigid frame construction is used throughout, it having the side members very heavily flanged in the region of the dash, and tapering gradually fore and aft. The front axle is noteworthy in that the design of the steering knuckle is to reduce tire wear. Fig. 6 shows the center line S of the wheel which toes in, and line S1 marks the center line of the spindle toeing slightly out so that these two lines intersect at the point where the tire rests upon the ground. This gives the minimum tire wear, and easy steering. Easy steering is further obtained by the use of ball-and-socket joints B at both ends of the tie-rod connecting the knuckles, as well as at B1 the end of the arm which connects to the steering mechanism. The car weight is carried on a ball thrust bearing beneath the upper jaw of the knuckle, and grease-cup lubrication is fitted wherever necessary.

Without allowing these lines to intersect at the ground, the front tires are subject not only to greater wear but every road shock is transmitted to the driver's hand through the steering mechanism. The reason for this is that every time the front wheel hits an obstruction it creates a turning moment about the steering knuckle due to the small lever arm, which is equal in amount to the distance between the point where the center line produced strikes the ground and where the vertical diameter of the wheel strikes the ground. This turning moment is transferred from the road to the driver's arms through the medium of the steering mechanism.

For the first time the Fiat company has scheduled a full equipment on all models this season. This includes mohair top, windshield with rain vision, Gray & Davis generator, and dynamo for electric lights, speedometer, clock, Klaxon horn, Q-D demountable rims, trunk rack, tire irons and other body essentials.

All three models have a standard line of bodies including seven-passenger touring types in curved panel or flush-sided styles, five-passenger phaeton, convertible roadster, limousine, and laundalette. The wheelbases measure 123, 128, and 135 inches respectively, on the three models.

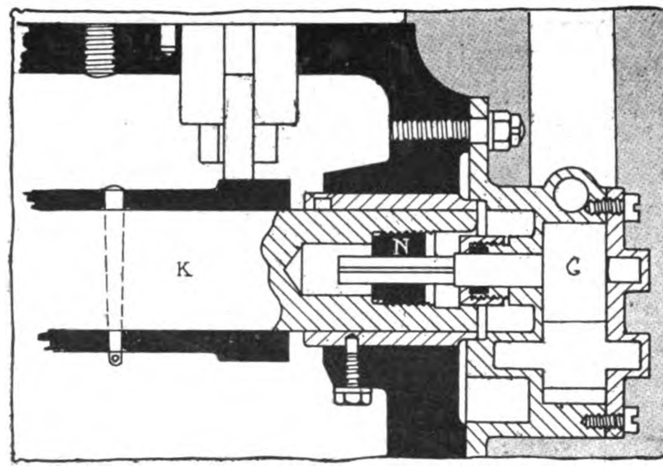


Fig. 9—Oil pump gear G, of the oil pump attached to crankshaft. Note the compression release combined with the cam, keyed upon the crankshaft by a tapered pin

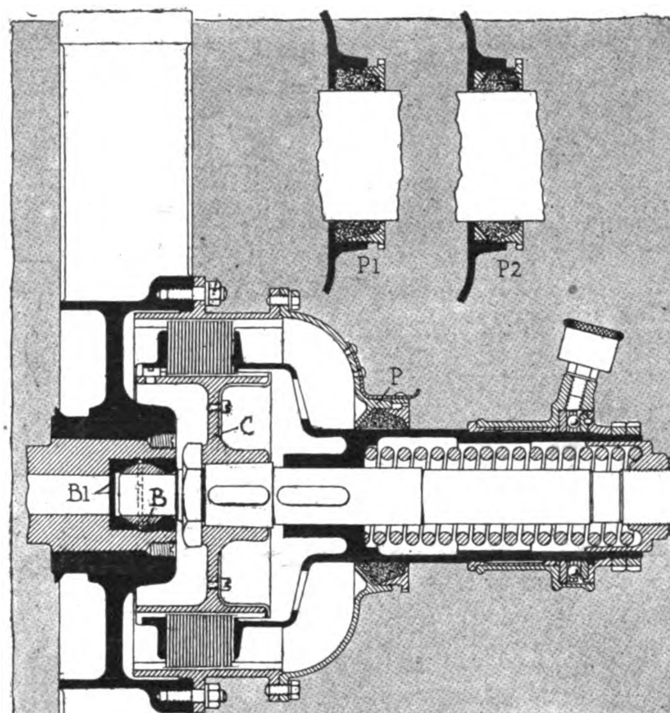


Fig. 10—Fiat 65-disk clutch. Note insertion into crankshaft end to secure alignment. Above are shown two views of the stuffing box fitted to prevent oil from working out of the clutch housing

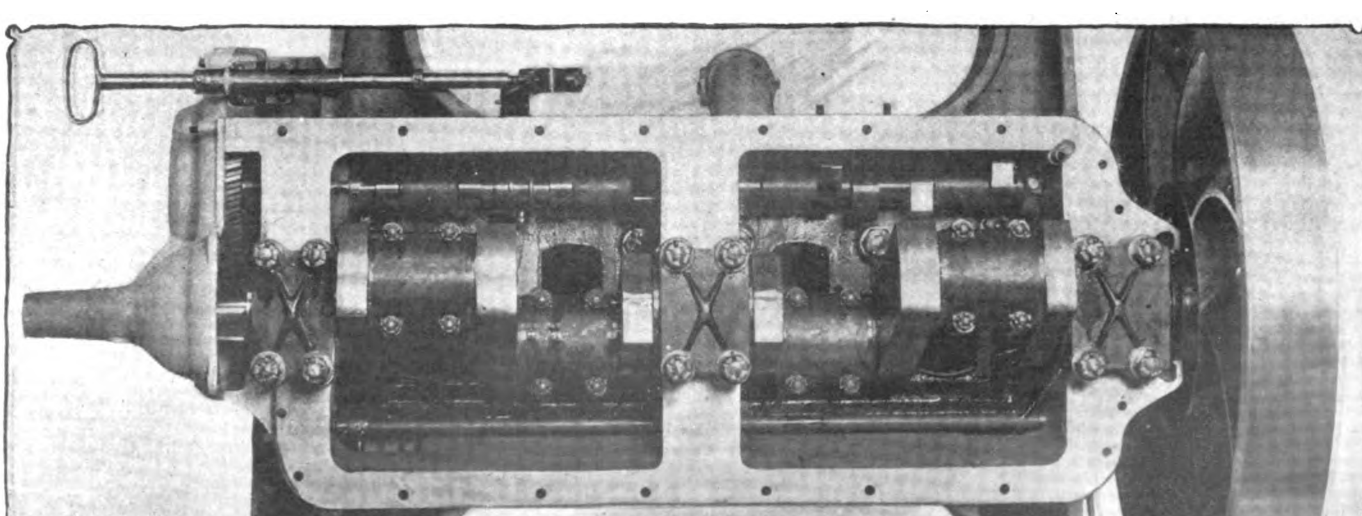


Fig. 11—Looking down into the crankcase casting of the Fiat model 55 four-cylinder motor which uses non-splash oiling

The AUTOMOBILE

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Sane Legislation Needed

MASSACHUSETTS, by recent action of one of its courts, has instituted a new ruling in the use of the highway by motor vehicles, and it is now imperative for an automobile to pass a street car on the left side when on the highways of the state. The feature of the decision lies in classifying the trolley car with horse-drawn and motor vehicles using the road. Heretofore it has been customary to pass trolley cars on the right side but the injury to a person alighting from a trolley car by a passing automobile has resulted in the new decision.

Today Massachusetts is in a worse predicament because of this decision than it was before. There is more danger to the public, embracing those who use the highway, by compelling motor vehicles to pass street cars on the left than there was in passing them on the right. This decision has brought the impossible into the limelight. Frequently on highways the street car does not occupy the center of the highway, being closer to the left side than to the right, in which exigency there is nothing for the motorist to do but keep back of the trolley car, stop when it stops, slow up when it slows up and do everything in general to congest traffic by the reduced pace.

It is almost impossible to conceive how long legislatures will continue to legislate against motor cars in use on the highways without any apparent regard for others who use these highways. Pedestrians and automobilists have equal privileges on the highway, yet when the person alighting from the trolley car is warned by the automobilist's horn but walks backward into the automobile, the courts apparently see only the automobilist and the legislatures begin more campaigns against motorists without the slightest effort to control the pedestrian in any way whatever.

It is true that pedestrians are directly responsible for a great many accidents in which automobiles figure. The pedestrian entirely ignores the rules of the highway, often failing to look to the right or left when starting to cross a street or highway. Such is not rational use of the highway in spite of the law that both the pedestrian and the vehicle user have equal rights thereon. It would be more beneficial if legislatures took up the question of pedestrian control chiefly within the limits of incorporated cities and towns. In our big cities millions of dollars are lost annually because of delays at crossings occasioned by the pedestrians not observing the rules of traffic at city street intersections. In New York in several sections an effort is being made to control such pedestrian traffic. A similar effort is to be instituted in Chicago. The great value of such an effort will be the habit that will be established in the minds of the pedestrians. The traffic control by policemen at street intersections has got automobilists into the habit of observing such regulations whether the policeman is on hand or not. Contrast this with the pedestrian who feels that dozens of times every day he is disregarding the police control, by crossing streets contrary to traffic rules where policemen are in control. Such a pedestrian becomes a law unto himself or herself so far as crossing streets is concerned. He or she fails to start crossing the street in the proper mental frame of mind that is necessary in these days of increased automobile traffic. The only way to correct this, in other words to secure the proper mental attitude, is by rigid regulation, regulation by the police. This and only this will result in proper regard for other street traffic by pedestrians.

Many cities have legislation today forbidding passing a stationary trolley car, one stopped to take on passengers or let others off. Such a regulation is necessary in cities with narrow streets, but the abuse of such an ordinance is working ill in several cities today. Such regulations are increasing street congestion, which in itself offers a fresh difficulty, and it is questionable if it would not be much better to call for a slow cautionary pace for automobiles passing standing trolley cars and arrest for violation, than to insist on the full stop, which invariably adds to the noise of the city and requiring higher speed to overtake the trolley and pass it.

The automobile is modern transportation, it is here to increase annually in numbers and in use. It will be on the city streets as long and perhaps longer in many places than the trolley car. The city officials should recognize this and legislate accordingly. It is just as important for pedestrians alighting from a trolley car to look back of them before beginning to walk to the sidewalk as it is for an automobilist to observe traffic rules at street intersections. The pedestrian must do his or her part. The police must do their part in educating the pedestrians, and when this is done accidents will be reduced and traffic congestion be relieved to a considerable extent.

Co-operation the Solution of Traffic Problems

James S. Marvin, Traffic Manager of the N.A.A.M., Covers Subject from Practical and Academic Standpoints in Paper Presented at Recent Convention in Detroit—Industry Pays $6,000,000 a Year Freight

THE development of our railroad systems has been rapid and has made possible our present industrial development; both are dependent on each other, and the manufacturer relies on reasonable efficiency at all times of the carriers which serve him; if the schedule between his factory and a certain market is 3 days, his business is tuned acordingly and he expects the schedule to be pretty closely maintained and that there will be cars available when he is ready to ship.

Now let us consider the situation of the automobile industry in its relations to railroads with respect to service. We have first to realize that the automobile, itself an article which is entering very largely and is destined to take an increasing part in the solution of this question of transportation, has nevertheless presented a new problem in freight transportation for the railroads. **I refer to the fact that the ordinary box car is useless for automobile service for the reason that the door openings will not admit any but the smaller machines; therefore, if the freight equipment of the railroads today was the same as 10 years ago, the development of the industry would have been impossible so far as dependence upon the railroads for transportation is concerned; aside from a few old-fashioned carriage cars and open cars, the transportation facilities for automobile factories would have been little better than if we had no railroads at all!**

This is an aspect of the situation that is not always realized; nevertheless it is fact that to keep pace with the development of this industry, railroads have departed from their old-time methods of designing door openings in freight cars to the extent of about 50,000 box cars, valued at perhaps 60,000,000, without which it would have been impossible to ship any but the smallest machines completely assembled.

It should not be understood, and I do not mean to say, that the railroads built these cars for the exclusive use of automobile shippers, or that the cars are of such a nature as to render them unfit for other freight service; **what I do desire to bring out is that the automobile industry is particularly susceptible to serious effects from freight blockades, because the factories cannot draw from the million and more box cars in general service,** but their shipments are confined to and are dependent upon these 50,000 automobile cars that are circulating around the country and are mixed in with all other kinds of freight cars.

The nature of the automobile business is such as to scatter these 50,000 cars in about as effectual a manner as could be devised; the factories are spread over a wide territory and each one ships to every section of the country. The problem of keeping these automobile cars moving back into the automobile manufacturing territory would be simplified greatly if outlying railroads gave closer observance to the rule requiring return of freight cars to the home road, as the automobile cars would come back with the others, but this rule, unfortunately, is not always enforced.

When industries in general find it difficult to secure sufficient freight cars, the situation is rendered all the more difficult for automobile factories, for when a car shortage occurs shippers of other articles gain the use, to a large extent, of automobile cars.

Such a shortage exists in this country today; the railroads are right now taxed to the limit of their resources in handling the exceptionally large crops and a heavy movement of traffic of all kinds. One of those periods exists at this time when the return of freight cars to the home roads is difficult of enforcement, and when it is considered that the observance of this rule is all that the automobile industry has to depend upon for the shipment of its goods, the real aspect of the situation confronting us is apparent.

To shippers of other articles which can be loaded in ordinary box cars it does not matter so much if the car which they load is owned by the railroad furnishing it to them, but the automobile shipper hasn't this choice, and must, in the main, depend upon the outlying railroads returning the initial lines' automobile cars. We have not, therefore, depended entirely on the railroad companies' rules. The traffic department has adopted many measures tending to co-operate with those rules and point out to railroads throughout the country the necessities of this particular industry and its dependence on the proper handling of automobile cars after they are made empty by dealers. To the tracing of the owning roads we have added our appeals to the outlying railroads that this equipment be given loads only such as will take the cars back to the manufacturing territory, instead of sending them to points entirely out of line.

In the belief that a full understanding of the situation on the part of automobile dealers throughout the West and South would be of assistance, we have outlined the situation so that the factories could explain it to their dealers and the latter to their local railroad people.

The advantage of using automobile cars for hauling supplies and material to automobile factories has been explained and encouraged, and we have called attention of our members to the necessity of keeping every automobile car actively in service by loading and unloading promptly and refraining from tying them up by loading in large quantities to dealers who cannot accept drafts and as a consequence would leave the automobiles in freight cars at destination a considerable time.

There are few more important questions confronting the business interests than these periods of car shortage which seem bound to recur under existing conditions. A general and far-reaching interruption of traffic contains possibilities not only of financial disaster, but of actual privation and suffering. There seem to be times when the methods in vogue on the part of railroads and on the part of shippers invite such results. The facilities and the regulations which are usually employed do not meet the requirements of a severe test, and business suffers.

The business of a factory sometimes grows at a gratifying rate, and the receiving and shipping facilities which were at first ample are perhaps not developed at a corresponding pace. An undue burden is sometimes put upon the railroads which serve the plants, whereby several shifts per day are necessary when one at first was sufficient.

Olympia's Doors Close on Most Successful Show

by

J. S. Critchley

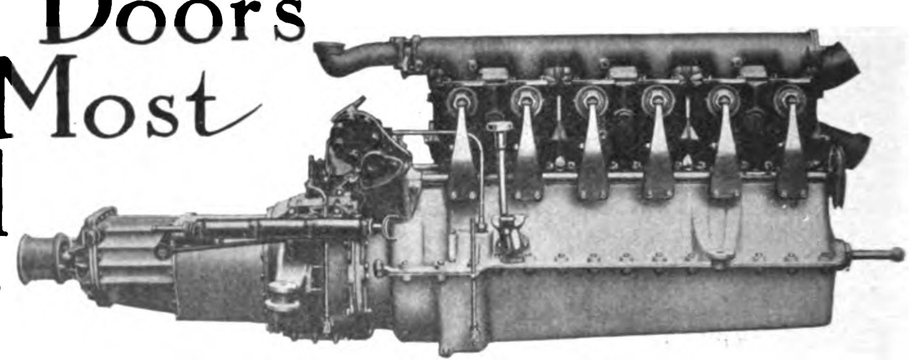


Fig. 1—View of the Lanchester six-cylinder motor, showing side valve levers

LONDON, Nov. 16—(*Special to* THE AUTOMOBILE)—The Olympia Show, which closed its doors today, has been an unparalleled success as regards the attendance of the public. At least 45,000 more people have visited the show this year than last, and over-crowding has been so severe that it has interfered with business to a considerable extent. On the days when the prices of admission have been raised to 5 shillings, and half a crown, the crowds have been even greater than on the days when the price was 1 shilling only, the reason of this being that people who really want to see things have selected the higher-priced days to avoid the crush. Those who have attended to seriously study the constructions have been very much hampered by the dense crowd. Among the manufacturers considerable dissatisfaction has arisen from the fact that the members of the Royal Automobile Club are admitted on presentation of their membership tickets. This has been the regulation ever since the show commenced. It is thought, however, that if members of the Royal Automobile Club were charged for admission there might be a little less crowding. Seeing that the club has only some 7,000 members, it is doubtful if this would make any appreciable difference, as probably not more than 1,500 of the members visit the show simultaneously.

One of the difficulties in getting to some of the stands is due to the fact that they are surrounded by the agents of the various concerns. In many cases thirty to forty agents will be dispersed round their firm's exhibit, and, as the stands are comparatively small, it is obvious that in many cases they are over-burdened with attendants.

The attendance has been greater than ever as shown by the following statistics:

	1910	1911	1912
Friday	10,954	12,539	14,322
Saturday	25,843	27,890	34,672
Monday	33,511	22,132	26,989
Tuesday	24,160	19,291	24,393
Wednesday	38,115	38,748	48,879
Thursday	29,728	36,765	39,739
Friday	27,292	39,832	33,470
Saturday	29,305	28,898	32,648
	218,908	226,095	255,112

Probably the private sales have never been less than this year, and this is entirely due to the inability of the purchasers in some cases, to even get to the stand they wish to visit. The provision of a bigger hall is every year more necessary, as the show has completel outgrown the capacities of Olympia.

Lanchester Improves on Details

The Lanchester company is making no changes in cylinder dimensions or horsepower. The two cars constructed by the Lanchester company are a four-cylinder, 4-inch bore and 4-inch stroke, and a six-cylinder of the same dimensions. The motor is shown in Fig. 1. There are, however, improvements in detail, one of which is rather notable. The object of this improvement is to render the four-cylinder engine as smooth in its running as the six-cylinder and to do away with engine vibration. This anti-vibrator consists of two spindles running at right angles to the crankshaft, and at twice its revolution. The spindles are provided with balance weights, which do not exceed 12 pounds. At high revolutions these balance weights tend to compensate the unbalanced force of the motor.

A self-starter is also fitted to one of the models. This is of the electric type. The dynamotor is driven by an inclosed silent chain from the rear end of the countershaft. The dynamotor charges a 32-volt accumulator, an 8-volt current being provided for for lighting purposes. The starting is effected by sliding the gearshaft and intermeshing gears between the forward end of the armature shaft and the flywheel of the motor. Coupled to the self-starting control lever is an arrangement for retarding the ignition simultaneously. Fig. 1 illustrates the six-cylinder engine and gear.

Benz in Remarkable Test

Practically no change has been made in connection with the Benz productions. The 12-30 Benz with a bore of 72 millimeters and stroke of 120, is a car which has achieved a considerable amount of notoriety on account of its efficiency. The car is very speedy and on a trial at Brooklands ascended the 1 in 4 grade with four passengers at a speed of 11 miles an hour. The dimensions of the car are as follows:

Length of frame from dash	8 ft. 2 ins.
Breadth of frame	2 ft. 6 ins.
Wheel base	9 ft. 6 ins.
Wheel track	4 ft. 2 ins.
Overall length of complete car (hood down)	14 ft. 6 ins.
Overall width of complete car	4 ft. 9 ins.
Height of complete car (hood and screen down)	4 ft. 6 ins.
Weight of chassis	14 cwt.
Weight of complete car	20 cwt.

The engine cylinders are cast monobloc with water jackets and internal gas passage forming an integral part of the casting. The camshaft is driven by silent chain with the valves in line. The cylinders are arranged over the crankshaft offset in the direction of rotation. The crankshaft is fitted with three bearings and is of specially large proportions enabling the engine to be run at very high speeds with freedom from periodic vibration. Lubrication is of the combined pressure and splash system, the end of the connecting-rods dipping into troughs which are fed from the overflow of the main bearings. Ignition is effected by the Eisemann self-advancing magneto, and the cooling system is on the thermo-syphon principle. From the flywheel the power is taken by means of a leather clutch fitted with springs beneath the leather. To effect easy changing of speeds a clutch stop is fitted, which is shown in Fig. 3. This consists of a disk working against two leather-faced adjustable pads. The shaft between the clutch and the gearbox is supplied with two universal joints. It will be noticed that there is no cramping of the various parts and that the removal of the gearbox or clutch is a comparatively easy matter. The gearbox is fitted with four speeds, and is of the jointless one-piece casting type. Stuffing boxes are fitted to the shafts to retain the oil.

Power is transmitted from the gearbox to the rear axle by means of a propeller shaft completely inclosed in a tubular casing. Radius rods are fitted, and the back springs double shackled.

For the 1913 season the Germain company is producing the following models: 20 horsepower with Silent-Knight engine manufactured by the Daimler company, Coventry, Fig. 2; 15 horsepower with poppet-valve engine, monobloc cylinders; 14 horsepower, 18 horsepower, 20 horsepower, 28 horsepower with poppet-valve engine and separate steel cylinders with brass water-jackets.

It is interesting, in the first case, to notice that this company has adopted the Knight sleeve-valve engine. This engine has the following dimensions: Bore of cylinder, 90 millimeters; stroke of piston, 130 millimeters, and the R. A. C. rating is 20 horsepower. The lubrication of the reciprocating parts and journals is effected by the Daimler semi-mechanical system which insures an adequate supply of oil while preventing over-lubrication and its attendant evils. The regulating device is inter-connected with the throttle regulator, the oil supply varying with the speed of the engine. The Zenith carbureter is fitted in conjunction with pressure feed. Cooling is effected by a worm-driven centrifugal pump, together with a radiator of ample capacity and a belt-driven fan. The ignition is by Bosch dual system with worm-driven magneto,

Long Pistons in 15-Horsepower Model

The 15-horsepower engine with monobloc cylinders is of particular interest and this engine will be described rather fully. In the first case the cylinder diameter is 80 millimeters and the piston stroke 140 millimeters, which is according to R. A. C. rating 15.9 horsepower. The pistons, though light, are exceptionally long—126 millimeters—and the cylinders are offset to the extent of 22 millimeters. It has been necessary to slightly slot the pistons on one side to clear the connecting-rod. The cylinder for the same reason has cast grooves on one side, a practice that is now common. Four piston rings are fitted, and this for pistons so small in diameter is somewhat unusual. The connecting-rods have a length of 290 millimeters and in comparison with the pistons are somewhat heavy. The crankshaft has three bearings, 70, 60 and 8 millimeters in length, respectively, the last mentioned having the bearing on the flywheel end. The diameter of the crankshaft at the two forward bearings is 40 millimeters and at the rearward bearing 45 millimeters, while the crankpins are 60 millimeters long by 40 millimeters diameter. It is noticeable that the camshaft chain-driven wheels are placed not at the forward end of the crankshaft, but at the back and near to the flywheel. Outside these wheels is a large ball bearing which is intended to support the weight of the flywheel. It seems that this is a position in which a ball bearing can be used with advantage for it would here receive little or none of the actual shock of the explosion. The crank wells are 20 millimeters wide against the bearings and the unsupported webs have a width of 26 millimeters. The front end of the crankshaft has a pulley to take a flat belt for fan driving.

Turning now to the camshaft, it will be seen that this has in all five bearings, three of them being plain journal bearings of large diameter and the remaining two ball bearings. The shaft has a diameter of 24 millimeters, and the cam width is no less than 25 millimeters, but this is partly due to the fact that no rollers are used on the tappets. There are two thimbles, one fitting inside the other; there is a long coiled spring, Fig. 13, that tends to separate them and thus to make up any slight clearance that may exist in the valve operating mechanism. The arrangement is very simple and should effect silence in operation.

Germain Spark Plugs in Novel Position

There is a small worm on the camshaft for driving the oil pump in connection with the lubricating system, which will be described. The valves are arranged upon one side of the engine and have a diameter of 40 millimeters, the ports and gas passages being very free. There are covers over the valve springs, tappets, etc., and these are attached in a simple manner. The igniting plugs are not over the inlet valves, a point that is now almost universal, but are screwed in to the opposite sides of the combustion chamber at an angle of about 45 degrees. Most tests that have been made with regard to plug position have served to prove that when the plug is placed in the pocket near the inlet valve a slow-running and elastic engine is most easily obtained; it is not easy, therefore, to see why in the Germain engine this practice has not been followed. In the position shown, too, the plugs would appear to lose some of the advantage of the cooling effect of the mixture as the electrodes are in a pocket some inches from the point at which the mixture enters, although the violent turbulence of the mixture will tend to clear the plug pocket to a great extent.

The water-jackets are carried well down the cylinders and the valve pockets and passages are very well looked after. There is a ribbed exhaust carrier having at one part of it a short hood for supplying warm air to the carbureter.

In connection with the lubrication it may be said that the oil is contained in a special sump or oil reservoir contained in the lower half of the crank chamber. This sump is of novel design, being fitted with a splash plate or baffle which prevents the oil washing over the edge into the crank chamber. The splash plate slopes towards a hole in the center after the manner of a funnel, thus allowing the return oil to flow into the sump. In addition to passing through the usual gauze filter, the oil is made to flow into a well in the center of the sump where any remaining sediment is separated from it by gravity. A perfectly

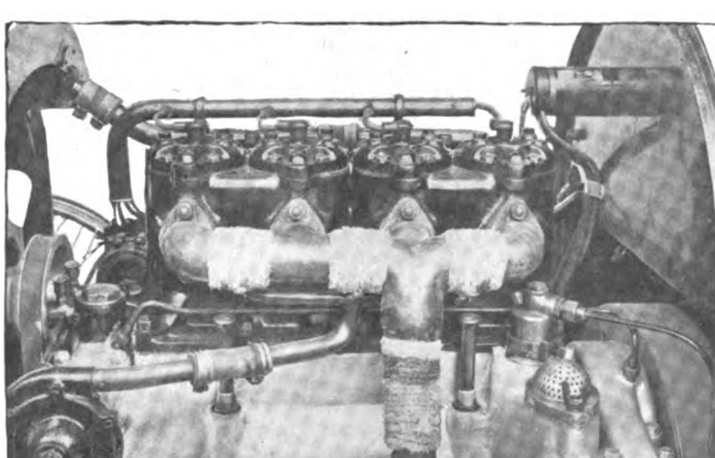


Fig. 2—Exhaust side of the 20-horsepower, four cylinder Germain motor

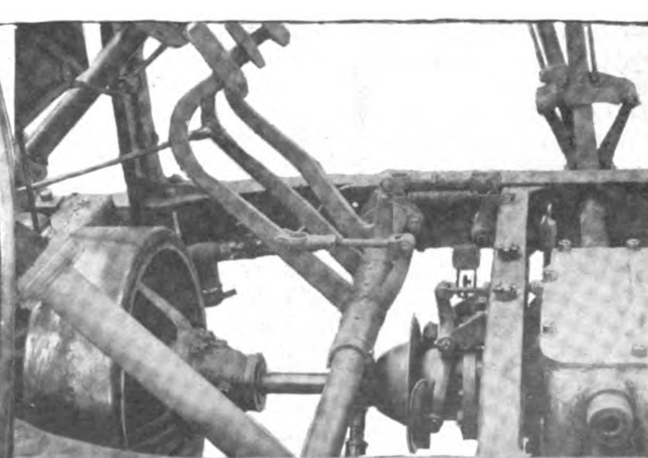


Fig. 3—View of clutch and control mechanism of the 12-20-horsepower Benz

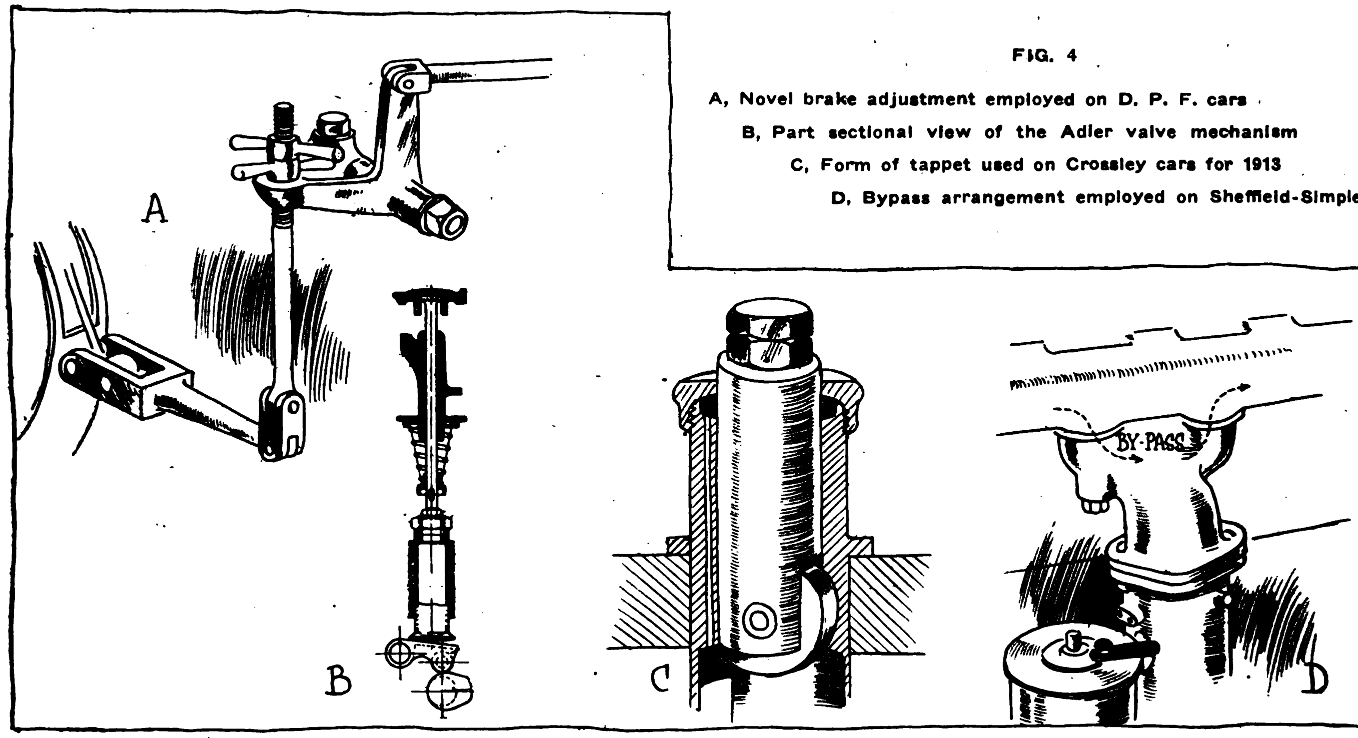


FIG. 4

A, Novel brake adjustment employed on D. P. F. cars

B, Part sectional view of the Adler valve mechanism

C, Form of tappet used on Crossley cars for 1913

D, Bypass arrangement employed on Sheffield-Simplex

clean supply of oil is thus obtained under all conditions and all possibility of the oil on the sump overflowing into the crank chamber and causing over-lubrication is entirely removed. The oil sump is approximately square in shape and has cooling ribs cast on its outer surface, which assist in keeping the main supply of oil cool and preventing its evaporation.

Fig. 13 shows an alternative type of tappet and it will be noticed that the principal difference between this one and the one described is that the coiled spring is replaced by a quantity of felt packing and that there are a series of thin steel washers contained in the bottom of the larger steel thimble. This is certainly a very novel feature and presumably would be more conducive to silence than the type of tappet previously described.

Felt Packing Makes for Silence

Presumably the felt packing will not only serve as a spring between the two thimbles, but will also in a great measure deaden or muffle any slight noise that might otherwise be due to some cause or other. It will be unnecessary, perhaps, to remind readers that felt or some very similar substance is used constantly to insulate running machines from the flooring to which it is bolted.

The engines of the other models retain for the most part the characteristic features of last year's designs. The cylinders are in every case of steel, machined from a solid forging, and surrounded by brass water-jackets, secured in a manner which makes any water leakage practically impossible. The use of steel for this purpose, although more expensive in manufacture, gives a cylinder which is entirely free from any danger of loss of efficiency through porosity, and one in which wear is reduced to a minimum. Also, the combination of this cylinder with a drawn-brass water-jacket of light gauge produces an engine far lighter than it is possible to obtain with cylinders of the ordinary cast type. The ignition is by Bosch magneto, an automatic advance device being included in the engine.

The new 20-horsepower model with separate brass jacketed cylinders of 92-millimeter bore and 150-millimeter stroke of piston has all the valves on the same side. The crankshaft is mounted on five bearings, that is to say, there is a bearing on either side of each cylinder. By reason of this the crankshaft remains exceptionally rigid under the heaviest loads. The lubrication system is similar to that employed on the other models, and a Zenith carbureter with pressure feed is also fitted. The ignition is by the Bosch D.U.4 type magneto, which includes an automatic advance device, and is driven, together with the water pump, from the camshaft by a worm gear.

The 20-horsepower Silent-Knight, 14-horsepower monobloc, 20-horsepower and 28-horsepower models are fitted with four-speed gearboxes, the other models having three speeds. In the 30-horsepower model, option is given of a three-speed box at a reduced price.

In the 14-horsepower, 18-horsepower and 28-horsepower models the inlet and exhaust valves are placed on opposite sides of the cylinders, the camshafts being operated by timing wheels of case-hardened steel running in an oil bath. These are finished by being ground together, and in this way perfect accuracy of tooth profile is obtained, and silent and efficient working assured. Forced lubrication is employed by means of a gear pump, worm driven from the camshaft, the oil being conducted to the main bearings through separate pipes, and thence to the big end bearings through holes drilled in the crankshaft. The Zenith carbureter, in conjunction with a pressure gasoline feed, is also used for these models.

A somewhat striking feature is the size of the brake drum; the diameter is more than 13.5 inches and the width of the brake shoe is 2.1875 inches. The drum has circumferential cooling ribs upon it, and owing to the comparatively high speed of the drum, these should be effective.

Crossley Continues Two Models

The Crossley Motors Company, Ltd., is making no radical change for the coming season, and is continuing to construct the two last year models, namely, 15 horsepower, 80 millimeters bore by 120 millimeters stroke, and the 20 horsepower, 102 millimeters bore by 140 millimeters stroke. The following are the features of these cars for 1913:

In the case of the 15 horsepower, the cylinders are cast en bloc, and in the 20 horsepower in pairs. The 15-horsepower engine flywheel pit and gearbox are on the unit system. In the case of the 20 horsepower the gearbox is independently supported in the chassis on two tubular cross-members. Both engines are cooled by thermo-syphon circulation, and both are lubricated under pressure, the oil pump being fixed on the casing at the front of the engine and driven directly off an extension of the camshaft, the oil being drawn by the pump out of the sump, and forced through the hollow crankshaft to the journal

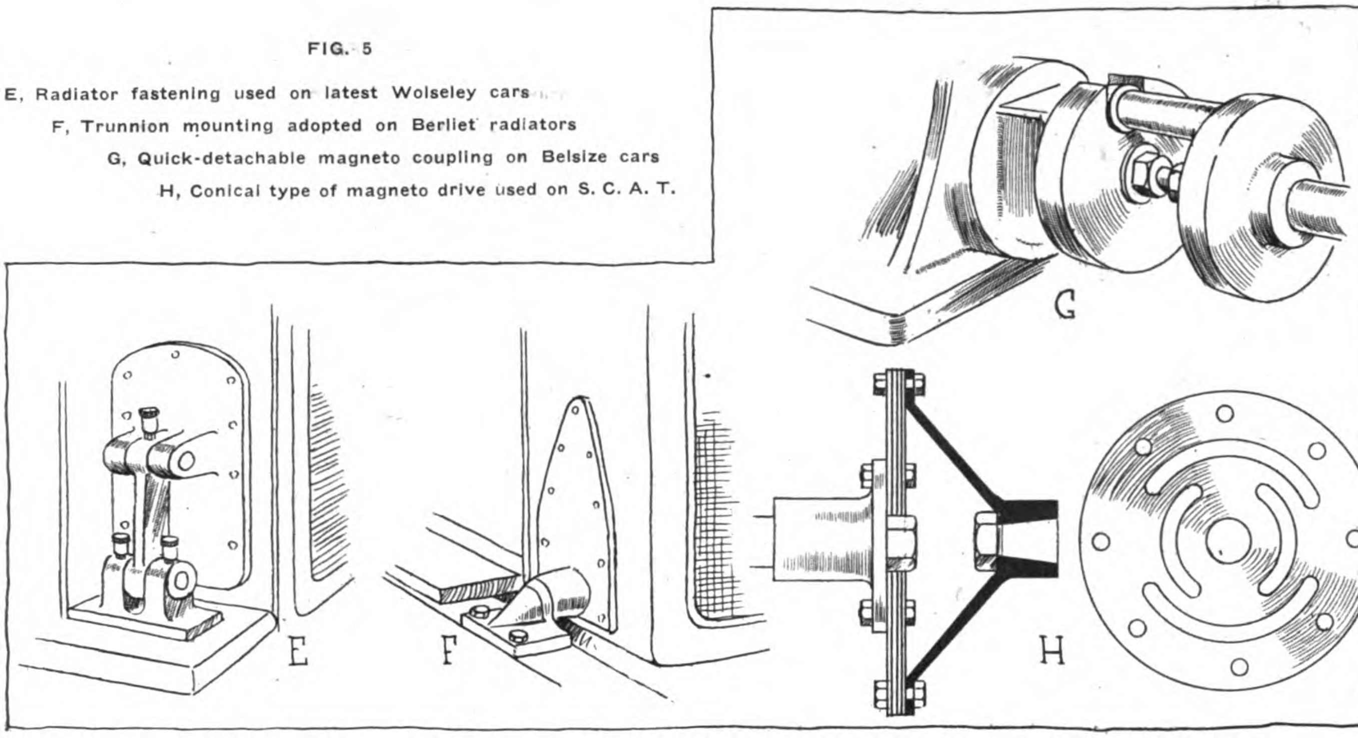


FIG. 5

E, Radiator fastening used on latest Wolseley cars

F, Trunnion mounting adopted on Berliet radiators

G, Quick-detachable magneto coupling on Belsize cars

H, Conical type of magneto drive used on S. C. A. T.

and big end bearings. The pistons are fitted with three rings above the wristpin and no scraper rings are provided. The earlier Crossley models were fitted with the dashpot arrangement on the valve risers, the object of which was to keep the valve stems continually in contact with the adjustable set-screw of the tappet plunger. It has been found, however, that the solid plungers, Fig. 4, without the dashpot are in every way as silent as the results obtained from the previous arrangement. Chain drive for the half-time shaft and magneto is retained.

Clutch Stop a Crossley Feature

The drive for the engine gearbox is through a leather-faced cone clutch. The clutch runs on a spigot forming the extension of the crankcase, and is of the internal type. A modification this year consists in adding a clutch stop. The universal joint of the ring type couples the clutch to the gearbox, the bushes and pins of the universal joint being fitted with ball non-return type lubricators which prevents the oil being thrown on to the bushes by centrifugal force. The gearbox remains exactly as before, and has four speeds and gate control. The features of the gearbox are the generous dimensions of the ball bearings, gear wheels and shaft. A feature in construction which differs from ordinary practice is the fitting of the keys of the sliding shaft after the shaft itself has been ground, in other words, the keys are not solid with the shaft. The advantage of this method is that the portion of the sliding shaft on which the change speed wheels slide can be made absolutely true by grinding; on the other hand, there is a chance of the keys working loose. Another feature of the gearbox is that the constant mesh wheel on the clutch shaft is supported by a ball bearing on both sides, and is thus not overhung. At the back of the gearbox there is the usual brake drum and universal joint connecting the gearbox through the propeller shaft. This universal joint runs in a spherical torque ball which forms an oil bath. The brake is of the two-shoe cam-operating internal expanding type, and the brake drum is ribbed for cooling purposes. The propeller shaft is entirely inclosed in a steel torque tube bolted on to the center casing of the rear axle. With regard to the rear axle, the differential is entirely removable through the lid at the back, and is provided with an adjustment for accurately setting the depth of the engagement of the main crown wheel with the driving bevel. The brakes and the rear wheels are also of the two-shoe expanding cam-operating type.

As in former years, the cylinders of the Sheffield-Simplex are cast in sets of threes and the valves are upon one side. The cams do not operate the tappets directly, but there are radius links upon which the cam rollers are mounted and the links are drilled to secure lightness.

The cylinder has a diameter of 89 millimeters and the stroke of the piston is 127 millimeters. There is a bearing between every crank and an exceptionally long bearing at the back end of the engine. The pipe arrangement on the valve side of the engine is very neat and compact, the exhaust pipe gradually increasing in area as it nears the back end.

Briefly, the points to be taken note of in connection with this model are: a double-dropped frame providing low carriage entrance without sacrificing maximum road clearance. Ordinary three push pedal type of control; Lanchester type rear springing; neatness of exhaust and induction piping on engine; thermo-syphon with draft induced by fan flywheel; spherical bulged radiator; both foot and hand-operated brakes acting direct on to rear road wheels and all of the expanding type; the clutch is a multiple-disk type having a large number of flat plates; two independent sets of brakes are fitted, both acting upon large air-cooled drums on the back wheels; a special adjustment is provided for taking up wear without affecting the original position of levers on pedal; the live axle has a Lanchester or concave type of worm, and, finally, all important power transmitting parts are manufactured from a steel specially developed by a leading firm of Sheffield manufacturers, providing a hard-wearing surface and exceptional strength, as shown by the following results of an official test taken by the Sheffield Testing Works, Ltd.:

Tensile strength	122 tons per square inch
Elastic limit	115 tons per square inch
Elongation	11 per cent. in 2 inches

Vinot Has Chain-Driving Camshaft

The Vinot car represents one of the most satisfactory designs in European construction for a light medium-powered car. The firm specializes in two models, namely, a 12-14 horsepower, 70 millimeters bore by 110 millimeters stroke and a 15-20 horsepower, 80 millimeters bore by 130 millimeters stroke. With both the cylinders are cast monobloc, all valves in line and camshaft driven by inclosed chain. The magneto and pump are placed on the opposite side to the carbureter and driven from the camshaft. Lubrication is of the forced variety, both to the main bearings and to the connecting-rods, the oil pump being driven on the camshaft by an eccentric. In connection with the oiling system the usual test-cock is fitted to the base, but in addition there is provided a metal dipping rod which, when it is withdrawn, shows by notches cut thereon the amount of oil in the sump. A gauge of this description is also used by the De Dion company.

The clutch is of the leather type and is fitted with six semicircular plate springs between the leather and the face with bolts extending through the rim by which these springs can be adjusted. Further, the clutch can be so arranged that it can be dismounted without disturbing any other part of the mechanism. Between the clutch and the gearbox a universal joint is fitted.

Hexagonal Shafts Used in Gearbox

The gearbox is provided with three speeds, and the shafts are finished to a hexagonal section, which, it is claimed, is stiffer than a round shaft of the same weight. The primary shaft runs in three sets of ball bearings, two of these being placed at the forward end, which take up the pressure when the dog clutch takes up the direct drive on top gear.

A feature of the construction is in connection with the lubricating arrangement, a tube being carried from the trunnion to the outside of the frame where a grease cup is fitted. The grease cup is further arranged so that a grease pump can be screwed on to the end of the pipe. This is one of the small refinements demonstrated by the present show. All the greasers of the Vinot car are placed in accessible positions. With many cars in order to lubricate certain parts either the floor-boards have to be removed or it is necessary to attend to the grease cups from below.

The Adler valve is illustrated in Fig. 4. The characteristic feature of the construction of the valve is that from its seating it is extended in a cylindrical form. By this means the valve can be lifted before the gas enters the cylinder, and it can be moved more slowly than the ordinary constructed valve, and vice versa, the valve can be closed more slowly. This slow start and termination of the valve movements with simultaneous shutting off of the aperture affords the possibility of compensating the interstice between the valve tappet and valve stem, and further of placing the valve on its seat noiselessly. To this there is added the action of the roller lever, interposed between the cam and the tappet, which also effects the gradual starting and termination of the valve motion. The roller lever, which pivots on a fixed shaft, carries the tappet and has at its upper end the setscrew terminating in a hexagonal, which is secured by a nut after the adjustment of the required play between the tappet and valve stem.

The Adler clutch is of the leather-cone type internally operated. Beneath the leather, leaf springs are fitted at three points. A characteristic feature of this clutch is that it can be easily dismounted in the following way: The bolts coupling the clutch to the flange are first removed, after which the bolts are screwed up, which draws the spring case into the clutch cone. This reduces the distance between the flange of the flywheel and the flange of the gearshaft, so that the entire clutch group, with the clutch ring, can be taken out.

There is a by-pass in the Sheffield-Simplex exhaust pipe, Fig. 4, which carries a portion of the exhaust gases round the upper part of the inlet pipe of the engine.

The Wolseley radiator, Fig. 5, is not fastened direct to the frame, but is anchored by short arms pivoted at either end. Thus when one side of the frame rises somewhat higher than the other, the links allow for the movement and there is no straining of the radiators and consequently leaks are not likely to be developed.

The Belsize magneto coupling, Fig. 5, consists of two disks, one having a pin screwed into it and the other a notch or slot in which the pin engages. The coupling allows for a small amount of lack of alignment without any undue friction in the bearings.

To permit a certain amount of freedom to the Berliet radiator it is mounted upon trunnions, Fig. 5. Thus in the case of frame distortion the radiator is not strained.

Spring Drive Magneto on S. C. A. T.

The magneto spring coupling on S. C. A. T. cars, Fig. 5, consists of a series of circular steel spring plates fixed to the magneto driving shaft; these are cut out as shown in the end view of one of the plates. A cone-shaped casting is fitted on the magneto spindle and this is secured to the outer diameter of the plates. Thus a fair amount of flexibility exists. A similar type of coupling is used between the flywheel and the multiple-disk clutch casing.

The armature of the Bosch starting magneto is geared up six to one to the starting handle; it is, therefore, obvious that a very slow pull-up of the latter results in a fat spark occurring at the plug. It will be understood that the starting magneto is only

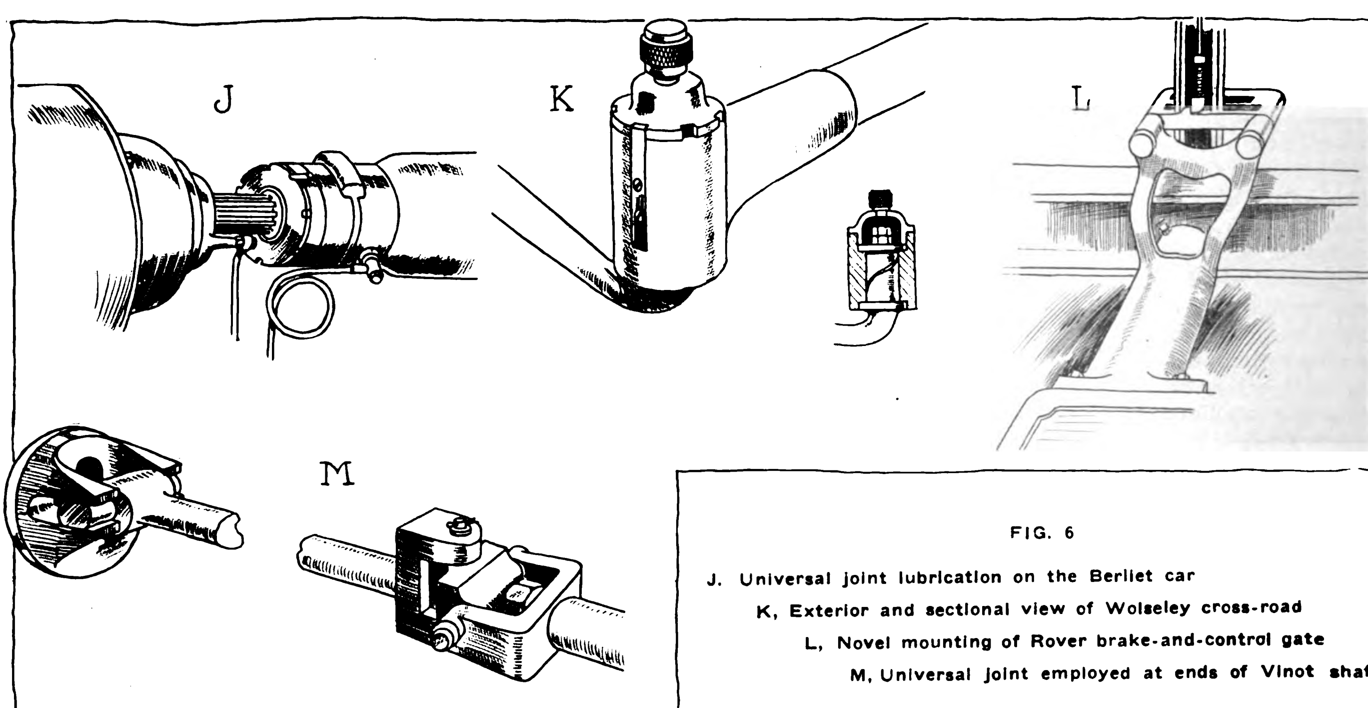


FIG. 6

J. Universal joint lubrication on the Berliet car

K, Exterior and sectional view of Wolseley cross-road

L, Novel mounting of Rover brake-and-control gate

M, Universal joint employed at ends of Vinot shaft operated when the engine is actually being started, and remains quite passive in ordinary running. If the engine be just warm a casual turn in either direction of the starting handle is enough to set it in motion.

The Berliet universal joint, Fig. 6, behind the gearbox is novel because it is kept supplied with lubricant from the engine; the front end of the propeller shaft is serrated so that a telescopic joint is formed at this point in addition to the universal movement permitted by the main joint. The oil feed to the back axle is led into the front end of the torque tube in which the propeller shaft is supported by a ball bearing. The shaft itself carries a little worm wheel just in front of this bearing, which acts as a kind of turbine and throws the oil entering the tube, just in front of this wheel, onto the ball race behind it. Thence it reaches the bevel gear and differential casing by gravity.

Fig. 7 illustrates the fan drive and pump of the S. P. A. car. The fan is provided with a free wheel arrangement to take away jar should the gears cease to run. The pump body is cast integral with the cylinders from which the water flows directly to the jacket. The turbine pump is fastened to the same spindle as the fan.

Darracq clutch withdrawal gear, shown in Fig. 7, has two ball-bearing rollers having their axles vertical, which are fixed to the fork ends of the clutch disengaging lever.

The Crossley brake-rod adjustment, Fig. 8, provides a simple and handy method of lengthening or shortening the brake-rod, and a glance at the illustration will render any description unnecessary. The angular position of the Crossley brake lever can be altered by slacking the nut, shown in Fig. 8, and disengaging the serrations. When the nut is tightened the serrations provide a certain grip.

Clutch Pedal Geared to Shaft

Fig. 9 shows the clutch mechanism of the D. F. P. car. With this engine the clutch is of the internal type, and in order to get the necessary movement the clutch pedal is geared to the shaft carrying the clutch disengaging fork.

A feature of the Waverley car is its rear suspension, Fig. 10. Forward springs of the usual semi-elliptic type are used, but at the rear two quarter-elliptic springs are fitted at each side. These are superimposed and spaced about 4 inches apart. Nearly flat, they give ample vertical movement, and can act as torque and driving members without reducting their efficiency as springs.

Fig. 11 illustrates the brake adjustment on the four-cylinder Standard car, 89 millimeters bore by 133 millimeters stroke. With this brake adjustment the adjusting devices are brought outside the frame, a practice which makers are adopting, namely, Deasy, Maudslay and others. It will be noticed that there are two adjustments, one for the grip, the other for positioning the lower shoe. It is quite unusual to find these two adjustments provided for in this manner. The grip adjustment is effected by the wheel A, which is keyed to the shaft B. At the end of this shaft a bevel wheel is provided, gearing with a bevel on the screwed shaft C, the rotation of which draws the shoes together. The positioning arrangement is effected by the thumb screw D, which by means of the screwed shaft E raises the bell crank F upon the lower arm of which the lower brake shoe rests.

Argyll Collapsible Tank Filler

The Argyll filler for the gasoline tank, which is on the dashboard, is made collapsible, Fig. 12, thus the filling process is very much facilitated. A neat and simple form of quickly detachable cap is also provided and the action of this is clear from the figure.

The J. B. shackle bolt is turned from the solid steel bar and the head of the bolt is bored out to form the grease box. The brass cap is so constructed that it can be slipped on to the grease box with a gentle pressure. There are no threads, either on the grease cup or cap, so that the annoyance of a crossed or worn thread does not exist. Four little steel balls fitted in the cap operate in such a manner that no amount of vibration will allow the cap to move back.

To lubricate the bolt the grease cup and cap is filled in the ordinary way, then the cap is slipped over the cup and gentle pressure from time to time on the cap, as the grease becomes exhausted, will keep the bolt properly lubricated.

The Thompson-Bennett exhaust car heater consists of an aluminum box let in flush with the floor of the car and the heat is derived from the exhaust by diverting the gases into the heater and thence to the atmosphere. A heat regulator is attached so that the temperature can be graduated at will or shut off entirely if necessary. This valve can be operated on the heater itself. As an alternative an independent regulator can be supplied and arranged in any suitable position on any part of the automobile.

The heater is simple to fit. The exhaust pipe is tapped at any convenient place either before or behind the muffler. It is un-

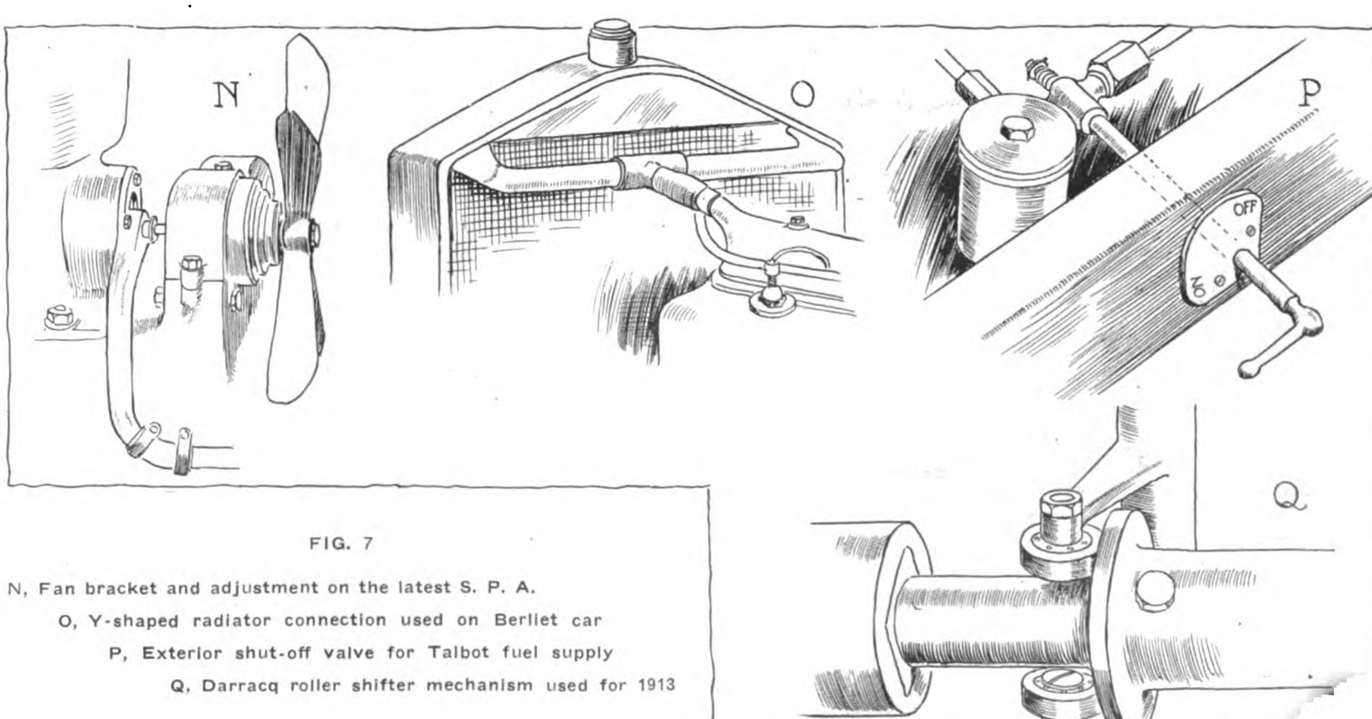


FIG. 7

N, Fan bracket and adjustment on the latest S. P. A.

O, Y-shaped radiator connection used on Berliet car

P, Exterior shut-off valve for Talbot fuel supply

Q, Darracq roller shifter mechanism used for 1913

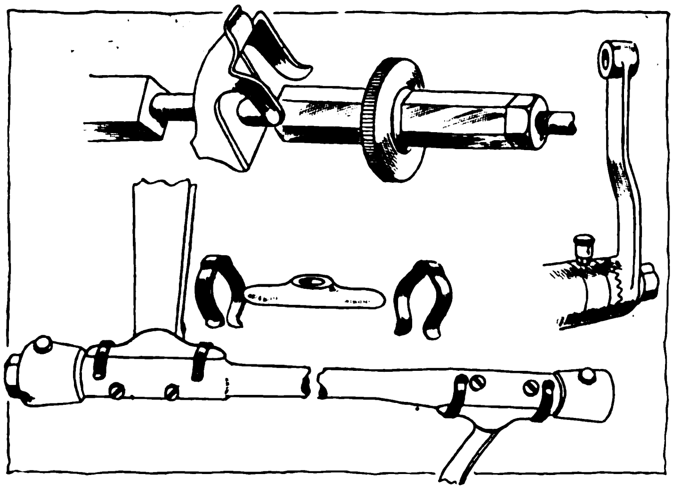


Fig. 8—Brake adjustments and lock on Crossley models

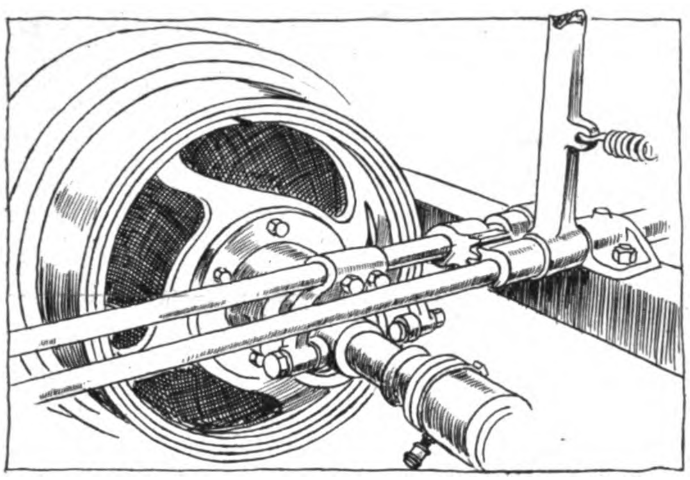


Fig. 9—Clutch and brake rod intermeshed on D. P. F.

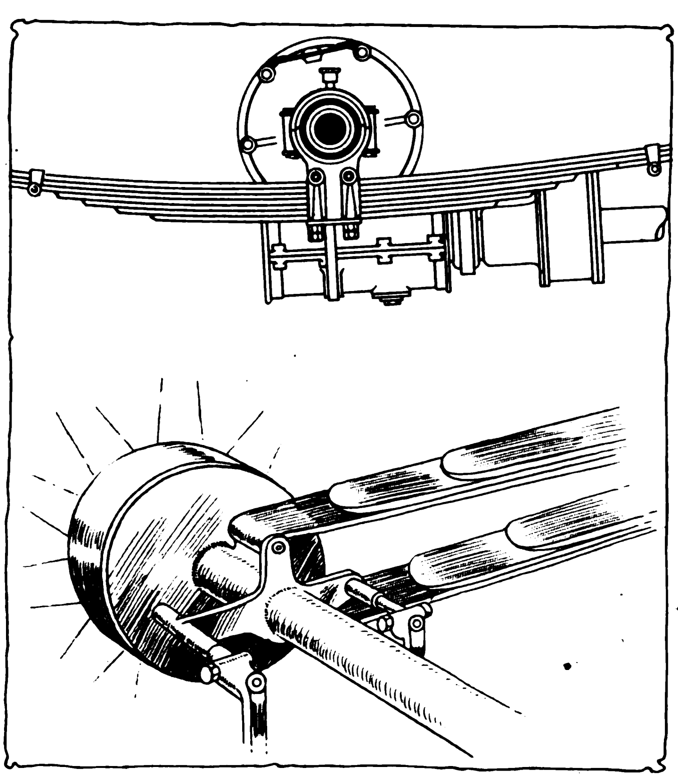


Fig. 10—Rear springs on Wolseley and Waverley cars

necessary to dismount muffler or pipes, as the valves clip on. There are six possible inlet or outlet positions, any two of gas-tight flanges. This greatly simplifies the operation of fitting the heater on the car.

The Rex induction pipe jacket has been designed to overcome the difficulty that is sometimes met in connection with types of carbureters having no warming jacket. The air that is drawn into these from some hot part of the engine sometimes becomes cooled by passing through long pipes. The Rex consists of a hollow flange-shaped fitting which is intended to be secured between the lower flange of the induction pipe and the top flange of the carbureter. Screwed into the jacket, one at each side, are two elbow pieces, and to these are coupled inlet and outlet pipes connected to the exhaust branch of the engine, so that a portion of the hot exhaust gases passes through the space within the jacket. The latter is shaped, as to its internal bore, with the serrations increasing the area of the metal, which, becoming hot soon after the engine is started, warms the passing mixture, so tending more completely to vaporize the gasoline before it reaches the engine. It should perhaps be pointed out that the freezing zone, namely, that portion of the induction pipe upon which frost appears when the mixture is unwarmed, is usually immediately above the mixing chamber of the carbureter and that it is at this point where the Rex jacket is intended to be fitted.

A survey of the exhibits gives rise to observations which may be summarized as follows: Monobloc castings are greatly on the increase. With many of these there is an inclination to cast the exhaust passages within the cylinder casting. This is specially noticeable in the Italian designs. It is very doubtful if the casting of the exhaust passage within the cylinder casting is a useful or proper construction, and it would seem far better to cast the exhaust pipe separately with four leads from the cylinders, which are generally adopted by British manufacturers. In one case with a six-cylinder engine cast in two pairs of three each, the inclusion of the exhaust passage within the main casting proved to be very faulty, and led to distortion of valves. In this case, however, thermo-syphon cooling was relied upon for the water circulation, and the majority of engines in which the exhaust manifold is not separate from the cylinders are fitted with pump circulation.

There seems to be a slight tendency towards the increase of cylinder bores, while crankshafts have undoubtedly increased in size. This leads one to the conclusion that periodic vibration is due to a large extent to over-strain on the shaft.

In very few instances were any means provided for cleaning the top of the piston and combustion head. With the majority of engines the only method of removing carbon deposit in a thorough manner is to take the cylinders off altogether, or one of the many chemical or oxygen processes.

As surmised previously, no new type of valve was exhibited. There is renewed evidence of the pains which have been taken in rendering the poppet valve engine reasonably silent. The Adler valve, B, Fig. 4, is a typical example.

The total number of cars exhibited at Olympia is 533. The countries of origin are as follows: Great Britain, 227; France, 163; Germany, 41; America, 34; Italy, 30; Belgium, 23; Switzerland, 6; Austria, 6; Holland, 3. This list includes not only vehicles exhibited by the manufacturers, but also includes those exhibited by various coach-building firms desirous of showing their work under favorable circumstances.

During the progress of the show Brooklands Track has been fully engaged, and some quite remarkable speeds have been attained. In the first place Christiaens, on a six-cylinder Excelsior car, 110 bore by 160 millimeter stroke, equalling 9,123 cubic centimeters piston displacement, beat the 50 miles world's record. His time was 29 minutes, 18.45 seconds, equalling 102.36 miles per hour. The half-mile was done at the rate of 108.3 miles per hour, and the one mile at 106.86 miles per hour. These figures, good as they are, were, however, on a recent trial badly beaten by Percy Lambert, with a four-cylinder Talbot car, 101.5

bore by 140 millimeter stroke, cubic capacity 4,531 cubic centimeters. In this instance the half mile was run at a speed of 113.28 miles per hour. The kilometer at 112.81 miles per hour, and the one mile at 111.73 miles per hour. The weight of the car with fuel, water and driver was 2,250 pounds. It was, therefore, obvious that the engine must have been developing quite 80 horsepower. The engine was in no way specially designed for racing purposes, but is one of the standard Talbot 25 horsepower motors. The carbureter was of the Stewart Talbot type, but of a larger size than that usually fitted. The tires were Palmer 820 by 120, which are now becoming quite standard tires in connection with Brookland records. The B. N. D. brand of steel piston and connecting-rods were used. The connecting-rods are of circular section, and only 1 millimeter thick. This gives one an idea of the extraordinary quality of the steel used. The Derihon shock-absorbers were fitted. These are quite a new type, and are on the principle that the suspension spring is free to move upward or downward from its normal position, and be checked only upon the return movement which follows this upward or downward displacement of the spring.

Digest of the Leading Foreign Journals

(*Continued from page 1162.*)

The approximate formula for the indicated horsepower of an engine is

$$\text{(2)} \qquad HP = \frac{S \times C}{60 \times 75} \times 2Np_i$$

in which S is the piston area in square centimeters, C the stroke in meters, N the number of revolutions, p_i the mean indicated pressure.

If f is the coefficient of the indicator spring in millimeters per kilogram of pressure, the mean indicated pressure is derived from equation (1) and has the value:

$$p_i = \frac{nk}{lf},$$

and equation (2) becomes:

$$HP = \frac{S \times C}{60 \times 75} \times 2N \times \frac{nk}{lf}.$$

Of all these values, it is noticed, the planimeter reading n is the only variable for the same engine [running at the same speed], so that, for this condition, one can write:

$$\text{(3)} \qquad HP = Kn,$$

K being a certain value with which the unit area of the planimeter can be identified by adjustment of the tracer arm.

[The author has mainly steam engines in mind, but the simplification seems applicable in practice to gasoline motors as well, if N is also singled out as a variable factor.—ED.]

If x is the coefficient corresponding to the data of the engine and k the actual planimeter unit, one has evidently: K equals $x - k$, and, to get a simple value for K, it suffices to adjust the planimeter unit on the basis that:

$$\text{(4)} \qquad k = \frac{K}{x}$$

With such an adjustment of the planimeter, the horsepower can thus be read directly from the planimeter on the basis of equation (3) [and allowance for variations in the engine speed may be made by means of an additional factor.—ED.]

Still more time may be gained by making use of rubricked paper, on which the diagrams are placed successively in the same position. The planimeter can then be held in the same position, and it suffices to take one reading at the beginning of the tracing of the diagrams and one at the end and to divide the difference between the two figures by the number of diagrams, thus obtaining without finicky calculations the mean indicated power which it is the object to ascertain [still on the supposition that the engine speed does not vary].—From *La Technique Moderne*, November 15.

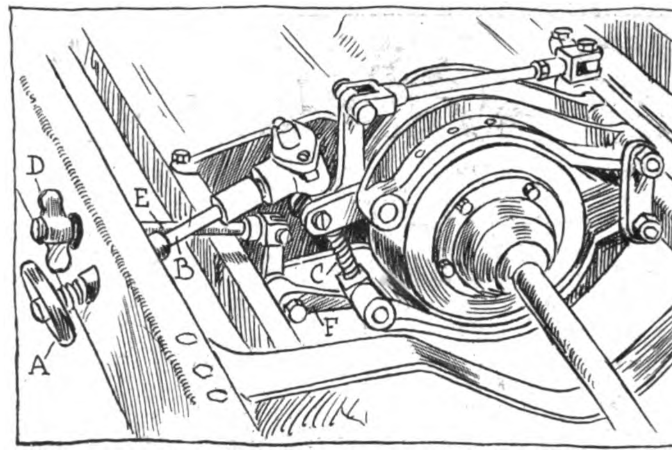


Fig. 11—Adjusting mechanism of the Standard Clutch

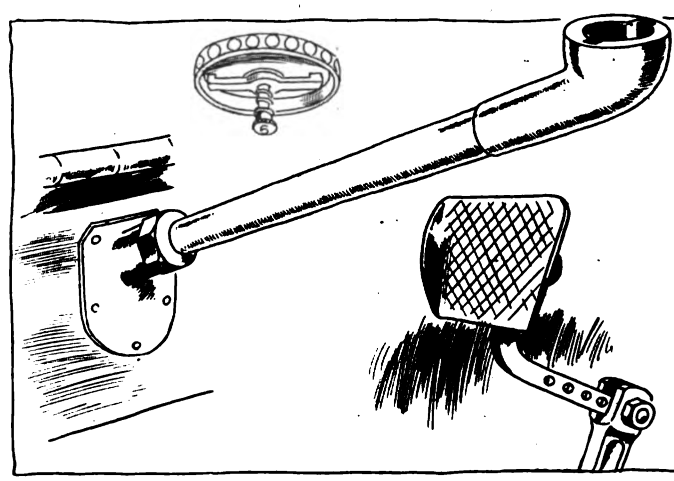


Fig. 12—Argyll gasoline filler pipe and Sunbeam pedal

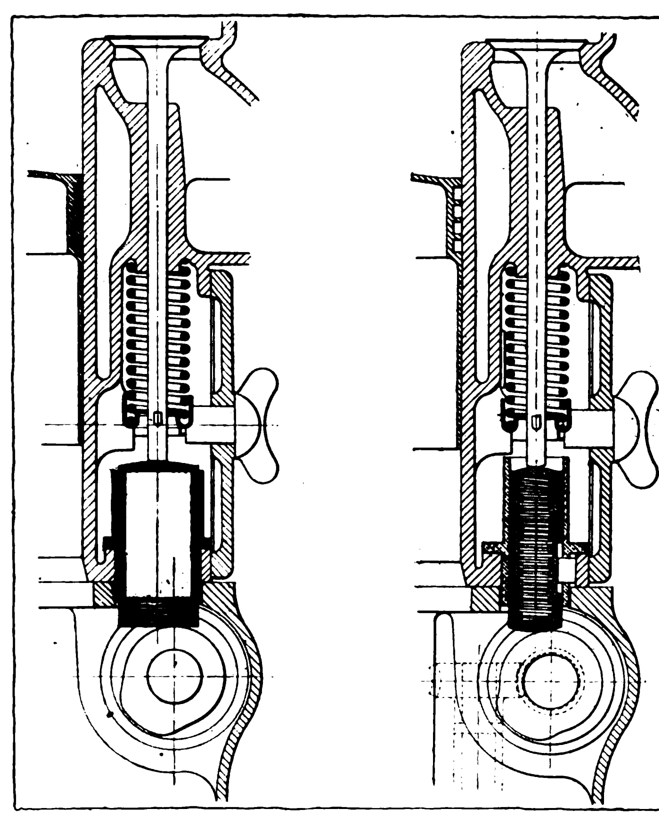
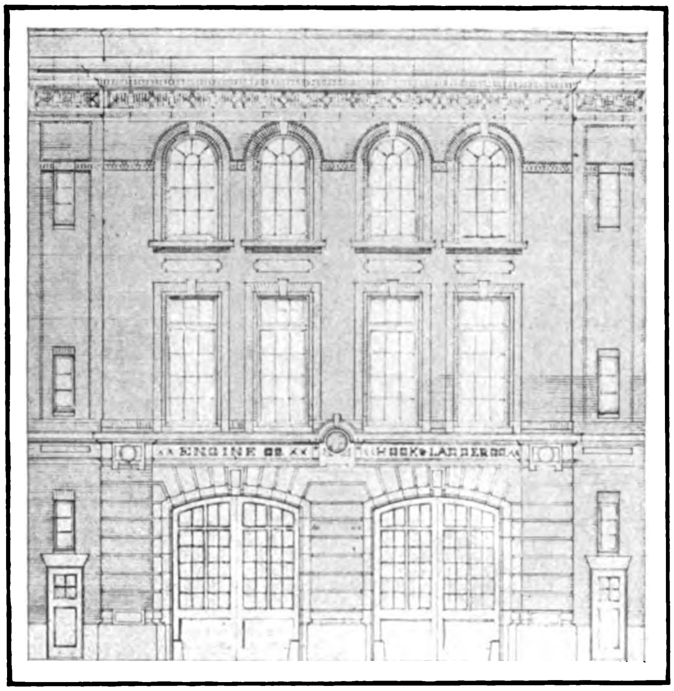


Fig. 13—Section through Germain valve, showing use of felt and springs in tappet mechanism



Front elevation of typical Brooklyn house

Gotham Is Building 45 New Fire Houses

(Continued from page 1153)

of the contract and the rest of the order is scheduled to come along at stated periods thereafter and the actual installation will commence shortly.

The first lot of hose wagons, consisting of five units, has been delivered and the story of the test to which they were submitted reads like a road race. The cars start from Broadway and Fifty-seventh street, work north through traffic to Van Cortland Park, swing east to the Concourse and thence south on the Concourse through the heart of the Bronx and back to the point of starting.

In order to cover this course of 20 miles in an hour, it is necessary to touch a speed of 35 miles an hour once in a while. On the Concourse the maximum speed test is applied and the car must maintain a speed of 30 miles an hour over at least 1 mile. Such speed on solid tires is quite a strain on cars and men.

The motor is of four cylinders 4 1-2 by 5 1-2 and rated at 32 horsepower. The fire-fighting equipment is similar to that in use in the department. There is no material variation from the prevailing type of bodies.

These wagons will be used where quick action is the prime essential. It has been found that fire losses mount up geometrically in the ratio of delay in extinguishing the blaze. Mrs. O'Leary's cow kicked over a lantern which started the conflagration that destroyed Chicago. If the late Mrs. O'Leary had summoned the fire department and if the fire department had rushed one of the new hose wagons to the historic barn with a charge of chemical extinguisher, the history of the republic might have been changed. Measured in minutes saved, the efficiency of a fire department equipped with swift wagons fitted for fighting and conquering small blazes is vastly higher than where time must be lost in getting the heavier apparatus into action. Minutes literally mean millions in fire department terminology.

The next lot of apparatus under contract consists of twenty-eight steam fire engines drawn by tractors. These are to be furnished by the American-La France company. In bidding for the job this company had an advantage in that it specializes in fire engines. The tractors are to be of the two-wheel type driven by four-cylinder, four-cycle, water-cooled motors capable of developing a speed of 25 miles an hour and a sustained speed of 20 miles an hour for at least an hour through city traffic. The recommended standards of the S. A. E. are specified for the guidance of bidders. One feature of this lot of apparatus is that the specifications require that the tractor shall be easily detachable from the fire engine so that in case of failure of the propelling power or for other reasons horses may be substituted with minimum loss of time in emergencies.

An alternative tractor, the generative power for which shall be furnished by a 40-horsepower gasoline engine producing electric current for final drive, which must conform to the speed tests required of the foregoing type of tractor, is allowed under the specifications. The contract was let August 15 and the first block of five is due in 120 days from that date. The remainder must be delivered within 120 days thereafter.

The contractor is obliged to guarantee the machine for 3 years after delivery against the results of poor material or poor workmanship. The contractor has given a bond to the city amounting to half of the contract price conditioned upon the terms of the guarantee.

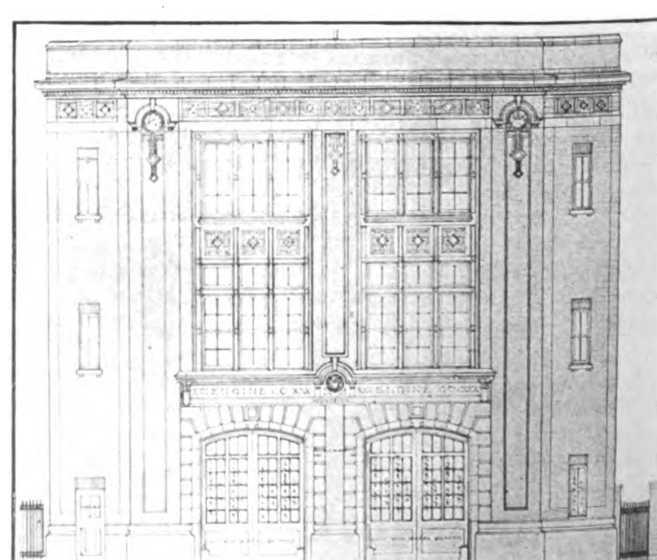
The contract just let for the tractor trucks provides for motors of the same general type as those called for in the case of the steam fire engines. The specifications call for automobiles standardized under the S. A. E. recommendations. The same option is given under them to supply gasoline generators with final drive by electricity. The tractors must be able to cover 20 miles within an hour through city traffic.

The trucks must all be delivered within 300 days of the execution of the contract, but some of them must be ready in 180 days.

Eighty-five Pieces in Apparatus Order

The whole order for new equipment amounts to eighty-five pieces and is not sufficient to supply the needs of the new houses. It will be necessary to purchase and install somewhere in the neighborhood of $500,000 worth more apparatus before the full capacity of the houses is filled, but in the meantime there will be enough of the new machines in daily service to test out the main idea underlying motorization.

This order is not in present contemplation, but will probably be taken up during 1913. If the new equipment answers requirements the displacement of horses will probably commence on a permanent basis not later than the beginning of 1914. It will not be on a wholesale scale such as might be indicated by the present additions, but will be accomplished gradually as the veteran horse-drawn equipment shows signs of faltering.



Bronx double house, 8 feet narrower than old type

The shadow of doubt as to the complete success of the present plans for motorization is founded upon some of the experiences of the past when makeshift mechanism failed to justify preconceived hopes. On the face of the specifications and contracts awarded for the new equipment this doubt appears to be unjustifiable, particularly in view of the fact that it has been definitely proven that the horse is extravagantly inefficient in long distance work.

The chief faults that have been found with relation to the automobile equipment that has been installed by the department, are lack of speed in some of the pieces; and the tendency to break down either through accident or otherwise. Part of the responsibility must be laid at the doors of the apparatus and at least a large part to the inexperience of the men who handled it.

In order to correct the first fault, the department has striven to secure better settled apparatus and to do away with the latter objection, it has installed a school of instruction that is designed to convert a plain fireman into a competent chauffeur and mechanic. This school turns out classes of graduates in 90 days and has been extraordinarily active in preparing for the reception and installation of the new machinery.

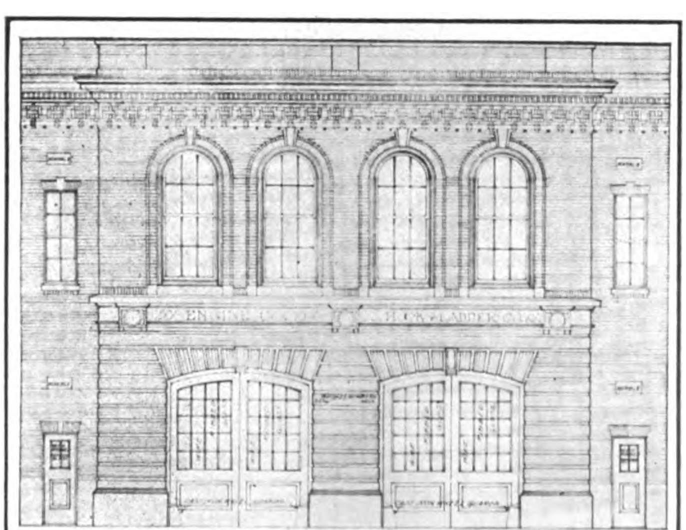
The original plan of the department included provision for a big municipal automobile factory. It was intended to erect a repair plant at a cost of $1,000,000 and to provide for manufacturing at subsidiary plants. The whole cost of operation was estimated at $3,000,000. But the authorities who have the veto power in such matters refused to sanction the appropriation. In case the plan had been adopted the department would have been in position to manufacture its own apparatus but it was shown that the cost would have been too high and in any new project of such scope the chance for failure must be reckoned.

The orders for fire apparatus given by the department are by far the largest group of orders ever placed for automobile fire apparatus.

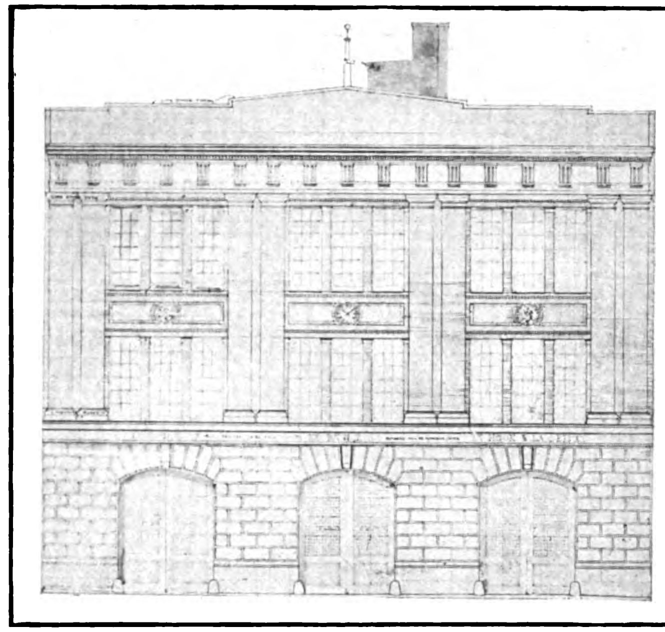
Harking Back a Decade

From *The Automobile and Motor Review,* December 6, 1902:

WITH a field of twenty starters and a number of outside cars, the Automobile Club of New Jersey held a successful hill-climb on Eagle Rock Hill on Thanksgiving Day. The day was gloomy and rain fell before and during the contest, turning the hill into a sheet of slippery mud. The course is 9 furlongs and the rise is 360 feet, maximum grade 17 per cent. W. J. Stewart in a Locomobile made the fastest time, covering the course in 2:58¾. The cars were classified by motive power and weight. The average time made was 4:43. Secretary S. M. Butler of the Automobile Club of America with a Mors timing instrument was in charge of the recording of the trials.



Big double house located in populous part of Queens



Triple house which will be equipped with six automobiles

Pronunciation of the names of French cars is still one of the puzzling things to American automobilists. De Dion-Bouton is about the worst thing for them to handle, but C. G. V. and Gillet-Forest are close competitors.

Col. John Jacob Astor has offered to subscribe $10,000 to aid in the construction of the national highway, on condition that the road run on the east bank of the Hudson, instead of the west bank. The suggestion has been made that the national government might be persuaded to appropriate $2,000,000 to construct a series of 40-mile stretches in each of the five districts comprised in the proposed road from New York to San Francisco

Mrs. J. B. Gibson of New York has just completed a 4000-mile tour through Europe in her new Panhard. She declares that the German officials were particularly pleasant in administering the laws and that she was not obliged to register in crossing the border or to carry numbers or initials to identify the car.

King Leopold of Belgium has commenced work on the preliminaries of a project to connect Ostend with Paris by a fine boulevard. Within the boundaries of Belgium the chief work required will be the substitution of macadam for the granite blocks that now extend from Ostend to Dunkergue. It is intended to have the road finished by July, 1903.

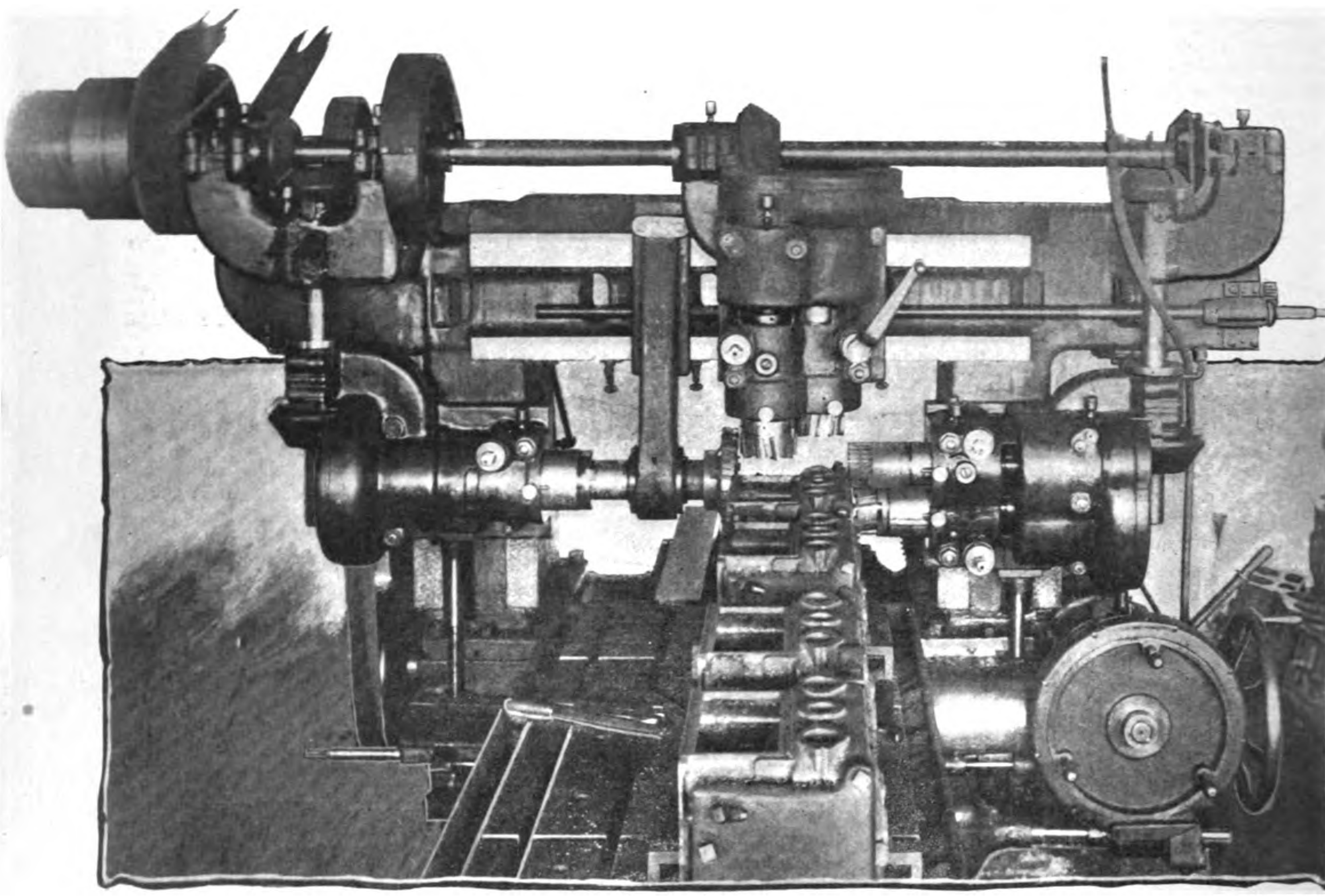
Kenneth A. Skinner of Boston recently made the round trip from that city to New York and return, 488 miles, in 35 hours elapsed time. He used an 8-horsepower De Dion, 1902 model.

The American idea of quantity production has been adopted by some of the French automobile factories. Jigs and templets have displaced manual skill at the Darracq and De Dion factories and a production of 2000 of the latter vehicles has been announced for next year.

F. T. F. Lovejoy, secretary of the Carnegie Steel Company at Pittsburgh, has let plans for the building of a private automobile stable or garage to cost $175,000. Mr. Lovejoy has eleven cars ranging all the way from a 40-horsepower racer to a small car for boulevard work.

Licensing of all drivers of motor vehicles is being discussed in New York City and an open hearing on the subject will be held shortly. The national organizations do not object to licensing the drivers, but they protest that the legislation should be by the state and not by the city.

A Winton car has been entered for the next Gordon Bennett cup race which will be run in Ireland or France next year.



Cylinder milling machine in use in the factory of the Velie Motor Vehicle Company, Moline, Ill.

THE above machine mills eight Velie cylinders at a time. This machine saves time and pays for itself in a short time—besides, and what is more important, it does the work well. In a factory where the uniformity of product and interchangeability is made an aim, a machine that will do the work rapidly is of special interest. This particular milling plant has a bed which supports four blocks of cylinders at a time. It has five simultaneously operating cutters which are shown in position. One man handles the machine. He can set up a job in 5 minutes and in 20 minutes more he will have milled a block of cylinders. This gives the Velie plant an output of 30 blocks of cylinders per day or enough for fifteen motors. Since the total production of the company is about fifteen motors a day this machine just takes chare of the output. The way the machine saves money is this: The Velie concern used to mill one block at a time. It took a longer time for the milling job and about the same time for setting up. In other words, 40 minutes was lost on each cylinder. 1,200 minutes per day's output—20 hours! This is equal to the work of two machines each working 10 hours a day. It is readily realized how valuable such a machine is as a time-saver.

NEW Timken-Detroit Building—Work on the new three-story and basement addition to the Timken-Detroit Axle plant, Detroit, Mich., is being pushed rapidly. The brick and steel structure is 60 feet wide and 275 feet long. On the first three floors the materials used in the manufacture of axles will be stored. On the top floor the general offices of the company will be located. This is the second big addition which has been erected within the year. The two buildings will increase manufacturing space about 33 1-3 per cent. New machinery worth $100,000 will be installed and 300 more men employed. The accompanying illustration shows the factory.

Chalmers Adds—The Chalmers Motor Car Company, Detroit, Mich., has begun the construction of a one-story brick addition to its factory.

Plant Has Fire—Fire which started with a gasoline explosion did $20,000 damage in the Nyberg Automobile plant, Chicago, Ill. No one was injured.

Anderson Resigns—Ross Anderson, for the past 3 years factory superintendent of the American Locomotive Company, Providence, R. I., has resigned his position to take effect January 1.

Brown Company's Plant—The John W. Brown Manufacturing Company, Columbus, O., will soon award the contract for the construction of a large addition to its plant. The company manufactures automobile lamps.

Moon Installs Machinery—The Moon Motor Car Company, St. Louis, Mo., recently installed a considerable amount of new machinery in its rear axle department. That department is now equipped to turn out a new rear axle every 20 minutes.

Lamp Company Builds—The Guide Motor Lamp Company has had plans prepared for the general contract for a new factory building to be erected in Cleveland, O. Plans call for a two-story and basement brick, steel and reinforced concrete building about 60 feet by 130 feet in dimensions, with cement and oak floors, electric lights, steam heat and a composition roof.

Kelsey Plant Damaged—The plant of the Kelsey Wheel Company, Detroit, Mich., was damaged by fire last month to the extent of $5,000. The origin of the blaze is unknown.

Michigan Steel's Addition—The Michigan Steel Castings Company, Detroit, Mich., has purchased a piece of property adjoining its present plant at Atwater and Guoin streets for an addition to its factory. The plot measures 92 feet by 190 feet.

Work on Dunkirk Factory—Work was begun on the construction of the plant at Dunkirk, N. Y., for the Niagara Gasoline Motor Company, which concern recently moved from Buffalo to that town. The building will be erected on Brigham road near the Lake Shore tracks.

Alco Factory in Detroit—It is reported that the American Locomobile Company is seriously considering the movement of the company's automobile factory from Providence, R. I., at Detroit, Mich., to manufacture the Alco car and that the committee is negotiating with the creditor's committee of the Grabowsky Power Wagon Company.

Racine's Radiator Company—The Perfects Radiator Company, of Chicago, Ill., has moved to Racine, Wis., and established a workshop on Fifteenth street and the Northwestern tracks. The production consists of motor car radiators, pumps, and other cooling devices. Twenty hands are employed and the force will be increased as needed.

Stove Works for Auto Plant—The Palmer-Moore Company, Syracuse, N. Y., has bought the plant of the Syracuse Stove Works in North Geddes street and will use the buildings to manufacture motor trucks. T. W. Meachem recently bid in the stove works buildings for $20,000 at a bankrupt sale. It is understood the creditors sold to the Palmer-Moore company at an advanced price. The property has been appraised at $75,000.

Lambert's Three Factories—In addition to the factories of the Waterman Company and the Monarch Electric Company, St. Lambert, Can., is to have a third factory which will engage in the manufacture of auto trucks. Mr. George Charrier, representing the Gearless Autotruck Company, yesterday purchased lots comprising about 10,500 square feet. On this it is the intention to erect a three-story steel and concrete building to be exclusively devoted to the manufacture of trucks for various purposes built according to an invention of Mr. Charrier.

Negotiating for Site—Negotiations are in progress for a site for a large plant to manufacture electric automobile tranmissions in Cleveland, O. It is stated that the new transmission, which can be attached to any gasoline motor-driven automobile, eliminates the present gear-driven transmission clutch, flywheel, heavy self-starter and the generator for the charging of batteries now part of automobile equipment. It has not yet been decided whether the new company will manufacture complete cars with the new electric transmission, or whether the gasoline and new electric transmission only will be manufactured and sold to makers of automobiles.

The Automobile Calendar

Shows, Conventions, Etc.

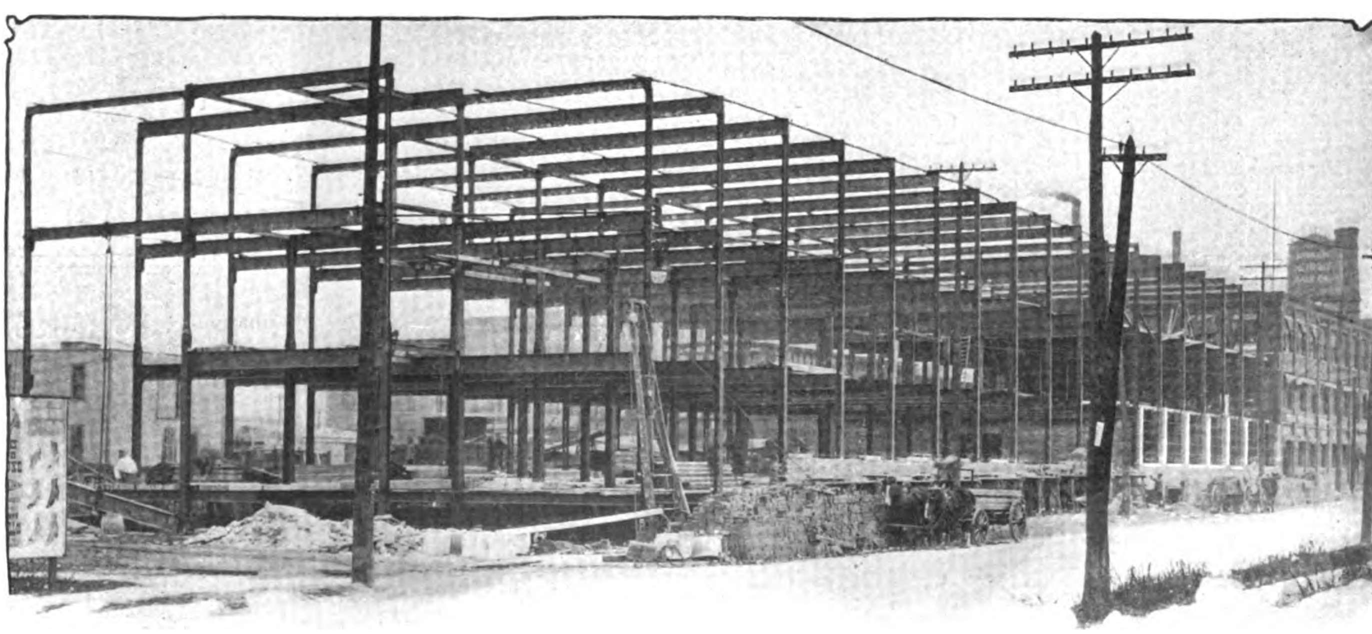
Jan. 2-10..........New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 4-11..........Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-18..........Milwaukee, Wis., Annual Show, Auditorium, Milwaukee Automobile Dealers' Association.
Jan. 11-25..........New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25..........Philadelphia, Pa., Annual Automobile Show.
Jan. 21-26..........Toledo, O., Annual Show, Exposition Building, Toledo Automobile Shows Company.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Buffalo, N. Y., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1.....Ottawa, Ont., Ottawa Motor Show, Howick Hall, Louis Blumenstein.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8..........Chicago, Ill., Annual Automobile Show.
Feb. 10-15..........Chicago, Ill., Truck Show.
Feb. 10-15..........Minneapolis, Minn., Annual Automobile Show.
Feb. 12-15..........Geneva, N. Y., Automobile Show, Armory, Louis Blumenstein.
Feb. 15-22..........Newark, N. J., Annual Automobile Show, First Regiment Armory, New Jersey Automobile Exhibition Company.
Feb. 17-22..........Kansas City, Kan., Annual Automobile Show.
Feb. 18-22..........Baltimore, Md., Annual Show, B. A. D. A.
Feb. 20-22..........Canandaigua, N. Y., Automobile Show, Louis Blumenstein.
Feb. 24-Mar. 1.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1.....Paterson, N. J., Annual Show, Paterson Automobile Trade Association.
Feb. 26-Mar. 1.....Glen Falls, N. Y., Automobile Show, Louis Blumenstein, Manager.
March 3-8..........Pittsburgh, Pa., Annual Automobile Show.
March 8-15..........Boston, Mass., Annual Automobile Show.
March 12-15.......Ogdensburg, N. Y., Automobile Show, Louis Blumenstein, Manager.
March 18..........Syracuse, N. Y., Annual Show, Syracuse A. A.
March 19-26.......Boston, Mass., Annual Truck Show.
March 20-24.......New Orleans, La., Annual Show, N. O. A. D. A.
March 24-29.......Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

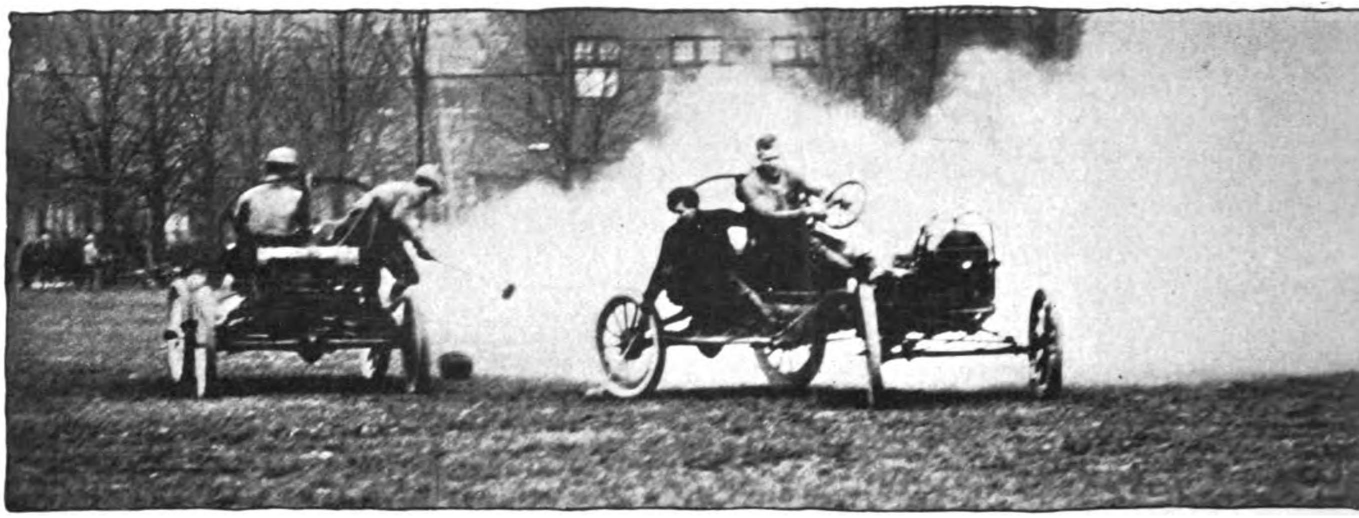
May 30...........Indianapolis, Ind., 500-Mile Race, Speedway.

Foreign

Dec. 7-22..........Paris, France, Paris Automobile Show, Grand Palais.
Jan. 11-22..........Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.
March ....France, Sealed Bonnet 3000-Mile Run.
April ....Barcelona, Spain, International Exhibition.



Three-story and basement addition to the Timken-Detroit axle plant now in process of construction in Detroit



Trying out the new game of automobile polo in Detroit, Mich. The circular bridge steel support on the cars is for the protection of the drivers in the event of the machines turning turtle as they frequently do in this pastime

AUTOMOBILE Polo New Sport—Upsets, bursted tires, buckled wheels, marked the Detroit, Mich., trial game of polo with automobiles. This game has proved most exciting. Two Ford cars were used. These were stripped for action until they consisted of but the chassis, with but one seat, one running board and the engine. When the cars have lined up at the goal posts with the ball directly in the center of the field, the official in charge fires a pistol and they rush at the ball in the center. From then on the elusive ball is sought, incurring upsets and all manners of accidents. The accompanying photograph shows the cars in action.

Washington Goodrich Moves—The Diamond and Goodrich tire depots, Washington, D. C., have been removed from 1319 Fourteenth street to larger quarters at 1502 Fourteenth street.

Opens Branch Office—F. M. Russell, manager of the Puyallup Garage and Pierce County agent for the Essenkay tire filler, has opened a branch office in Tacoma, Wash., at 902 Tacoma avenue.

Want Show Representation—Sixty per cent. of the Seattle, Wash., dealers have signified their intention of seeking representation at the automobile show to be held in the Armory, December 16 to 21.

Linteau Promoted—J. O. Linteau, of P. T. Legare, of Quebec City, Can., has been promoted to the managership of the Montreal branch of Legare-Gadbois Automobile Company, Ltd., succeeding M. J. Gadbois.

Philadelphia Company Moves—The American Automobile Company, Philadelphia, Pa., has removed from the southwest corner of Broad and Callowhill streets to its new sales and service building at 2116 Market street.

Syracuse Has New Garage—The Jefferson Garage Company, Syracuse, N. Y., central New York distributors for National and Hupmobile pleasure cars and the International Harvester truck, has opened a new fireproof garage.

Mineter with Rayfield—N. H. Mineter is now associated with Findeisen & Kropf Manufacturing Company, of Chicago, Ill., as factory sales manager. He will in future represent the Rayfield carbureter throughout the country.

Fire Truck for Ottawa—Ottawa, O., has just received a $5,500 automobile fire truck, which has already been demonstrated. It is 70 horsepower, and capable of making 60 miles an hour. It will carry 1,000 feet of hose and a dozen men.

Troutman Resigns—J. F. Troutman, manager of the sundry department of the Franklin Automobile Company, Syracuse, N. Y., has severed his connections with that company to take up work with the H. A. Smith Machinery Company of that city.

E. L. Retting as Wholesale Agent—A direct factory branch of the Federal Rubber Company has been opened at 361-363 Golden Gate avenue, San Francisco. E. L. Retting will act as wholesale agent and Mohring Bros. will act as retail distributors in San Francisco.

Meet Highway Commission—More than 100 members of the East St. Louis Commercial Club, St. Louis, Mo., motored to Collinsville, Ill., recently to meet the Illinois State Commission which is touring the several suggested routes for the new State Highway.

Lu Lu Club's Election—The following nominations for officers and board of governors of the Lu Lu Temple Automobile Club, Philadelphia, Pa., have been made: president, Joseph Way; vice-president, C. L. Martin; secretary, H. S. Evans; treasurer, W. C. Buck.

Retail Department Transferred—The retail selling department of the Studebaker Corporation, Philadelphia, Pa., has been transferred to the Wallace Automobile Company, which has secured new and enlarged quarters at the southwest corner of Broad and Callowhill streets.

Building Moline Garage—Fred R. Young is building a new garage on Sixth avenue, Moline, Ill., to be completed January 15. The building will be of brick, 45 feet by 150 feet in dimensions, two stories in height, to cost $20,000. The building will be known as the Plow City Garage.

Tractors for Farm Work—J. J. Dauche, a Sandusky, O., manufacturer, has organized a company to manufacture a gasoline tractor, especially adapted to farm work. It is the aim of the promoters of the concern to develop a tractor which will take the place of horses for all farm work.

Commercial Company's New Quarters—The Commercial Automobile & Supply Company, Washington, D. C., Studebaker agents, have leased the first floor and basement of the Pope building, formerly occupied by the Pope Automobile Company, and after extensive alterations will take possession about February 1, 1913.

New Orleans Show in March—This year's New Orleans La., 5-day automobile show will be held March 20-24. It has been decided by the Dealers' Association after the minority had worked hard for an earlier show. It was decided also to hold two shows each year beginning with 1913. The second show next year will be held in November and will be made an annual feature.

New Agencies Established During the Week

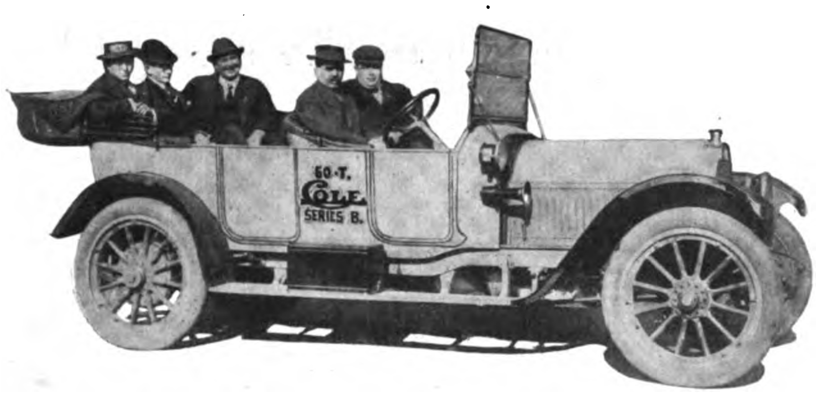
PLEASURE CARS

Place	Car	Agent
Akron, Colo	R-C-H	G. MacDonald
Albuquerque, N. M	Haynes	C. T. Williams
Aledo, Ill	Moon	E. B. Miller
Alliance, Neb.	Mason	N. C. Pederson
Amityville, L. I	Franklin	A. R. Quick
Amarillo, Tex.	R-C-H	Lon Sellars
Baltimore, Md.	Little	Auto Outing Co.
Berlin, N. H.	R-C-H	W. G. Dupont
Brighton, Ill.	Empire	W. G. Hunt
Broken Bow, Neb.	Cartercar	Bromen Bow Auto Co.
Cambridge, O..	R-C-H	J. B. Siegfried
Canton, O	Moon	Auto Service Co.
Canton, O	R-C-H	A. H. Wilson Motor Car Co.
Carmi, Ill.	Empire	J. F. Orr
Carlisle, Pa..	Empire	Cumberland Valley Gar.
Central City, Neb	Michigan	Linderman & Blake
Charleston, Mo.	Moon	Luke Howlett
Cincinnati, O.	Empire	Commercial Motor Sales Co.
Dallas, Tex.	R-C-H	Davis & Turney Auto Co.
Danube, Minn.	R-C-H	.. F. Schroeder
Des Moines, Ia.	Empire	rtercar Iowa Co.
Des Moines, Ia.	Haynes	Lagerquist Carriage & Auto Co.
Delhi, Minn.	R-C-H	Kunde A. Knudson
Edgeley, N. D.	R-C-H	A. M. Hodge
Elliott, Ia	Michigan	M. Lembke
El Paso, Tex.	Haynes	W. F. Payne
Englewood, N. J.	Haynes	Stillman & Hoag
Evanston, Ill.	R-C-H	Fancher Bros.
Fall River, Mass.	Franklin	Eckberg-Place Gar. Co.
Freeport, Ill.	Haynes	Seth Scott
Fullerton, Neb	Cartercar	T. M. Sheath
Galion, O.	Empire	Galion Motor Car Co.
Garske, N. D	R-C-H	R. J. Orchard
Gaylord, Minn.	R-C-H	N. C. Doering
Geneva, Neb.	Nyberg	W. H. Menking
Greentown, Ind.	Empire	H. F. Wagner
Greenville, S. C.	Empire	Ellis Car Co.
Hackensack, N. J.	R-C-H	Beyer & Feakes
Hannibal, Mo.	Moon	Long Mfg. Co.
Hartington, Neb	Studebaker	Nelson & Roskopf
Hastings, Neb	Cartercar	C. W. Jacobs
Hicksville, N. Y.	R-C-H	Karlson's Garage
Hillsboro, Tex.	R-C-H	Walter-Hafner Jewelry Co.
Houston, Tex.	Haynes	Gulf Motor Car Co.
Ipava, Ill.	R-C-H	E. J. Weese
Ipswich, Mass.	R-C-H	E. C. Currier
Jackson, Miss.	Haynes	Floyd Willis
Kansas City, Mo.	Empire	England Bros. Motor Co.
La Carne, O	Empire	W. S. Woodring
Lancaster, Pa	Haynes	Butzer Bros.
Lincoln, Neb	Studebaker	Wertz Auto Co.
Los Angeles, Cal	Empire	Greer-Robbins Co.
Loveland, Colo	R-C-H	Ray Danner
Madisonville, O.	Franklin	W. G. Blaney
Malvern, Ia	Nyberg	I. G. Bliss
Mancos, Colo	R-C-H	G. D. Woods
Mascoutah, Ill	Empire	Schoepp & Karch
Mason City, Ia	Haynes	M. J. Lyons
New Haven, Conn	Moon	J. J. Laverty
New Haven, Conn	Stutz	Stutz Auto Co.
New London, Conn	Stutz	Stutz Auto Co.
New Orleans, La	Haynes	Demack Motor C. Co.
Odell, Tex	R-C-H	B. D. Smith
Ogallala, Neb	Studebaker	Jay Ellingsworth
Olean, N. Y	R-C-H	G. R. Daniels
Olsen, N. D	R-C-H	Martin Rimestad
Omaha, Neb	Haynes	Drummond Motor Co.
Orange City, Ia	Moon	Aerotte Van Der Wilt
Orleans, Neb	Cartercar	Lideen Hardware Co.
Pender, Neb	Empire	Silas Lieb
Petersburg, Va	Moon	Wm. P. Atkinson
Pompton Plains, N. J.	Empire	W. H. May
Portland, Me.	Flanders	Speare Auto Co.
Quincy, O.	Empire	Haines Bros.
Richmond, Va.	Haynes	Alsop Motor Co.
Roanoke, Va.	Haynes	J. E. Hunter
Rochester, N. H.	R-C-H	W. H. Carll & Sons
Rosenberg, Tex.	Moon	Rosenberg Auto Co.
Roswell, N. M.	Haynes	C. T. Williams
Schaller, Ia.	Moon	E. F. F. Hasseler
Schenectady, N. Y	R-C-H	W. D. Havens
Schleswig, Ia	Michigan	G. T. Hollander
Scribner, Neb	Nyberg	W. A. Kurz
Sheboygan, Wis.	Cadillac	Clarence Garton
Sheboygan, Wis.	Kissel Kar	Sheboygan Auto & Supply Co.
Superior, Neb	Rambler	Jack Galbreth
St. Louis, Mo.	Cutting	Rindell Auto. & Repair Co.
St. Louis, Mo.	Empire	Johnson Auto. Co.
Toledo, O.	Empire	Crist Motor Sales Co.
Toronto, Can.	Moon	Auto. Sales Co., Ltd.
Taylor, Tex	Moon	Prewitt Auto Co.
Texarkana, Tex-Ark.	Moon	Paul Jones
Terre Haute, Ind.	R-C-H	Terre Haute Machine Works
Vermillion, S. D.	Haynes	M. L. Thompson
Wall Lake, Ia.	Moon	Hopkins & Harrig
Waterloo, Ia.	Haynes	J. C. Hileman & Son
Waterville, Me.	R-C-H	Elm City Publishing Co.
Winfield, Ia.	Moon	Nesbitt Auto & Supply Co.
Wooster, O.	R-C-H	J. N. Ginter
Yankton. S. D.	Moon	F. J. Nyberg
Whitehall, Md.	Ford	Anderson & Wiley

COMMERCIAL VEHICLES

Place	Car	Agent
Allentown, Pa.	Stewart	Allen Motor Co.
Baltimore, Md.	Stewart	R. Stuart Beaver
Cleveland, O.	Stewart	H. E. Ricker & Co.
Columbus, O.	Federal	Coates Motor Co.
Columbus, O.	Gramm	O. G. Roberts & Co.
Birmingham, Ala.	Federal	Birmingham Motor Co.
Buffalo, N. Y.	Stewart	Reinold Bros.
Edmonton, Alb.	Stewart	Northrup Motor Service Co.
Houston, Tex.	Stewart	Young & Dwire
Kansas City, Mo.	Gram	Bond Motor Co.
Los Angeles, Cal.	Stewart	Albert Biner
Nashville, Tenn.	Stewart	Martin & Crocker
Philadelphia, Pa.	Stewart	Gomery-Schwartz Motor Car Co.
Portland, Ore.		
Rochester, N. Y.	Stewart	Coast Commercial Car Co.
Salem, Mass.	Stewart	Mandery Motor Car Co.
	Stewart	North Shore Motors & Service Co.
San Francisco, Cal.		
San Francisco, Cal.	Kissel Kar	J. W. Leavitt & Co.
Savannah, Ga.	Overland	J. W. Leavitt & Co.
	Stewart	Savannah Motor Car Co.
St. Louis, Mo.	Stewart	Federal Truck Co. of St. Louis
St. Paul, Minn.	Stewart	Borg & Wharry Motor Co.
Toledo, O.	Gramm	Landman & Griffith
Utica, N. Y.	Stewart	Crim-Bronner Auto Co.
Wilkes-Barre, Pa.	Stewart	Koons & Hallier

The Day School of the Boston Y. M. C. A. on a recent tour of inspection through the service department of the Packard Motor Car Company in that city



President J. J. Cole, of the Cole Motor Car Company, Indianapolis, Ind., at the wheel of the new 6-60 model

Fresno has 2,000 Cars—Fresno, Cal., has over 2,800 registered cars and the county has over 4,000.

Membership Campaign Successful—The membership campaign waged by the Vancouver, B. C., Automobile club is meeting with success.

Illinois Registration Statistics—Automobile license, issued in the state of Illinois from January 1 to September 30, inclusive, numbered 65,299.

Jacobson in Metal Field—I. M. Jacobson & Sons, Detroit, Mich., are operating a company for the sale of strictly pure metals of every description.

New York Club's Membership—The New York Motor Club, New York City, now has nearly 140 members and expects to have 200 by the time the show opens.

Wagner with Garford—H. A. Wagner has left the Peckham Motor Car Company, Dayton, O., and is now connected with the sales department of the Garford Company, Elyria, O.

Italian Imports in 1911—During the 1911 season the imports of Italian automobiles to the United States was valued at $186,746, as against $295,013 in 1910 and $674,666 in 1909.

Tri-City Traffic Resolution—Davenport, Rock Island and Moline automobile men at a meeting at Davenport, Ia., last week, unanimously adopted a resolution favoring uniform traffic ordinances for the tri-cities.

New Headquarters—Frank G. Miner, Southern California distributor of Kelly trucks has opened headquarters at South Grand avenue, Los Angeles, where the Southern Pacific coast distribution will be centralized.

Wells Changes—J. R. Wells, formerly sales manager for Legare-Gadbois Automobile, Ltd., Montreal, Que., has resigned his position to take up similar duties with the Motor Import Company, of Canada, Ltd., this city.

W. E. Bayless Appointed—W. E. Bayless, formerly Seattle manager for Fisk Rubber Company, has been appointed to succeed the late Tom Rawlins, who died several weeks ago, as manager of the San Francisco branch.

Use American Tires—Taxicabs in Norway, Sweden, Denmark and Finland will run on American tires. A contract for 750 sets of tires for use on taxis in these countries has just been closed between a Stockholm and American firm.

J. R. Thomas Appointed—J. R. Thomas, who has been manager of the Washington, D. C., branch of the United States Motor Company since March, 1910, has been made manager of the branch at Philadelphia, Pa. He has been connected with motor industries in Washington since 1905.

Anderson Resigns—D. G. Anderson, who has been cost accountant of the Russell Motor Car Company, Ltd., Toronto, Can., has resigned his position with that company to take effect at once. Mr. Anderson has been appointed the purchasing agent for the Tudhope Motor Car Company, Ltd., of Orillia, Can.

Syracuse Show in March—The Syracuse Automobile Association, Syracuse, N. Y., announces that the next show will begin Tuesday evening, March 18, and the main show will be held at the Armory. If the number of exhibitors warrants it the Alhambra will also be engaged and two shows held, as last year.

Henderson Starts Western Tour—O. B. Henderson, sales manager of the Baker Motor Vehicle Company, Cleveland, O., started the latter part of November for his annual tour through the western part of the United States for the purpose of visiting dealers, particularly those located along the Pacific coast.

Tudhope's $50,000 Building—The Tudhope Motor Car Company is putting up a $50,000 building in Vancouver, B. C. The new structure will be a combined show room, garage and machine shop. It will cover an area of 75 feet by 125 feet at the corner of Fifteenth avenue and Granville street. It will be two stories high, of concrete construction.

Atkinson Severs Connections—C. J. Atkinson, inventor and patentee of the Atkinson gas producers, has severed his connection with the Dornfeld-Kunert Company, Watertown, Wis. Mr. Atkinson's services and the use of all his patents have been secured by Fairbanks, Morse & Company, Chicago, Ill.

Centaur in Larger Quarters—The Centaur Motor Company, Chicago, Ill., distributers of the Abbott-Detroit line of automobiles, will shortly take possession of the new premises located at 2246 and 2248 Michigan avenue, Chicago, Ill. The new building has a frontage of 40 feet on Michigan avenue and extends back 170 feet, and is three stories high. It will be completely equipped.

France Buying Our Cars—In the past 10 months the value of French imports of American machines has been $340,000 in excess of the total value of the imports of the 10 months of the preceding year. At the same time, so far from losing ground on this side, French makers of automobiles de luxe have doubled their exports to America during the present year, the total up to October 31 representing a value of $800,000.

Ontario's Revenue Doubled—Ontario's revenue last year from the sale of licenses for motor vehicles totaled $50,831.25, twice the amount received during the year 1910, which was $24,394. The revenue for 1906, the first year fees were imposed, was only $15,235.15. The licenses issued last year totaled 11,339, and for 1910, 4,320, while in 1906, 1,176 licenses were issued. Fees collected for issuing charters to automobile corporations totaled $235,663.10.

Baltimore Show in February—The Baltimore, Md., show will be held this winter from February 18 to 22 inclusive. The

Automobile Incorporations

AUTOMOBILES AND PARTS

Buffalo, N. Y.—Empire Radiator Company; capital, $1,000,000; to manufacture automobile radiators. Incorporators: E. B. Green, W. S. Wicks, C. J. Ellis.

Chagrin Falls, O.—Falls Garage Company; capital, $100,000; to manufacture and deal in automobiles. Incorporators: O. S. Gore, T. O. Waite, H. D. Bishop, T. H. Huggett, A. E. Huggett.

Cleburne, Tex.—Cleburne Motor Car Manufacturing Company; capital, $10,000; to manufacture automobiles. Incorporator: H. E. Luck.

Colonial Beach, Va.—Colonial Beach Motor Company; capital, $5,000; to manufacture automobiles. Incorporators: F. W. Alexander, George Staples, H. W. B. Williams.

Chicago, Ill.—Edgar Motor Delivery; capital, $10,000; to manufacture automobiles. Incorporators: J. Edgar, E. A. Zimmerman, Abram L. Meyers.

Chicago, Ill.—Molliter Tire Company; capital, $100,000; to manufacture automobiles. Incorporators: Benjamin S. Lippincott, Bion D. Towne, William J. Higgins.

Detroit, Mich.—Kessler-Detroit Motor Car Company; capital, $10,000; to manufacture automobiles.

Findlay, O.—Northway Motor Company; capital, $600,000; to manufacture motors. Incorporator: R. F. Northway.

Indianapolis, Ind.—Tone Car Company; capital, $200,000; to manufacture automobiles. Incorporators: M. H. Miller, William P. Kirk.

Lagrange, Ga.—J. F. Carley; capital; to engage in automobile business. Incorporator: John F. Carley.

Morgantown, W. Va.—Colonial Motor Car Company; capital, $10,000; to deal in automobiles. Incorporators: A. A. Exley, W. E. Graham, J. H. Wolfe.

Newcastle, Ind.—Rose City Auto Company; capital, $10,000; to manufacture automobiles. Incorporators: F. E. Smith, C. W. Moucn, W. F. Byrket, H. M. Van Matre, G. Cameron, L. W. Bailey, A. D. Ogborn.

New York City.—American Commer Truck; capital, $10,000; to manufacture automobiles. Incorporators: R. C. Thompson, Julius Jagn, E. Thomas.

New York City.—Gilbert-Fulton Corporation; capital, $1,000; to deal in automobiles. Incorporators: G. J. Gilbert, Otto Gilbert, D. J. Fulton.

New York City.—Kell Motor-Radiator Corporation; capital, $650,000; to manufacture radiators for automobiles. Incorporators: H. A. Bingham, A. F. Garbe, C. A. Cole.

New York City.—Universal Auto Appliance and Construction Company; capital, $5,000; to manufacture motors. Incorporators: F. W. Darnstaedt, M. J. Lelerc, H. B. Tucker.

Niagara Falls, N. Y.—Niagara Motor Car Corporation; capital, $10,000; to manufacture automobiles. Incorporators: C. E. Cromley, D. M. Hepburn, L. S. Hepburn.

Richwooe, O.—Scharf Gearless Motor Car Company; capital, $5,000; to manufacture and deal in automobiles. Incorporators: G. W. Worden, J. A. Scharf, W. H. Siples, H. E. Payne, L. J. McCoy.

St. John, N. B.—Maritime Motor Car Company; capital, $250,000; to manufacture automobiles.

South Bend, Ind.—South Bend Motor Car Works; capital, $10,000; to manufacture automobile parts. Incorporators: J. D. J. Farneman, A. C. Mecklenburg, Hilton Hammond.

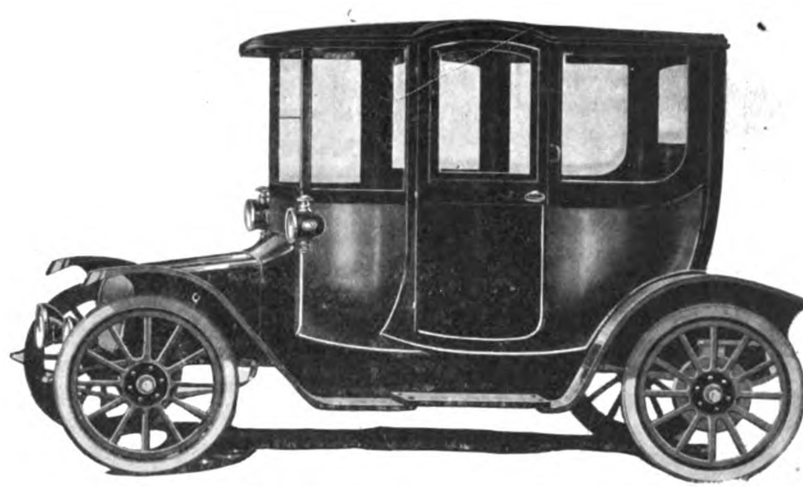
show will be combined, the pleasure and commercial cars to be shown at the same time. The show will be under the auspices of the Automobile Club of Maryland and the Baltimore Automobile Dealers' Association as heretofore. Application has been made by the joint committee of these two organizations for the use again of the Fifth Regiment Armory.

St. Paul's Ambulance—The city hospital, St. Paul, Minn., has ordered a Studebaker 30 emergency ambulance. The chassis is a stock model.

Hood Sales Manager—Wallace Hood has been appointed sales manager with supervision of advertising of the Westcott Motor Car Company, Richmond, Ind.

Davis Resigns—G. M. Davis, advertising manager of the Pierce Arrow Motor Car Company, Buffalo, N. Y., has resigned and will engage in newspaper work.

Sullivan Alco Manager—G. L. Sullivan has been appointed manager of the Chicago, Ill., branch of the American Locomotive Company, succeeding B. C. Day, resigned.



New model with forward drive, manufactured by the Chicago Electric Car Company

Alco in San Diego—The Los Angeles Alco Motor Sales Company, Los Angeles, Cal., southern California agents for Alco cars and trucks, has established a branch in San Diego, Cal.

Fort Dodge Show Plans—The second annual northern Iowa automobile show under the auspices of the Fort Dodge Dealers' Association is to be held at the Armory February 26 to March 1.

Brooks with Coach Builders—Emerson Brooks has purchased an interest in Burr & Company, coach builders, in New York City, and will devote his energy to the sales and repair departments.

Remy's Minneapolis Branch—The Remy Electric Company will open a branch in Minneapolis, Minn., January 1 and Gerald Fitzgerald, assistant manager at Chicago, Ill., is to be made manager.

Electric Starter for Henderson—In addition to the wire wheel equipment of the Riley type with which the Henderson company is going to fit its cars in the spring, an electric starter will be a part of the equipment.

Republic Rubber's New Home—The Republic Rubber Company, Minneapolis, Minn., will have a home in the new Murphy automobile building at Thirteenth street and Hennepin avenue, which is now constructed as far as the street level.

Milwaukee's Good Roads—More than 350,000 tons of asphalt were laid on the streets of Milwaukee, Wis., during the season of 1912, according to the report of the commissioner of public works, and next year it is planned to increase this by 50 per cent.

Milwaukee Automobile Stealing—The theft of five cars in Milwaukee, Wis., in eight days has caused a renewal of the agitation for a state law which will place automobile stealing on the same plane as horse stealing.

Contemplates Fire Truck Purchase—The Delaware Fire Company, Wilmington, Del., one of the fire companies contracting with that city annually for fire service, contemplates the purchase of a motor fire truck and has appointed a committee to look into the merits of the different makes.

Chauffeurs Receive Increase—Chauffeurs in the St. Paul, Minn., fire department have received an increase in their pay from $85 to $100 and the assistants will receive $85. The positions of drivers of motor apparatus will be open to competent men outside as well as inside the department.

Coffin in Southern Run—H. E. Coffin, vice-president of the Hudson Motor Car Company, Detroit, Mich., was one of the participants in the Thanksgiving run of the Savannah Automobile Club to the Lawyers' Club in Liberty County. Thirty-five cars participated in the run. The purpose of the run was to boost the good roads movement over the counties traversed.

Should Have Been Phosphor—A typographical error caused the word sulphur to be substituted for phosphor in the brief outline of the paper on Copper Alloys for Motor Car Service read by W. H. Barr before the Detroit section of the S. A. E. as given in THE AUTOMOBILE for November 14. It is obvious that sulphur does not have a beneficial effect on bronze as stated.

Des Moines Show in March—The fourth annual show of the Des Moines Automobile Dealers Association, Des Moines, Iowa, will be a two weeks' exhibition, the first week being devoted to pleasure cars and the second to commercial cars. March 3 to 8 will be given over to the pleasure cars. This will be the first time that a complete commercial show has been attempted in Iowa.

Three Wheel Electric Truck—To take the place of a number of two-horse tip carts which it operates, the Third Avenue Railway Company, New York City, has developed a novel type of electric truck. This has but three road wheels, the single one in the front having an electric motor contained within it. The large steel-tired rear wheels and body of the horse tip cart are retained and a heavy frame from which the batteries are suspended and a steering gear complete the new truck. It can be turned around in its own length.

Automobile Incorporations

GARAGES AND ACCESSORIES

AMSTERDAM, N. Y.—J. E. Larrabee Company; capital, $100.000; to deal in all kinds of automobiles and supplies. Incorporators: L. L. Larrabee, W. W. Leavenworth, K. L. Larrabee.

BUFFALO, N. Y.—American Kushion Kore Tire Company; capital, $10,000. Incorporators: K. E. Wilhelm, C. M. Baldy, C. H. Tavlor.

BUFFALO, N. Y.—Buffalo and Interurban Motor Delivery Company; capital, $125,000; to carry on a general automobile delivery. Incorporators: J. G. Berner, C. T. Horton, W. D. Grandison.

DAYTONA, FLA.—Daytona Auto Supply Company; capital, $1,000; to engage in garage business. Incorporator: A. G. Hunt.

EVANSTON, ILL.—Penn. Oil Company; capital, $2,500; dealing in oil and supplies. Incorporators: J. M. Maddle, L. Ladole, L. B. Davis.

GREENSBORO, N. C.—Reitzel Auto Service Company; capital, $25,000; to carry on garage. Incorporators: J. H. Reitzel, O. C. Klingman, L. G. Klingman.

INDIANAPOLIS, IND.—Miller Carbureter Comnany; capital, $200,000; to manufacture carbureters. Incorporators: F. C. Fairbanks, R. M. Fairbanks, L. H. Colvin, O. L. Snyder, N. M. Doyle.

KENTVILLE, N. S.—Provincial Motor Car Company; capital, $50,000; to carry on a garage business. Incorporators: R. E. Harris, J. J. Porter, G. N. Reagh, R. J. Shaffner.

NATCHITOCHES, LA.—Natchitoches Livery & Garage Company; capital, $10,000. Incorporators: M. Aaron, J. B. Presburgm.

NEW YORK CITY.—Bradhurst Garage Company; capital, $5,000; to carry on a general garage business. Incorporators: J. C. Jackson, P. R. Gorden.

NEW YORK CITY.—Foreign & Domestic Automobile Repair Company; capital, $10,000; to repair automobiles. Incorporators: L. O. Rothschild, Otto A. Deffan, Max Kaplan.

NEW YORK CITY.—Motor Hauling Corporation; capital, $5,000; to do automobile trucking. Incorporators: W. G. McGrath, M. B. Sentner, S. B. Kerr.

NEW YORK CITY.—Rector Engine Corporation; capital, $150,000; to manufacture motors. Incorporators: Edward Gore, William Magowan, S. C. Yeaton.

PHILADELPHIA, PA.—Auto Safety Signal Lamp Company; capital, $100,000; to manufacture a safety signal device. Incorporators: L. Abeles, J. J. Drew, J. G. Gray.

QUEENS, N. Y.—Elmhurst Garage; capital, $5,000; to carry on a garage business. Incorporators: T. G. Smith, P. J. Testan, Millie Testan.

ST. PETERSBURG, FLA.—Ramm's Garage; capital, $100,000; to engage in garage business. Incorporator: F. W. Ramm.

WASHINGTON, D. C.—J. B. Bayne; capital, $4,000; to engage in garage business. Incorporator: Clarke Waggaman.

CHANGES OF NAME

AKRON, O.—Ideal Commercial Car Company; change of name to the Akron Motor Car & Truck Company.

ST. PAUL, MINN.—Electric Manufacturing Company; increase of capital to $50,000.

ST. LOUIS, MO.—Meuhling Motor Car Company; capital, $15,000; to conduct an automobile repair plant.

McCormick Power Spark Plug; Ackerman Two-Pane Windshield; American Auxiliary Air Valve; Gray & Davis Starter for National Cars; Emergency Fuel Tank Gauge; Triplex Gas Saver

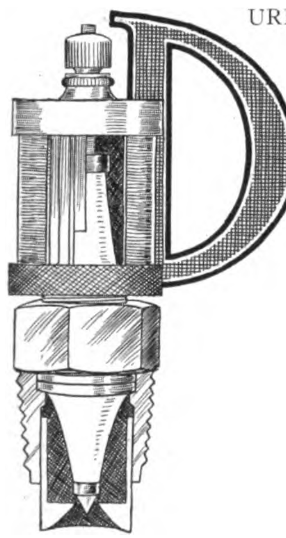


Fig. 1—McCormick power spark-plug

DURING the past year many developments have been made in spark-plug design and construction. One of the plugs involving a number of novel ideas is the McCormick power spark-plug, Fig. 1, which is distinguished by the use of a porcelain, the lower part of which is shaped as a cone and contained in a chamber serving as primary ignition space, of an electrode construction which produces a spark traveling around the positive sparking point and a condenser inclosed in a steel-case and effecting a stronger spark than would be obtained without its use. The illustration shows these several features, part of the shell and the steel-case being cut away for this purpose. The principal part which distinguishes this plug from others is the condenser which is interposed between the binding post terminal and the firing point. The latter, shaped as shown in Fig. 1, is covered by the porcelain insulation, against the lower end of which seats the flat flange of the conical point. This point is located centrally within the ring-shaped negative electrode, consisting of a sleeve which fits into the inner face of the shell. The spark always occurring at the coolest points is formed alternately at various places around the circumference of the shell, so that it travels, so to speak, around the positive electrode and does not permit the formation of soot and oil deposits on the plug. The effect of the space above the sparking point is that mixture is compressed in it during the compression stroke, and is ignited quickly all over. It is claimed that by the combined effect of the various features of this plug its working efficiency is materially increased, resulting in the production of a very powerful spark, which again helps to produce perfect combustion. The plug is made by the McCormick Manufacturing Company, Dayton, O., in the standard sizes, so that it may be fitted in place of any other spark-plug which it is desired to replace in an automobile motor. All McCormick spark-plugs are made standard and with interchangeable parts.

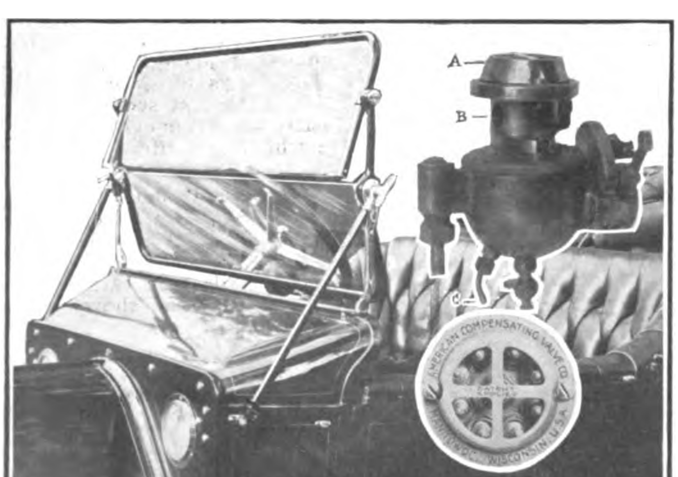


Fig. 2—Ackerman windshield. Fig. 3—American compensating valve

Matchless Pocket Lighting Device

The pocket lighter, Fig. 7, called the Matchless, is made by the Schiller Manufacturing Company, Chicago, Ill., for the lighting of acetylene and oil lamps on automobiles without the use of matches. The lighter is hardly 5 inches long and fitted with a clip so that it may be carried in the pocket like a fountain pen. It consists of a long, hollow piece into which fits a cap carrying a steel rod which has an alloy-steel point. The latter is surrounded by a wick. In practice the long piece is filled to about half its capacity with gasoline or alcohol, so that the wick is always soaked with the fuel. To produce a flame the cap and rod are pulled out of the hollow piece and the end of the rod is struck against the knurled piece of steel attached to the long piece, whereby a series of sparks is made which ignite the alcohol or gasoline with which the wick is soaked. A small but strong flame is thus obtained which is not easily extinguished by wind.

Emergency Gasoline Tank Gauge

The gasoline gauge shown in Fig. 6 is made by the Emergency Novelty Company, Port Huron, Mich., and is equally adaptable for gravity and pressure-feed systems. The gauge is attached and connected to the tank C by means of a coupling F inserted into the gasoline line leading to the carbureter and a pipe G providing a communication between the upper portion of the tank and the upper space in the gauge vessel. The latter is a glass tube, the upper and lower end of which is closed by a check valve opening downwardly. B is the lower valve which separates the gasoline in the tank from that in the gauge, and A is a pushbutton which may be pressed down. If this is done, the air pressures in gauge and tank equalize through the pipe G, and the gasoline in the gauge assumes the same level as in the tank, so that the amount of fuel contained in the latter may be read easily on the scale attached to the gauge glass. If the glass is broken, only the gasoline in the gauge tube is spilled, while the contents of the tanks is kept from flowing out by the valve B, which is pressed against its seat formed at the bottom of the gauge, by a spring. The gauge scale may, of course, be adapted to fit any type or design of gasoline tank, making the gauge applicable to any automobile.

Edelmann Tire Chuck and Gauge

E. Edelmann & Company, 229 West Illinois street, Chicago, Ill., have added another tire specialty to their line of accessories. This is the inflating chuck, Fig. 6, which is an entirely automatic device. It is simply a coupling built up on a right-angled air lead, one arm being formed with a ratchet surface over which the hose is slipped while the other fits over the tire valve, being pressed on it to make an airtight joint. When the tire is fully inflated, the air chuck is pulled off the valve, which is thereby shut automatically. Fitted in the chuck is a tire gauge of the ordinary Edelmann design, which at all times indicates the pressure obtaining in the tube.

American Compensating Valve

A sensitive compensating valve for multi-cylinder engines is seen in Fig. 3; it is said to give more perfect combustion at high speeds than can be obtained without it. The valve consists of a truncated cone in which a number of spring-controlled check valves are mounted and which is attached to the air inlet of the carbureter. Fig. 3 shows the valve mounted on the air inlet of a Schebler carbureter. The valve is shown at A, being mounted in place of a plate which normally closes the pipe, which is bored at B for the normal air admission. The air opening B is fixed and supplies the motor at low speeds, wherefore the needle valve C must be adjusted to give the right mixture under these conditions. As the motor speeds up with the throttle opened wider, the auxiliary compensating valve supplies the necessary air, one check valve opening first, the others after, in response to the increasing vacuum in the cylinders. The design of compensating valves varies for the various types of carbureters, but the American Compensating Valve Company, Manitowoc, Wis., makes designs to fit every type of carbureter now on the American market.

Ackerman Ventilating Windshield

Joseph N. Smith & Company, Detroit, Mich., manufacture a two-piece type of windshield which permits of a variety of positions of its panes and consequently gives a variable effect. Fig. 2 shows the shield in such a position that the upper shield deflects the wind so that it passes over the head of the driver, while the lower pane, being turned in, ventilates the lower space in front of him. The upper pane may be turned completely around the axis formed by the two points at which it is secured to the frame of the lower pane. The joints are so constructed as to be proof against rattling. The shields may be had with black enamel, brass or nickel finish, or a black enameled frame with brass or nickel mounting.

Bremer-Wilson Gasoline Saver

Under the name Triplex Gas Saver, the Bremer-Wilson Manufacturing Company, 1256 Michigan avenue, Chicago, Ill., sells a small and effective device which is designed for the breaking up of liquid fuel globules getting past the throttle. To obtain perfect atomization of the fuel, the mixture is forced, on its way from the carbureter to the motor, through a fine, triple screen of wire gauze which is held in a brass frame shaped as the device in Fig. 8. A part of the brass frame on each side is formed en relief, so as to fit between the carbureter and manifold flanges, to which it is bolted. The opening in the gas saver is equal in diameter to the size of the carbureter; the thickness of the device is about .5 inch, so that the only difference made by the installation of the saver on the engine is that the carbureter is placed so much lower, as compared with its original position. The trouble of installing the device is very small, and the result of better atomization of the fuel inevitable.

National Car's Self-Starter

The Gray & Davis starter used on the cars of the National Motor Vehicle Company, Indianapolis, Ind., operates in conjunction with the lighting generator, the latter being of the constant-speed type. This generator construction is used to obtain a current output at constant voltage, a slipping clutch being used between the driving member and the generator shaft itself. The current is fed to the battery which floats on the line of the lamps. The motor which serves for starting is actuated by the current from the battery; it is so connected to the engine that the pressure on a pedal both closes the circuit which energizes the field of the motor and throws the motor shaft in gear with the crankshaft. As soon as the engine speeds up sufficiently, the starting motor is automatically thrown out of gear with the

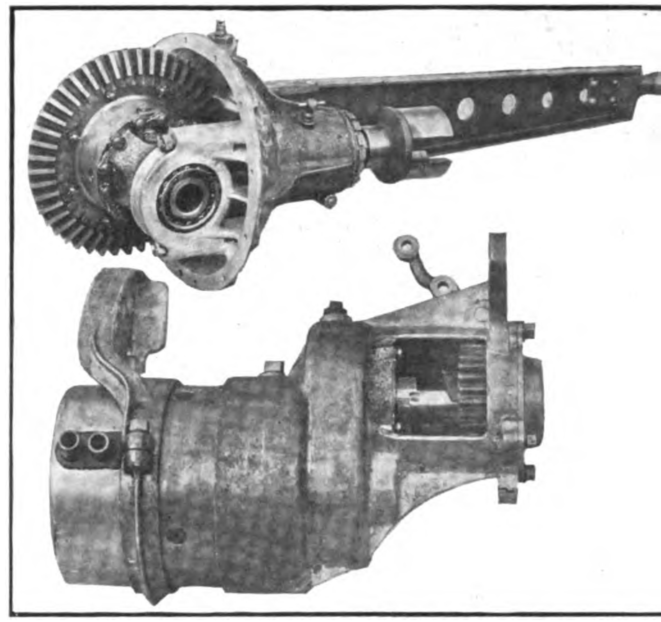


Fig. 4—Gray & Davis electric starter of National automobiles

engine, and the circuit is interrupted, whereupon the dynamo generator begins to recharge the battery. The battery used in the National equipment is of sufficient capacity to furnish current for the lights for several hours.

Wolf Automobile Fuel Mixer

The mixer of A. M. Wolf, 146 East Eighty-first street, New York, is a device of one-piece construction which fits between the carbureter and the intake pipe. It consists, in principle, of an open sheet-metal cylinder, the lower end of which carries a horizontal flange, and the wall of which has been cut along its entire height, at two places diametrically opposite to each other. Two of the four edges thereby produced are bent inwardly under an incline of about 50 degrees, thereby forming two inclined surfaces in the mixture passage, which have an effect somewhat akin to that of a screw, resulting in a whirling motion set up in the mixture traveling toward the inlet manifold. This whirling motion, in turn, brings the particles of the mixture in very intimate contact and causes whatever liquid parts are carried along in it to be broken up and thus prepared for efficient combustion.

Lubro Anti-Freezing Compound

The Lubro Oil Company, Cleveland, O., has manufactured an anti-freezing fluid, which is red in color, harmless in action and is claimed to prevent the radiator water from freezing even in the coldest weather. In practice 1 volume of Lubro is used to 2.5 volumes of water.

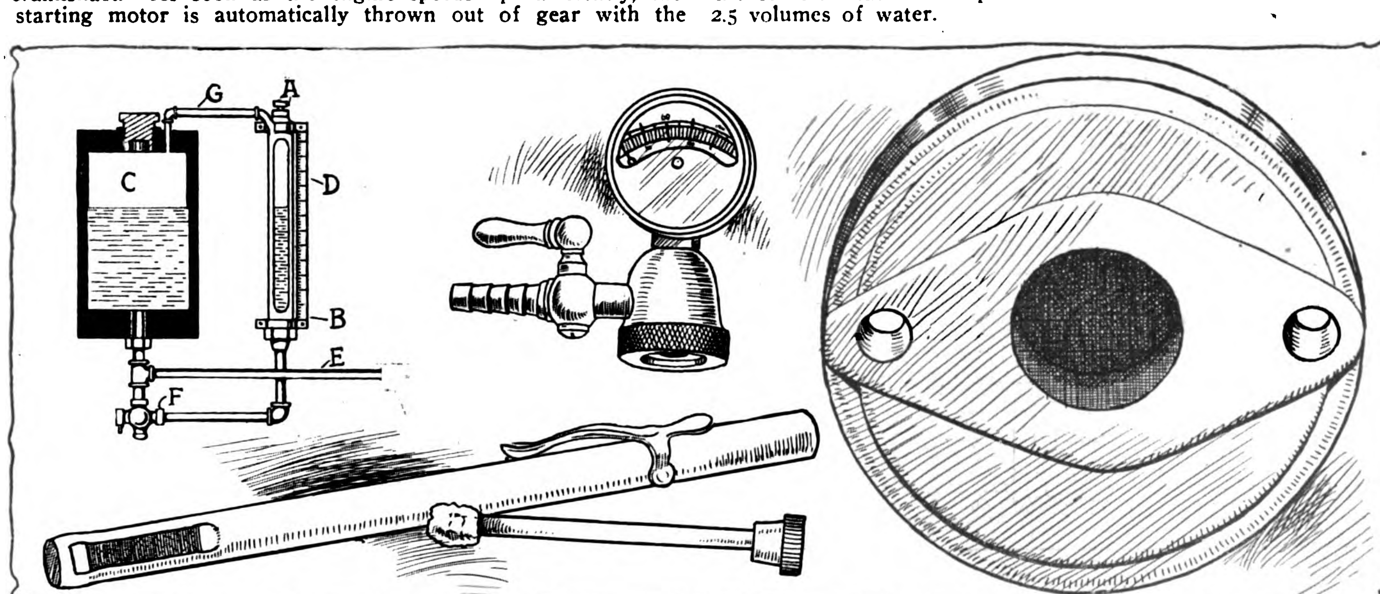


Fig. 5—Emergency fuel gauge. Fig. 6—Edelmann inflation chuck. Fig. 7—Matchless pocket lighter. Fig. 8—Triplex gas saver

AUTOMOBILE Engine Carbureter—In which the walls of the mixture chamber are contractible for the purpose of throttling.

This patent refers to a carbureter, Fig. 1, the body of which is formed with parallel sides and has at its upper end a discharge port M for mixture. Into this body a pair of opposed, inwardly curved, plates P are fitted, being hinged at their lower ends H and forming a flanged port just below M. Between the inwardly curved portions of plates P, a fuel jet is provided which communicates with a float-chamber regulating the supply of fuel. The plates P form a mixing chamber above the jet and an air chamber below it, these chambers being adjustable, due to the movability of the plates P. An air valve for regulating the amount of air admitted into the carbureter is provided by two plates Q depending downwardly from the lower ends of P. A mechanism A permits of simultaneously actuating the plates P and Q, thereby regulating the amount of air admitted to the carbureter and maintaining a fixed ratio between capacities of the throttle and the air inlet.

No. 1,045,613—to Harris C. Roth, Chicago, Ill. Granted November 26, 1912; filed July 29, 1911.

Rotary Valve Design—A sleeve which is positioned between the cylinder wall and the head.

The valve design which is the subject matter of this patent, is shown in Fig. 2. This figure shows a cylinder C which is formed with a concentric head H secured in the top end of C and made with a somewhat lesser diameter. Thereby an annular cavity between the cylinder and the head is formed in which a sleeve valve V is in place. The ports are formed on one side of each cylinder and the manifolds are so constructed that one inlet pipe serves the twin inlet ports P of two adjacent cylinders, while the outlet ports Q are served by separate manifold leads. By means of gearing G the sleeve valves are operated at suitable speeds through the movement of the cylinder pistons.

No. 1,045,500—to Edward H. Belden, assignor to Belden Engineering Company, Pittsburgh, Pa. Granted November 26, 1912; filed December 26, 1911.

Autogenous Welding Torch—Comprising separate inlet conduits for oxygen and a fuel gas, and a capillary connection between them.

The welding torch referred to in this patent consists of a head H, Fig. 4, which is made of one integral block of heat-resisting material and formed with conduits C1 and C2, for a combustible gas and for oxygen respectively. The conduits into the head are separate; C1 opens directly into a passage forming an orifice O in the removable tip T of the torch, while C2 communicates through the bore B with that passage. The bore B intersects C1 at a practically right angle, so that the gases meet before entering the tip.

No. 1,045,506—to Worthy C. Buckham, assignor to Davis-Bournonville Company, New York City. Granted, November 26, 1912; filed February 27, 1912.

Automobile Motor Lubrication—Being a connection between crank and flywheel chamber.

This patent relates to a lubricating scheme, Fig. 5, which comprises a flywheel F housed in an annular enlargement E of the crankcase C. In the lower portion of E is an oil chamber O in which part of the flywheel is immersed: an oil-receiving pocket P1 is formed adjacent the top of E, while the lower portion of it has a transparent panel P. Centrifugal action sends oil into P1, whence it returns to C.

No. 1,045,772—to Howard E. Coffin, Detroit, Mich. Granted November 25, 1912; filed April 13, 1908.

Automobile Muffler—Combining the action of tortuous passages and baffling plates.

The muffler described in this patent comprises a casing C having a head H formed with a flange F. An inlet pipe I closed at the outer end by a perforated plate supplies the interior of the muffler with exhaust gases. The latter pass out of the pipe through other perforations therein, formed close to the cap C which closes its inner end. Baffle plates B mounted on rods R, which hold the muffler together, offer further resistance to the gases, which leave through the funicular discharge D.

No. 1,045,614—to John H. Sames, Galion, O. Granted. November 26, 1912; filed April 16, 1912.

Electric Automobile Signal—Comprising a diaphragm and a vibrating armature.

This patent relates to an electric horn construction which includes a hollow body to the front wall of which a resonator is attached communicating with the interior of the body portion. To the latter a diaphragm is removably attached and it forms a chamber between it and the front wall of the body portion above mentioned. Electro-magnets are secured adjustably to the body portion, being out of contact with the vibrating portion of the diaphragm. An insulating disk is supported by the magnets and an arm mounted on the disk, as well as an armature resiliently secured to it. This armature is so constructed that when the current is closed it makes intermittent contact with the arm mentioned above.

No. 1,045,706—to Martin E. Hepburn, Elgin, Ill. Granted November 26, 1912; filed October 26, 1911.

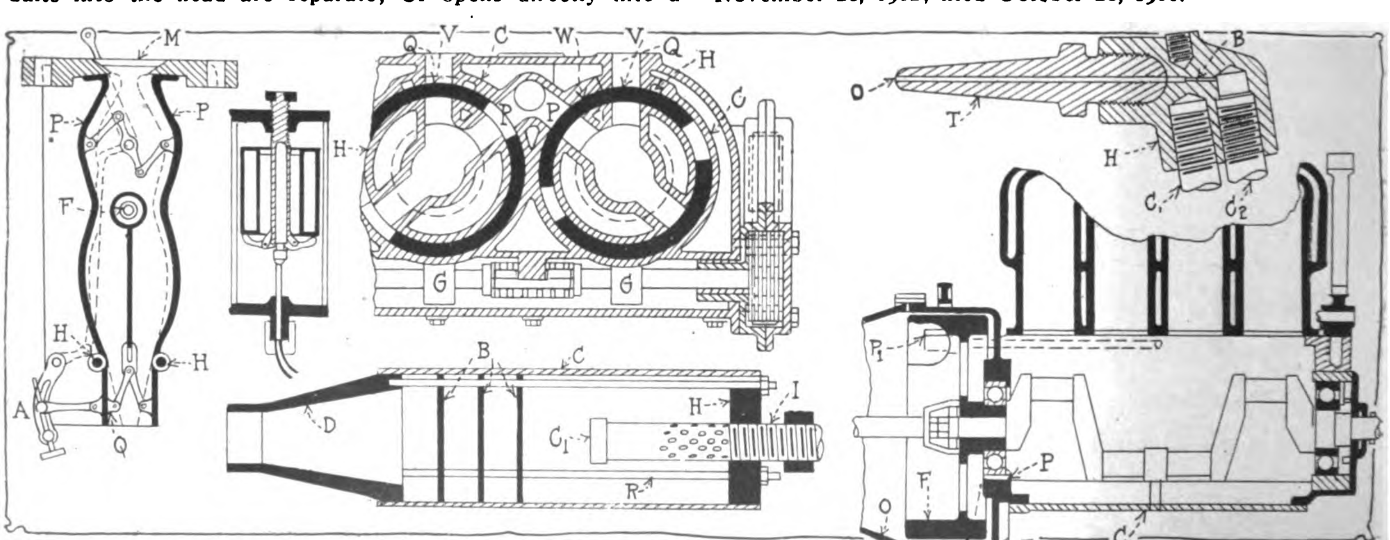


Fig. 1—Roth carbureter. Fig. 2—Belden rotary valve. Fig. 3—Sames muffler. Fig. 4—Buckham welding torch. Fig. 5—Coffin oiling system

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The AUTOMOBILE

One Reason Why Cars Are Stored In Winter

Radiators Freeze In Open Sheds While Hotel Guests Are Entertained

Style of open shed common to the average inn; a relic of the horse

IT is with regret that the red-blooded motorist who takes a keen delight in speeding through the frosty air of a winter evening, puts away his car until a milder climatic condition shall have again returned. Every winter brings an increase in the numbers of those who have joined the ranks of the all-year-round motorists who, either for business or pleasure, are to be found on the roads throughout the country during the time the snowstorm and icy wind have come into their own and rule supreme.

Around the large cities throughout the United States there are a large number of inns or hotels which cater to the passing automobilist. Many of these are open all winter and every year finds more who find the cold-weather trade profitable. In a great many respects these inns are similar to those which were famous in the old countries of Europe before railroad travel became common. These were open all year and the passing traveler could stop at any time and secure accommodations.

Travel on the highways is coming back. In place of the old stage coach and the mounted traveler, the automobile, speedy as the railroad and more comfortable with its luxurious inclosed winter body, is found everywhere, at any season, going from town to town. The inns and taverns along the roads connecting business centers are beginning to cater to trade of this kind, and

A—Shed behind one of the most popular inns in the vicinity of New York. Large sign in foreground pointing to this alleged garage to indicate to guests where cars should be stored while at the inn. Shed used also as chicken-coop and storehouse

B—Large stone garage in connection with one of the largest hotels just outside of New York City limits. This is one of the few garages connected with a hotel which furnishes adequate shelter and protection against cold

yet they overlook one of the most important of all points, the accommodation for the car.

In order to look into the conditions which face the automobilist who braves the cold to make either a short or long trip, a run was taken starting from New York and following along one of the main lines to Boston for a considerable distance. This is one of the most traveled routes in the East, and the inns along this line receive more patronage during the winter than can be found in most other districts. There are a number of large towns along the way which handle a large part of the accommodations for long distance touring parties for the simple reason that the accommodations at the smaller inns are not what they should be for the car, while for the parties themselves they are all that could be desired. Frequently it is not convenient to make one of the larger towns for dinner or even for the night. A conversation with the proprietor never fails to disclose his expectation of a great increase of winter trade this season, and he invariably based his observations on the fact that his patrons had told him that they intended to keep their cars going all winter.

When asked where the parties who visited the inn left their cars, the replies were various, but always interesting. One, after making wary inquiries regarding the purpose of his visitor, stated that he was just about to have a charging station for electrics installed, and that his sheds were not in very good condition at the time, although they would soon be in excellent shape, so people left the cars outside in a small parking place, but a walk around to the back disclosed a large and ornate red sign with GARAGE, spelled out in big gold letters and a hand pointing to an open barn-like structure that serves as a combination woodshed, storehouse and hen coop. It is depicted at the top of this page, along with its identifying and somewhat necessary sign. A further conversation with the proprietor who dwelt at length on the comforts and delights of his house, developed the fact that, although nine-tenths of his guests arrived by automobile, he had never thought of providing a protected spot for the car in which they arrived, regardless of the weather.

While some of the large hotels are provided with stone garages containing a stove, these are among the minority. In illustration B is shown one of the stone variety lying along one of the Boston routes. This is connected with an exceptionally large hotel and is everything to be desired in its arrangement. Contrast with this, however, the condition shown in the illustration C, where one of the largest inns along the route from New York to Albany may be partially seen. There is not even a shed in this instance. A sudden rain or snowstorm would find the cars unprotected and open to the damage which may result. Within the inn, however, the appointments are most luxurious. Nothing has been omitted in the arrangement of the furniture or decorations which would lead to the attractiveness of the surroundings. Yet the accommodations for the costly and richly upholstered cars which frequent this resort are worse than those found even at some of the smallest taverns.

On the grounds connected with another prominent inn along the Albany line may be found the sheds depicted at D. This shed, like many of the others, is a relic of the old horse days. The halter ropes are still hanging in the stalls and the feed boxes are along the walls. It is no doubt a protected spot in many ways, but on a cold winter night would furnish little security and no assurance against a frozen radiator.

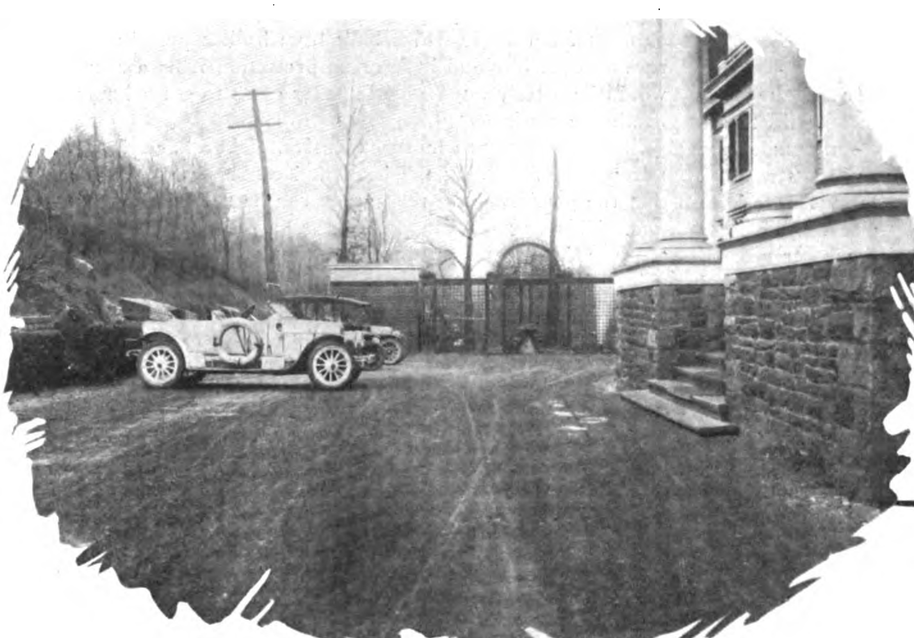
When the proprietor of one of the large inns was asked how the guests' cars were protected against the cold, he stated that little trouble was experienced in that direction as he employed a man whose duty it was to go up and down the line of cars located in the sheds and turn over the motors. What would happen in a case of one of our latest models without a starting crank, he did not state. It is safe to say, however, that the idea of the stable boy turning over the motor with an expensive electric starter would not appeal to the average owner.

One innkeeper along the Boston route has converted a stone stable into a garage. He uses one corner for his laundry, and the heat of the stove used in this corner is sufficient to maintain a steady heat through the garage. He further declares that as far as he knows he is the only proprietor within a distance of several miles along that particular route who maintains such a garage. He has sufficient room to store several cars, and this fact alone has brought him considerable trade showing that the desires of tourists are in this direction. Indeed, the idea of heating his garage was given to him by the remarks of guests of his inn. This garage is shown on page 1203.

An excellent idea which has been adopted by one man who has realized the value of maintaining a heated inclosure for the cars of his guests shown at the bottom of page 1202. One portion has been separated from the rest by a thick partition. The front is inclosed by rolling doors. The track for each one of these doors runs along the entire length of the closed portion thereby enabling anyone to reach any car without disturbing or moving any other. That is to say, any portion of the front of the inclosed portion can be opened for the entrance or exit of a car. At the other end of the shed, the central portion of which is left open, is a room which serves as a stockroom for gasoline, tires and a few tools. A telephone is located in this room also, so that it would be possible in case of a breakdown to reach the town nearby by telephone, secure necessary parts and make repairs while the party waited within the hotel. This shed was formerly opened for its entire length, but is now arranged as shown and described, with very little sacrifice of space. The inclosed portion can be locked and in the summertime can be thrown open or used as a storehouse.

While at this time of the year the chances of the radiator freezing during the day are still remote, at the same time it is very difficult to start many cars while the motors are as cold as they become while standing in an exposed spot. At night the danger of freezing radiators is exceedingly great as the temperature changes which then occur are sudden and often radical. The results are so costly to the owner, who may possibly have to purchase a new set of cylinders and a new radiator, that the precautions which should be observed are justified. The device of employing a man to walk up and down in front of the line of cars in a shed turning over the motors by hand will not suffice. In fact, in very cold weather it will not even keep the water from freezing. Blankets over the radiator and hood, while very good to stave off the effects of a frigid atmosphere temporarily, are not satisfactory when the car is to be left standing for any length of time. Non-freezing solutions, while effective, are very often forgotten or are not put in because the owner perhaps had no intention of stopping when he left his home. To drain the radiator every time the car is stopped for an hour or so is too much trouble, and should be unnecessary.

A heated garage is not necessarily a great expense. It is not imperative to have the temperature much higher than



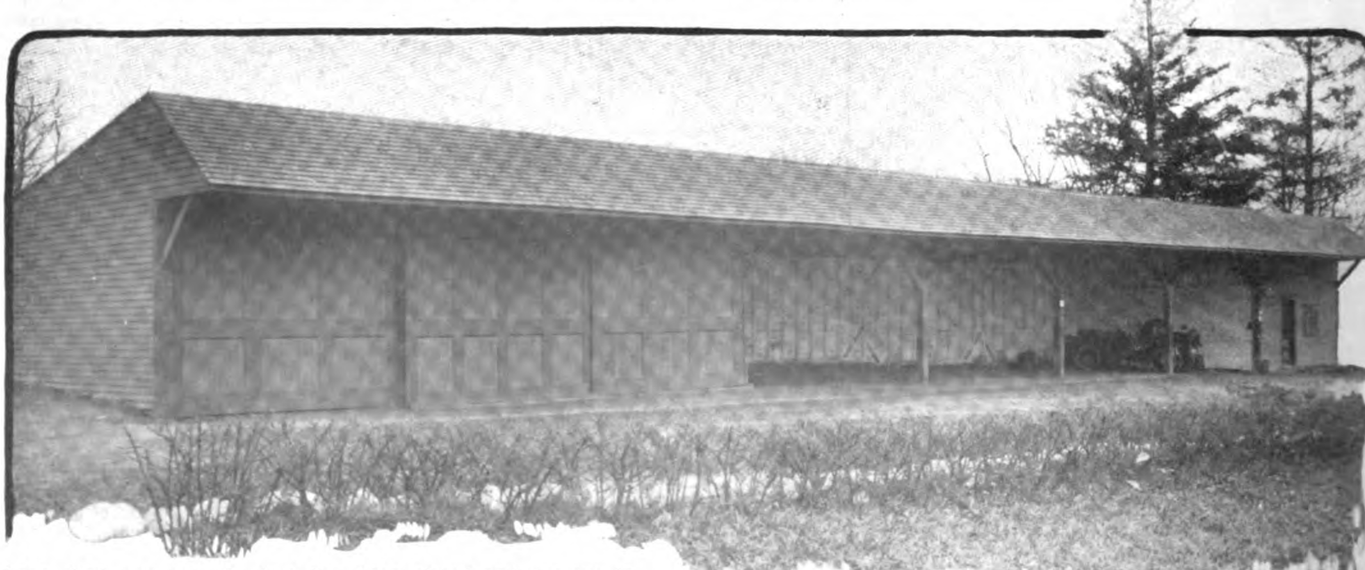
C—Showing a portion of the pretentious entrance to one of the large inns along the line between New York and Albany, which does not even provide a shelter against a sudden rain. Cars are left standing as shown, in parking space

D—Squalid, tumble-down shed which is pointed out by a well-known innkeeper as a spot where guests may leave their cars in case it rains; otherwise, cars are left in a parking space on lawn. This inn stays open all winter long

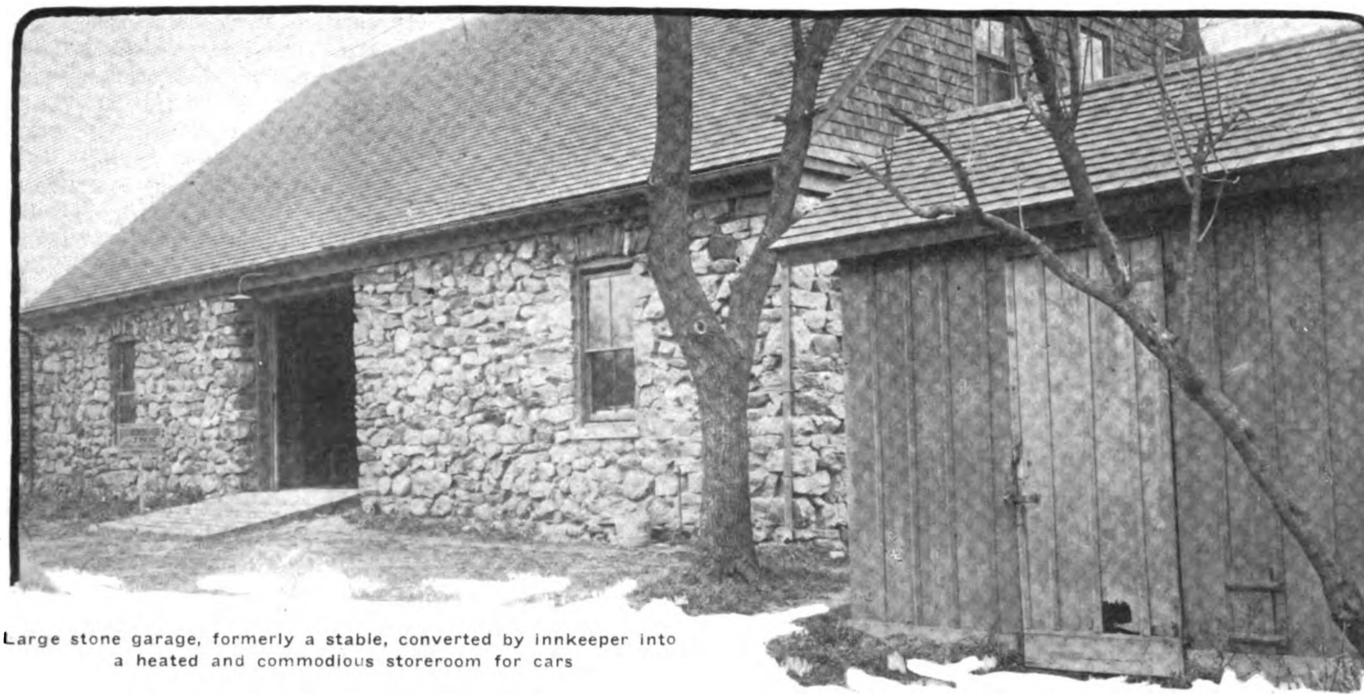
Another view of stone garage used in connection with a large hotel just outside of New York City

50 degrees. Above this temperature most cars will start easily, and there is no danger of freezing. The number of cars visiting an inn are not often great at any one time. Hence, there will be no necessity for providing extraordinarily commodious quarters for any large number of cars. A small section of the shed heated in the manner described above, by the use of a light partition would not be expensive, and would more than compensate the proprietor of the garage who arranged such a structure. Nearly all the inns which have widespread reputations have been standing since the time of the horse days or else they are the outgrowth of the bicycle roadhouse. Many of the latter type of hostelry have been very much enlarged and reconstructed throughout. All of these had sheds which accommodated horses and also a bicycle rack. There was little or no bicycle riding after the late fall season and the horse was capable of withstanding severe cold if left with a blanket thrown over him. When reconstructing the inn for the automobile and its party, the sheds were left exactly as they were. They have not grown in the majority of cases with the inn. Automobiles are parked about lawns and along the sides of the hotel approaches, while wood piles to provide fuel for the cheerful log fires which are the pride of many hostelries occupy the sheds. Many of the sheds have the ground beneath them full of glass from broken bottles or nails from boxes which have been broken up. In others, the roofs are leaking and little or no protection from a rain, while it would be utterly impossible in other cases to get a limousine beneath the roof.

Stone garages are more expensive. They have, however, the advantage of holding the heat, and can be built in such a way that the portion above the garage can be used as servants' quarters. This was done in one of the garages illustrated. As may be seen in the illustration, the upper part of the garage is shingled and provides a warm and cosy residence. This makes an ideal combination, although it is somewhat expensive to build. The heat that takes care of the servants' quarters can then be utilized to take care of the entire building, garage included. The laundry and other accessories of the hotel can be housed within such a building which could be built with a basement without any difficulty. In fact, it is possible to utilize the space afforded by such an establishment to great advantage in many ways, depending upon the size of the hotel itself.



Open shed, one end of which has been closed and a stove installed for heating purposes in cold weather

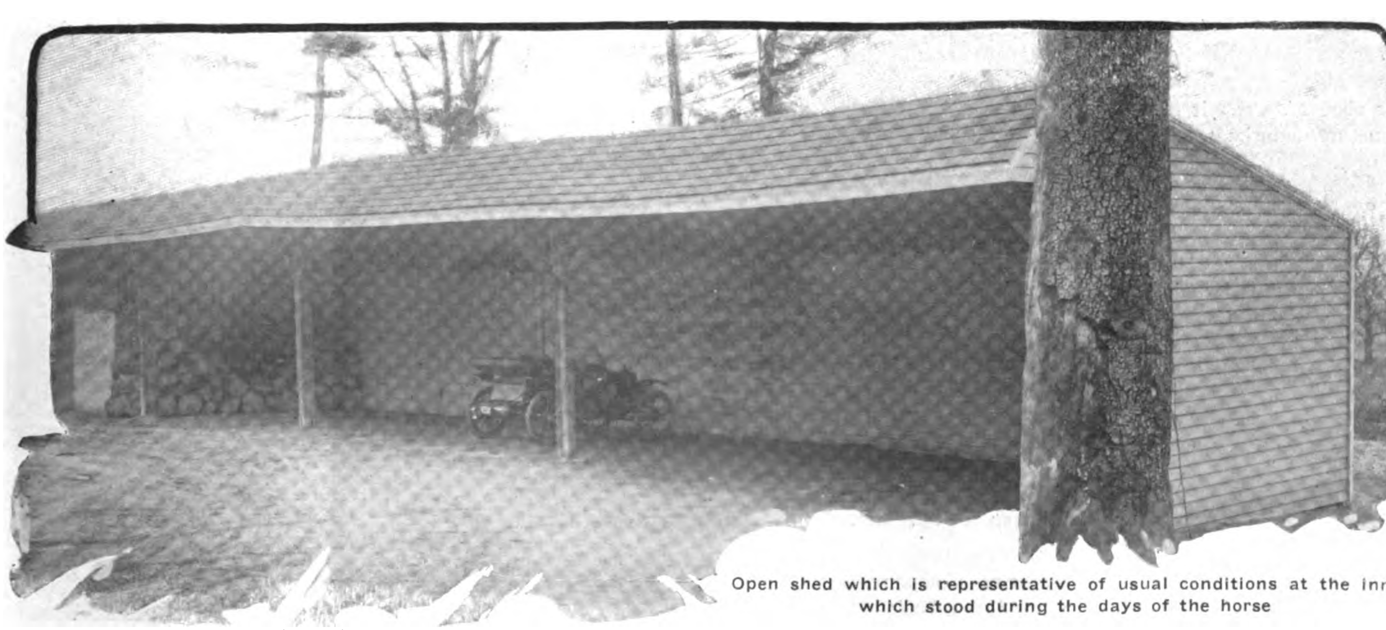


Large stone garage, formerly a stable, converted by innkeeper into a heated and commodious storeroom for cars

For the innkeeper who wishes to meet the situation as it now stands, there are many ways of protecting the car. An ingenious scheme which has been suggested is to arrange a number of portable light sockets. An electric heater is plugged into the line and placed against the radiator so as to maintain the water at such a temperature that the motor may be readily started. He may partition off a portion of his sheds or he may go to a greater expense and build a new garage designed specially to be heated. It is certain that any expense he may go to will bring him great returns if his resort is situated along the lines of main travel. It is just as important to have suitable arrangements for the conveyances of his guests as it is to provide the best of service and entertainment. There are many innkeepers who are automobilists themselves and who realize the ever-increasing number of winter tourists.

On a cold, clear winter night there are many who take a keen delight in a trip of 25 or 30 miles with a stop at some inn for refreshment. Many are deterred from stopping because they dare not leave their cars unprotected. This no doubt has a considerable influence on the number of cars which are stored, because it detracts from the pleasure of winter riding. In spite of the fact that a large number of the resorts have done absolutely nothing towards protecting the automobiles of their guests against the effects of cold, they enjoy a large patronage. This alone should show the tendency toward an increase in winter travel and it is strange that the wideawake proprietor has not more closely followed the interests of his best, and, in fact, only customers.

The automobile has ceased to be a horseless carriage, it is now at a stage where it is as much of a conveyance as the trolley or railroad. With the ever-increasing number of state roads more territory is being thrown open to it and its scope has been widened until in the more settled parts of the country it forms the ideal method of travel when the roads are not actually blocked by heavy snows or other causes. In the majority of our states the percentage of time that the roads are blocked is so small as to be negligible. Realizing this condition and also the necessity for adequate stations along the lines of main travel there is a golden opportunity for the inn to build itself up and to grow in the same manner as all year round traveling is growing. The surest way to help build up this condition is to supplement the good roads now found through every state by suitable protection and provisions for the car while it is at rest and sensitive to climatic conditions.



Open shed which is representative of usual conditions at the inn which stood during the days of the horse

Good Year for Goodyear

1912 the Greatest in History of Company Whose Factory Additions Amounted to $1,532,595

During Past Year Company Has Increased Its Capital from $6,000,000 to $15,000,000

NET income of the Goodyear Tire & Rubber Company for the year ending October 31, 1912, was $3,001,294. Other profits, chiefly on rubber contracts, amounted to $217,593 and the unappropriated surplus from previous operation is $1,856,888. The year proved to be by far the greatest in the history of the company and manufacturing operations were extended to such an extent that it was found to be advisable to increase the capitalization of the corporation. Hitherto the company has had a capitalization of $6,000,000, but during the past year this has been expanded to $15,000,000. The new stock consists of $4,000,000 of 7 per cent. cumulative preferred and $5,000,000 common. About $5,000,000 of the common stock has not been issued.

During the year dividends of $2,289,100 in common stock have been distributed and $139,604 has been paid to preferred shareholders.

The balance sheet shows assets of $13,818,214. The plant is listed at $3,855,569; actual cash on hand or deposit, $1,268,539; inventories consisting of crude rubber and other materials, $4,398,384. Patents are listed at $1 despite the fact that the company receives a large income from royalties on patents owned or controlled.

The list of liabilities include outstanding capital stock, par value $10,026,700; current debts, $1,116,406 reserves and the surplus noted above.

Additions to the plant during the year have been made at a cost of $1,532,595.

Reeves Goes to Hartford Company

Alfred Reeves, vice-president and sales manager of the United States Motor Company, and A. R. Gormully, general purchasing agent of the same corporation, have severed their connections with that company to engage in other work. Mr. Reeves has been elected vice-president and general manager of the Hartford Suspension Company, manufacturers of shock absorbers, electric starters and lighters and automobile specialties. He will remain with the motor company until after the coming shows.

Mr. Gormully has been elected treasurer of the Steinbock Engineering Company, which has been in course of development for about a year. It is announced that he will probably assume some more intimate connection with the industry in the near future.

Lion Company Confesses Bankruptcy

DETROIT, MICH., Dec. 9—A voluntary petition in bankruptcy was filed in the United States District Court here December 6 by the Lion Motor Car Company, Adrian, Mich., whose plant was destroyed by fire some time ago. C. L. Robertson, of Adrian, was named receiver by L. E. Joslyn, referee in bankruptcy, in the absence of Judge Tuttle. The concern's liabilities are given as $108,894.05 and the assets as $105,546.94, of which $86,727.91 is given as merchandise.

Receiver for Flanders Mfg. Co.

DETROIT, MICH., Dec. 7—Following a meeting of the board of directors of the Flanders Manufacturing Company December 4 at which plans for the continuing of the business were submitted by the creditors' committee, application was made on behalf of the Wagner Electric Manufacturing Company, St. Louis, Mo., by S. T. Douglass, an attorney of Detroit, before Judge Tuttle in the Federal Court in Bay City, Mich., to have a receiver appointed for the Flanders concern. The Detroit Trust Company was appointed, the bond being fixed at $50,000.

According to a statement of the Flanders company's affairs. which appeared in these columns, the concern's assets are greatly in excess of its liabilities, and its present financial distress is merely from the lack of ready capital. It is generally understood that the Pontiac plant is a money maker and that the straitened monetary condition is due to several other holdings. It is proposed to continue the business in the event that the contemplated refinancing and production plans are agreeable to the receiver.

Poss Company to Fight Bankruptcy

DETROIT, MICH., Dec. 9—As predicted in THE AUTOMOBILE last week, the Poss Motor Company has signified its intention to contest the granting of the involuntary bankruptcy petition which was filed by the Detroit Foundry Company and several other creditors in the United States District Court November 19. Denial has been made by the concern and twenty-four of its creditors that its affairs are such as to make it bankrupt. A fight in the courts is probable.

Receiver to Divide Atlas Money

INDIANAPOLIS, IND., Dec. 9—Fred C. Gardner, receiver for the Atlas Engine Works, has been authorized by the Superior Court to distribute the funds in his possession. In the final settle-

Automobile Securities Quotations

SAVE for a sharp bulge in Firestone, Swinehart and Miller which made new high marks for each of those stocks, the automobile securities market for the past week has been a fruitful field for the bears. The activity in those tire issues was accounted for on a variety of theories, but the main fact that stands out is that the buying was apparently by insiders. There was some talk of a merger but nothing definite developed. The buying orders appeared on Tuesday and various brokerage houses reported that quite an amount of the shares were picked up. Otherwise the market slumped badly in response to the general situation in financial circles, based upon European politics.

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	180	190
Ajax-Grieb Rubber Co., pfd	..	..	98	99
Aluminum Castings Co., pfd	..	..	98	100
American Locomotive Co., com	34	35	41½	42½
American Locomotive Co., pfd	102½	102¾	106	107
Chalmers Motor Company	..	..	125	145
Consolidated Rubber Tire Co., com	5	10	11	14
Consolidated Rubber Tire Co., pfd	12	20	50	60
Firestone Tire & Rubber Co., com	178	185	310	316
Firestone Tire & Rubber Co., pfd	108	110	105	107
Garford Company, preferred	..	..	100	102
General Motors Company, com	37	38	33	34
General Motors Company, pfd	76½	78	76	77½
B. F. Goodrich Company, com	..	..	63	64
B. F. Goodrich Company, pfd	..	..	105	106
Goodyear Tire & Rubber Co., com	245	250	..	425
Goodyear Tire & Rubber Co., pfd	104	106½	105	106
Hayes Manufacturing Company	..	..	..	90
International Motor Co., com	..	..	..	18
International Motor Co., pfd	..	..	..	65
Lozier Motor Company	..	..	..	40
Miller Rubber Company	..	..	158	163
Packard Motor Company, pfd	104½	106	105	106
Peerless Motor Company	..	..	115	120
Pope Manufacturing Co., com	40	43	27	28
Pope Manufacturing Co., pfd	66	68	68	70
Reo Motor Truck Company	8	10	9	9½
Reo Motor Car Company	23	25	19½	20½
Studebaker Company, common	..	..	38½	39½
Studebaker Company, preferred	..	..	91	92½
Swinehart Tire Company	..	..	113	118
Rubber Goods Mfg. Company, pfd	100	105	105½	106½
U. S. Motor Company, com	..	..	5	10
U. S. Motor Company, 2nd pfd	..	..	30	35
U. S. Motor Company, 1st pfd	..	..	65	70
White Company, preferred	..	..	105	108
Willys-Overland Co., common	..	..	69	70
Willys-Overland Co., pfd	..	..	100	100½

ment the common and preferred stockholders will get nothing and the bond holders of a bond issue of $1,050,000 will have to look to the property, which is now owned by the Lyons-Atlas Company, for their money.

The receiver has about $84,000, of which $20,550.92 will be used in paying the receiver and his attorneys. The balance, $63,459.89, will go to the merchandise creditors. The Lyons-Atlas Company, in keeping with the terms under which it acquired the property, has paid $31,500 interest due on a bond issue of $1,050,000, $6,500 judgments against the Atlas company, paid a debt of $105,000 secured by a bond issue and has paid debts secured by pledges of Atlas accounts amounting to $48,187.04.

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Myers Heads Swinehart; Plant to Grow

AKRON, O., Dec. 9—Clifford B. Myers has been appointed general manager of the Swinehart Tire & Rubber Company to take the place of W. W. Wuchter, president of the company, who has acted as general manager.

It was announced today that the Swinehart company has plans under way for a material enlargement of the Akron plant. The present factory is in a business district in the city and as it is practically impossible to buy more land there, it is probable that a new factory will be built in the suburbs.

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Crude rubber rose 4 cents at the week end, being above $1.11 for up-river fine, where the level had been at $1.07 heretofore. The firmer tone which recently developed in the leading crude rubber markets was still in evidence during the past week. Smoked sheets dropped 1-2 cent and pale crêpe rose 3 1-2 cents.

Market Changes of the Week

Few features in the market developed during the last week. In the rubber market, scrap rubber showed no change. With collections light the market remains in a firm position. Importers report a steady demand for all grades of foreign scrap. Cottonseed oil trading was of a routine character Tuesday with the increase of price from Monday failing to reflect any aggressive movement by either party. Though strong on Wednesday, it dropped to $6.25 and then rose to $6.29, a loss, though, of $.07 for the week. In the metal markets, tin and lead experienced slight losses, $.01 and $.02 1-2 respectively. In the lubricant markets, linseed oil, petroleum, Pennsylvania crude, and rapeseed oil, changed in prices, linseed oil dropped $.04, petroleum rose $.05, and rapeseed oil experienced a loss of $.04. Taken altogether the week has been one of unusual lack of activity in the metal, old rubber silk and lubricant markets.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb..	.08⅞	.08⅞	.08⅞	.08⅞	.08⅞	.08⅞	....
Beams & Channels, 100 lbs....	1.61	1.61	1.61	1.61	1.61	1.61	....
Bessemer Steel, ton	27.50	27.50	27.50	27.50	27.50	27.50	....
Copper Elec., lb.	.17 3/10	.17⅗	.17 3/10	.17 3/10	.17 3/10	.17 3/10	....
Copper, Lake, lb..	.17½	.17½	.17½	.17½	.17½	.17½	....
Cottonseed Oil, Dec., bbl........	6.36	6.25	6.25	6.25	6.25	6.29	—.07
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	....
Fish Oil (Menhaden)	.33	.33	.33	.33	.33	.34	+.01
Gasoline, Auto, 200 gals. @.........	.21	.21	.21	.21	.21	.21	....
Lard Oil, prime...	.96	.96	.96	.96	.96	.96	....
Lead, 100 lbs.....	4.35	4.32½	4.32½	4.20	4.32½	4.32½	—.02½
Linseed Oil.......	.50	.46	.46	.46	.46	.46	—.04
Open-Hearth Steel, ton	28.00	28.00	28.00	28.00	28.00	28.00	....
Petroleum, bbl., Kansas, crude...	.76	.76	.76	.76	.76	.76	....
Petroleum, bbl., Pa. crude.......	1.90	1.90	1.90	1.90	1.90	1.95	+.05
Rapeseed Oil, refined	.73	.69	.69	.69	.69	.69	—.04
Silk, raw Ital....	....	....	4.35	....	4.35	....	....
Silk, raw Japan...	....	....	3.82½	....	3.82½	....	....
Sulphuric Acid, 60 Beaumé	.90	.90	.90	.90	.90	.90	....
Tin, 100 lbs......	4.93	4.91	4.90	4.90	4.91	4.92	—.01
Tire Scrap.......	.10	.10	.10	.10	.10	.10	....

U. S. Motors To Move

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Preparations Are Being Made for the Removal of the Company to Detroit in the Near Future

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This Will Place Administration Departments in Closer Proximity to Its Manufacturing Plants

FINAL preparations are being made for the removal of United States Motor headquarters from New York to Detroit. The date for the actual change is still unfixed but it is generally believed that it will be accomplished very shortly after the judicial sale has been made and reorganization finished.

During the past week a series of meetings has been held at headquarters behind closed doors and the announcement has been made that the few remaining office employees of the company will resign within a short time.

The removal of the company to Detroit places its administrative departments in closer proximity to its manufacturing plants and foreshadows renewed manufacturing activity at the quiescent factories of the company in the Detroit zone.

The affairs of the United States Motor Company await the judicial sale that has been decreed for January 8. In the meantime, manufacturing activities are at a low ebb. Save for such industrial work as is necessary to maintain the supply of parts for the repair of existing cars all the plants of the company are shut down except for the completion of the manufacturing schedules of 1912 and the continuance of the manufacturing schedules of the Maxwell Briscoe Motor Company, for 1913 and its experimental work for 1914.

The Brush and Sampson plants are idle except for the production of spare parts; the Columbia is finishing the last of its regular schedule; Stoddard-Dayton has finished its schedule. The three Maxwell plants, chief of which is at Tarrytown, N. Y., have about completed schedule. The Newcastle plant is inactive for the time being and the Providence plant is quiescent. The Thomas plant is completely shut down except the repair department.

Under order of court the issuance of $1,500,000 of receivers' certificates was authorized to commence the Maxwell manufacturing schedule for 1913, and much work has been done toward this end. So far the money used for the Maxwell program has come from other sources than the sale of the certificates.

Attorneys for the creditors state that upwards of 95 per cent. of the total claims against the company have been filed indicating an almost unanimous opinion in the minds of the creditors as to the feasibility of the reorganization plan.

The second call for 10 per cent. of the assessment levied against the stock has been made, but details as to the exact amount of stock deposited are lacking. It is said that it totals more than a majority.

No apprehension is felt among the various interested elements in New York with reference to the court action in bankruptcy in New Jersey.

It is pointed out that the New York court has possession of the assets and that the indicated program of sale will be carried out.

At the meeting of the sales and district managers of the company, those who represented districts in which the branch houses have been liquidated resigned automatically and the remainder considered the future in executive session.

Announcement has been made that C. E. Reddig, chief engineer of the Columbia Motor Car Company, and designer of the Columbia-Knight car, has resigned his position with that company, and has been made assistant chief engineer of the Timken-Detroit Axle Company, with headquarters in Detroit, Mich.

S. A. E. Program for Winter Meeting Fixed

Sessions To Last 3 Days—New Members in Board of Trade—Studebaker Branch Managers Meet

New Morgan & Wright Buildings Will Have More Than 1,000,000 Square Feet of Floor Space

DETAILS of the program to be followed at the annual meeting of the Society of Automobile Engineers are contained in the current issue of the bulletin published by that organization.

The sessions will be held at the new Hotel McAlpin and will commence January 16 at 9:30 o'clock in the morning with a business and professional meeting. There will be a professional session at 2 in the afternoon and the Commercial Vehicle will be the subject of discussion and consideration at the evening meeting.

Friday, January 15, will have professional sessions at 9.30 a. m. and 2 p. m. and in the evening the annual banquet will be held at the McAlpin. Saturday morning's professional session will close the convention.

Prior to the opening meeting the Standards Committee will assemble on Wednesday at the headquarters of the organization to receive the presentation of the reports of subdivisions that have met with the approval of the Council.

Among the papers and reports scheduled are the following: Reports: Broaches, C. W. Spicer; Ball and Roller Bearings, David Fergusson; Frames, J. G. Perrin; Miscellaneous, A. L. Riker; Sheet Metals, T. V. Buckwalter; Motor Testing, John O. Heinze; Nomenclature; Springs, Harold L. Pope; Truck Standards, William P. Kennedy; Wheel Dimensions and Fastenings for Tires, William P. Kennedy, and Aluminum and Copper Alloys, William H. Barr. All of the above are formal reports of divisions of the Standards Committee and will be presented by the various chairmen as noted.

Among the formal addresses scheduled are the following: Effect of Relation of Bore to Stroke in Automobile Engines, John Wilkinson; Stability of Automobile Propeller-Shafts, J. M. Thomas; Methods of Brake Capacity Determination, S. I. Fekte; Leaf Springs, L. J. Lane, and Standardization of Drawings, George W. Dunham.

Numerous other optional papers have been listed in case the opportunity is afforded for presentation.

Board of Trade Elects Four

Four new members have been elected by the Automobile Board of Trade and have qualified for membership in that organization. They are as follows: Federal Motor Truck Company, Inter-State, Imperial and Stutz.

The accessions bring the membership of the A. B. of T. up to sixty-three, which is a new high record for that association. The present tendency to be noted in the national organization is to absorb individual members of the National Association of Automobile Manufacturers, so that when the time arrives for the merger of the two bodies the change will not be radical as far as the members are concerned.

Studebaker Staff Holds Conference

SOUTH BEND, IND., Dec. 9—Last Saturday a special train pulled on the siding of the Studebaker Corporation plant bearing a party of Studebaker officials from the automobile division in Detroit. The group included the thirty branch managers whose annual meeting has been in progress during the week. The afternoon was devoted to conferences under the direction of General Manager Gunn. In the evening a banquet was served, after which the party embarked again on the special train for Detroit.

The party included the following, most of whom returned to Detroit: F. S. Fish, president; C. Studebaker, Jr., first vice-president; G. M. Studebaker, second vice-president; W. R. Innes, assistant treasurer; Scott Brown, secretary; J. E. Spencer, assistant secretary; J. N. Gunn, general manager; A. H. Brown, Portland; B. R. Person, Memphis; L. J. Oliver, Los Angeles; C. N. Weaver, San Francisco; N. S. Riley, Kansas City; R. L. Sutherland, Indianapolis; J. A. Graham, Minneapolis; L. A. Keller, Omaha; P. E. Hawley, Boston; O. C. Reed, Birmingham; B. T. Kingsman, Buffalo; G. W. Hanson, Atlanta; L. Markle, Chicago; C. A. Quigley, Salt Lake City; J. O. Hahn, Cleveland; C. W. Hartman, Dallas; J. C. Beck, Jr., Denver; A. K. McLuney, Detroit; W. C. Vleit, Fargo; H. R. DeGroat, Philadelphia; G. H. Phelps, New York; W. W. Beeson, Louisville; C. J. Simons, St. Louis; E. H. Habersham, Washington; G. C. Nichols, Spokane; C. H. Snoke, Sioux Falls; H. T. Myers, South Bend; H. L. Kuhns, New York Vehicle branch; R. L. Messimer, J. A. Austin, R. H. Booth, Theodore F. MacManus, H. A. Biggs, Hanson Robinson, O. S. Wilson, W. B. Brady, E. R. Carpenter, H. F. Wellington and H. E. Dalton.

M. & W. to Add Sixteen Buildings

DETROIT, MICH., Dec. 9—Permits have been issued to the Morgan & Wright Company for the erection of sixteen new factory buildings to take care of the prospective increase in output of pneumatic tires. It is stated that when these additions have been completed about 5,000 tires will be turned out per day and the working force doubled.

The new structures will vary in size from 2,000 to 121,000 square feet, the largest being 60 by 230 feet and six stories high. The new buildings will swell the total Morgan & Wright floor space to over 1,000,000 square feet and will make this plant the largest in the world, it is said. The Morgan & Wright Company is a subsidiary of the United States Tire Company.

Receiver for Whitesides Truck

INDIANAPOLIS, IND., Dec. 9—The affairs of the Whitesides Commercial Truck Company have reached the Henry County Circuit Court, where Mark Davis has been appointed receiver for the company, which has a plant at Newcastle. The plant has been closed for some time and the receiver is to wind up and dispose of the business as rapidly as possible. The receivership proceedings were brought by the stockholders who have been unable to agree as to how the business should be conducted. The company was founded by V. M. Whitesides, who was general manager until he withdrew from the concern a few weeks ago.

Massachusetts Fees Jump $140,000

BOSTON, MASS., Dec. 7—The Massachusetts State Highway Commission closed its fiscal year November 30. The gain in the number of cars shows a jump of more than 11,000, while the increase in fees represents something like $140,000.

In 1911 there were 38,907 cars registered from which the commission got $380,760, while this year 50,132 machines were put on the books for which $492,482.50 was collected. The manufacturers and dealers helped to swell the fund, too, for last year with only 870 the state got $24,849, while for 1912 the figures show a gain to 1,114 from which $27,157.50 was secured. This does not include nearly $5,000 for additional number plates for dealers.

Next in importance in revenue comes the operators' licenses that brought in this year $29,386, compared to $22,122 in 1911. The renewals of licenses was good for $16,127.50 this year against $12,672.50 last year. The chauffeurs poured in $11,140 for licenses and $7,063.50 for renewals, while a year ago the figures were $8,366 and $5,680.50, respectively.

Then there were the examinations that were good for $14,036, while in 1911 $12,274 was received. The increase averages about 25 per cent. all along the line.

This year there were within a few hundred cars rating under 30 horsepower registered as many as there were of all classes a year ago. The cars under 20 horsepower getting the $5 rate totaled 15,774. Those between 20 and 30 getting the $10 rate numbered 22,265. Some got proportional rates between due to change of ownership.

Chauffeurs contributed $32,239.50 this year against $25,000 in 1911. And the drivers of horse-drawn vehicles numbering thousands never have to pay a cent to earn their living. The commission is now receiving applications for 1913 numbers.

Comparative figures showing the increase in registrations and finances from the motor industry in the Bay State in 1912 over that of 1911 are as follows:

	1911	1912	1911	1912
Automobiles	38,907	50,132	$380,760.00	$492,482.50
Motor cycles	3,685	5,034	7,030.00	9,640.00
Manufacturers, dealers	870	1,114	24,849.00	27,157.50
Operators' licenses	11,561	14,693	22,122.00	29,386.00
Chauffeurs' licenses	4,183	5,570	8,366.00	11,140.00
Operators' renewals	25,345	32,255	12,672.50	16,127.50
Chauffeurs' renewals	11,361	14,127	5,680.50	7,063.50
Examinations	6,137	7,018	12,274.00	14,036.00
Miscellaneous cash	...	...	3,663.95	9,200.44
Fines	...	...	26,744.50	29,108.00
Total			$504,162.45	$645,344.44

Balkan War Gets the Angora

SAVANNAH, GA., Dec. 9—The possibility that the Balkan controversy and the attending depression of Turkish commerce will result in the price of automobile tops advancing is suggested by the fact that much of the material now used in making the high class motor car top covering is of mohair, which is imported from Turkey, the home of the famous Angora goat.

With all the mammoth automobile business of the United States encouraging its manufacture, the best mohair material for their use is not made in the United States. The material is rubberized after it reaches America, and a lining added to it before it goes to the factory to go over the framework of the automobile top.

U. S. Motor Branch Dissolved

WASHINGTON, D. C., Dec. 9—The United Motor Washington Company, a branch of the United States Motor Company, has been dissolved, the Maxwell agency being given to H. B. Leary, Jr., and the Columbia to the Dupont Garage Company. Leary has leased the company's salesroom and the Dupont company has taken Leary's old quarters at 1317 Fourteenth street, N. W. The latter also handles the Rambler and Mitchell. John R. Thomas, former manager of the United Motor Washington Company, has been promoted to the managership of the Philadelphia branch.

THE FLEX-O-FILL CORE COMPANY has been incorporated under the laws of New York for $50,000 to manufacture a tire filler for which patents have been asked. The principle involved is that of applying pressure to the circumference of the core in such a way that wounds in the casing will not cause the destruction of the shoe. The substance used for the filler is designed to heal up small wounds by automatic action. The incorporators are G. Osborn, L. McCready, M. A. Noble, and the offices and factory of the company will be in New York.

THE ANNUAL BEEFSTEAK DINNER of the Big Village Motor Boosters will be held January 14, during the opening week of the national annual show. The place for holding the function has not been fixed but a meeting of the organization has been called this week to arrange that detail and other important matters with reference to the program.

World's Records Go at Brooklands Track

New Figures for the 50-Mile Distance Established by Christiaens in an Excelsior—Hemery in Lorraine

Record for 6-Hour Run Better by More Than 66 Miles by Hemery—Other Times Bettered by Margins

LONDON, Dec. 2—There has been a revival of record breaking attempts in England, with the result that many of the old figures that have been standing as world's records have been eliminated. The world's record for 50 miles was broken last week by an Excelsior car of 60 horsepower, driven by J. Christiaens. He made two attempts to cover 100 miles in the hour and but for a slight mechanical breakdown in the first attempt and tire trouble which caused him to stop prematurely on the second run there is little doubt that he would have accomplished his object, as his speed averaged for the distance he actually covered well over 100 miles an hour. In the first attempt he covered the first lap in 1 minute 56 1-5 seconds from a standing start, and the second and third laps were covered in 1 minute 36 seconds, giving an average speed of 103.76 miles per hour. In the second attempt, although he failed in covering the hundred miles, he established new figures for the world's record at 50 miles, covering that distance in 29 minutes 18.45 seconds, which gives an average speed of 102.36 miles per hour, easily beating the previous best of 97.17 miles an hour recently set up by a Vauxhall car.

In the next series of world's records, Victor Hemery, of Continental fame, and who drove the 84.8 record-breaking Benz over the flying 1-2 mile on the Brooklands track in November, 1909, at a speed of 127.9 miles an hour, thereby not only establishing the fastest speed ever attained on the Brooklands track, but also creating a world's record that has stood ever since, took the wheel of the car. On this occasion, however, he was driving a 60-horsepower Lorraine-Dietrich and succeeded in establishing world's records from 1 hour to 6 hours. He covered 518 miles 312 yards at an average speed of 86.36 miles per hour, thus easily beating the figures put up by the 30-horsepower Sunbeam car of 451 miles 445 yards at an average speed of 75.2 miles an hour. He also established new figures for all intermediate long-distance records except the standing start 50 miles, which is fully dealt with above, established by the Excelsior car, and the 300 miles which C. M. Smith put up on a 60-horsepower Thames car, averaging 85.6 miles per hour.

Having failed to establish a record in the first 50 miles, Hemery deliberately stopped at the end of 5 hours in order to make a fresh attempt for the distance in the last and sixth hour. He began in fine style, lapping the course at a speed well over 100 miles an hour, and when everything seemed smooth for new figures he experienced tire trouble. Nevertheless, despite these halts, he improved on the old 6-hours' world record by no less than 66 miles 1,627 yards.

The new figures now read: 1 hour, 97 miles 1,037 yards, against the old record of 92 miles 797 yards; 2 hours, 189 miles 1,747 yards, against 173 miles 810 yards; 3 hours, 284 miles 817 yards, against 261 miles 1,633 yards; 4 hours, 344 miles 1,344 yards, against 319 miles 242 yards; 5 hours, 422 miles 1,574 yards, against 391 miles 1,429 yards, and 6 hours, 518 miles 312 yards, against 451 miles, 445 yards.

He covered 100 miles in 1:01.:27.69; 200 miles, 2:05:56.73; 400 miles, 4:34:23.87, and 500 miles in 5:48:38.87.

Decorations of New York Show Superb

White and Crystal Color Scheme To Be Feature at Garden and Mural Landscapes at Palace

Sixty-Eight Truck Manufacturers Have Already Contracted for Space at Commercial Vehicle Exhibition

DECORATION and esthetic setting for the annual automobile shows commands a position of more and more importance each year and for 1913, the management of the New York show which will be held at Madison Square Garden and Grand Central Palace has paid more attention to the matter of decorations than ever before.

White and crystal will be the color scheme at the Garden, while mural landscapes illustrating scenes significant to automobiling will be the keynote of the Palace decorations.

Preparations for the Garden division of the show require much more labor and expense than those for the Palace. For instance, something like 200 tons of steel and 1,000,000 feet of lumber are required to reconstruct the interior of the hall in anticipation of the show. Two great freight elevators must be installed to hoist exhibits above the main floor. Part of the mission of the decorative plan is to conceal the rough corners necessitated by the alterations of the building.

The crystal feature of this year's plan will be embodied in three giant chandeliers and thirty smaller ones, suspended from the dome. Around the walls many thousands of square feet of mirrors will be placed and the sculptural effects will be carried out in white. Some of the details of the plan still remain to be worked out as far as the Garden decorations are concerned but it is certain that the lattice used last year in conjunction with ornate lamp-posts to separate the exhibits will again be favored. Garlands of flowers and greenery will be intertwined along the balconies and looped in front of the pillars that support the elevated platform.

At the Palace the main floor will show scenes on Long Island, at Delaware Water Gap, in the Berkshire Hills and along the Hudson. On the mezzanine floor, western views will be displayed.

The pergola style of decorative framework will be used in connection with trellis and garlands.

The main and mezzanine floors will be used for complete cars while the accessory and motorcycle show will be in the balcony.

The decorative features of the Palace are pronounced by the management to be the finest ever used in that building.

All the preparations for the extensive alteration necessary to convert the Garden into a fitting place to hold its section of the automobile show have to be made in advance. Each girder and stanchion must be prepared and numbered so that when the word is given it can be installed. As the big hall is frequently used for other shows up to the week before the opening day, the work of getting ready for the automobile show requires work at high pressure. The preparatory work commenced several months ago and in a big loft near the building the sky, which will be used to cover the ceiling and girders of the Garden, is now being painted. The rug that was used last year has been discarded and the covering at the coming show will be of soft blue in simulation of the real sky.

As usual, the signs of the individual exhibitors will be uniform and will harmonize with the decorations.

Twenty-one different makes of motor wagons and trucks never before exhibited in New York will be displayed in the commercial car section of the New York Automobile Show during the second week, from January 20 to 25. All of these will be located in the New Grand Central Palace. This year the electric vehicles will all be grouped together in the Palace, so that a few of the early truck makers, including several real pioneers in the field, will be found in company with the newest makers in the fold.

Sixty-eight commercial car companies already have contracted for space at the Show, 5 weeks before it opens, which is four more than the actual number of exhibitors at last winter's shows in the two buildings. There will be additions no doubt that will bring the list to between seventy and seventy-five this winter.

Of the score of makes not previously exhibited, one-half are entirely new to the market, never having been exhibited before in any show. Most of the others are western products, for which their makers are seeking Eastern recognitior.. Some of them have been in the market for a number of years and have made good in exacting service over poor roads in the central states.

The new makes include both gasoline and electric vehicles. They embrace all sizes, from delivery wagons of 1,000 pounds capacity to 6-ton trucks. An even greater range of size will be found among the older makers, ranging from about 800 pounds to 10 tons load capacity.

While a majority of the models on view will be fitted with standard bodies suitable for the commoner lines of business, there will be a great diversity, from florists' wagons and motor ambulances to motor fire apparatus, automatic dump trucks and so forth.

Time Schedule of M. A. M. Show Meetings

Detailed schedule of the various meetings to be held during the coming show season by the Motor and Accessory Manufacturers has been announced as follows:

Tuesday, January 14 at 10 o'clock a. m.: Meeting of the executive committee at headquarters.

Tuesday, January 14 at 3 o'clock p. m.: Meeting of the board of directors at headquarters.

Wednesday, January 15, 5:30 o'clock p. m.: Tenth annual meeting at Waldorf-Astoria.

Wednesday, January 15, 8 o'clock p. m.: Fifth annual banquet at Waldorf-Astoria.

Thursday, January 16, 2:30 o'clock p. m.: Board of directors at headquarters.

Washington Dealers Split on Show

WASHINGTON, D. C., Dec. 8—Plans for the motor car show scheduled for February 5-8 are progressing satisfactorily, despite the fact that sixteen of the leading dealers have declined to take part. Chairman T. Oliver Probey claims that more than one-half the space has been sold, it being understood that a number of outside concerns will take space in order to introduce their cars here and thus pick up an agent. A portion of the hall will be devoted to an exhibit of trucks. E. A. Garlock has been elected secretary of the show committee.

The opposition dealers, who are planning a carnival or opening week Feb. 10-15, are going ahead with their arrangements. A meeting of the committee in charge of the affair, of which J. M. Stoddard is chairman, will meet this week to formulate further plans for the carnival.

Club Garage for Quaker Show

PHILADELPHIA, Dec. 7—With but few exceptions members of the Automobile Club of Philadelphia are heartily in favor of the proposition to lease the building of the organization at Twenty-third and Market streets to the Philadelphia Automobile Trade Association for the holding of the annual automobile show which opens on January 18. This practically assures the holding of the event there, in which case it will be the largest and most representative of the industry ever held under one roof in this city, as ample accommodations will be at the disposal of the Show Committee of the Trade Association to take care of additional exhibitors, and a larger number of cars will be on view than ever were assembled before.

Pending final acceptance of the plan to use the club's garage for the show, plans are being worked out by the Trade Association to make it the best ever. These are, as yet, only in a formative state. As has been the custom, the exhibition will extend over 2 weeks. So far, no changes in the yearly routine have been announced outside of the fact that the first week will be devoted to gasoline pleasure cars, electrics and accessories, the second week being confined exclusively to commercial vehicles. Heretofore the electrics have been on view the second week, in conjunction with the trucks, owing to lack of room.

Next Saturday afternoon from 2 until 6 o'clock, the cornerstone ceremonies and formal opening of garage and clubhouse of the Automobile Club of Philadelphia will take place. Men prominent in the automobile world will be present and make addresses.

Chicago Truck Show Growing

Nine more motor truck and wagon makers have contracted for space at the National Automobile Show at Chicago during the past week. This brings the list of complete vehicle exhibitors up to sixty-nine—one more than in the New York show.

As all of the ground floor space in the Coliseum, Annex and First Regiment Armory has been allotted, it has been found necessary to set aside a large section of the second floor of the Annex for the display of the lighter types of motor wagons. This embraces all the space on the south half of the center aisle formerly devoted to motorcycles.

Among this year's exhibitors are sixteen companies that never have shown their product at Chicago. All but four of these are new makers whose machines are just coming into the market for the first time. Eighteen of the Chicago exhibitors have made no arrangements to display in New York this winter. Most of these are mid-western makers, located principally in Chicago and in other Illinois, Wisconsin, Michigan, Indiana and Ohio cities.

The week's additions to the list are as follows:

Harder Fireproof Storage Warehouse Company	Chicago, Ill.
Kentucky Wagon Manufacturing Company	Louisville, Ky.
H. J. Koehler Sporting Goods Company	New York City
The Lansden Company	Newark, N. J.
Mais Motor Truck Company	Indianapolis, Ind.
Mercury Manufacturing Company	Chicago, Ill.
Mogul Motor Truck Company	Chicago, Ill.
Stewart Motor Corporation	Buffalo, N. Y.
Ware Motor Vehicle Company	St. Paul, Minn.

The M. & P. Electric Car Company and Transit Motor Truck Company have dropped out.

Milwaukee Show Opens January 11

MILWAUKEE, WIS., Dec. 9—The fifth annual Milwaukee motor show, to be given in the Auditorium from January 11 to 17 inclusive, will be under the auspices of the Milwaukee Motor Show Association, a new corporation. Blank applications for space have just been issued. The show will open on Saturday night, January 11, at the same time that the national pleasure car show opens in New York, and will close on Friday evening, January 18.

Tri-City Show February 19-22

DAVENPORT, IA., Dec. 9—At a meeting of the Tri-city Auto Dealers' Association held at the New Kimball in Davenport last week the date for the annual show was set as February 19, 20, 21 and 22 at the Coliseum. The annual meeting of the association was held at the same time and officers elected as follows: President, G. F. Burmeister, Davenport; vice-president, Emil Buck, Davenport; secretary, Webb Mason, Davenport; directors, G. F. Burmeister, Emil Buck and Webb Mason, Davenport; W. C. Totten, Rock Island, and Fred R. Young, Moline.

Paris Salon Opens With 565 Exhibitors

Clean Sweep for Long Stroke Motor—Six Types with Sleeve and Slide Valves Shown

After Lapse of 2 Years Tremendous Enthusiasm Manifested —Twelve American Makes on View

PARIS, Dec. 9—*Special Cable*—President Fallieres gave the signal for opening the automobile salon Saturday morning at 9 o'clock and since then the French public, reinforced by delegations from all the countries of the world in which automobiles are made, thronged the Grand Palais.

The show is pronounced the greatest and finest ever held and the expressed opinion of many of the visitors coincides with the French opinion on the subject.

There are 565 exhibitors and of these there are over 200 displays of French automobiles. England is represented by thirty-four makes, America by twelve, Germany by nine, Italy by eight, Belgium by nine, and Switzerland by four. In all there are over 275 different makes of automobiles on display.

The Grand Palais floor measures 260,000 square feet and it is all occupied by the automobile exhibition.

After a lapse of 2 years since the last automobile show was held in Paris, the enthusiasm is very great. In fact, it has been stimulated to such an extent that the holding of a show annually is practically assured.

Various propositions have been made to hold a pleasure car show every other year with a commercial vehicle exhibition on the alternate years. This plan has been viewed with favor by the parent organization behind the shows, but the immense favor with which the salon has been received makes it almost certain that a yearly pleasure car show will result, the popular demand for it appearing to be strong.

The overflow show includes displays by more than 200 manufacturers who were unable to crowd into the Grand Palais. The overflow show is housed in the Jardin de Paris, a huge pleasure garden that is usually closed at this season of the year.

PARIS, Dec. 10—(*Special Cable*)—Paris sprung a surprise on Olympia by making a clean sweep for the long stroke motor. Not counting the American exhibits there were 321 four-cylinder models, twenty-six sixes, eleven twin and fifteen one-lunger models. The motor with the smallest bore had cylinder dimensions of 50 by 100 millimeters (1.97 by 3.94 inches). The motor with the longest stroke had cylinder dimensions of 110 by 200 millimeters (4.42 by 7.88 inches). An idea of the relative sizes of the motors may be gained from the following: There were seven motors of 60 millimeters bore, forty of 65 millimeters, thirty-one of 70 millimeters, sixty-two of 75 millimeters, seventy-two of 80 millimeters, eighteen of 85 millimeters, fifty of 90 millimeters, seven of 95 millimeters, thirty-eight of 100 millimeters and thirty-seven between 100 and 140 millimeters. Thirty-three motors have a stroke-bore ratio of 2 to 1 and 50 per cent. have 1.5 to 1 stroke-bore ratio. The balance are scattered but none were square, bore equalling stroke with the exception of the Knight sleeve motors.

Six types of sleeve and slide valve motors were exhibited at the show, the Knight proving the most popular and attractive to makers. The small, well-made poppet valve is proving itself silent, economical of fuel and generally efficient. A noticeable feature was the effect of the war scare on purchasing, a great retarding influence being exerted.

Carburetted Alcohol, Harmless, Rich in Calories and Stronger than Gasoline, Developed at French Chemical Plant and Tried Out in Ordinary Motors—Wobble-Disk Crankshaft-Drive in Aviation Motor—Convenient Hoist for Factory Use

CHECKING Rise of Gasoline Prices by Manufacture of Competing Fuels, Especially Carburetted Alcohol— The strong efforts made in Europe to emancipate the employment of all internal-combustion motors—from the Diesel ship motor and stationary power plant to the diminutive bicycle motor—from their dependence upon imported and especially American fuels, are taking more and more definite forms and promise eventually to relieve the American supply of the European demand, thereby removing one reason for the constantly increasing market prices and creating means by which a direct competition with gasoline and kerosene may be promoted even in the American home market. The fact that the Diesel motor has already been made independent, with the result of forcing the German-American oil syndicate to moderate the prices of crude oils, has greatly encouraged this movement for nationalizing the fuel supply by technical means, and it is expected that sharp import duties will be resorted to in some of the European countries to help out the national product, as soon as this may be done without hardship to the consumers.

In Germany, where the original movement for utilizing alcohol and carburetted alcohol was at one time very strong and has left sad memories of technical and financial disappointment, so far as the use of these fuels in automobile motors is concerned, the leaders of the movement have turned to benzol, and the manufacture of this distillate of coal has been so organized that a minimum output of 27 million liters annually has been guaranteed the consumer. In England, where import duties play no part, the efforts are centered upon the development of carbureters and motors in which kerosene, benzol and gasoline may be used optionally.

From France a new method for the carburetion of alcohol is announced which will also begin to interest the United States as soon as the expansion of all motoring interests shall have influenced public opinion sufficiently to warrant the removal of govermental interference with the free production of alcohol whether pure ethyl or denatured. The restrictions imposed by the Internal Revenue laws and the supplementary enactments relating to industrial alcohol and the public supervision of the denaturing processes, by which after all a substance is produced which cannot be utilized economically in any motors of ordinary construction, operate at present as a brake upon all initiative by which the cost of production of alcohol, and of any suitable fuel of which it might form a part, could be reduced to its minimum. Similar factors, it is noticed, are at work in European countries, and the condition for progress is therefore the actual production of an alcohol fuel which can compete on its merits and which the public will demand.

THE NEW PROMISE OF CHEAP ALCOHOL FROM CORN

Maurice de Keghel, a prominent chemist and manager of the French Wood Impregnation Company sets forth some interesting details on this subject of producing a really suitable motor fuel from alcohol, and the substance of his article is presented in the following with a few abbreviations at technical points.

The industrial production of alcohol has entered upon an entirely new phase since Stewart's discovery with regard to the use and harvest of Indian corn. The Stewart process is simple. It consists in detaching the ear from the stalk as soon as the grain is milky. This results in an indefinite prolongation of the life of the plant and a constant and gradual increase of the sugar-content of the stalk until it rivals that of the sugar cane. The milky ear itself contains more than 20 per cent. of fermentable matter, and one-half of the weight thereof can be turned into alcohol while the rest forms a nutritious bran mash for cattle. It is highly important that Indian corn can be raised to this degree of maturity even in far-northern countries.

According to Dupont, in *Revue Mensuelle* for June, 1912, corn harvested according to the Stewart method yields 2000 liters of alcohol per hectare of land (about 203 gallons per acre) and in addition 13000 kilograms of sugar which may be used as such or converted into alcohol.

The possibility of cheap production of alcohol may, from these data, be considered as established, but alcohol in itself is a feeble fuel and also attacks the metal of a motor. It has been shown that ordinary alcohol, or alcohol denatured with wood alcohol, cannot compete with gasoline or benzol. It must be enriched, and then two questions arise. First, with what other fuels must it compete and, secondly, how shall it be enriched in order to become most valuable and economical?

SHORTCOMINGS OF DIFFERENT FUELS AND MIXTURES

With regard to gasoline it must always be a drawback to its universal use that only about 6 per cent. of crude petroleum can be converted into this fuel and that American petroleum is the only kind which produces the best grade; the supply falls short of the demand, and the high price is aggravated by import duties. In case of war the supply is threatened. It can neither be the standard fuel in the long run nor the substance with which alcohol should be enriched.

Benzol, which is spirit of coal tar, can never supply the market as the production of it is limited by nature to a quantity incomparably smaller than that of gasoline. It is also objectionable by entraining corrosive elements in the distillation process. which it is costly to remove, by having a very high freezing point and by the strong odor of its exhaust gases.

By mixing benzol and alcohol in equal parts, as has been done in order to enrich the alcohol, a fuel is obtained in which the disadvantages in other respects of both constituents are preserved. This mixture is therefore little used.

THE TECHNICAL REQUIREMENTS

In seeking for a new kind of carburetted alcohol it has been the object to produce a homogeneous fluid with physical and chemical characteristics of its own and, of course, having none of the objectionable features of other fuels or compounds. The fuel which has resulted from these efforts contains 70 per cent. of alcohol in which elements have been absorbed from coal tar. from wood tar, from white spirit, from crude Galician petroleum and from pyridine. The preparation involves the five processes of mixing, distillation, neutralisation, redistillation and carburetion.

DESCRIPTION OF THE NEW PROCESS

The first process consists in mixing 60 parts of 93 deg. alcohol, 23 parts of wood tar and 17 parts of coal tar and heating the mixture, which is thoroughly stirred, slowly to 90 deg. C. in a still. The distillate is gathered by condensation in a cooling coil. It gives a plainly alkaline reaction and emits an odor resembling at once that of creosote and that of benzol, and this odor remains with the product throughout the subsequent processes. The distillation yields from 65 to 67 per cent. of the total weight of the mixture from which it is made and grades 90 deg.

The residue of this distillation has a special value for the preservation of wood and cordage. The tars in it have acquired new properties in the process, the corrosive and the hygroscopic elements disappearing. By adding pitch and white spirit turpentine in suitable proportions this residue forms an excellent and very adhesive black coating for metals. On the other hand the residue may be used for the manufacture of colors, as if the tars had undergone no change.

The distillate has a greenish yellow color and holds in solution a considerable proportion of ammoniacal compounds to which its alkaline character is due. The next process consists in transforming these compounds by chemical means into salts which are insoluble in alcohol and which also have an independent commercial value. Phosphoric acid has been found the best means to this end. It causes the formation of a very stable phosphate of ammonia which is precipitated in snow-like crystals. This is removed by decantation (pouring the liquid slowly away from the precipitate) and filtration and amounts to 0.6 to 0.7 per cent. of the neutralized mass. The liquid is slightly acid after this process, however, because phosphoric acid had to be used in slight excess over the alkalinity which it was to remedy, and it is therefore now redistilled, this process resulting in a strictly neutral alcohol of 93 deg. and of a density close to 826. When cooled to minus 25 deg. C. it does not separate in the least but remains homogeneous. Its denaturing elements constitute 3 per cent. of its weight, and it is found absolutely impossible to remove them or the odor which they cause. Its appearance is greenish yellow and fluorescent. Any fraudulent use of it would be very easy to detect by reason of the presence of compounds, such as rosaniline and pyridic bases, which give constant and characteristic reactions under test.

It is this alcohol which serves for the preparation of the carburetted alcohol. Extensive experiments were conducted at the shops of Henri Mers to determine the best proportion for admixture of enriching hydrocarbons, and 35 per cent. was found to give the best average results. The carburetting process consists in the distillation of the prepared alcohol in the presence of hydrocarbon compounds which part with some of their volatile constituents and in which some of these volatile constituents during the condensation form a stable chemical combination with the prepared alcohol, so that the final product is completely homogeneous and has a fixed distillation point. And it was found that compliance with this requirement, as expected, also resulted in a fuel of extraordinary power-producing properties, when used like gasoline in ordinary motors.

CARBURETTING THE PREPARED ALCOHOL

In the actual process, 66 parts of the prepared alcohol is mixed in a large closed vat, provided with a stirring tool, with 19 parts of Galician crude oil, 13 parts of white spirit and 2 parts of pyridine. The stirred mixture is left alone for 30 hours and is then distilled at 77 to 81 deg. C., yielding at this heat an average of 86 to 88 per cent. of the total mixture. This distillate grades at 95 deg. on the alcoholometer and is the carburetted alcohol ready for use in motors.

The assimilation of the crude oil is particularly favored by the presence of the pyridine which is a remarkably energetic solvent and a veritable extracting agent in separating the hydrocarbon elements from the crude oil. By its use, 39 to 40 per cent. of the crude oil is absorbed.

The residue represents usually 12 to 13 per cent. of the mixture. It has peculiar properties. Unlike the crude oil from which it is mostly derived, it cannot be coked. While the naphtaline has been removed from it, it is easily solidified and should make an excellent briquetted fuel, especially for marine purposes. The odor of the crude oil has partially disappeared from it.

The carburetted alcohol has a density of 826 at 15 deg. C., a fluorescent greenish-yellow appearance and an odor calling to mind both creosote and gasoline. A few drops of it rile water. It is strictly neutral and therefore harmless to the metals of the carbureter and the motor. The weight of the coke from it does not exceed 23/10,000 parts of 1 per cent. The average solid residue is .0003. This explains why it does not foul a motor. Its inflammability begins at minus 7 deg. C. and it is practically unfreezable, a temperature of minus 25 deg. C. causing no change in its action. It contains an average of 8030 calories and the exhaust from it is neither odorous nor smoky. Its efficiency as a source of power in automobile or stationary motors of standard design exceeds that of gasoline or benzol by about 60 to 70 per cent., according to the tests made at the Henri Mers shops.

COST OF PRODUCTION OF THE NEW FUEL

With a cost of production for 95 deg. alcohol of 30 francs per hectoliter, which is more than the actual cost at this moment though far from the exchange quotation, and with by-products which more than pay for all the cost of preparation and distillation, the cost of production of the carburetted alcohol may be figured as 27.30 francs per hectoliter, basing the calculation on a daily production of 65 to 70 hectoliters. [This cost which equals about 22 cents per gallon would perhaps be sufficiently low to establish the product on a competitive basis in Europe, considering the claimed power-efficiency of 60 to 70 per cent. in excess of that of gasoline, and would begin to interest America in a practical manner if the cost of production of the alcohol base were reduced to 10 cents per gallon, allowing in that case for a hundred per cent. of expense in handling the product commercially.—Ed.]—From *Revue de Chemie Industrielle*, November.

New Motor Types—At the recent aviation show in Paris several motors were exhibited which, though intended mainly for aviation purposes, embody new design features which are applicable to motors in general. Among these, several Canton-Unné motors made by the Emile Salmson firm attracted wide attention, partly by reason of their special design and select workmanship and partly because it was known that they operate satisfactorily in practice. One was a 7-cylinder water-cooled star-shaped motor of 80 horsepower with exposed central crankchamber; anothed a 9-cylinder fan-style motor of 300 horsepower weighing 450 kilograms, also water-cooled; still another a 9-cylinder motor with horizontal cylinders and the vertical motor shaft connected by a reducing gear inside of the crankchamber with a horizontal propeller shaft. But these types had been before the public for some time, while the fourth type shown was quite new and remarkable by its compactness and the adoption of a certain system for transforming the reciprocating motions of the pistons into rotary motion of the crankshaft which was brought out many years ago in an American patent for a hydraulic transmission and is at present copied and perfected in a hydraulic transmission known as the Williams-Janney and made by the Delaunay-Belleville company of France. The principle of the motion is public property. The Salmson motor in which this principle is utilized has 7 horizontal and parallel cylinders arranged as the cartridge chambers in the barrel of a revolver. Each of the cylinders has a central combustion chamber and two pistons which are moved by each explosion in opposite directions. At the ends of the cylinders

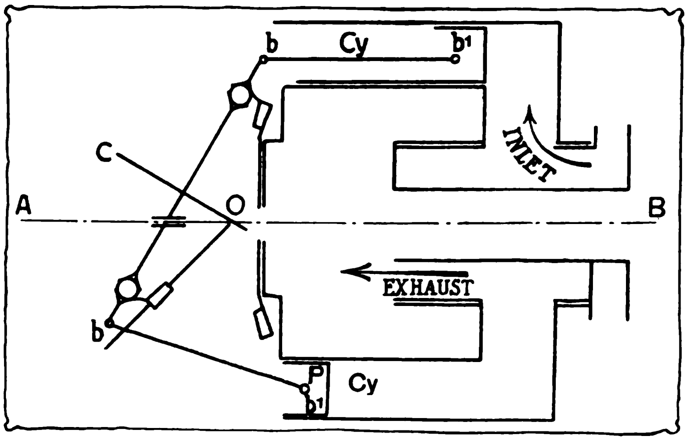

Fig. 1—Diagram of mechanical movement in one type of Canton-Unné motor

there are aluminum housings, and within each of these a round plate is secured obliquely upon the crankshaft which extends axially through the middle of the system. The connecting-rods are secured to these plates by means of a ball-bearing ring and suitable joints, so that the oblique disks are free to rotate, taking the crankshaft with them, while the cylinders remain stationary. The movement of one of the disks is diagrammatically represented in Fig. 1, showing two of the seven parallel cylinders, one at the beginning of the exhaust stroke and the other at the beginning of the power stroke. When the connecting rod b-b_1 of one of the pistons P is driven out against the circumferential ring of the disk, the latter can give room for the pistons only by rotating into the position in which its edge is farthest removed from the cylinder, and as the axis of the disk, CO, is at an angle with the crank shaft smaller than 45 degrees and the resistance to rotation is only that of friction with the ball-bearing ring—besides the load of the motor—the rotation is accomplished on the principle of following the lines of smallest resistance, practically in the same manner as a reversible worm drive is made possible by absorbing end-thrust in the ball-bearings of the worm. And a new impulsion to rotation is received as the rotating disk passes each successive cylinder of the seven, the charge being fired in each of them at that moment. Obversely, the rotation of the disk serves similarly to compress the charge in each cylinder while the disk is moving from the relative position to the cylinder indicated in the lower part of the diagram into the position shown in the upper part. The efficiency of the movement has been shown to be good when the frictions are minimized by the use of ball-bearings and by good lubrication.

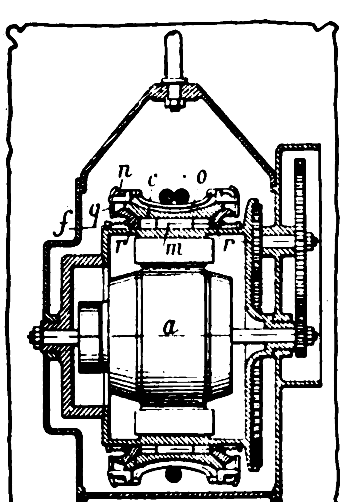

Fig. 2—Electric winch adapted for factory use

This motor develops 60 horsepower and weighs 110 kilograms. The bore and the stroke of each piston both measure 65 millimeters (2 3-5 inches), the construction naturally tending toward a short stroke in order to have the obliquity of the disks as small as possible for a given diameter of the whole system of cylinders. The valve control is arranged in the space separating the cylinders from the shaft. The water-cooling is operated by a centrifugal pump, the brass water jacket being secured upon the single casting in which the cylinders are bored. The front disk-casing contains a reducing gear; the rear one carries the magneto and incloses the force feed oil and the water pumps.—From *Allgemeine Automobil-Zeitung* of November 8 and *La Vie Automobile* of November 23.

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ELECTRIC Winch.—The Wilhelmi electric winch is notable for its compactness and is suitable for use in connection with overhead cables for the transportation of material in factories which are electrically powered. It comprises essentially a small electric motor on the shaft of whose armature (a in Fig. 2) there is keyed a pinion which is in mesh with a gear mounted upon an intermediate shaft which is journaled in a bearing in the frame of the device. This intermediate shaft carries a second small pinion meshing with an internal gear wheel which is rigidly fixed upon the frame of the magnetic field, which arrangement renders it possible to offset the rotary speed of the armature by that of the field, so that the reduction effected by the gears need not be so large. The drum of the winch is a cast cylinder c mounted to revolve upon the rollers m which in turn roll freely upon the smoothly turned circumference of the field frame, and the drum can be locked to this frame by means of two cones r which are mounted upon the latter. The cones r are movable transversely, being held disengaged from the corresponding conical surfaces of the drum by the springs f but can be brought into engagement with the drum by means of the bell levers g whose upper arms are formed as cams and can be actuated by two small bell levers n, which are connected pairwise by flexible cross members o. As soon as a pull is applied to the free end of the cable which makes a turn and a half around the drum, and provided a load is attached to the other end of the cable, these cross-members o are depressed and, thereby being made to pull on levers n, cause the cones r to be engaged with the drum, so that the latter is revolved together with the cable in the direction which means the raising of the load. In order to stop the load it is sufficient to cease pulling at the free end of the cable or cord, as this has the effect of reducing the pressure upon the cross-members o and of permitting the springs f to separate the levers g and partly releasing the cone clutch. The movement of the winch also in itself tends constantly to cause a slack at the free end of the cable or cord.

The operation of this winch is thus absolutely similar to that used in pulling a cord over a simple pulley, except in so far as the effort is concerned; to pull the load up, one pulls upon the cord, and to stop it one ceases to pull. A complete release of the cord causes a more complete disengagement of the cones r, and the load in that case draws the drum backward without causing the cord to slip on it.

The electric motor of this winch turns at a constant speed without interruption so long as the work with it is going on.—From *Zeitschrift des Vereines Deutscher Ingenieure*, October 5.

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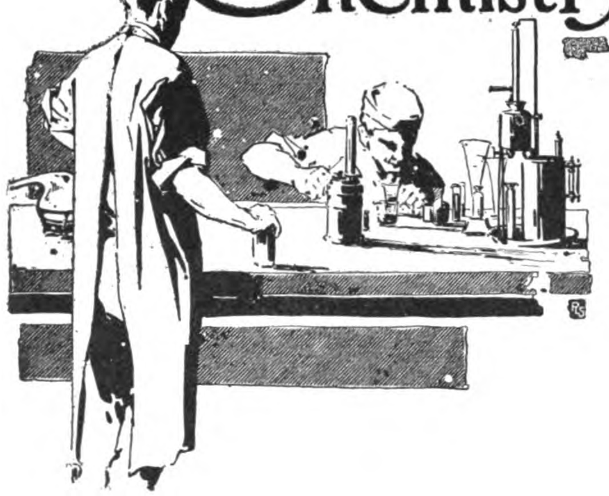
SQUARE Long-Stroke Motors.—According to Mr. Faroux, an opinion is "common among the Philistines" to the effect that it is the proportion between the bore and the stroke which makes a motor a long-stroke motor or a short-stroke motor. But in reality the length of the piston stroke is an absolute value, since on its measurement in inches depends the piston speed at any given number of revolutions. Up to a stroke length of 150 millimeters (6 inches) one cannot, with the present data of construction, speak of a long stroke. A motor with 70 millimeters bore and 120 millimeters stroke cannot be termed a long-stroke motor, despite the proportion of 1.7 between the stroke and the bore. And, on the other hand, a motor with bore and stroke both 160 millimeters is a long-stroke motor although it is commonly designated as "square." The proportion between bore and stroke is a matter of small interest, apart from statistics.—From *L'Auto*, November 10.

The Chemistry of Cylinder Oils



Professor Gallup Takes Issue with W. Jones Regarding Flash Point, Fire Point and Viscosity of Oils

WORCESTER, Mass.—Editor THE AUTOMOBILE:—The writer has noted with unusual interest the recent articles in THE AUTOMOBILE on the Chemistry of Cylinder Oils, by W. Jones, and inasmuch as the conclusions to be drawn from the statements made are so entirely at variance with not only common sense, but accepted practice, that some objection seems necessary.

The statements which deserve criticism are too numerous to mention in detail, since the space required would demand another article, but in general they may be referred to as:

1. Effect of flash point on the lubrictaing value of an oil.
2. Effect of fire point on the lubricating value of an oil.
3. Effect of viscosity point on the lubricating value of an oil.

Taking up 1: The chief argument in the article referred to seems to be that **in order to be effective, an oil should be of low flash and fire test, and for the specific reason that it burns up clean.** Might it be asked right here, what is the object of a lubricant? To lubricate or to furnish heat in the engine? If the latter be the case, why not dispense with the gasoline and use oil entirely? Or why not go still lower in flash and arrive at a point where combustion of the oil will be absolutely clean? **This would result in a clean engine and less gasoline would be used, since part of the power would be furnished by the oil itself.** But this is ridiculous. The best oil for lubrication is one which serves that purpose exclusively, one which will withstand the high speeds, high pressures and high temperatures without deterioration. At present there is no oil known which will satisfy the last condition perfectly, and the only alternative is to use that which approaches its accomplishment most nearly. Needless to say, the output of these oils is already controlled so that the distribution of a new oil requires a ready argument for its adoption, and the easiest one seems to be that it burns up quickly. Another feature of the low flash oil is that its price is usually lower than that of the high grade, and many users are appealed to on the ground that the expense for lubrication will be less. In answer to this, let it be pointed out that **an oil which is readily burned up requires excessive amounts to offset the loss due to the burning, so that at the end of a year it will be found that so much more of this low-price oil has been used than of the high-price best quality that the total cost is actually greater.** Also, consider the condition of the engine, something which is often lost sight of for the reason that an outward glance at it does not indicate the wear caused by a poor oil. It is a fact so well known as to be incontrovertible, and which has been proven in comparative tests, that the most efficient oiling is accomplished by the use of the highest flash test lubricant and in the smallest quantities possible, not by flooding the engine with a low test oil, the excess of which is burned up and which must be furnished to offset the low quality.

How long would the engine of a racing car stand up under the use of a low flash oil? The temperature existing in the cylinders under these conditions is so high that the use of an oil of low flash would amount to almost a negligible value, since the oil would be disintegrated before it had the chance to perform its function.

One more point: **The combustion of any oil is unclean;** the more unclean the larger the quantity, and hence the aim should be to use an oil which has the least tendency to burn, i.e., high flash.

Taking up the fire point, let it be remarked that this is of no value in the selection of an oil, since the lubricating qualities are determined by the flash point. This is true simply for the reason that the oil begins to disintegrate at the flash point and much of the lubricating value is lost in vaporization.

Under 3: **Viscosity is of prime importance,** if correctly determined, for the reason that it indicates whether an oil will be able to maintain a film at high temperatures or not. The usual standard of 70 degrees Fahrenheit is known to be misleading for the reason that many oils will show a high viscosity when tested at this temperature, but at higher temperatures, such as 212 degrees Fahrenheit, will show a marked decrease in this quality. This is more pronounced in the case of low flash test oils than high. Continued tests at still higher temperatures will show the divergence to be still more clearly defined. In other words, an oil showing a relatively high viscosity at low temperatures may be totally unfit for gas engine lubrication on account of the sudden loss in viscosity with increase of temperature. If, however, the test for viscosity is made at 212 degrees Fahrenheit, or at 250 degrees Fahrenheit, then the law becomes applicable and a high viscosity oil at this temperature should be given the selection. Investigating still further, it will be noted that these oils will have the higher flash tests. Put in another way, **an oil with a low flash test must possess a low viscosity at this temperature and therefore be unfit for lubrication even though at low temperature it possesses a high value of viscosity.**

On any modern engine of representative type and which is available, let a test be run for maximum horsepower, using a grade of oil outlined as advantageous by W. Jones, noting the quantity used, the heat going into the jacket water, and any other features which have a bearing on the question. Finally let an oil be used which is of high flash and of other characteristics similar to what is put forward in this letter and before an impartial set of judges, and if my position is not vindicated as to the latter being more efficient in dollars and cents regarding both the cost of oil used and wear on the engine, then an apology will be in order.—DAVID L. GALLUP, Assistant Professor of Gas Engineering, Worcester Polytechnic Institute.

Foreign Constructions Designs and Practices

The French School of Engineering

American Engineer Analyzes Features of French Designers and Makers—Fans Mounted in Radiators on Buses—Practically All Truck Tires Are of the Steel Type in Paris—How the Steel Bands Are Made

Part II

THE omnibus service in Paris is fairly good. The most striking innovation to be noticed at first glance is the appearance from the front. This is due to the use of a circular radiator with the fan within the same, much as in Fig. 1. Air is taken in through a screen at the front and is forced out radially through the peripheral interstices of the circular radiator unit. The fan diameter is about 16 inches and the space within the unit is adjusted accordingly. The radiator does excellent service. For upwards of a month, during hot weather, it was observed on buses, and the result may be summed up in the statement that one hot motor standing at the Gare du Nord on a very hot day was all that was noticed. The radiator was cool. The exhaust had the odor of excess gasoline. In addition to an apparent good efficiency, the radiators of this shape seem to be strong. Not one radiator was observed to be leaking. There is one other point: the spider in front which serves as the outboard bearing for the fan spindle serves also as an excellent protection for the radiator. A screw is placed inside of the spider through which the air is sifted. The fan blades are shaped to throw the air radially in the plane of the fan so that it passes out in the radial plane through the radiator unit.

Steel Truck Tires Numerous

In the commercial field revision is the order of the hour. Innovations of yesterday are the fractured hopes of today. The tire problem for trucks seems to be solved so far as Paris is concerned. The makers of tires seem to rejoice, for in the solving of the problem a way was found which makes it wholly unnecessary to call upon them to make good their frail guarantees. Fig. 2 shows how the tire problem was disposed of—steel tires are used. **Out of 100 heavy trucks actually loaded and going along the streets of Paris within a single week in July, 98 were steel shod on all four wheels.** One truck was fitted with steel rear and solid rubber front tires, and the remaining truck, about 2½-ton size, was equipped with pneumatics.

Of the steel shoes actually used on trucks in Paris all are not as illustrated in Fig. 2. Indeed, there is a wide diversity of sizes, but as a rule the front tires are as wide or wider than the rear tires. Fig. 2A shows a sixteen-spoke wooden wheel with a wooden felloe, fitted with a steel band slightly over 7 inches wide, made of tire-steel slightly over 1⅛ inch thick. The front wheel, Fig. 2B, has two bands with serrated surfaces diagonally disposed, with the grooves running right-hand on one band and left-hand on the other. The two bands, as they appear on the wheels, look very much like a pair of monster right and left-hand milling-cutters on an arbor. Each band on the front wheel was about 4½ inches wide. The space between the bands was about ¾ inch wide.

The idea seems to be to prevent skidding at the front and

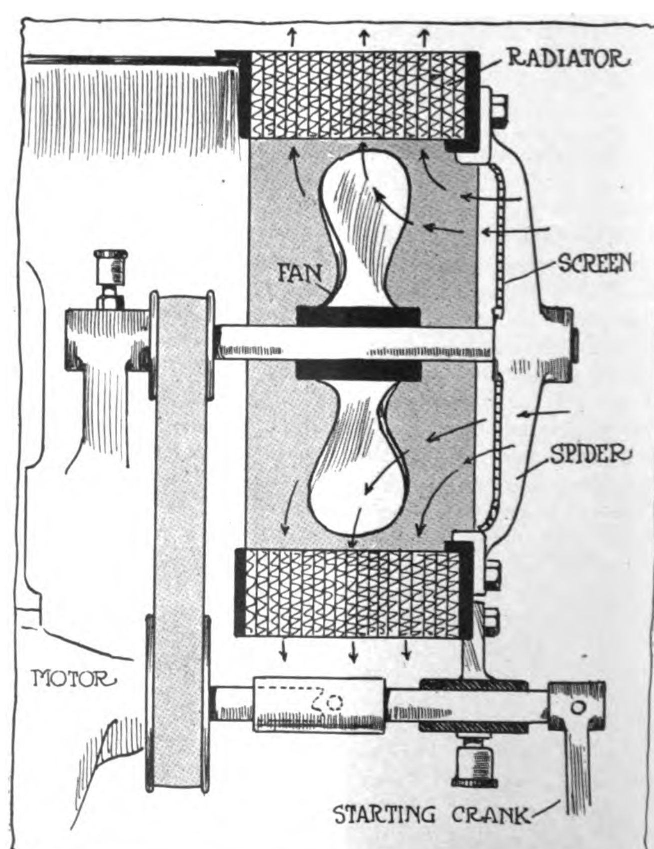


Fig. 1—Style of radiator used on Paris buses with air propeller located within the radiator and provided with an outboard bearing

to gain traction at the rear. The performance of a truck fitted with these steel bands was excellent. On one occasion, in a stone yard on the bank of the Seine, the truck, heavily loaded, went up a deep dirt road to the paved street beyond without any difficulty. On several occasions, on wet pavement, observation showed good performance of these trucks.

There is one point involved in this matter of steel-shod road wheels which should not be overlooked. The chassis springs are long of span, made of wide, thin plates, and the rear springs are, in the majority of cases, of the platform type.

Wide Steel Tires on Rear Wheels

Some trucks have wide steel tires on the rear wheels. Even widths of 12 inches are in use. In a few cases the steel bands on rear wheels are between 4 and 5 inches. It will be fair to conclude that there is no standard of width in sight as yet. The wheels, in the main, are 36 inches in diameter; a few are greater in diameter, some are less.

It might be said that steel bands are prone to leave the mechanisms of the vehicle unprotected against shock and vibration. One fellow said when this subject was broached, "There is nothing so shocking as a large tire bill!" At all events, the steel bands are not giving out; they have not been used long enough to make it possible to know how many years they will survive if they are properly set and if the service is fair. In making observation, the casualty list so far for trucks shows one truck disabled and being towed in —that truck was fitted with solid rubber tires!

Of course, there are commercial vehicles in service fitted with solid rubber tires and even pneumatics are employed to a certain extent, but these trucks are doing soft work. The army uses solids and pneumatics for hospital and like duties. The buses in Paris are fitted with solid rubber bands. Newspaper and post-office service fall into the same category. But real trucking work, where the loads are heavy, is being done in Paris on steel-shod wheels. The speeds of these trucks range between 7 and 11 miles per hour, depending upon the sizes of the trucks. The heavier trucks go slower than the lighter trucks, of course.

Making Steel Bands for Truck Wheels

IN France where automobile trucks are being operated, running on steel feet, displacing solid rubber tires, it is interesting to note that the steel bands are more carefully made than they were in the past, as they were used on the wheels of horse-drawn trucks. In addition to a greater width of bands, and a considerably increased thickness of the metal of the bands, **the important advance is settled in the point that welding is not resorted to, primarily on account of the lack of average ability of welds; furthermore, due to the use of a superior grade of steel; metal that is incapable of being welded.**

It is not unusual to note in this newer work the use of bands up to 12 inches in width. Some of these bands have a radial thickness of wall of 2 inches. As a rule the steel bands are considerably wider than the felloes over which the bands are pressed. The band over-hang is as much as 2 inches on each side of the felloe. In putting these steel bands on the felloes, remembering that the special grade of steel used in them would be damaged by heating the bands in order to make a shrink fit, they are set by a pressing process, but, instead of being pressed on in the ordinary way, they are kneaded while they are being pressed on. In a word, by means of a plurality of hydraulic press-units mounted in a cast-iron frame with the units spaced equally around the periphery of the steel band to be pressed on, pressure is exerted radially, and this series of operations is conducted while the main press is forcing the steel band over the wooden felloe, into the position it will occupy in service.

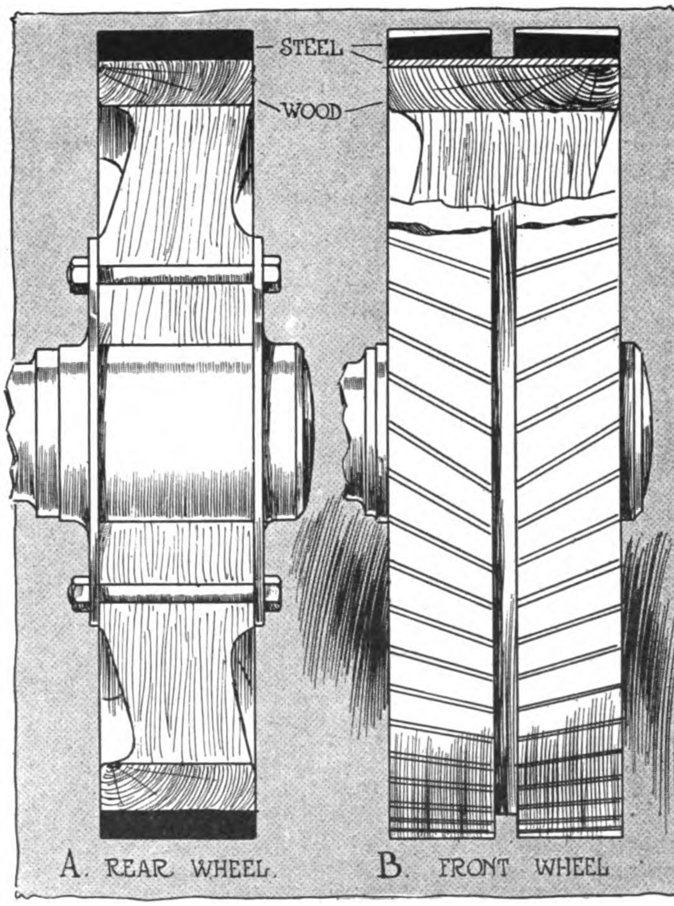


Fig. 2—A, truck rear wheel with sixteen spokes and fitted with steel band instead of rubber tire. B, front wheel of the same truck having a pair of bands with serrated faces, with serrations placed diagonally and reversed.

Speaking of the quality of the steel, it combines hardness with toughness. The hardness is due to the proper admixture of carbon, mingled with silicon and manganese. An acid steel is preferred. As to the process of production, if the ores are Swedish iron, or blends of other ores of suitable analysis, it is not so important to adhere to the acid process. The toughness of the steel is partly traced to the process; partly to the ores and their excellent characteristics, but, in the main, to the analysis which shows a mere trace of sulphur and phosphorus, not forgetting that, in the forming of the tires the metal is worked under the most favorable conditions for the birth of a fine grain and the kneading of fiber.

The billets, instead of being of the usual shape, are round and of the required thickness to furnish enough metal for one band. Instead of rolling or hammering the billets, they are first, after heating to the desired temperature, subjected to the pressure applied to the end of a mandrel which makes a hole in the center of the billet. A second mandrel adds to the size of the hole. A third, and a fourth, help in the process of enlarging the central hole. In the course of the process the hole becomes large enough so that the expanded metal forms a ring. This ring is placed in a rolling machine and, by means of rollers, the metal is subjected to pressure, and the ring is slowly but surely formed into a band, always under the condition of temperature which is likely to give birth to fine grain, and it is to the rolling process under these conditions that fiber is woven out of the fine grain. The rolled product is in the shape of the rough band near size; finishing on a lathe brings the band down to size for use on the wheel. It has been found in actual service in France, that bands, so made, last for more than 60,000 miles on heavy trucks. The cost of a set of these bands is about $200.

Part III Carburetion

by Robert W. A. Brewer

Subject Digest

One of the most important functions of the carbureter is to regulate the amount of fuel passing through the jet in a unit of time.

Under certain conditions where heat is not available an excess of fuel is necessary to make up the required quantity of vaporized gas.

A factor which comes into play and is of great importance is the variation in viscosity of the fuel due to the changes in the temperature.

Another point which must be carefully noted is the fact that although a greater volume of fuel is taken through the jet at a higher temperature, still the actual weight per unit volume of the fuel is reduced.

There are two methods of meeting and adjusting for the varying fuel conditions. One is by a variable orifice and the other by an obstruction in the fuel line at some point before the fuel mixes with the air.

Spring-actuated devices are not needed in scientifically designed carbureters and are rapidly disappearing for this reason.

A CARBURETER **jet has two functions to perform, first, that of spraying the fuel into the mixing chamber, and second, that of regulating the amount of fuel passing through the carbureter in unit time.** We have already dealt with the question of spraying and we will now proceed to discuss how different heights and forms of jets can be designed and arranged to carry out the measuring operations. Going back in history, we remember that the jet carbureter was originally unknown, as the surface carbureter was not provided with a jet, and it was with the advent of the Maybach instrument that the jet came into use and is now almost universally adopted.

During the development of the jet carbureter it was generally the custom to utilize a small brass nipple with a single hole, and the amount of fuel which issued from this orifice was controlled by the difference of pressure existing between the jet chamber and the float chamber of the carbureter.

Assuming that an engine is running at more or less constant speed, the simplest form of carbureter consists of a single jet located in the throat of a venturi tube, and the size of the orifice can then be calculated from experimental data so as to correctly proportion the efflux of the fuel to the amount of air passing.

Reverting to the second article, published last week, it will be borne in mind that under certain conditions at the time of starting up **when heat is not available it is essential that there should be an excess of fuel passing through the jet.** This state of affairs is also advisable for slow-running conditions when the air passing is not entirely concentrated round the jet and there is consequently a lack of mechanical action.

When the engine speed is increased the fuel-flow curve (as plotted, showing the relation between fuel discharge and air velocity) takes an upward trend so that at the higher air velocities the amount of fuel flowing is greater than it should be to give a correct proportioning of the mixture. At the same time the amount of air flowing is in a falling ratio. In other words, **the air curve droops while the fuel curve rises.** It is necessary, therefore, to take certain precautions so that this tendency can be overcome, and we, therefore, find that modern carburter development has been concentrated, to a great extent, upon dealing with this particular matter.

There is another factor which also comes into play, namely, **the viscosity of the fuel which is a function of its temperature.** I have shown from time to time how that Rummel's formula for the rate of fuel discharged from a jet applies.

$$C_1\left(\frac{Q}{t}\right)^2 + C_2\left(\frac{Q}{t}\right) = h$$

where C_1 and C_2 are constants, being the co-efficient of discharge for the orifice.

In previous tests which I have made to find out the value of C for gasoline jets of the dimensions ordinarily in use, working from the formula generally used in such cases.

$$Q = C\omega\sqrt{2gh}$$

where Q is the discharge in cubic centimeters per second,
c is the co-efficient of the discharge,
ω is the area of the orifice in square centimeters,
g is the acceleration due to gravity in centimeters per second,
h is the head in centimeters over the orifice.

I have found from numerous experiments with jets whose lengths were approximately five times their diameter that the co-efficient of discharge of gasoline at a temperature of 60 degrees Fahrenheit varied from 0.738 to 0.770, the mean co-efficient being 0.7. Unwin gives 0.77 as that for water in his Treatise on Hydraulics.

Now this feature gives the designer some scope for retarding the flow of fuel at high speed, and it has been taken advantage of in some instruments by interposing a resisting medium in the fuel path. **In other cases an obstruction has been placed immediately outside the jet orifice so as to throw back the issuing stream upon the orifice.** I have found from experiment that a discharge from such an orifice is considerably affected by particles of fuel dropping back, but it is a difficult matter to form any law upon this subject.

There is one other important thing to be borne in mind, namely, **the effect of temperature upon viscosity, and at the same time upon its specific gravity.** One can see that although a greater quantity of fuel with a reduced viscosity passes through a given orifice in unit time, yet the actual weight of that fuel is also reduced but by a lesser proportion on account of its rise of temperature.

Passing now from the fixed-jet and variable suction instrument we will go on to the varying-jet and constant-suction type. This type has been evolved in order to overcome the difficulties referred to at high speeds, and **it appears in at least two types, those where the orifice is varied in dimensions where the fuel meets the air stream, and those where this adjustment takes place at some point in the fuel line before the fuel actually leaves its passage to mix with the air.**

In the latter type of instrument there may be some difficulty on account of the wear of the moving parts exposed to the air stream, but this is to some extent counter-balanced by the increased spraying effect due to the arrangement. On the other hand, with the submerged type of metering pin the conditions are reversed.

When one comes to consider a varying orifice of this type scientifically, one is up against a problem of some importance and difficulty, for we find that **with a pin of straight taper the increase in the area of the orifice is not proportional to the movement of the pin.** Furthermore, we find that **as the pin is gradually withdrawn from the orifice the ratio of the length of the orifice to its effective area varies from moment to moment.**

There is still another difficulty which I have found, due to the metering pin not always lying central in the hole, and I am of belief that it is for this reason that one often experiences erratic behavior in this type of instrument. For instance, I have found that with an increasing area of from 1.02 square milimeters to 3.10 square milimeters, the co-efficient of discharge varies from 0.783 to 0.500. In another case where the areas were smaller the co-efficient of discharge rose from 0.415 to 0.790 as the effective area increased. In another case with an engine on trial at 500 revolutions per minute giving 8.25 boiler horsepower, the co-efficient was 0.795; at 1,000 revolutions per minute giving 19 boiler horsepower it was 0.568, and at 1,800 revolutions per minute giving 26 boiler horsepower the co-efficient fell to 0.482.

In order to get over this difficulty I have designed a carbureter combining the characteristics of the two types before mentioned, and **with such a combination it is possible to obtain any desired results with regard to air and fuel flow.** Furthermore, such an instrument can be adjusted within certain limits so as to surmount the difficulty of the **fixed-fuel flow at starting.**

The multiple jet of the Polyrhoe has many features to recommend it in respect to the accuracy of the jets, as we all know how difficult it is to make small jets with sufficient acccuracy, and as a further expansion of this type there is the jet in the form of a narrow adjustable slit in the Ideal carbureter.

Here we have an instrument with a right-angled movement in which as the air valve opens it uncovers a shutter over the gasoline orifice, so that when the carbureter works at its predetermined depression the efflux of fuel from each unit length of the slit is the same, neglecting, of course, the friction at the ends of the slit. Widening the slit by means of an adjusting screw gives a uniform proportional increase of fuel flow throughout the range of working.

In the Polyrhoe, the action is to reduce the width of the air slit, but the result is the same in each case.

There is one ruling factor which has to be observed in all these types of instruments, and that is the gradual action of the free moving parts. A free moving part is often condemned because it works badly, and it can only be made satisfactory by accurate workmanship and a suitable dashpot. The expense of carbureter manufacture is generally a function of the accuracy of workmanship, and for this reason I have endeavored to eliminate accurate workmanship of importance from my new design.

It is unfortunately a fact that a large number of wasters are made in modern high-class carbureters on account of the lack of extreme accuracy and exact clearances, and for American practice, particularly where large output is concerned, there should not be too great a dependence upon accuracy of manufacture.

The Holley carbureter undoubtedly scores by its absence of moving parts which either would require accurate machining or careful adjustment. Too much dependence must not be placed upon adjustments of spring-actuated devices. These are fortunately rapidly disappearing, as in scientific designs they are not necessary. **Our present knowledge enables us to design rather than to compromise in carbureter work.**

When the Carbureter Is Wrongfully Blamed

THE most abused part of a motor is the carbureter. Perhaps it is something which has been handed down to us from the early days of automobiling that leads us to grab a wrench and start for the carbureter whenever the motor misfires, overheats, carbonizes or does any of the hundred and one things that a balky gasoline motor can and does do.

One of the most common things that a carbureter is blamed for is the failure of the motor to throttle down. One man complains that he cannot get his car to run any slower than 10 miles an hour on high speed. He states that he is tired of trying to improve his trouble and that whenever he changes the adjustments things become worse instead of better. **He forgets his spark-plugs and the fact that after a time they become sooted or the electrodes become farther apart on account of the heavy work they are called upon to perform during a hard season of automobiling.** If he will close up the gaps on his plugs he will probably be able to throttle down to 5 miles an hour without trouble on high gear. The spark-plugs should not have their gaps further than .02 inch apart when running on the magneto, as is habitually done in most cases. The magneto that is turned over at the same speed as the motor does not generate as high a current when the motor is running at 200 revolutions per minute as it does when the motor is running at 1,000 revolutions. Naturally **the current is not strong enough at low speeds to jump the increased gap, and as a result there is an irregularity in the running of the car when the speed drops to the point where the spark does not occur.**

Another man, whose motor is continually fouling even after he has cut down his mixture until it is as thin as possible, forgets that he is using a bad oil in his effort to make his running inexpensive. Even a little bad oil can carbonize badly. It does not take an over-supply. It is a fallacy to try to save money on oil. The best is none too good for the automobile engine. After the carbureter has been adjusted so that the car runs smoothly it is seldom that it has to be changed unless to meet a decided change in climatic conditions.

Overheating may be due to too rich a mixture, but the water circulating system should come in for its share of suspicion. Not long ago an enthusiastic automobilist whose car was overheating discarded a perfectly good carbureter because of this trouble. He was greatly elated because he had received what he thought to be a handsome allowance for the carbureter which had formerly been upon the motor and which he thought to be out of commission. After the smoke cleared away he had bought another carbureter of the same make he formerly had used and another water pump to take the place of the corroded article he had been depending upon. Besides this he had adjusted the fan belt which the garage man had told him was slipping badly and promoting the overheating process.

Smoke due to an over-supply of oil is sometimes blamed upon the carbureter. **Oil smoke is bluish in tinge, while carburetor smoke is a black or dak gray.**

Continual tampering with the carbureter leads nowhere. It is necessary that adjustments be made systematically.

System of New York Splitdorf Service Plant

Gotham Department of Magneto Manufacturer Organized to Give Users of Splitdorf Products Prompt Service

A PENNY saved is a penny earned. In these seven words lies the abstract of commercial wisdom of the past 40 centuries which a few years ago became the foundation of a very important economic idea, that of scientific management. The principle of scientific management is the elimination of futile effort and of waste of material, to which factors is due the high production cost of manufactured articles. Carefully organized and systematically conducted experiments have shown that even with so-called ideal installations in factories and shops half of the power and labor consumed goes to waste, that is, it is expended without the production of a result or value. In other words, an efficiency of only 50 per cent. is obtained from the power and labor expended.

High efficiency is to be desired by everybody. No one wishes to pay for more than he receives, and this progressive turn of mind is at the bottom of all economic and social problems. The proposition remains the same whether the parties are called buyer and seller, employer and employee, or what not. Every one objects with equal vigor to the high cost of living, to extortion by buccaneering garage men and to all the other nuisances of modern life.

The automobile owner today recognizes that when he buys an automobile, he may expect a certain amount of service from it, for a reasonable cost of upkeep. He also knows that if anything goes wrong with the car, even through his own fault, he is entitled to a good repair job done at a comparatively low price. He demands from the maker of the car every protection conceivable against the outrageous charges of the old-time repair man.

Service Needed for Accessories

The same applies to the parts of every car of good make. The fact that a car manufacturer buys carbureters, ignition or lighting systems from a special maker of such accessories does not alter the condition that he must be ready to give efficient and economical service to the users of his products, when these respective accessories are in need of repair. In the case of large accessory manufacturers, the latter are beginning to organize their own service departments, thereby taking a great deal of work off the car maker, to whose lot it would otherwise fall. In this respect, magneto manufacturers are making especially energetic efforts to serve the users of their products promptly and at the lowest possible charge.

One of the most recent undertakings along this line is the central service department of the Splitdorf Electrical Company, 18-20 West Sixty-third street, New York City. This department is organized in a way like an automobile service department, the principal points of the business and its operating system being given below.

The service department occupies the ground floor and basement of the address mentioned. Office, retail salesroom and shop are located on the ground floor, while the basement contains a machine shop and garage room, in which latter magnetos and lighting systems are installed on cars. Furthermore, stockroom and shipping department are located in the basement. The number of men employed in these practical departments, outside the sales and office rooms, is twenty-seven.

Splitdorf System Has Four Forms

Due to the fact that it has to deal only with products of a very few classes, the system used by the Splitdorf company is rather simple, yet elaborate enough to permit of recording every essential detail of the service work done by the company. The purpose, to which this system is adapted, is twofold: first, it is a means of controlling the activities of the workers in general and of seeing whether all the necessary repair work is being done; second, it affords exact records of the repair costs and permits of placing the minimum charge on every job which is done in the establishment. Thus the system works out to the advantage of both the company and the user of the company's products.

The system itself depends for its execution upon a number of blanks which are handled by the company's employees as the work passes through their hands. Four forms, which are printed on three cards, are all that are used. Figs. 2 and 3 are repair orders, Fig. 4, being the reverse of Fig. 3, is a repair cost form, while Fig. 1 is the stockroom inventory card used to keep track of materials.

Repair work, which constitutes the bulk of the activity of the Sixty-third street place, is handled in the following manner. When a magneto, coil, etc., is received, a form is filled out which accompanies the accessory through the service department while it is being worked upon there. An entry is also made in a book.


ARTICLE PART No. Shelf No. Drawer No. Bin No. Quantity Sold Cost Maximum Minimum Ordered for Stock from

Date	Rec'd	Date	Sold	On Hand	Date	Rec'd	Date	Sold	On Hand	Date	Rec'd	Date	Sold	On Hand	Date	Quantity	Rec'd

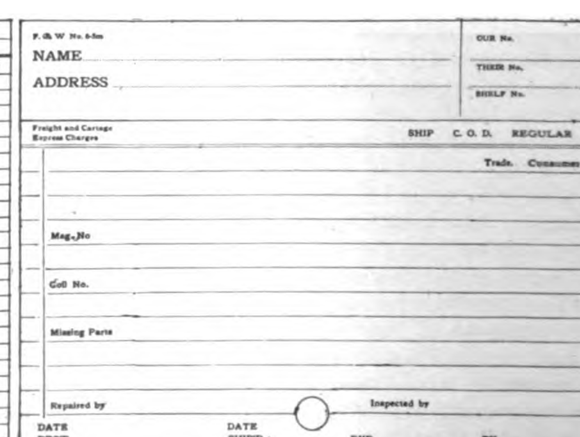

NAME
ADDRESS
OUR No.
THEIR No.
SHELF No.
Freight and Cartage
Express Charges
SHIP C. O. D. REGULAR
Trade. Consumer
Mag. No
Coil No.
Missing Parts
Repaired by
Inspected by
DATE REC'D
DATE SHIP'D
EXP.
BY

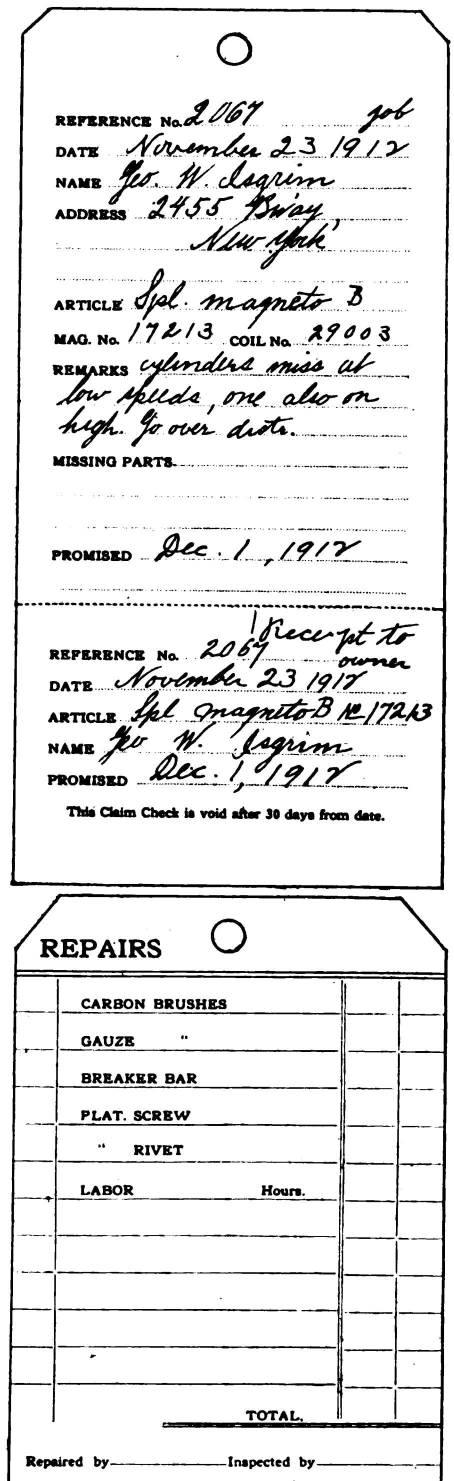
Fig. 1—Stockroom record card used in the New York service department of the Splitdorf Electrical Company. Fig. 2—Repair order card used in the Splitdorf service department when repair jobs are received by express

Then the accessory is sent into the shop where all the necessary repairs and replacements are made. The work being done, the finished product is either sent to the owner or held for delivery, depending on circumstances. The working orders which accompany the objects to be repaired on their way through the shop are printed on their reverse sides for recording the cost of the work. These cost records are used as a basis for the bill delivered with the finished repair.

Taking up these several operations in turn, attention must be called to the fact that accessories brought into the office of the department by their owners are sent through the shop equipped with a different repair card than the goods which arrive from out-of-town by express. Fig. 3 shows the card which is filled out in the first case, Fig. 2 that used in the second. Name and address of the owner, as well as of details relating to the magneto or coil and the repairs necessary on it, are entered on either card, whatever one is used. If the magneto is brought into the place by the owner, Fig. 3 is made out, the stub at the bottom, which is detached and delivered to the owner, serving as a receipt. In the case of accessories arriving by express, no receipt except an acknowledgment per letter is used.

Whenever a device is received by the Splitdorf company and a repair work order is made out, the accessory is entered in a record book under the reference or job number. Two separate books and, consequently, separate series of job numbers are used for the articles arriving by express and delivered by the owner himself. No numbers of one series duplicate those of the other series. Incidentally, it should be noted that the repair orders for magnetos and coils received from out-of-town are blue, while the form, Fig. 3, is tan.

These forms being filled out the magneto—we will speak of magnetos only, to avoid unnecessary complication—is immediately delivered into the shop. Here work is started on it at once. This expedition is made possible by the distribution of work in the shop, where every man works on just one sort of work. The magneto is first turned over to a man on the first bench, who completely disassembles it and puts the parts in a box, which is moved along the bench. The foreman goes over the parts, sees what repairs are needed and either writes instructions on the card, or gives them to the workers who do the specific repairs. In this way, the owner is often saved the expense of a new part by a minor repair. The parts are then repaired or replaced, as ordered by the foreman, after which the magneto is assembled again, inspected and tested for the perfect operation of its various parts. The man who made the repair then fills out the back of the repair order, which is printed as Fig. 4. Materials used are reported on this blank, and so is the time used in repairing the magneto. The charges for material and labor are entered on the card in the office, and the bill is made out from them, being delivered to the customer with his magneto.


REFERENCE No. 2067 job
DATE November 23 1912
NAME Geo. W. Isgrim
ADDRESS 2455 B'way, New York
ARTICLE Spl. magneto B
MAG. No. 17213 COIL No. 29003
REMARKS cylinders miss at low speeds, one also on high. Go over dists.
MISSING PARTS
PROMISED Dec. 1, 1912

REFERENCE No. 2067 Receipt to owner
DATE November 23 1912
ARTICLE Spl magneto B No 17213
NAME Geo W. Isgrim
PROMISED Dec. 1, 1912
This Claim Check is void after 30 days from date.

REPAIRS
CARBON BRUSHES
GAUZE "
BREAKER BAR
PLAT. SCREW
" RIVET
LABOR Hours.
TOTAL.
Repaired by Inspected by

Fig. 3—Repair work order used for goods brought by their owners. Fig. 4—Repair cost blank on back of Fig. 3

When a repair is completed, the magneto is put into the storeroom and is there placed in a compartment by itself and held until the owner calls for it, if he had brought it in himself. If the magneto had arrived by express, it is returned to the owner as soon as the repair is done.

The stockroom of the service department, in connection with which the New York retail store is operated, contains both complete magneto, coil and lighting assemblies and all the parts of the same. These articles are numbered, according to the company's factory drawings, and are kept in orderly arranged shelves. To keep track of them, a record card is used for every type and size of part, and these cards are kept alphabetically according to the names of the articles. The inventory file card, Fig. 1, is so designed that whenever any quantity of a part is received, it is entered on the card, together with the date it arrives. Likewise, outgoing material is recorded on this card, and a monthly balance is made which affords a clear review of the stockroom and its business. The records of incoming material are checked against the bills of lading and the factory invoices, while the outgoing material must correspond to the material records appearing on the backs of the repair orders.

The labor charges on the repair work orders must, on the other hand, total up the sum of working time recorded by the clock cards of the shop workers. This phase of the subject, which has been repeatedly treated in The Automobile, does not require to be taken up again in this article.

One interesting point of this system is that, unlike other recording systems, it does not call for the services of any men specially occupied with its execution. The store clerks receive the incoming magnetos, coils and so forth, and sign for them if they arrive by express, or make out a repair order with a receipt stub when the accessories are brought in by their owners. From the orders complementary to express shipments the blue cards, Fig. 2, are made out, which, like the cards, Fig. 3, serve as permanent record accompanying the devices through the shop and as blanks for the cost records, from which the bills are made out. The latter work is done by a bookkeeper or office clerk, and is ordinary office work really outside of the special service system. To put the whole situation in a nut shell, the system is carried out by the entire force employed in the establishment, thereby relieving the individuals of any great measure of connection with it. This makes the whole system so much easier to enforce, as with the work the responsibility is shared among the workers. Consequently, the chance of an error is also materially reduced, as every record form passes through several hands, whereby the probability of its being found out is greatly enhanced. Thereby one of the principal aims of efficient management is realized.

Placing Truck Back on Road—Selden Patents Not Now in Effect—Motor Can Be Used as Air Compressor—Trouble Traced to the Spark-Plugs—Carelessness Responsible for Clutch Trouble—Origin of Venturi—Motor Overheats

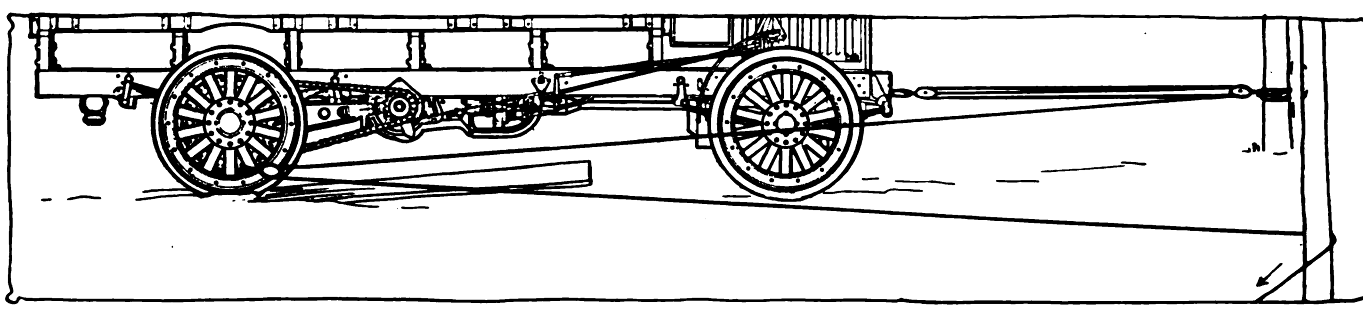


Fig. 1—One way of using block and tackle to move stranded truck by its own power

Putting Truck Back on Road

EDITOR THE AUTOMOBILE:—In case a 1-ton truck slides off the road into soft ground, is there a way of putting the truck back on the road with a block and fall under its own power?

Jersey City, N. J. CHARLES NEU.

—This is a case where the particular circumstances surrounding the truck and its position are of the utmost importance. A block and fall could be rigged up in such a way that it would exert a pull on the truck and would move it a short distance and then after rearranging the apparatus another distance gained until the truck was once more upon hard ground, if the conditions were right, while under other circumstances it would be impossible to apply the block and fall.

Assuming that the truck were in some position where the block and fall could be used to pull it out a little distance at a time, it would be necessary in the first place, assuming that the wheels spun around without securing traction, to stop the differential action by locking one of the wheels so that it could not revolve. It could be roped in place. The block and fall could then be attached as shown in Fig. 1. The tackle is attached to a tree or post and to the front or rear of the truck, depending upon the direction in which it is to be pulled. The loose rope is then secured through the means of another block to the rear wheel and the end of the rope passed around a tree to hold whatever advantage is gained when the motor is started. A plank is then placed in front of the wheel in such a way that a slight forward movement of the truck will bring the wheel up on the plank and put it in a position to secure traction.

A far better way of getting out of soft ground than by using a block and fall is to put a plank under each rear wheel as far as it will go. The plank is then tied to the wheel in the manner shown in Fig. 2. When the wheels start to revolve they will carry the plank under the wheel with them and the result will be that traction is automatically given.

A chain-fall could be rigged up if the truck is at some place where the fall could be attached. Very often also the shovel can be plied with good effect or a chain wrapped around the wheel to form a mudhook. If the wheels will not revolve the chains should be discontinued.

Selden Patents Now Expired

Editor THE AUTOMOBILE:—Will you kindly answer the following in your next issue of THE AUTOMOBILE?

Can anyone build an automobile to order for a customer without infringing on the Selden patents? This person would no doubt continue to build a few machines for different people wherein he would place the best parts of their kind on the market today. I am sure that there would be trouble for him in regard to the above named patents. If the patents are still in force kindly let me know, and the length of time they can still be in force.

Newark, N. J. A STEADY READER.

—As far as the Selden patents are concerned there need be no fear, as they have now expired. The only thing you will have to guard against will be the installation of other patented devices which are, to say the least, rather numerous in automobile construction. By using standard parts and devices, however, no harm can be done, even in this direction.

Small Motor as Air Compressor

Editor THE AUTOMOBILE:—I have a small marine type gasoline engine which I wish to convert into an air compressor for charging a storage tank for garage use at maximum pressure of 150-200 pounds. The engine is 3 inches by 3 inches; rings fit tightly and everything is in good working order. Water-cooled.

Please advise me of the best way to make the change.

Can you give me the address of the Waterhouse Welding Company?

Prattsburgh, N. Y. H. G. MORGAN.

—You do not mention the type of construction of the motor or if it is a two- or four-cycle. The principles would be the same however in any case. Assuming that it is a two-cycle motor all that would be necessary would be to cut down the compression space until there is nothing left but just enough for piston clearance, say 1-8 inch. An outlet pipe with a ball check is then installed, the check operating, of course, so that the air does not escape from the tank back into the motor? In the case of a four-cycle motor the only difference would be that besides cutting down the compression space to practically nothing, the exhaust valve will have to be locked and the intake valve made to act automatically. That is the cam action should be removed and a spring installed which will be just light enough for the piston to draw up on its suction stroke. It will then act automatically. A safety valve loaded to the desired pressure could be put on the tank or a gauge installed which could be watched while the power is on.

Users of Air Starting Systems

Editor THE AUTOMOBILE:—Which 1912 and 1913 model automobiles are using compressed air starters?

Jamestown, N. Y. J. E. WHITE.

—Among the prominent users of air starting devices for the season of 1912 were the Winton, Chalmers, Parry, McFarlan, Austin, Amplex, Berkshire, Midland and Nance. The makers have not all fully determined on their 1913 starters as yet, although it may be stated that the trend is toward electricity and acetylene. The above will probably continue with the air starters for 1913.

Pounds When Running Slowly

Editor THE AUTOMOBILE:—I have a four-cylinder, four-cycle Cadillac. When running slowly the fourth cylinder misses. It does not fire at all as it should; it does not pick up quickly when changing for higher speed but seems to be all right when running rapidly. It will start pounding when running slowly, the cylinders soot up quite badly and so do the spark-plugs in the fourth cylinder. I have a high-tension magneto of the Bosch make. Some think it is in this and others tell me to use a different spark-plug. Do you suppose it could be in the piston rings? Would like to hear from you about the trouble through Letters Answered and Discussed.

Petoskem, Mich. J. OLDHAM.

—Your trouble is either due to bad carbureter adjustment, a leaky bushing around the intake valve, improper spark gap or a combination of these. Try a little richer mixture on low speed and renew the bushing surrounding the inlet valve stem on the number four cylinder. The latter trouble is very common and often unsuspected as there is no perceptible hiss as is the case with other gas leaks. Air is sucked into the cylinder around the leaky bushing and the result is a lean mixture in the affected cylinder. The spark gap on a magneto ignition system should be about .02 inch. On the battery system the gap can be as large as .045 inch with satisfactory results. Close up the gaps of the plugs and adjust the carbureter before renewing the bushing so that in case the latter is in good condition you will not have had the expense of fitting a new one unnecessarily.

Origin of the Venturi Tube

Editor THE AUTOMOBILE:—Will you kindly tell me through your columns the origin of the name Venturi tube now frequently mentioned in carbureter construction. What was its original form and application?

Penaski, N. Y. J. H. D.

—The origin of the Venturi is traced to G. B. Venturi, an Italian physicist, who lived between the years of 1746 and 1822. The purpose of the tube was to reduce the resistance to air flow. In Venturi's explanation of the tube, 1791, he states that the quantity of air that would pass through in a given time under a given depression would be multiplied by four as compared to a plain tube, provided the two inverted cone frustrums of which it was composed could be so arranged that the convergent angle of one of the cones was fixed at 30 degrees while the divergent angle of the other was fixed at 7 degrees. The designs of the Venturi used in carbureter work vary materially from the designers' dimensions, as practice does not render the latter feasible.

Did Not Lubricate His Clutch

Editor THE AUTOMOBILE:—I am having some trouble with the clutch of my model R, 1910 Reo touring car and although I have had an expert take same apart and thoroughly cleanse the plates he has been unable to do anything for me. The trouble is as follows:

Instead of being able to start the car gently and with increasing speed by gradually releasing my foot from the pedal nothing happens until the pedal is almost all the way up, and then the car starts with a jerk, often killing the engine, and is naturally very hard on the transmission and driving gears in the rear axle, not to speak of the wear on tires. Experts and Reo owners have frequently told me to wash the clutch plates out by squirting in gasoline through the plug hole for that purpose. This I have frequently done, sometimes squirting 1 gallon of gasoline through this hole. This does not do any good but I find that by putting in about one teaspoonful of fairly thin sewing machine oil it cures the trouble for two or three days, when the clutch will again become fierce. Another trouble is as follows:

On the pressing of the clutch pedal the clutch does not seem to properly disengage and instead of the driving shaft between the clutch and the transmission box ceasing to revolve when the pedal is depressed it rotates at practically the same speed as before, the consequence being that when the gear-shifting lever is moved in any desired position either to start or change speeds, a horrible grinding noise is the result, caused, of course, by the gears revolving so rapidly that they will not mesh until their motion is stopped, when of course they will mesh.

It is a most uncomfortable feeling, as I am always in fear of stripping the gearset or breaking some part of the driving mechanism in the rear axle, and if there is any remedy for this I would be glad if you would kindly advise me. I am confident that the plates in the multiple-disk clutch are perfectly clean and therefore the trouble is not caused by any dirt or foreign matter between the disks. I have never put any oil in the clutch except as above described, as I always understood that this type of clutch was supposed to be run dry.

Macleod, Ont. R. H. HILLIARD.

—The trouble has developed because you have not lubricated your clutch. The proper oil to use in the Reo 1910 clutch is a mixture of kerosene and medium cylinder oil in about equal pro-

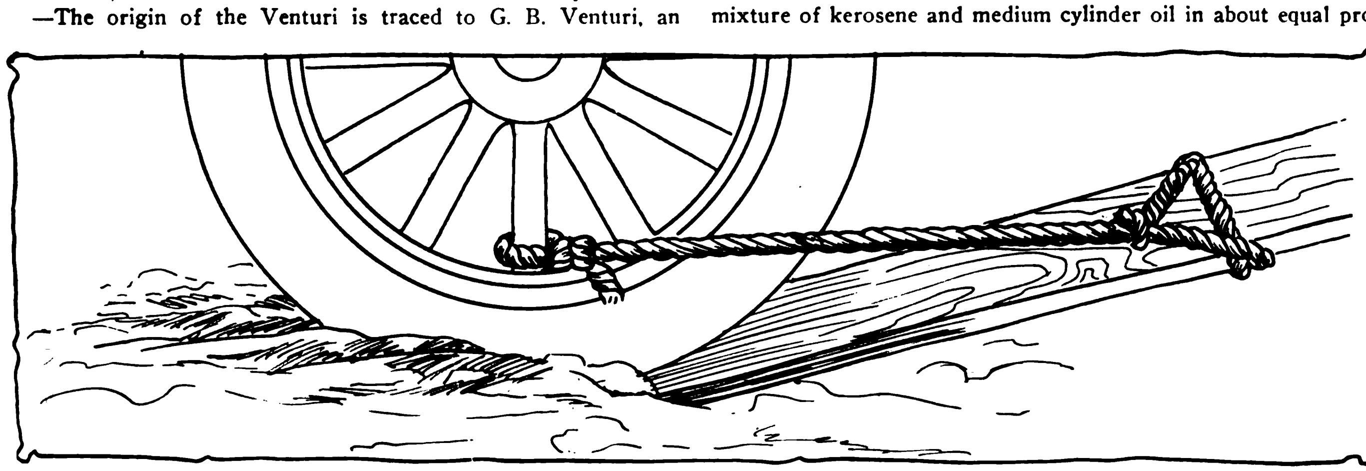


Fig. 2—Scheme sometimes employed for moving truck which has gone off road into soft ground

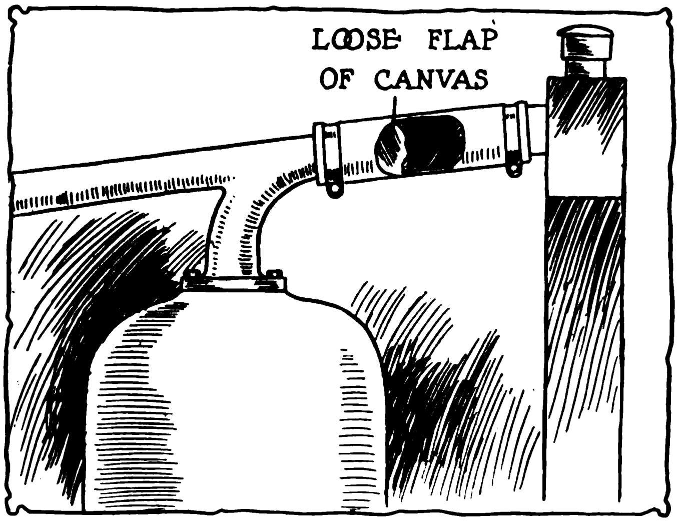


Fig. 3—Where overheating trouble sometimes lies unsuspected

portions. The Reo 1910 clutch gave trouble in some respects and it has been entirely redesigned, heavier plates lined with asbestos fabric new being fitted. A view of this clutch is shown in Fig. 4. The plates in the 1910 Reo gave trouble by their liability to distortion, especially when they had been insufficiently lubricated and this is the cause of your trouble. New plates will be necessary. It is possible that the 1912 type of plates could be fitted to your car without much expense. This matter should be taken up with the factory. Another part which is probably worn is the clutch guide bushing which surrounds the end of the crankshaft. The bushing should be carefully examined and, if worn, renewed.

Sudden Case of Overheating

Editor The Automobile:—Will you kindly give me a little information? I have a 1910 Oakland car which for the past season has been overheating very badly. The trouble started all at once. On Saturday the car was working splendidly on the worst hills in Vermont. On Monday it would get hot in running 3 miles, regardless of what oil or mixture of gas was used, and continued to work that way since. The richer the mixture the cooler the car would work, but with a decided slump in power.

2—I have had to replace the pinion shaft and tube on account of a broken roller bearing. The large differential gear is sadly worn. If I set the pinion so that the noise is at a minimum the car works hard. If I mesh it deeper it growls badly but will work much easier. Would you advise a new gear and will you kindly tell me how I can be certain that the pinion and gear are meshed properly? Could a worn gear cause a car to work hard enough to overheat?

Brasher Falls, N. Y. P. E. Kennehan.

—The trouble is either due to carbon trouble or an obstruction in the cooling system. First, have the carbon removed and if the trouble still continues, examine the hose connections to see if a loose flap of canvas caused by the rotting of the hose could have interfered with the water circulation. The radiator may be also flushed out with a few pails of boiling water to which has been added a handful of soda. It very often happens that oily water is inadvertently poured into the radiator and forms a non-conducting coating over the surface of the radiator. While this would not be apt to give such a bad case of overheating as you seem to have, still, in combination with hilly country, a rich mixture and a retarded spark, the tendency to overheat would be great.

2—It is necessary for you to get a new gear at once or else you will be in the unfortunate position of having to purchase another pinion also. It is useless to attempt to get a worn gear to mesh with a new pinion and to act noiselessly. It is not likely that this is the cause of overheat, although it may be if the resistance opposed to the motor is tremendously high. Jack up the rear wheel and see if it is very hard to turn the wheel around by hand. You can tell when the teeth of the gear and pinion are in proper mesh when there is no lost motion between them and when they run easily together. Improper mesh will be indicated by silence, although it can be detected by the eye to a certain extent if the light is good.

Specifications Show Good Truck

Editor The Automobile:—Will you kindly give me your opinion on the following specifications, for a 2-ton truck, allowing 30 per cent overload?

Do you consider the material specified of the best?

Does a truck with the following specifications compare favorably with other trucks selling at $2,800?

Specifications as follows:

Continental motor, 4 1-8 by 5 1-4, in sub-frame.
Clutch, Helie Shaw No. 5.
Transmission, Cotta, selective, three speeds and reverse.
Timken bearings connected on jackshaft.
Jackshaft, Timken, full floating.
Axle, rear, Timken, 2 1-4 by 3 3-8.
Axle, front, Timken, 1 3-4 by 3.
Frame, channel steel, 7 inches deep, 2 1-2 inches wide.
Springs, semi-elliptic, 40 inches long, 3 inches wide, front.
Springs, semi-elliptic, 54 inches long, 3 inches wide, rear.
Wheelbase, 140.
Front wheels, 36 by 5, solid tires, S. A. E. equipment.
Rear wheels, 36 by 3 1-2, dual tires, S. A. E. equipment.
Timken bearings in front and rear wheels.
Harrison radiator, suspended on coil spring.
Ignition, Bosh dual and Atwater Kent.
Carbureter, Stromberg.
Brakes, contracting on rear wheel drum and jackshaft.
Wheels, to have 2 1-4 inch spokes, 14 inches each wheel.
Hermer, steering wheel, 20 inches.
Shaft connecting clutch and transmission shaft connected with Blood Universal joints.
65 per cent., of load to be carried on rear axle.

Erie, Pa. George McLaughlin.

—These specifications are good and as compared to three of the standard trucks of that size which have made a name for themselves and which are satisfactory in every respect show that this truck is the equal of any.

Can Fit Vacuum Oil Feed

Editor The Automobile:—I am overhauling an old six-cylinder car and would be very glad if you can advise me through Letters Answered and Discussed as to the simplest way to install

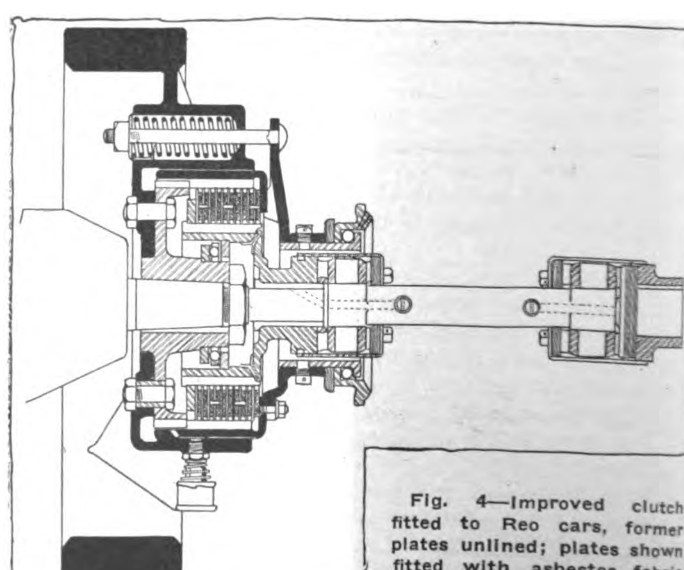


Fig. 4—Improved clutch fitted to Reo cars, former plates unlined; plates shown fitted with asbestos fabric

a constant level oiling system. Motor is lubricated by splash alone and no provision made for maintaining level, the practice of dumping in more oil from time to time as practiced several years ago being the only method of lubrication. Lower half of crankcase is divided with usual partitions between each cylinder, top of these partitions being about what is considered the normal oil level. It would be possible to establish a circulating system by providing a tank alongside of bottom of crankcase, thence overflow to tank, etc., continuously. I understand, however, that there is a simpler system in use in which a syphon effect is utilized in some way, this plan having been in use in Everitt cars as I understand it, same consisting of a tank from which oil is let into the crankcase by quantity sufficient merely to maintain predetermined level. In the old motor above referred to the division between each cylinder in the bottom of the crankcase—in short, between each oil well—is drilled through with a 3-8 inch drill at the bottom of the crankcase so that all the wells are in communication. It seems to me that by having the holes the divisions are made useless as all the oil would quickly run to one end or the other of the crankcase in ascending or descending a grade. Would it not be advisable to plug them up as with a means of maintaining a constant level flush with the top of the division walls all requirements would then be taken care of?

2—Also can you tell me of any parts manufacturer who makes a transmission and clutch as a unit as shown in cut, Fig. 5, page 1127, in your issue of November 28? I wish to purchase such a unit and would appreciate any information you can give, as I have been unable so far to locate any manufacturer of same.

New York City. C. J. WARD.

—A vacuum system such as used in the E-M-F cars could readily be installed. This system works as follows:

The oil tank is an integral part of the crankcase and is located on the left hand side of this casting. The capacity of the reservoir is about 1 gallon. The tank is filled through an opening in the forward end which is covered by a screw cap so made as to screw down tightly so as to form an air-tight fit over the oil reservoir. This tightness is an absolute necessity to the system as will be seen later.

The oil is fed into the crankcase splash troughs by vacuum. Two feed pipes extend from the bottom of the tank into the crankcase. These pipes are U-shaped, one end leading into the bottom of the tank, while the other projects through the bottom of the crankcase, to a point about five-eighths of an inch above the bottom. When there is no oil in the crankcase, but the reservoir is full, it can readily be seen that there will be a flow from the reservoir into the crankcase by means of these two pipes. When there is sufficient oil in the crankcase to cover the pipe ends, they will be sealed so that no air can enter them and hence no more oil may flow out of the reservoir.

This system automatically supplies the oil that is used just as rapidly as it is needed and keeps the oil level constant, since the pipes are continued into the crankcase for just such a distance as to provide the correct level for the splash of the connecting rods. The oil cannot rush into the crankcase and flood it when filling the tank as there is a valve which closes automatically when the screw cap is removed. There is an opening directly under the valve in the bottom of the oiler, through which the valve may be taken out for inspection in case of leakage. Any leakage would be detected while filling the reservoir.

The splash of the connecting-rods throws a spray up into the cylinder and fills the crankcase with oil vapor. This oil vapor lubricates the entire motor, including the camshaft.

The camshaft gears are lubricated through an oil hole and by means of grease cups which are provided for this purpose.

In order not to waste oil certain precautions must be observed in the monthly cleaning to which the crankcase should be submitted. The filler hole cap, on the oiler box must be removed so that the oil does not pour into the crankcase. The drain in the bottom of the crankcase is then opened until all the oil has poured out, when the drain cock is closed. Kerosene should then be poured into the breather pipes and the motor allowed to run for about fifteen seconds. The drain cock is then opened and the kerosene allowed to run out. After the drain cock is closed and the filler hole cover screwed firmly back into place the oil will run into the crankcase until it reaches its proper level.

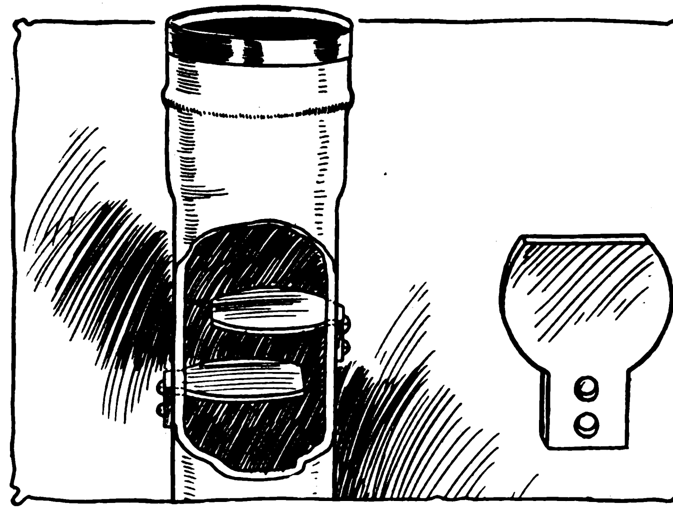


Fig. 5—Baffle plates can be fitted in breather to check oil spouting

It would be advisable to plug the division holes.

2—If you will apply to Victor W. Page, care of the New Departure Manufacturing Company, of Bristol, Conn., who submitted the sketch you will no doubt find where such a unit can be purchased because the oil will, as you say, run down to the rear end of the crankcase in climbing a hill. A point which should be observed in doing the drilling work necessary on this job is to remove all traces of metal borings as they might damage the motor seriously.

Position of Oakland Balance Weights

Editor THE AUTOMOBILE:—Kindly state the best method of setting the geared counterbalance on crankshaft of a two-cylinder 1909 Oakland engine. I do not get as steady a running at high speeds. I see no marks on gears but get them balanced by sighting them horizontally.

2—Can you suggest any remedy for oil being forced out of breather at crankcase when cylinder has apparently good compression? I added one screen.

3—Will a set of new clutch plates on slow speed in transmission prevent the very noisy hum when starting? What is the best oil to use with this clutch?

Oak Park, Ill. J. L. DAVIS.

—The only method is to take a trial setting and observe how the motor runs, then try another setting and see if running is better or worse. The first and second settings should be one tooth apart on the gears. That is, if the two teeth that are in mesh on the gears are marked in the first test the second test will consist of moving the tooth over one point on one of the wheels. The running should be observed on each test and the direction in which to make the changes will soon be noted. Should you be unable to secure silent running under any adjustment it will signify that the gears are worn and should be replaced.

2—The trouble is probably in the design of the breather which is not properly baffled. In Fig. 5 a method of constructing a new breather pipe is outlined. Two opposing baffle plates are fitted for the purpose of catching the oil thrown out. The breather is easily made; the upright piece of the breather may be the same as you have now. The two baffle plates are cut to suit the inside diameter and may be made of sheet brass. A gauze screen across the top will complete it.

3—A new set of plates would have a good effect in the direction of noise. The best oil to use with this clutch is a heavy steam engine oil thinned down with kerosene. It should be thinned down to the consistency of a medium cylinder oil.

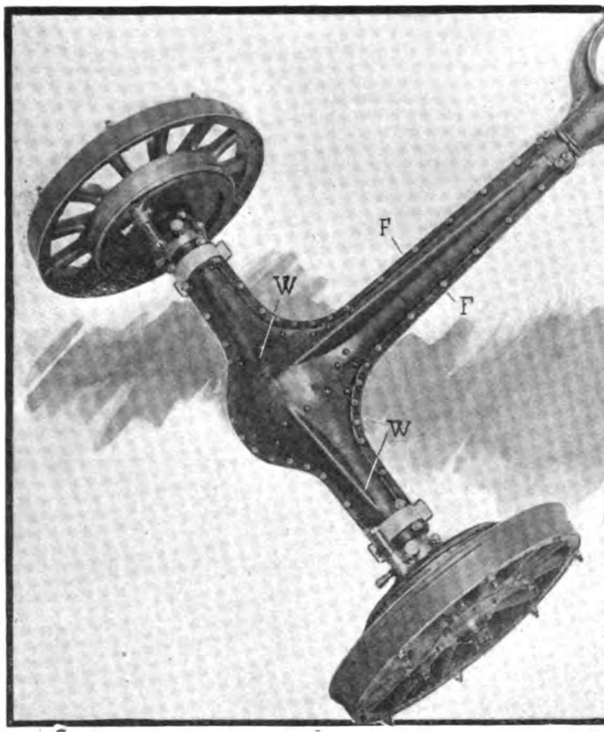


Fig. 1—Fiat pressed steel rear axle and combined torque tube.

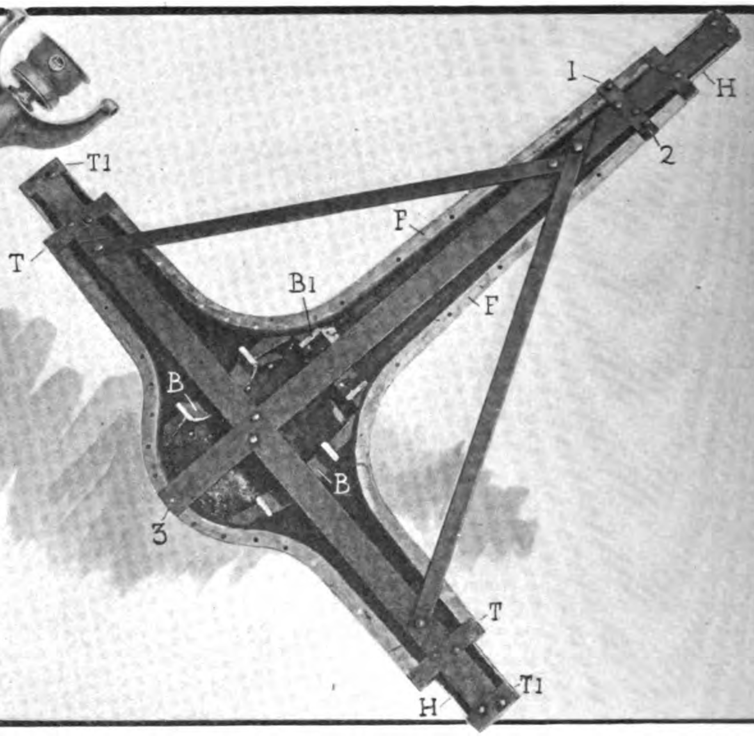


Fig. 2—Template used in cutting barrel ends of stamping to size

Fiat Rear Axle and Torque Tube a Unit

Factory Processes in Construction and Assembly of Combined Rear Axle and Torque Tube Stampings

Accurate Testing and Gauging Are Important Features of Company's Manufacturing Methods

THE last 3 years have witnessed general advances in rear axle construction. Interwoven with these advances has been the development of novelties, some with special merits, but often these offset by hidden disadvantages. The Fiat pressed steel rear axle and combined torque tube for the propeller shaft while unique in America has a following in Europe which is gaining. It has the complete housing made from two stampings made in the Turin factory of this concern. One stamping forms the top half, the other the bottom half, a series of cold-rolled steel bolts uniting the two. These stampings weigh in the rough 41 pounds each, giving the total housing weight little above the 80-pound mark, a fact which the factory can proudly boast of in these days when all Europe is aiming at reducing the unsprung weight of the rear axle. Not a few other European makers are cutting down unsprung weight. De Dion being a leader in that he uses the combination stationary and live axle, the stationary or unsprung part being but a forging extending from wheel to wheel whereas the differential and the drive shafts from it to the rear wheels are supported on the chassis frame, thus being carried through the springs and not coming under the classification of unsprung weight.

Each half of the Fiat rear system housing is stamped from a sheet of 50-point carbon manganese steel 4 millimeters, or approximately 1-6 inch in thickness. The utmost accuracy has to be maintained in the manufacture of these housings and the illustrations herewith show in a general way some of these processes. In making a rear axle quietness is the great aim, and quietness means proper meshing of the driving pinion with the differential bevel. The Fiat company has constructed this axle housing along the line of getting this meshing correct in the factory and not making any provisions for disturbing it by the car owner or the casual garageman; in a word, it is a non-adjustable axle with the axle drive shafts not withdrawable.

To get the desired accuracy in the housing and the mounting of the differential and pinion it is necessary to treat each stamping with the utmost care. First in this comes the preparations of the flanges F, Fig. 2, where the halves bolt together. These flanges, to reach the desired degree of accuracy, are gone all over with a hand file, are then finished with emery cloth and finally shellacked, thereby eliminating the use of a gasket and yet giving an oil-tight joint. This necessary accuracy of the flange faces is tested on a huge metal surface plate, not illustrated.

After accuracy in these flanges has been obtained it is necessary that the halves be rigidly held together, which is done by 5-16-inch cold-rolled steel bolts placed 4.5 inches apart on the straight portions of the housing and much closer at the four curved portions in the proximity of the differential expansion.

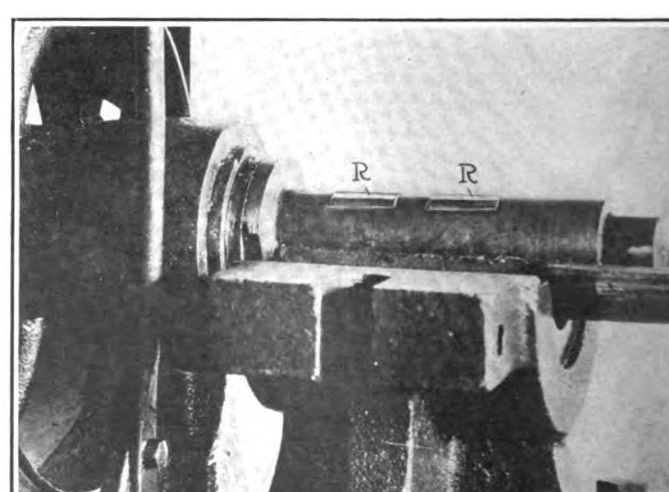


Fig. 3—Detail of hub truing operation

where the strains of the differential and driving pinion are set up. Further strengthening of the expansion is by the heavy webbing W, Fig. 1.

But the preparation of the flanges is only one part of the work on these stampings. They must be of correct measurement which is accomplished by templet, Fig. 2, which serves several purposes. Its iron cross-piece carries a part T which determines the exact length of the flange, and another part, T1, fixes the length of the further extension of the flange in the form of a hub. A similar cross-piece fixes the length of the flange at the forward end of that portion of the housing constituting the torque tube, and another determines the length of the tube. The templet has three anchor points designated respectively 1, 2 and 3 which are the fixed layout marks for the housing.

After the stamping has been cut to the correct size the three ends or hub portions have each to be brought to perfect semi-cylinder in order to mount them accurately in the brake drum carriers. This work is done by a special machine, Fig. 5, in which three truing hubs H1 fit and are revolved. The exact nature of these hubs is better shown in Fig. 3, in which it will be seen that a series of short rollers R carried in slots with provisions within the sleeve carrying these rollers to force them out radially as desired. The operation of the truing up of these three hubs consumes 20 to 30 minutes. When the operation is in progress caps K, Fig. 5, are fitted over the expanding parts, these being removed in the illustration for clearness. This done there is the necessary trimming of the flange edges, which is a minor operation.

Truing of Hub Ends

After this expansion of the hub ends a test gauge, Fig. 6, is placed in each half of the axle and the portions of this test gauge fitting within the hub ends is painted with a color preparation to ascertain if the hub portion completely coincides with the curvature of the gauge.

The next major work in this axle construction is that of mounting and preparing the three brackets B and B1, Fig. 2, on which the differential and driving pinion are mounted. These brackets are steel castings riveted to the stampings. Once in place they have to be accurately prepared for the bearings. These brackets B are first bored one-half at a time. The bracket B1 is similarly bored, the boring fixture being secured at the forward end of the torque tube in order to insure the desired accuracy. In addition to boring the bracket B1 is hand reamed, Fig. 4 showing the hand reamer R in place together with the fixture J with its two bosses of exact size of the bearings carrying the differential and resting on the brackets B. The reaming shaft is anchored at R1, the forward end of the torque tube to gain the greatest accuracy. When this hand reaming is taking place both valves of the stamping are bolted together, the upper one having been removed in the illustration in order to show the reamer.

Special fixtures are used on the boring machines to insure accuracy of the brackets B.

Many of the internal details of the Fiat axle cannot be obtained from photographic reproductions, but appear in Fig. 7. The drive shafts S support the rear wheel on a slight camber of 1 per cent., to be more explicit 1 millimeter camber to every 100 millimeters of drive-shaft length. The road wheels are fitted to a taper with key and at the inner ends the differential bevels are similarly fitted. The inner end of each shaft takes a hardened piece P which is sunk into the end of the shaft and pinned. The oppos-

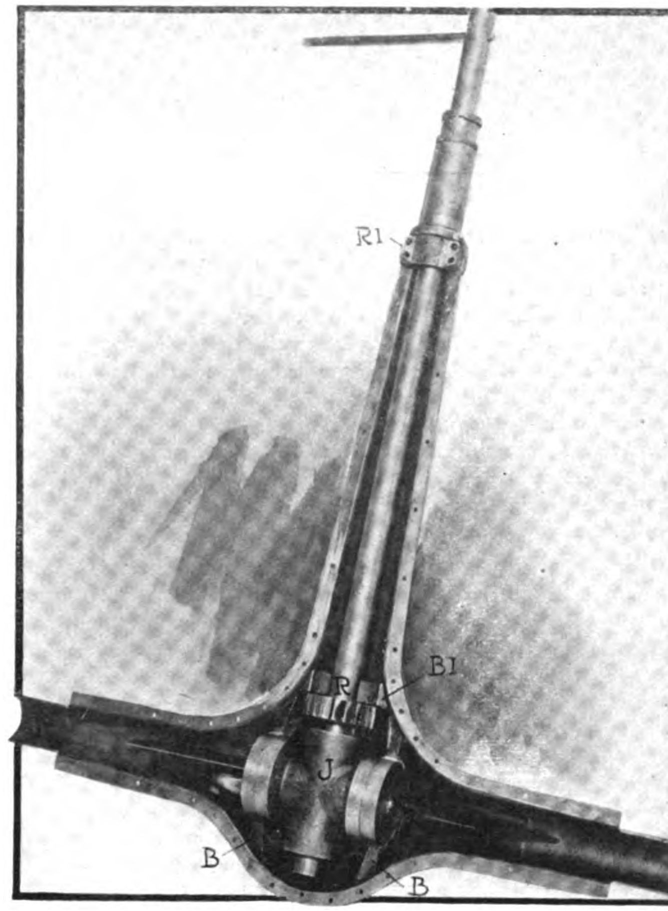


Fig. 4—Showing method of hand-reaming of pinion bearing in Fiat rear axle. During this operation both stampings are firmly bolted together

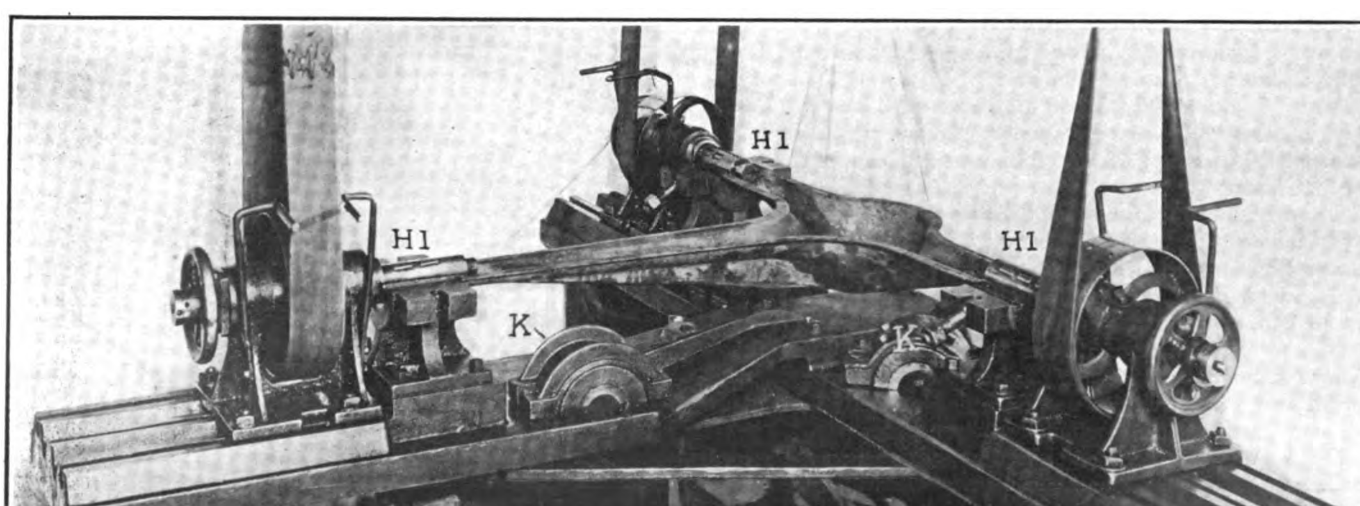


Fig. 5—Machine used for simultaneous truing of all three barrel ends of Fiat rear axle stampings

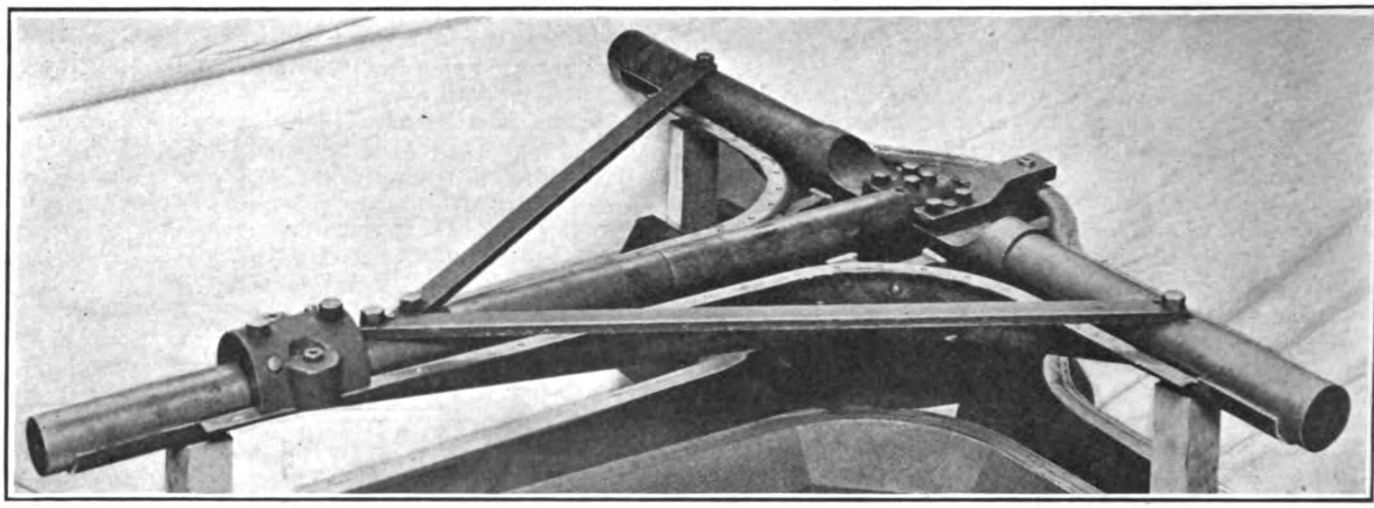


Fig. 6—Combined T square gauge and drilling jig for Flat rear axle

ing faces of these pieces bear together constituting a thrust bearing. In addition to this there are three other thrust bearings, one at each side of the differential and one in advance of the pinion. Four R. I. V. annular bearings are used to carry the differential and axle shafts and a double race of these bearings supports the pinion fitted to the rear end of the propeller shaft. The forward end of the propeller has plain bearing at the point Y. The fork or yoke X supporting the torque tube has the axis X1 in line with the axis of the universal joint thereby giving the desired action.

The rear brakes, as shown in the inset Fig. 7, are of large diameter, giving great braking power. They are double-acting, with expanding shoes A and contracting shoes B.

Harking Back a Decade

FROM *The Automobile and Motor Review*, December 13, 1902:

A project is being seriously advanced to connect New Jersey with New York and the north Atlantic coast by a macadamized highway across the Newark meadows. New Jersey has from 1,200 to 1,500 miles of finely improved roads but it is exceedingly difficult to reach them from New York. Flat steel rails will be laid in Murray street on the Manhattan side and it is expected that the new road will extend from Marion on the Hackensack river to Harrison on the Passaic cutting between the Lackawanna and Erie tracks.

The first Peugeot coupé imported into the United States has attracted a lot of attention recently on the streets of New York. The car has a two-cylinder motor, carried beneath the body in the rear. Ignition is by hot tubes. Its speed is from 4 to 25 miles an hour.

Henry F. Donaldson, editor of *The Automobile and Motor Review* has gone to Paris to report the automobile show and later will make a tour of inspection covering various large continental factories.

The question of licensing automobilists is agitating the national organizations. The A. C. A. recently went on record as favoring a state license; the N. A. A. M. wants federal license. The A. A. A. and A. M. L. have taken no definite position on the matter to date. Conditions are becoming intolerable through the passage of laws and ordinances in various localities without definite standard, making it a misdemeanor to operate an automobile in a certain way in one town and perfectly legal to use the same methods in the adjoining village.

The A. A. A. has declined to receive and sanction the records made at Detroit last month by Barney Oldfield in the Ford racer. This leaves the record for the flying mile on a circular track to the former holder, Alexander Winton. The Oldfield trials were timed with stop watches held by Dr. R. C. Rudy, William E. Metzger, E. H. Broadwell and J. M. Colquhoun.

Exports of automobiles and parts from New York during October reached a valuation of $122,624. For the first 10 months of the calendar year they were $970,610. This showing compares with $55,735 and $262,537 during the corresponding periods of 1901.

Warrant for the arrest of E. J. Pennington, who has cut a wide swath in the automobile and airship field in the United States and England, has been issued at the request of a Cincinnati hotel where he stayed this fall. Pennington is said to have sold his airship patents to Great Britain for $5,000,000 a short time ago but that his activities in buying automobile factories exhausted his capital.

German Daimler cars are being duplicated by the Daimler Manufacturing Company, of Long Island City, L. I., and will be placed on the market shortly. One 12-horsepower car, an exact facsimile of the foreign built model, has been turned out.

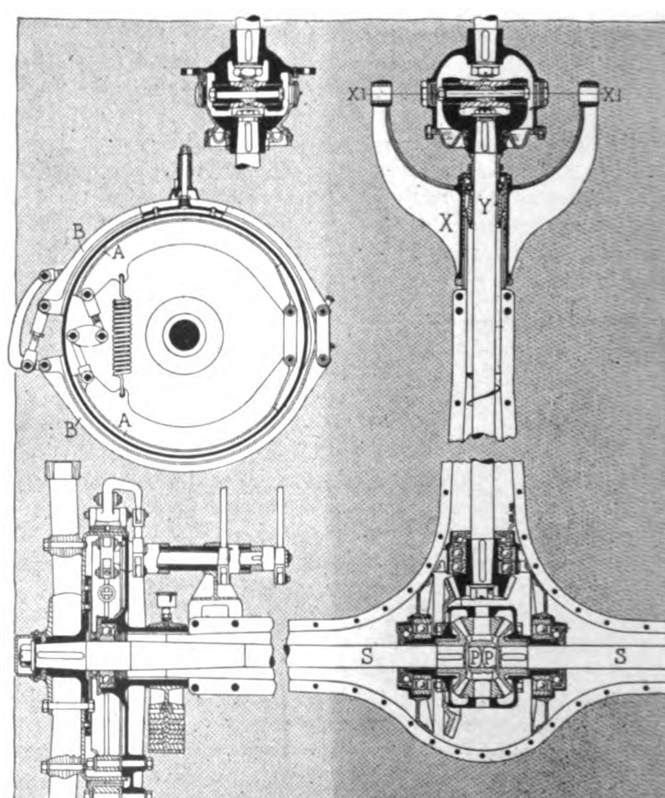


Fig. 7—Section showing construction of Flat rear axle and brake mechanism

Communications from The Manufacturer

H. H. Franklin on Annual Models—P. W. Litchfield on the Breaker Strip —Owners and the Care of Rims

SYRACUSE, N. Y.—Editor THE AUTOMOBILE:—The editorial in your issue of November 21, entitled The Annual Model, was about the weakest statement I ever saw on the subject. You attempt to show conclusively that the American automobile is not sufficiently developed to warrant the elimination of the annual model.

The development of a car, namely, its degree of perfection, has nothing whatever to do with the annual model question. You also say that so long as automobile shows are held it will be necessary to have the annual model.

You must have written the editorial to please the annual modelers. Or else you are in possession of a fine large fund of ignorance on the subject.

Improvements can be, should be and are made in automobiles regardless of annual models.

Just when improvements are made is usually a question of the manufacturer's stock, both raw and made up. This is sometimes offset by the character of the improvement required. If it is something that must be taken care of to preserve the car's quality and the manufacturer's standing, it will be done at the earliest practical moment no matter what the loss in stock on hand. The improvement demanded may be something to overcome weakness in design or material, or both.

When the front door bodies appeared some makers attempted to go through the season without that type of body. They had announced their annual model, but they got the front door on as soon as they could. They did not wait for another annual model announcement time.

Right now makers who announced their 1913 models without starter are moving heaven and earth to get starters on. They would be in a fine fix if they waited until the 1914 model was ready. Some who announced starters are already changing to other types, and so it goes.

You will find that the makers who have abandoned the annual model plan will be at the shows this winter with right up-to-the-minute product. They are likely to be more up-to-the-minute than the annual modelers, because their manufacturing plans are worked out on a more flexible basis. They can make improvements easier and with less expense. They are really in position all the time to take advantage of today's advancements.—H. H. FRANKLIN, H. H. Franklin Manufacturing Company.

AKRON, O.—Editor THE AUTOMOBILE—There are still occasional tire users who do not fully understand the function and purpose of the breaker strip, which lies along the tread of the Goodyear automobile tire, concealed by the tough rubber of the tread. The explanations occasionally given for the presence of the breaker strip are entertaining, to say the least.

The breaker strip is put in a tire to take the shocks which obstructions in the road are liable to give to a tire, before they can reach the organic part of the tire. It plays no part in the strength or efficiency of the casing, but is simply an armor belt around the outside of the tire to protect it from injury.

The body of the tire, to give the best results, is made of fairly close-woven fabric placed at an angle of 45 degrees. The tread rubber, to give the best wearing qualities, is made thick and tough, and while in service exerts a drag on the fabric, tending to pull it loose. The breaker strip should be put in with the treads running around the circumference of the tire, instead of at an angle of 45 degrees, as this more effectively takes up the shocks without transferring them to the carcass and better resists the drag on the rubber, pulling it away from the tire fabric.

When sharp stones or glass cut the tread rubber, in many cases the abrasion is stopped at the breaker strip, preventing the water and dirt getting down to the main fabric, thereby preventing the tire being water soaked or sand blistered to quite an extent. As the breaker strip is the nearest fabric to the road, it receives all the cuts, water, dirt and sand, and should be made, so far as possible, to resist damage caused by them. For this reason we wish an open fabric which can be more effectively united to the rubber. On the other hand, we wish a closely twisted yarn, tightly woven, to avoid becoming spongy when water soaked, thereby letting go from the rubber. We believe that our rivet fabric is the best compromise between these two qualities, as it is made from closely twisted yarn, tightly woven, to make it as waterproof as possible, but leaving large holes at intervals through it, which result in the formation of large rivets of rubber, making a fabric which is more closely united to the rubber than any ordinary loose-woven fabric, and at the same time it is more waterproof after the tread has been cut.

Always bear in mind when you have breaker strip trouble that undoubtedly this has saved the tire from much more serious injury at a much more vital point in its construction. To obtain the best results from breaker strips there should be a cushion of rubber between the breaker strip and the main fabric of the tire.—P. W. LITCHFIELD, Goodyear Tire and Rubber Company.

CLEVELAND, O.—Editor THE AUTOMOBILE—Of all the component parts of the automobile, perhaps the most widely discussed by the press and by users is the motor, and those parts which receive least consideration, if any at all, are the rims on which the tires are mounted. Although rims are operating mechanical devices, they are seldom looked upon as such by the car owner, even though he may be thoroughly familiar with every other mechanical feature of his machine. And yet there is no part of the automobile which receives more severe service.

Often, when a blow-out or puncture takes places on the road, your car owner will be confronted with an entirely new problem—he will not know how to go about removing the tire from the rim. If his car is fitted with demountable rims he is a lucky man, for in that case he can put on the spare tire without much trouble. But let him try to get the tire off the rim and he will begin to find cause for complaint in the rim. Yet if the rim had been investigated and its construction understood the operations connected with its removal would have been simple.

Rim makers of today have given as much thought to their product as have the manufacturers of any other product, and perfection along this line is as nearly attained as elsewhere. Tire replacement is not the burden now which it was in the past, but the new devices must be understood for their extreme simplicity to be apparent. Not that they are complicated by any means, but there are certain special operations connected with their use with which every car owner should familiarize himself.—Standard Welding Company.

NEW ORLEANS, LA., Dec. 6—In the French quarter, laid out nearly 200 years ago, there has been great difficulty in handling the traffic, owing to the narrowness of the streets. In the last report of the chief of police, he states that, due to the increased number of motor vehicles it is now possible to reduce the traffic squad materially in the old part of the city. When horses were used altogether, the lives of pedestrians often were endangered by the animals becoming unruly in the jam at street intersections. Motor vehicles have radically changed conditions.

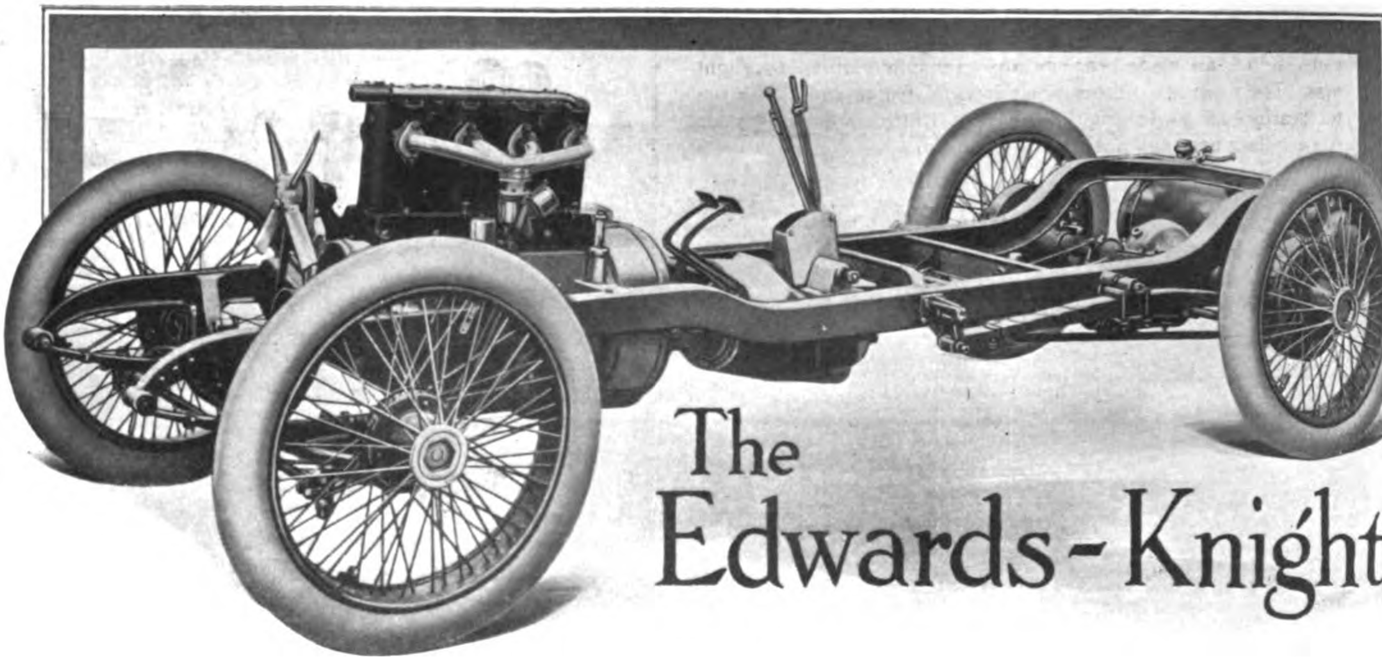


Fig. 1—Edwards-Knight 25.6 horsepower chassis, showing double dropped frame and Lanchester spring

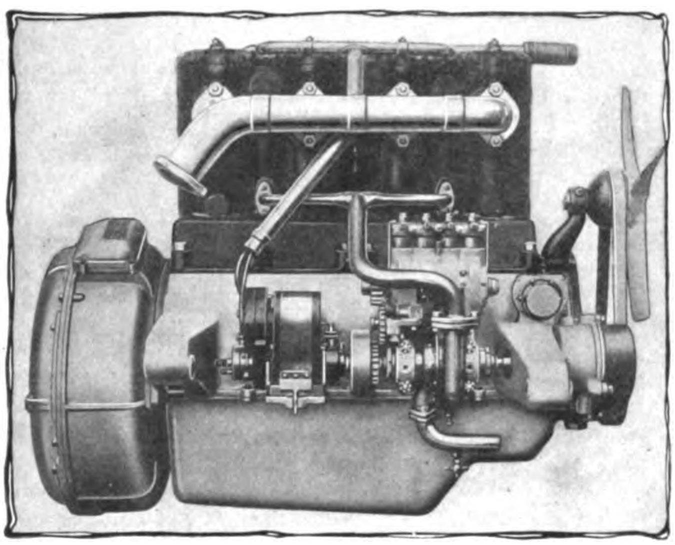


Fig. 2—Exhaust side of the new motor, showing disposition of chain-driven magneto and pump

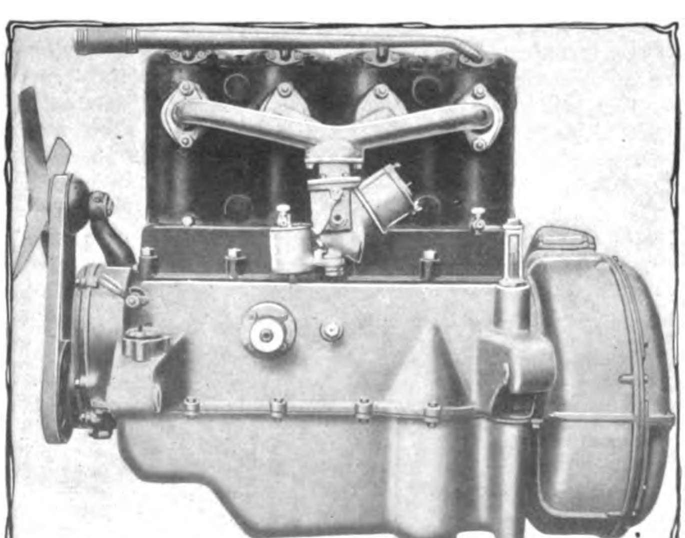


Fig. 3—Intake side of the Edwards-Knight. The flywheel housing at the right contains an electrical self-starter

Notable Features of New Car Include Electrical Flywheel Starter—Unit Clutch and Gearset—Worm Drive

THE Edwards-Knight is out. This latest addition to the list of American-made cars was originally announced last February when C. G. Stoddard and H. J. Edwards withdrew from the United States Motors and immediately launched the Edwards Motor Car Company, of New York City. At that time announcement was also made that Messrs. Stoddard and Edwards had secured from Knight & Kilbourne the last American license to build automobiles under Knight patents, that is, using two sleeves in place of poppet valves.

The Edwards-Knight is a specially-designed automobile. To summarize, it is a 25.6-horsepower, four-cylinder type, with 4-inch bore and 5.5-inch stroke; the motor uses silent chain drive for the eccentric and magneto shaft; it has force-feed non-splash lubrication; it has an electric self-starter incorporated within the inclosed flywheel; the dry-disk clutch is carried in a separate compartment in the forward part of the gearbox; the gearbox is flexibly supported and has four forward speeds; worm drive is used in the rear axle, with the worm beneath the axle yet affording a 9.25-inch clearance; detachable wire wheels with Q. D. rims are used; the steering wheel is on the left side with center levers; Lanchester patent springs are used in the rear, and the frame is double dropped.

The chassis embodying these features is made with 120-inch wheelbase and takes two-passenger roadster, four-passenger torpedo, five-passenger touring car, seven-passenger limousine and seven-passenger landaulet bodies. Prices are $3,500 to $4,700.

The present chassis model 25 possesses new features in torque and radius rod design as well as universal joint action in the propeller shaft.

The motor incorporates all of the 1913 improvements that the European licensees have made in the Knight type, including long-stroke, namely, a stroke-bore ratio of 1.35 to 1; longer stroke of the sleeves; making both inner and outer sleeves the same thickness, and change of timing to give a maximum opening of the ports on both intake and exhaust strokes.

The twin cylinder castings are imported, as are the cast-iron sleeves and pistons. Water pump, Simms magneto and tire pump are grouped on the right side, all driven through a longitudinal lay shaft; on the left are the S. U. carbureter and the air pump for gasoline pressure, leaving this side clean for the steering column.

The motor uses a five-bearing crankshaft 2.25 inches in diameter. It has all main bearings and crankpins drilled for lightness. The flywheel anchors to an integral flange and at the center bearing are two flanges F, Fig. 4, which care for the end thrust. The bearings are bronze lined with .03125 inch of babbitt.

Connecting-rods are tubular forgings of round section, drilled out to reduce weight and leaving a wall thickness of .125 inch which is increased to .15625 inch at one-third the height of the rod, which is the point of greatest strain.

Pistons with concaved heads carry three eccentric rings above the wristpin and are relieved from the lower ring to the wristpin to facilitate lubrication. The skirt is perforated. An allowance of .012 inch is made at the top and .0035 at the piston base.

The wristpin is a hardened and ground steel tube working in a steel bushing, the bushing being hardened, ground and lapped.

The silent chains used to drive the eccentric and lay shafts are non-adjustable. The drive to the eccentric runs on pulleys with 6.676-inch centers and that to the magneto with 8.8225-inch centers. Both are broad and of 6 pitch. Lubrication is through the forward end of the drilled crankshaft and out through radial holes, 1, 2 and 3, Fig. 6, and thence by centrifugal force outward through holes in the pulley into the chain.

The operation of the Knight sleeves is well understood. Here they have a reciprocation of 30 millimeters, or 1.18 inch, which is longer than previously used and results in longer intake and exhaust openings. The intake ports are on the left side, the exhausts on the right, and both have a circumferential length on the sleeves of 3.5 inches. The intakes are 12 millimeters, .472 inch high, the exhausts 18 millimeters, or .70 inch. In other words, the intake port is equivalent to 1.645 square inches opening and the exhaust to 2.45 square inches.

The intake opens 15 degrees late and closes 36 degrees late, giving it an opening of 210 degrees. The exhaust opens 55 degrees early and closes 5 degrees late, a total opening period of 240 degrees. With this motor the power efficiency is not only due to the area of the port or valve openings, but also to the length of time they remain open as well as to the rapid opening and closing. This is graphically shown in the timing chart, Fig. 10.

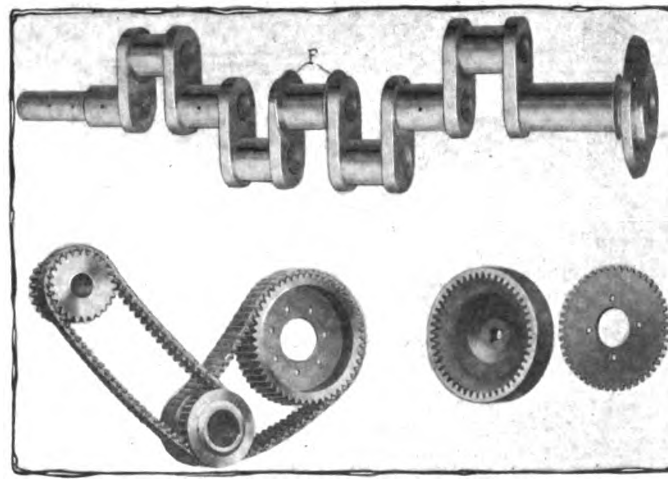


Fig. 4—Top view shows hollow crankshaft with integral flanges at the center main bearing to take end thrust. Below, arrangement of silent chain drive for eccentric and magneto shafts

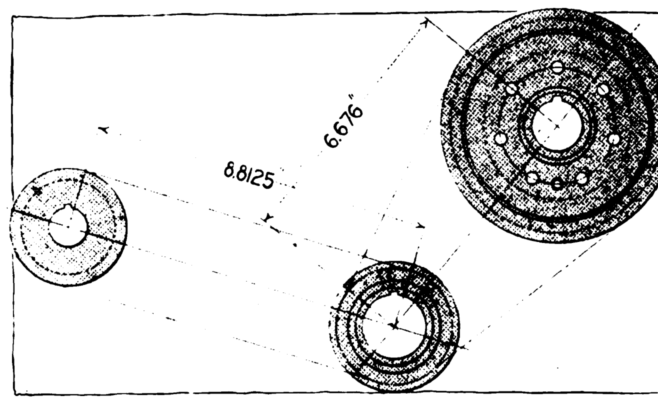


Fig. 5—Relative position and sizes to scale of magneto and eccentric shaft chain drive

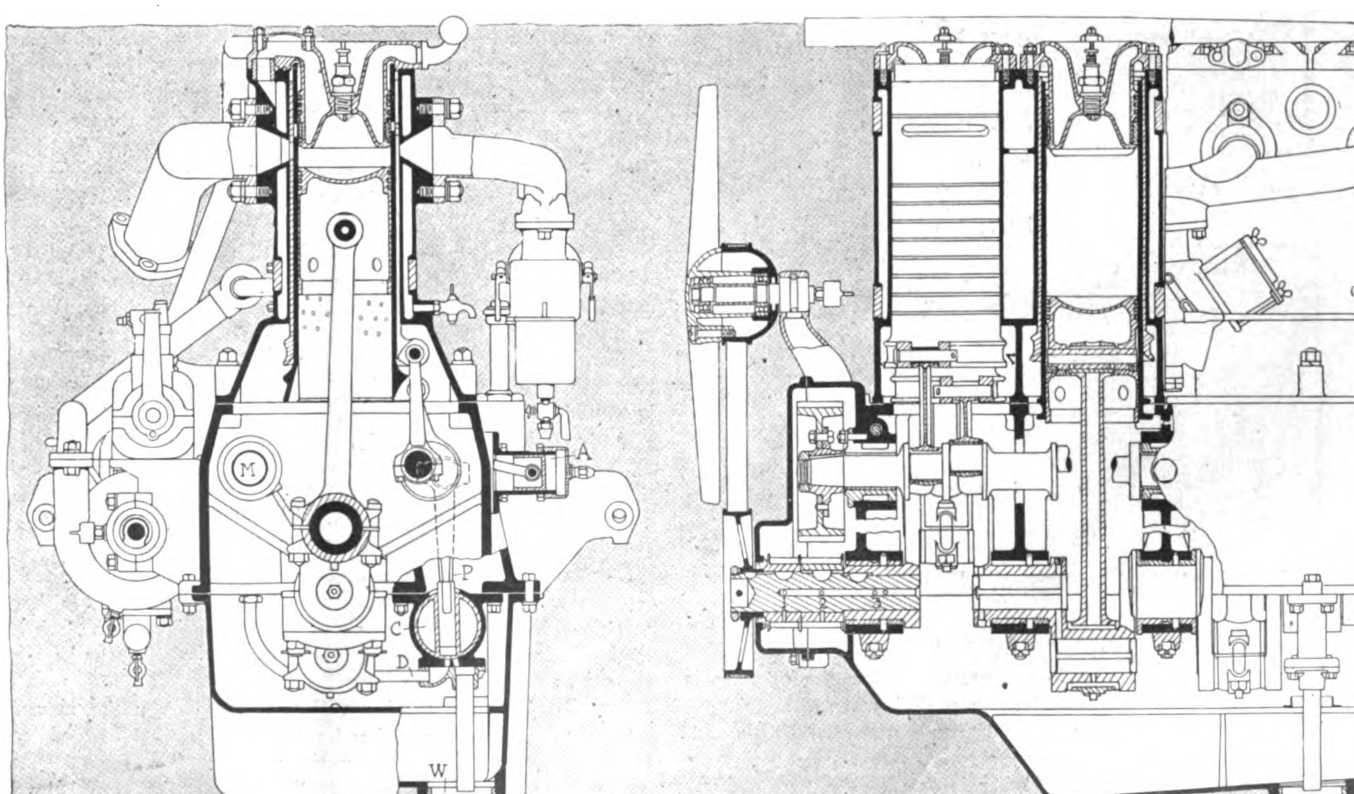


Fig. 6—Cross-section and partial longitudinal section of the Edwards-Knight 25.6 horsepower motor

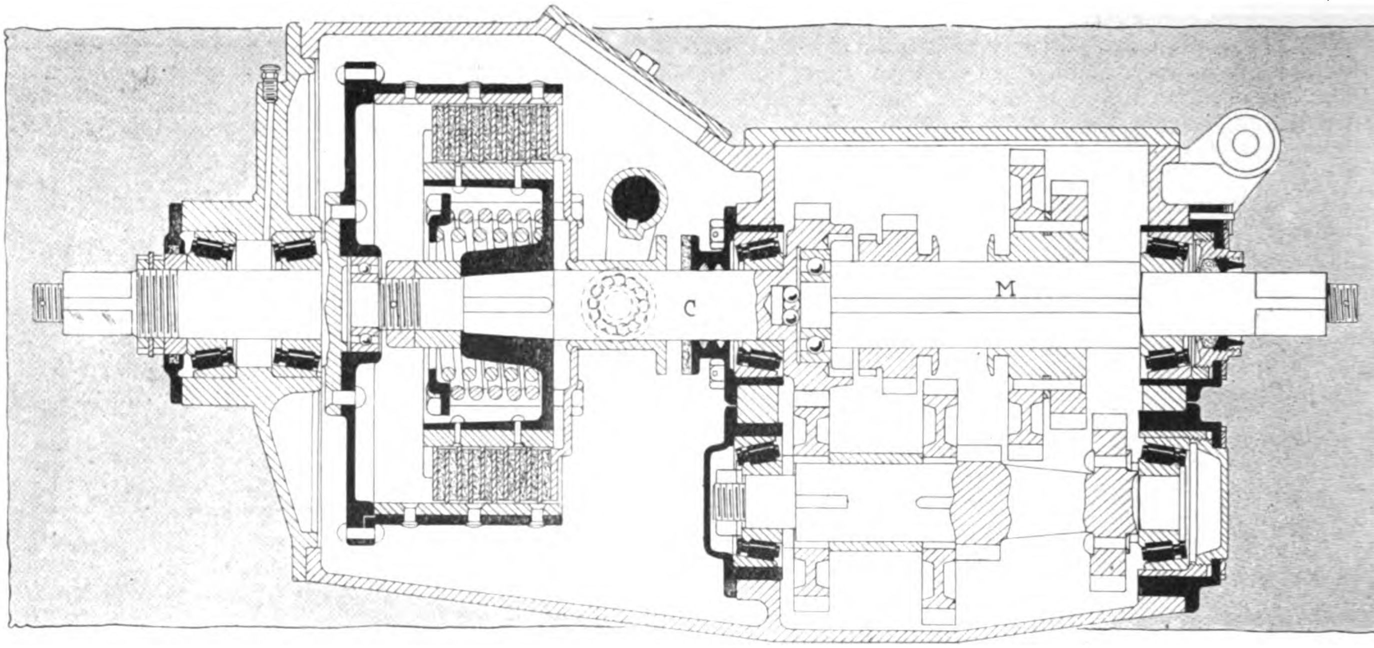


Fig. 7—Combined dry-disk clutch and gearset. Note oiltight dividing wall and use of roller bearings

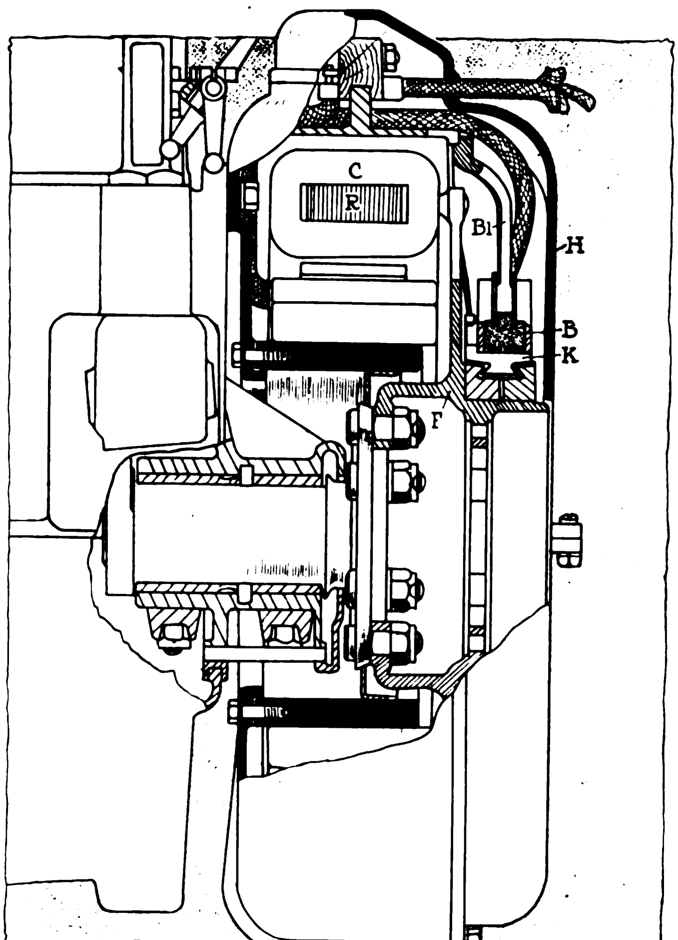


Fig. 8—Sectional view of electrical self-starter attached to rear end of crankshaft

The intake opening chart is practically a 45-degree opening line and also closing line; and in the exhaust valve the opening is quicker and there is a considerable period when the port remains at maximum opening, this being represented by the flat top of the diagram.

This quicker opening and closing is due to the two reciprocating sleeves which are so timed that in intake opening the inner sleeve moves up and the outer sleeve down. The inner sleeve beginning its acceleration and the outer sleeve at its maximum speed of travel. To close the intake the inner sleeve alone moves upwards at maximum travel against the junk ring in the cylinder head, which gives the gas sealing necessary. The exhaust ports are opened by the inner sleeve lowering at maximum speed from the junk ring and are closed by the outer sleeve on its downward motion.

Lubrication is an improved non-splash pressure system without any auxiliary feeds to cylinder heads or sleeves. A single-plunger oil pump located within the crankcase base supplies lubricant at a pressure varying from 2 to 20 pounds according to the demands. The plunger P, Fig. 6, operates direct from the eccentric shaft and works in an oscillating cylinder C, whose oscillations are so timed that its bore registers with the intake pipe from the oil well W on the upstroke of the plunger and with the discharge pipe opening D on the down-stroke. The discharge pipe connects with a large conduit M incorporated in the crankcase when cast, and which conduit has distributing branches to all five of the crankshaft bearings; thence, through the drilled crankshaft and the hollow connecting-rods and hollow wristpins, the positive oil pressure of the pump reaches all of the important motor bearings, etc. The motorbase has an oil capacity of 2.5 gallons.

Stock equipment includes an electric self-starter of the U. S. Light & Heating Company type incorporated within the flywheel and weighing approximately 100 pounds extra and being entirely within the housing containing the flywheel. Fig. 11 shows the housing H and the rotating portion of the starter R. These parts are also shown in the sectional drawing Fig. 8. The rotor R is mounted on a spider F and carries a series of coils C. The commutator K is fixed on the hub portion of the spider, the brushes B being supported though arms B1. To start, current is drawn from a battery and once started the battery is recharged from the starter which assumes the rôle of a generator. The starter control is in a small lever on the dash.

The magneto timing can be adjusted by changing the mesh of the gears. Closely associated with the ignition system is that of the four-cylinder power tire pump driven by gear from the pump shaft. The tire pump is snugly nested above and back of the water pump.

The S. U. carbureter is an English production the manufacture of which in America has been secured by the Edwards company, and its cardinal characteristic is that the area of the air space surrounding the nozzle is automatically varied by the motor suction acting on a bellows which in turn controls a piston. This piston obstructs the air passage. With high motor

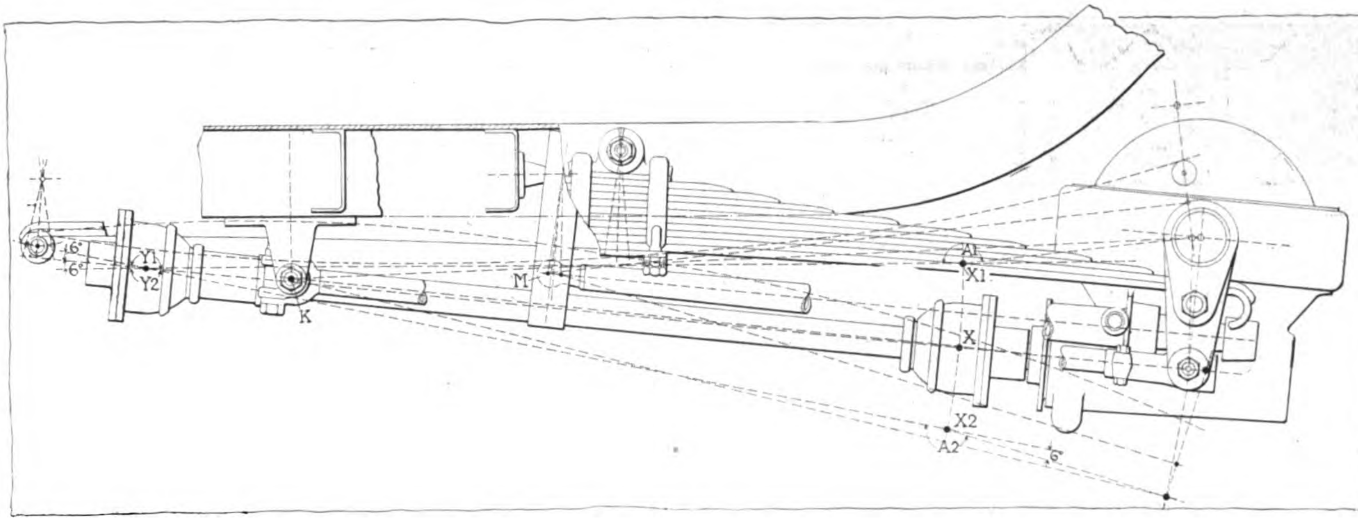


Fig. 9—Diagram explaining the action of the torque rod and distance rods which is such that no sliding takes place in the universal joints of the propellershaft

speeds the piston is drawn out of the passage, increasing its area and thereby lessening the suction on the gasoline in the nozzle and giving that desired reduction of richness in the mixture, whereas with low motor speeds this governing piston largely obstructs the air passage thereby increasing the suction pull on the gasoline in the nozzle and giving a richer mixture. The governing bellows is contained within the cylindrical part of the housing, Fig. 3, which is mounted at approximately 45 degrees. The vertical cylindrical chamber contains the float. Air pressure for the feed is through a simple plunger pump A, Fig. 6, driven from the eccentric shaft.

The combined gearset and clutch is shown in Fig. 7, the clutch a dry-disk type with its steel disks faced with asbestos and all contained within a separate compartment and supported in front on a double race of Timken rollers and in the rear by a single race. The clutch shaft is carried within the recessed end of the crankshaft in a ball bearing and it is formed with an integral gear on its rear end within the gearbox proper and supports the mainshaft M on an annular ball bearing and carries also a ball end thrust. The remainder of the bearings of the set are Timken rollers, the short-series type, oiltight bearing plates and packing are used. Nickel steel is used throughout for gears and shafts. There are four forward speeds with direct on third. The gearbox is flexibly mounted on two frame cross-members, in front through a trunnion and through two points at the rear where a fore-and-aft hinge motion is afforded.

The Edwards-Knight has a straight-line drive in that the motor is mounted to decline slightly to the rear, to be accurate, the angle is 4 degrees; and the gearbox is similarly declined so that with the car loaded the crankshaft, the mainshaft of the gearbox, the propeller shaft and the worm shaft in the axle are all in a straight line.

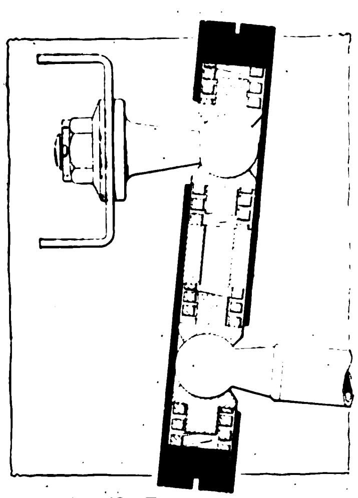


Fig. 12—Flexible torque rod fastening

To understand the merits of the propellershaft system it must be remembered that a torque rod and two distance rods are used that the length of these is such that they work in unison and eliminate all sliding movement in the universal joints. The angles in the front and rear universal joints are the same at all times, namely, the angle between the gearshaft and the propellershaft in the front joint equals the angle between the propellershaft and the wormshaft in the rear joint, a fact which neutralizes the acceleration and retardation which take place twice during each revolution in a universal joint. Fig. 9 will aid in explaining this: The arc Z contains three indicated point, X, X1 and X2, which represent the rear universal joint at three positions, normal in the center,

(*Continued on page 1234.*)

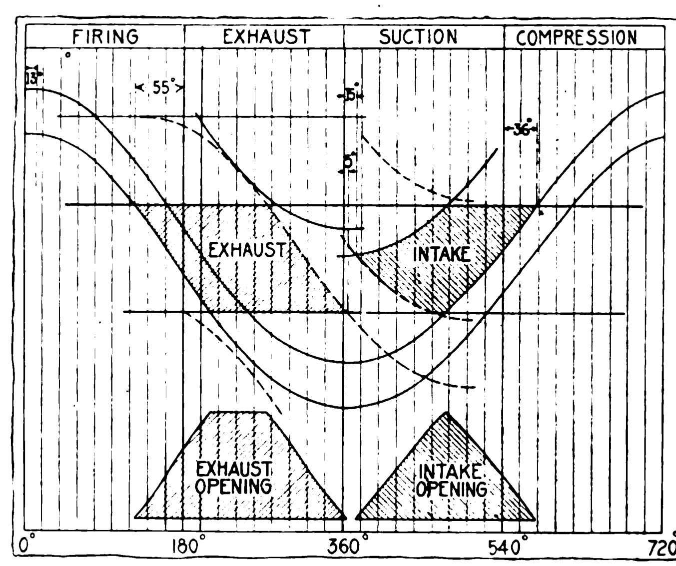


Fig. 10—Valve timing chart of Edwards-Knight motor

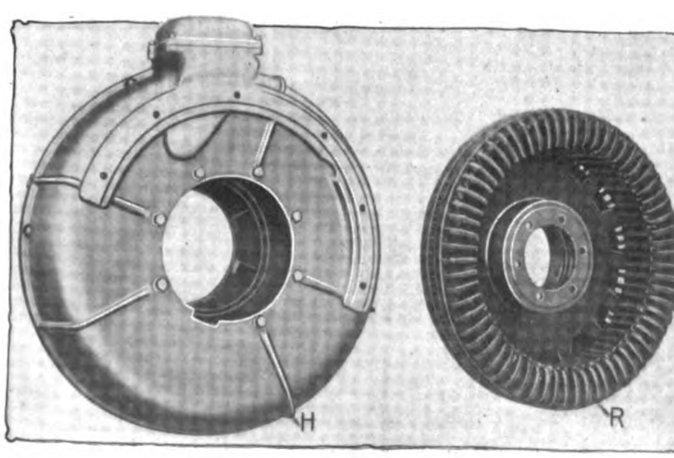


Fig. 11—Outer casing and inner rotating member of dynamo-starter

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Announcement

BEGINNING next week THE AUTOMOBILE *will start the publication of a series of articles entitled Criticisms of Non-Poppet Valves To-Date, by Eugene P. Batzell. These articles will appear from week to week in relatively short instalments so that the busy man of the day and the onslaught of holiday activity will not make the following of them from week to week, a difficulty with any reader.*

In his treatise on the subject Mr. Batzell, who has approached the subject from the viewpoint of the practical engineer, takes up seriatim the many types of non-poppets that have been invented and brought into the practical stage to one extent or another. He points out the various shortcomings of many of the types as shown in practice and analyzes the inherent weaknesses of others that in some cases have progressed little beyond the patent office stage.

The able manner in which Mr. Batzell deals with any subject he undertakes to write upon is well known through his papers presented before the Society of Automobile Engineers, which have invariably shown keen engineering judgment coupled with a wide knowldge of modern practice. In Criticisms of Non-Poppet Valves To-Date he has accommodated his language to the intelligent car owner, to the intelligent dealer as well as combining in his sentences many new thoughts on the situation which cannot but stimulate activities among the engineering fraternity of today.

Fewer Models—More Cars

Foreigners Imitate Americans

ALL manufacturers must come to the rational order of things or die a premature death. This is most apparent to-day in the phenomenal change that has swept over the makers in the question of multiplicity of models. The time was when one concern boasted that it had twenty-one different models for a certain year. Each model had its characteristics and while the company had not twenty-one different motors it had over half that number of different cylinder dimensions, wheelbases, angles to steering columns, wheel sizes and other specifications. It deemed that such a scale of models was necessary in order to meet the requirements of the fastidious public.

To-day this is changing and changing rapidly. Business competition is working the change. Companies with seven different models in 1912 are cutting them to three for 1913 and some extremists have dropped from a variety program of six to a single one for the ensuing year. All through the list of car manufacturers, where there has been a needless multiplicty of models there has been a pruning for next season.

Some makers have ben inexcusably slow in discovering the amount of factory disorganization occasioned by so many models. Only with the present reduction in prices, made possible in many cases by increased production and elimination of models, have they realized the losses due to upsetting the factory every few days or weeks in order to run through a line of parts for the various models. They have at last weighed the situation and discovered the loss of time in actual machine operation and coupled with which is the lack of workman capacity for a period after each change is made.

Our biggest producers have naturally been the first to act on the model-reduction program. Output has made it imperative with them, and frequently it was essential with them to have output in order to meet the listed price of rivals. But one of our big holding companies has gone still further in this centralizing program and instead of cutting out models of the same make has been gradually reducing the number of subsidiary factories, dropping one here and another there and, as each is disposed of, centralizing on the others and multiplying their annual product. The dollar-and-cent value of this good judgment cannot be overestimated. It facilitates work all through the factory gamut.

In this respect the German engineer must be credited with going perhaps a little further than his rivals in that he has been busied in research work for several years in which he aims not only at reduced cost of output but at putting a little better workmanship and a little better design and a little better material into his car. The laboratories of Germany have been activity-centers for the last few years. Much of the research information has been kept private or issued at the end of each year in booklet form. Even in these the usual German brevity in matters technical is apparent, and the engineer who would follow closely the research of the German must read closely between the lines and put continuous study into his work.

Indianapolis and Detroit Sections of S. A. E. Meet

E. B. Van Wagner in Paper on Metallurgy of Motor Bearings Recommends S.A.E. Standard Babbitt—Discussion on Swiss Slide Valve Motor

INDIANAPOLIS, IND., Dec. 6—The November meeting of the Indiana branch of the Society of Automobile Engineers having been postponed on account of Thanksgiving, it was held Thursday night, December 5, at the regular meeting place—the Hoosier Motor Club rooms in this city.

The subject under discussion was the Metallurgy of Gasoline Motor Bearings, the speakers of the evening being Mr. Van Wagner, of the Van Wagner Die Casting Company, Syracuse, N. Y. The chief points of interest in the talk embraced the following:

At the present time there are three classes of bearings in use on gasoline motors—the ball roller and anti-friction metallic bearings. With the exception of the Chalmers and the Lozier, which use ball bearings, practically all automobile manufacturers in this country use anti-friction bearings either in the form of die castings or as sand cast alloys.

The design of motor bearings is interesting and not understood by the average layman. A feature developed with one manufacturer of high-speed motors in that the use of different bearing materials influenced the speed obtainable from the motor. The design of bearing naturally resolves itself into the question of length and diameter, which should be as small as possible in accordance with the pressure and work expected from it.

Best Alloy Depends on Shaft Material

There are four main points to be considered in the selection of a bearing for any special position, namely, the dimensions; selection of the proper material; the anchoring and the clearance between bearing and shaft.

In the anti-friction bearings there are two kinds being used. The anti-friction white metal and the bronze bearings. The anti-friction bearings are commonly the white brass ones backed by a bronze backing. The advantage of having this soft plastic metal next to the shaft lies in its capacity to shape itself to the shape of the shaft and more nearly form a perfect surface than in the case of the bronze where hard spots are likely to develop.

The selection of the material of the alloy used depends upon the shaft material; the temperature developed: the friction and pressure and the cost.

The lubrication of bearings is a very important feature in the determination of the alloy used. Soft white brass compositions have a quality of self-lubrication—a decided advantage over the bronze.

As to the cost of the two materials, notwithstanding the fact that the ingredients of the white brass are more expensive than the bronze, the fact that it is much easier worked brings down the final cost lower than that for bronze.

From experiments, the Society of Automobile Engineers standard of babbitt has been found best—having no tendency to flake—which feature is very noticeable in the majority of the alloy bearing metals.

The last point in the selection of a bearing, namely, the clearance, is an important one. There is a tendency to make the fit too close and not allow space enough for the film of oil.

The following discussions by Howard Marmon, of the Nordyke, Marmon Company, Mr. Wall of the National, and Mr. Wood, of the Indiana Die Casting Company, proved of interest.

Instead of using the customary bearing which consists of the plastic white brass backed by the bronze, why not use the white brass die castings with no backing? This might be satisfactory where the pressure on the bearing was not too great. Is it not a fact that the unequal expansion of the two metals, when submitted to the high temperature which results from high speed, causes this kind of bearing to become loose and the soft part to wear at the ends?

Yes, to a certain extent, but the common practice is to have the bronze backing shorter than the white brass.

The Indiana Die Casting Company is now experimenting on a composition bearing metal to consist of 10 per cent. copper in combination with the other ingredients and discarding the bronze backing. The idea of the bronze backing naturally is to give the bearing strength and resiliency. In answer to a question as to the advisability of using this bronze backing, it was stated that one manufacturer has never used it and found the solid white brass bearings gave excellent service. A second, however, found that when there was any tendency to pound, the white brass bearing would break off at the edges.

The question was raised as to what the result of die casting was with reference to the grain and density of the metal as compared with the ingot. The density of the metal depends upon the casting temperature since this density in turn is influenced by the chilling effect of the die. The grain of the die casting, however, is more open, but harder than the ingot.

The common practice among automobile engineers is to use oil grooves in bearings and to put these grooves on the pressure side.

The question was raised as to the whole subject of bearings; if it is not entirely dependent on lubrication; if, with perfect lubrication—a perfect film of oil—if this would not take the pressure, absorb the friction, etc., but experiments have proven that even with perfect lubrication, when high speed is obtained the bearings undergo a very rapid increase in temperature, even in one case to the point where the connecting-rod ends become blue—all of which points out that the composition of the bearings must contend with this factor even if the lubrication is perfect.

The conclusion to be gathered on the composition of the anti-friction bearings was that the white brass die cast bearings, backed with a resilient metal such as bronze and provided with correctly spaced oil grooves, have so far proven the best.

Record Attendance at Detroit S. A. E.

DETROIT, MICH., Dec. 6—At the regular monthly meeting of the Detroit Section of the Society of Automobile Engineers, last night, at which the record number of sixty-eight was present, a paper by L. B. Brown and descriptive of a new Swiss slide valve motor was presented. It was productive of considerable discussion. Ferdinand Jehle also read a short paper on a new form of magnetic absorption dynamometer.

The new Swiss motor which was brought to this country by Mr. Brown and George Ratcliffe, of London, England, was designed by Martin Fischer, of Zurich, Switzerland. The Motor and Gear Improvement Company has undertaken its promotion in this country, and has it in an imported machine which is also built by Mr. Fischer. This particular engine has been put through some 11,000 miles of hard service and from this experience Messrs. Brown and Ratcliffe stated to the Detroit section of the society that they could give the information obtained by this actual road use of the engine, as well as results of a dynamometer test which was conducted on the Hudson Motor Car Company's testing block.

Want American Exhibits

Russian Show to Be Held in May—Big Field for Exporters—Military Trucks Needed

THE Emperor of Russia will inaugurate the International Automobile Exhibition at St. Petersburg on May , 1913. This project is organized by the Imperial Automobile Club of Russia under the patronage of the Czar and with the backing of the Imperial government. As an event of momentous national import it is being planned on a scale altogether unprecedented in that country.

The president of the Council of Ministers, Mr. Kokoftzeff, has assumed honorary presidency of the exhibition. It is the first exhibition of its kind in Russia to have enlisted direct support from the government authorities and the august patronage of the Czar of Russia.

It certainly is the first exhibition ever held in the Russian empire which avowedly aims to arouse popular interest in the American automobile industry and those allied therewith; in fact, where not only is there marked attention paid to prospective American exhibitors, but where American products are distinctly given official indorsement from the outset.

In his official invitation to the United States Department of State, George Backmeteff, the Russian Ambassador at Washington, expresses himself as follows:

"Considering the fact that the American type of the automobile is indicated for country use in Russia, adapting itself more than the machines of European construction to roads not macadamized, the Automobile Club of Russia is keenly interested in seeing the great American manufacturers of motors and automobiles exhibit their new models at St. Petersburg in the spring of 1913."

Addressing the automobile manufacturers at large Dr. W. Swetchine, aide-de-camp to the Emperor and vice-president of the I. A. C. of R., imparts the following interesting information about Russia:

"Russia was later than other countries to take up the automobile and it is only in the last few years that its use has become general. Our reliability trials of 1910, 1911 and 1912 for the Emperor's prize finally exploded the idea that the Russian roads are unsuitable for automobiles and showed that the country possesses a fine system of excellent highways. These trials also induced the rural population to take an interest in automobiling.

"We are convinced that the American cars should suit the Russian demand as there is a great similarity in the automobiling conditions of the two countries. Our vast grain-producing steppes, peopled with landowners and farmers, dependent altogether on horses for means of locomotion, should prove an excellent market for cars and especially for American cars, as in these districts it is noticed that the light and powerful American cars negotiate the sandy tracks quite satisfactorily when the heavier European car finds difficulty in getting through. Unfortunately, up to the present time, the Russian customer has had little opportunity of judging what a really good American car is as few American firms are represented here. We consider that this is the moment for the American automobile trade to take its just position in the Russian market and our exhibition offers them the means to do this quickly and conveniently. American exhibitors need not bother about the language question, as they will find numbers of Russians talking their language."

Perhaps one of the motives actuating the Russian authorities in evincing such marked and complimentary attention to prospective American exhibitors springs from their desire to dispel any erroneous impressions lodged in the mind of the average American about the alleged hostility of Russia towards this country on account of the abrogation of the treaty of 1831, which came as a result of the widespread agitation from anti-Russian sources. Some anxiety is entertained on this score by the promoters of the exhibition and should the American manufacturers decline to participate in this event it is reasonably certain that their motives will be misconstrued. This may prove disastrous for any prospects of a wholesale export of American cars to Russia.

There is no doubt, however, that the chief factor governing the attitude assumed by the Russians towards the American automobile manufacturer lies in the undoubted superiority of the American-made cars and particularly trucks over the European types, so far as Russian road conditions are concerned, which show a great similarity to those prevailing in this country. English, German, Belgian motors and cars have been developed along essentially different lines. They are a product of ideal road conditions. Some of the makes are superb specimens of engineering skill, but they are, none of them, calculated to withstand the wear and tear imposed by Russian country roads. European trucks are not especially adapted for interurban traffic because countries like England, Belgium and Germany are so

The Edwards-Knight Car

(*Continued from page* 1231.)

highest at X1 and lowest at X2. This arc Z is part of a circle described from the center K, which is the center of support of the forward end of the radius rod so that the line KX1 is a radius of this circle as also are the lines KX and KX2, making them all the same length so that there is not any equalizing of distance and consequently no sliding at the joints.

Further: The angle A1 in the rear joint equals the angle Y1 of the forward joint and similarly the angles A2 and Y2 are equal, a fact which explains the neutralizing of the acceleration and retardation of the joints twice in each revolution.

Radius rods have a ball-and-socket front-end support and ball rear-end support.

The torque rod, a tapered tubing, is doubly flexibly supported in front. Fig. 12 shows the ball-end stud carried in a cross-member of the frame and the similar end on the torque tube. The vertical tube containing them has four coil springs, one above and the other below, so that the utmost universal action is obtained. In action this torque member synchronizes with the propellershaft and radius rods in that the point M is midway between the front and rear universal joints, a fact which aids in preventing joint slippage.

The worm-driven rear axle is a Timken housing with a David Brown straight-type worm mounted underneath the bronze worm wheel. The axle housing is a standard type of Timken stamping with the differential expansion placed horizontally instead of vertically as in the bevel-driven axle. The wormshaft is carried fore and aft on special non-adjustable Timken rollers, their end-thrust merits eliminating other end-thrust bearings. The unit made up of the worm and wormwheel with differential is mounted in a steel casting hung in the under side of the axle stamping. There is a 4 to 1 reduction between worm and wheel. The axle is a floating type, and carries standard internal and external brakes.

The Lanchester rear springs, shown in Figs. 1 and 9, are inverted semi-elliptics supported in their center to the frame through a trunnion, shackled to the frame at their fronts, and carried underneath the axle at their rear, where they are not shackled but bear upon a roller, thus allowing for free back-and-forward motion. The spring is 54 inches long.

In the running gear the double-dropped frame gives a low body, the drop being 3 inches at the dash and 7 inches in advance of the axle. Tires are 36 by 4.5 inches all around.

thickly honeycombed by a network of railways as to obviate all necessity for truck-hauling of goods or passengers. They have never experienced any lack of railroad communication between any two points, wherever conditions would in the least warrant the construction of a railroad. Hence the use of the motor truck has been confined almost exclusively to city delivery service and the motor and truck manufacturing plants have been adapted for production along these lines.

Compared with the American machine, the average European car or truck is encumbered with too many parts and much too delicate adjustments of the same. They have been thoroughly tested in Russia and found unable to cope with the rough-and-ready service demanded of them.

The Russian military authorities are particularly interested in the American motor truck in view of the impending reorganization of the entire army transport service. The following is the list of special types of trucks in which the Russian military authorities are particularly interested:

Motor trucks fitted for carrying military stores, motor trucks fitted for transporting aeroplanes, motor trucks fitted for radio-telegraph stations, motor cars fitted with radiography stations, searchlight motor cars, field kitchen motor cars, freight wagons fitted for smithy and fitting workshop, tank motor trucks, motor cars with armored body for quick-firing guns, sanitary motor cars for carrying wounded and sick, motor cars fitted for being used as field surgical operation rooms, freight cars with appliances for receiving field stretchers with wounded, motor cars with an unarmored gun for firing at aerial craft, motor fore-carriages for fortress artillery, military telegraph motor cars, power plant cars, light motor cars for scouting and communication service, appliances for enabling motor cars to drive through moving sand, tractor cars, 70-80 horsepower, with three trailers for carrying 30.4 centimeter mortars, motor cars with 90 centimeter projectors, motor cars with cranes for lifting guns and various heavy loads when going up hill on steep slopes, and motor cars with radio-telegraph stations.

All the exhibits will be divided in twelve sections as follows:

Automobiles, complete, for sport, touring and city use; chassis for same. Only motor and chassis constructing firms will be admitted in this class, under obligation to exhibit but automobiles and chassis of their own manufacture, while the bodies need not necessarily be of their own construction.

Passenger-carrying parts of automobiles, car bodies and materials entering the construction of the same; tonneaus exhibited separately or mounted on chassis, without mention, however, of the chassis makers.

Exhibits bearing direct relation to military automobiling.

Automobiles for fire companies, ambulances and other specific purposes.

Motor trucks, vans and wagons for various industrial, commercial, public service and agricultural purposes; railroad cars and trains driven by combustion motors; auto buses and automobile sledges.

Combustion motors for automobiles and for industrial and agricultural purposes.

Motor cycles, bicycles; parts and accessories for the same.

Motor boats, parts and equipment for same; bodies, motors, propellers, etc.

Tires and rims for automobiles, motor cycles and bicycles; special tire-mounting contrivances, etc. Overhauling and repair outfits; detachable and demountable rims, etc.

Machinery, lathes and other plant for the equipment of automobile factories.

Automobile accessories, head and tail-lights, searchlights, sirens, horns, candles, carbureters, lubricating devices, motor trimmings, cocks and valves; automobile attire and objects of necessity or convenience for motorists, cyclists and tourists. Bibliography, photography, periodicals, drawings.

Fuel: benzine, gasoline, alcohol, crude oil, etc. Lubricants: oils, greases and mixtures. Illuminants for lamps and searchlights. Special tanking for oils, benzine, etc.

Street Cleaners Engineers

Paris Examination for Post on Motor Squad Severe—Automobile Racing for Christmas in Mexico

PARIS, Nov. 27—There is no room for green hands in the motor street sweeping service of the city of Paris. The government driving license, delivered after a practical examination, is the least important of the requirements, for while it is considered necessary that the operator should be able to drive, mechanical skill is considered of still greater importance. In order to be admitted to the ranks of the motor street sweepers all applicants must successfully pass the following tests: Forge a small part according to drawing supplied; solder; adjust and assemble various forged parts; bearings, pulleys, flywheels, crankshafts, transmissions, gearsets, ball bearings, etc.; case hardening, brazing, soldering, the making of pipe joints for automobiles. Complete dismounting of a gasoline motor, assembling same and tuning up; fitting various kinds of lubricators, also cooling systems by pump and thermo-syphon and with and without fan; fitting and regulating a carbureter for gasoline or benzol; fitting and regulating an ignition system by magneto or storage batteries; fitting and regulating a clutch; change certain parts in a gearset and a differential; assemble and regulate brakes and steering gear. Finally, the candidates must find the causes of a breakdown in a motor and remedy them and also show their ability to verify the condition of a machine before taking it out.

Arrangements have been made by the Paris municipality for the gradual displacement of all horse-drawn vehicles for street sweeping and watering.

Mexicans Prepare for Xmas Race

CITY OF MEXICO, MEXICO, Dec. 7—The automobile devotees in this city, as well as in other parts of Mexico, are much interested in the City of Mexico-Pueblo road race that is to be run on Christmas day. This will be the fourth annual running of this race and the event is arousing more interest this year than ever before. The race will be from this city to Pueblo and return. The committee in charge of the event has decided not to divide the race into a contest beginning one day and finishing the next, but the round trip of the racing cars will be made in a single day.

Prospects are bright for a larger entry list than ever before and it is believed that every prominent car in the country will be represented.

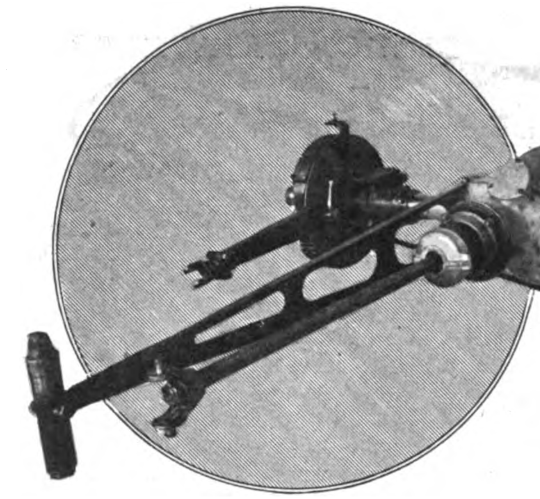
The cars will be divided into three classes, the same as last year, the most powerful cars running in class A, which is for automobiles of over 350 cubic inches cylinder capacity. Class B for cars of between 230 and 350 cubic inches cylinder capacity and the small class C, for cars of less than 230 cubic inches cylinder capacity.

The automobiles in class C will run only as far as Calpulalpam and return, thus making the round trip for this class 160 kilometers, as compared with 320 kilometers for classes A and B. Class C cars will be the last to leave Mexico and the first to return. From the time the last car leaves in the morning until the first returns in the afternoon there will be an interval of, probably, not more than 3 hours.

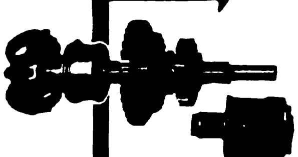
The position of the cars will be published at intervals on a bulletin board in front of the grandstand, at San Lazaro, so that the public can follow the progress of the race from start to finish.

The race is being arranged under the auspices of *El Automovil en Mexico* and *El Imparcial*.

Locomobile Little Six Introduced for 1913



Mounting of torque rod and rear axle



Part view of Locomobile gearset

ELEMENTAL design has undergone little change in the Locomobile line for 1913, but many minor refinements and changes in dimensions have been made. Of chief interest, however, is the little six, introduced for this season. It has been designed to meet the demand for six-cylinder cars of moderate cylinder dimensions. Besides the small six there is a larger six-cylinder car and a four-cylinder. The maker's horsepower ratings in all these models, which are known as the M, R and L respectively, are far below the horsepowers actually developed. In order to show the performances a horsepower and torque curve plotted on a basis of revolutions per minute is given in Fig. 6. The ratings of the models M, R and L are given in the table below. The bore and stroke are also given and it will be noted that the six-cylinder motors have all a larger stroke-bore ratio than has the four-cylinder motor. The dimensions are:

Model	Cylinders	Bore	Stroke	Rated H.P.
R	6	4.50 inches	5.5 inches	48
M	6	4.25 "	5.0 "	38
L	4	4.50 "	4.5 "	30

The principal changes to be noted are in the motor dimensions on the larger six-cylinder car. The stroke has been increased to 5.5 inches and this has, of course, necessitated changes in the connecting rod and cylinder lengths. An increase in the horsepower of the motor has been the effect of this change, the motor showing 82 horsepower at 1,800 revolutions per minute. The horsepower and torque curves are given in Fig. 6 and show the performance. Other changes which may be remarked are the increased valve sizes, changes in the form of the inlet and exhaust passages and a new design of Locomobile carbureter. The latter differs from the former Locomobile product by its longer throat and the use of both hot-air and hot-water jackets. A six magnet magneto takes the place of the former type while refinements in the oiling system of the 1913 cars consist of a shift of the oiling pump drive from the exhaust to the inlet side of the motor. The oil-level pet cock has been placed on the left side of the reservoir in the motor base. A new type of main bearing oil lead has been fitted to give an increased flow of the lubricant and also to give a more direct flow. Changes in the cooling system consist in the enlargement of the radiator and pump as well as the waterjackets. The installation of the generator for the electric lighting system has necessitated a change in the water inlet manifold. Increases in the size of parts in the transmission units have been necessitated by the larger power which they are compelled to carry. Tires are now carried at the rear on brackets which are a unit with the frame of the car and the running boards have been left clear to give a clean appearance. A motor tire pump forms part of the 1913 equipment.

As the practice is the same in the design and construction of both sixes, a description of the larger will cover the general design. The exterior appearance of the motor is shown in Figs. 1 and 2, giving the left and right sides respectively. It will be noted that the cylinders are cast in pairs and are mounted with a space between, giving a hint of large bearing space. In the sectional views given in Fig. 4, an idea of the transverse and longitudinal arrangements may be gained. It will be seen that the cylinders are T-shaped castings. They are composed of the standard grey cylinder iron and have the side waterjackets integral and the upper part separate. The 5 1-2 inch long pistons are also composed of grey iron and are fitted with five rings, four of which are located above the wristpin. A ring which serves as an oil distributer is at the bottom. The wristpins are located at the centers of the pistons and are held in place by two studs which are locked by a wire passing across their inner extremities. The material in the wristpin is chrome nickel steel case-hardened and fitted with a bronze bushing for the upper connecting-rod bearing. The diameter of the wristpin is 7-8 inch on the large six, which may be taken as a standard to show the proportions which exist throughout Locomobile design and which car is specifically described in the following.

The connecting-rods are 11 7-8 inches in length and are composed of chrome-nickel steel. The big end bearings on the big six are 2 1-4 inches in length and on the little six are 2 inches. The seven-bearing crankshafts have large bearings between the cylinder blocks and smaller bearings between cylinders forming part of the same casting. The smaller main bearings on the big

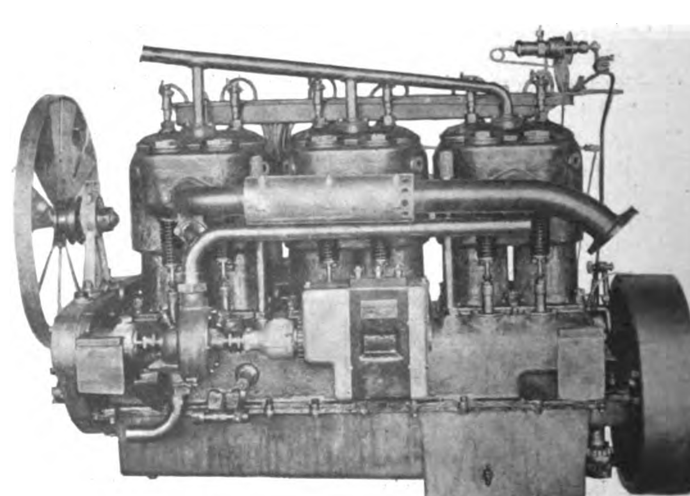


Fig. 1—Left side of model R Locomobile motor

six are 1 7-8 inches and those between blocks are 2 1-2 inches. The crankshaft is made of chrome nickel steel and being supported on the seven bearings lined with Parsons white metal bushings gives a stiff and lasting installation.

The valve action is clearly illustrated in Fig. 4. As will be noted, the cams act directly upon the roller followers giving a minimum of linkage with silent and quick action. The tappet guides are lengthened out to prevent a troublesome leakage of oil around this part of the motor. No covers are placed over the valve action, silence being secured by a close adjustment between the tappet and valve stem. A cold clearance of .003 inch is allowed at this point. The cams are cut integrally with the camshaft and hence have no tendency to become loose. The camshaft is driven through the spiral timing set. The Locomobile company has gone over to the spiral gear and has secured silence by eliminating back lash. The limit to which each gear is finished is within .00025 inch, and noise from this quarter is eliminated. The pitch of the gears in the model M is 11 and in the model R 12.

The cooling circulation is attended to by a centrifugal pump located on the right side of the motor. It is shown in Fig. 1, near the forward end of the motor and is operated off the same shaft as the generator. As may be seen from this view the water intake manifold has been lifted above the generator and runs back just below the exhaust pipe. Cooling is further aided by a six-plated aluminum fan mounted on a bracket fixed to the timing gear case. The radiator is of the cellular type and as has been stated, is made larger for this season.

The ignition system is by the high-tension dual consisting of magneto, storage batteries, and coil. The storage battery is used independently for ignition, and consists of three cells providing a current of 6 volts. This same system is used on all three models and is independent of the lighting and starting. The remainder of the electrical equipment is used for the lighting system. It consists of the Adlake dynamo battery and regulator. The dynamo operates when the motor has reached a certain speed and supplies the current for the lights at that time. The battery takes care of the lights while the dynamo is not in operation. The regulator maintains a constant voltage and protects the lights and filaments. This system is protected from the effects of overload by a fuse system so arranged that they may be easily reached on the removal of a cover plate. The electric horn is also protected by a 10-ampere fuse.

Among the innovations for the season of 1913 is the carbureter used on the little and big six-cylinder cars. This carbureter is of the eccentric float type and is heated by either hot air or hot water. The air valve of this carbureter is distinctive. It is provided with two springs, the smaller and stiffer of which operates only at comparatively only high engine speeds. At lower speed the amount of opening is controlled by the larger and weaker spring.

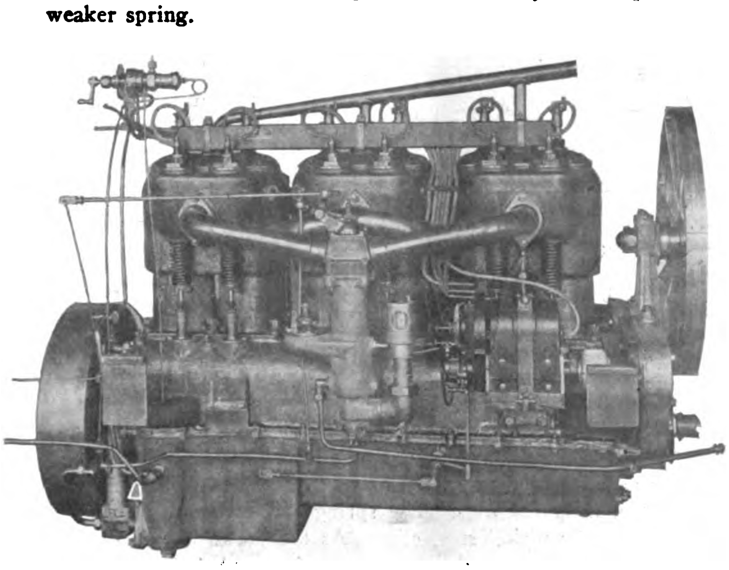


Fig. 2—Right side of model R Locomobile motor

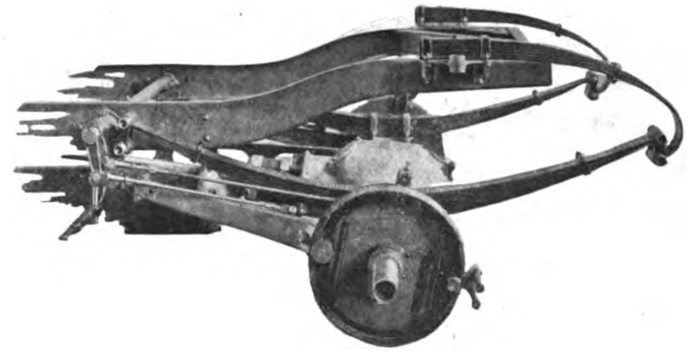


Fig. 3—Locomobile suspension and brake assembly

Oiling is accomplished by combination of the force-feed and splash systems. The crankcase is made in two parts, the lower forming the oil reservoir and containing the troughs necessary to the splash, and the upper which is composed of manganese bronze, carrying and supporting crankshaft and camshaft bearings. The oil capacities for the models M, R, and L are 2.25, 3.5 and 2.5 gallons respectively. The main reservoir on the 38 and 48 horsepower motors is carried at the rear of the crankcase casting. Fom here it is lifted by the gear pump driven off the inlet camshaft to a series of leads through the bronze part of the crankcase to each main bearing. The leads are cored through the centers of the web or bridge carrying the main crankshaft bearing. A hole drilled in the main bearing bushing registers during a portion of each revolution with the opening at the end of the oil lead. During this time oil is forced under the pressure of the pump, against the centrifugal force at this point, and is forced to enter the drilled crankshaft. Following the drilled duct through the crankshaft the oil is led to the lower connecting rod bearings and supplies these copiously with lubricant. Excess oil drains to the splash troughs, located below each cylinder and keeps these constantly filled. A test made on the oil pump used in the Model M car is shown in Fig. 7. As will be noted the output between 100 and 1,000 revolutions per minute increases directly as the speed of rotation. The output of the pump is such that it will at all times furnish a greater supply of oil than is needed, so that there will be an overflow from the splash troughs back to the reservoir in the crankcase. The course of this overflow may be noted in the longitudinal section given in Fig. 4. In order to prevent any bad effects which might occur from recirculating the oil, wire gauze screens are placed between the reservoir and the circulating pump.

The starting system is the Disco acetylene. The acetylene tank which is carried for use with this starter has no other purpose, as all the lighting throughout the car is taken care of by electricity.

Forty-three hardened saw steel disks are used in the clutch, which is of the conventional multiple-disk type housed within the flywheel. The clutch on the four-cylinder model is a leather-faced cone. The multiple disks on the two six-cylinder cars run in a bath of engine oil and kerosene in equal parts. The clutch disk retainer, or in other words the driven member of the clutch is supported upon a double row of ball bearings at the motor end and upon a single large ball bearing at the other end. A feature of the clutch which is worthy of comment is the fact that it can be removed from the car without interfering with any other member and any repairs necessary can be made in a correspondingly short time and hence with less expense.

Between the clutch and the gearset is a universal joint. The gearset which is standard for the Locomobile line has four forward speeds and reverse. The backlash on these gears is limited to .001 inch and the grinding work is done to limits of .00025. This gives a silent and long wearing gear. Ball bearings are used throughout and the lubricant to be used is a light gear compound. The capacity of the gearset is 20 1-2 pounds of grease.

A chrome nickel steel propeller shaft transmits the power to the rear axle. At each end there is a universal joint. The shaft is not enclosed in a torque tube but there is a deep strut as shown

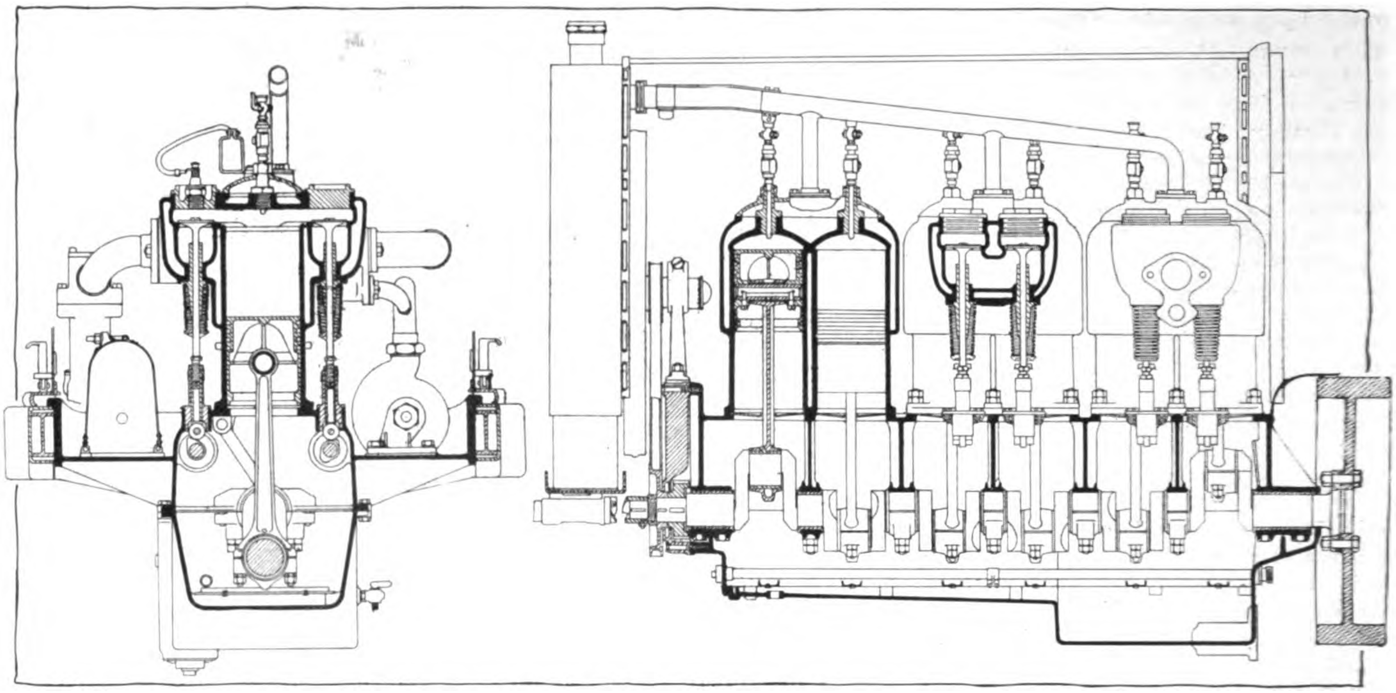


Fig. 4—Transverse and longitudinal cross-sections of model M Locomobile motors, showing details of construction

at the head of this description, which is bolted rigidly to the rear axle and flexibly to a cross member of the frame. This torque member tapers from its rear connection to the forward point of suspension giving it a triangular shape. To lighten it without materially cutting down its strength or rigidity the web of the channel is left open as shown in the illustration. The material of which this member is composed is pressed steel. Two radius rods take up the drive allowing the rear springs to be free as far as the drive is concerned and leaving their only duty the easing of the suspension of the car. The radius rods are steel castings and are bracketed to the frame.

The rear axle is bevel driven. Both the pinion and the gear are adjustable and changes can readily be made in the mesh of these two gears. Fig. 8 shows the rear axle housing with the cover plate removed allowing of an inspection of the gears. A smaller cover plate over the differential housing allows of a view of the pinion and large bevel gear. The adjustments on the pinion can be made through this opening while the adjustments on the bevel gear can be made through the opening left by the removal of the rear cover plate. The rear axle is built up of tubes which are forced into place under 9 tons hydraulic pressure. In addition to this the tubes are riveted. These tubes carry the load of the car as the axle is of the floating type.

Both sets of brakes are carried on the rear wheels. All the braking stress is taken through the radius rods, none of it is felt by the torque rod or springs. The dimensions of the brakes are 14 inches diameter and 2 inches face for the expanding and 14 7-16 inches diameter and 3 inches face for the contracting. Both sets of brakes are lined with asbestos fabric. The brake adjustments are made by right and left threaded nuts on the emergency brake and by wing nuts on the service brakes. A view of the brakes, radius rod and spring suspension is given in Fig. 3. An equalizing bar is placed across the frame.

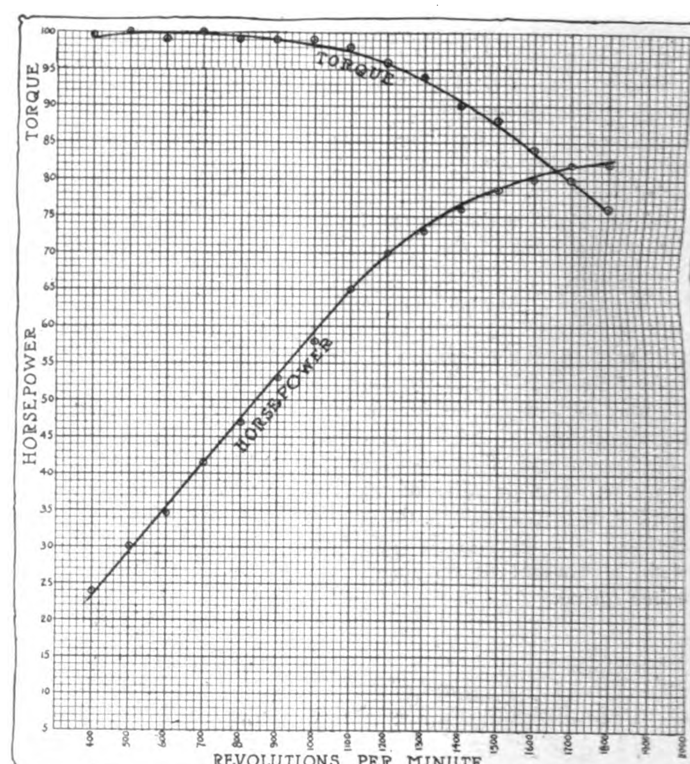


Fig. 6—Horsepower and torque curve of model R motor

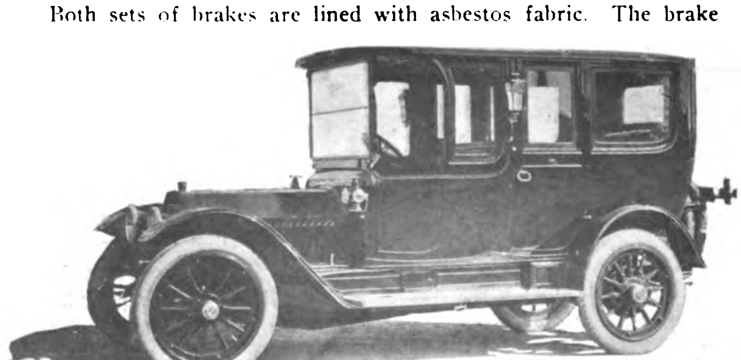


Fig. 5—Six-cylinder Locomobile with limousine body

Semi-elliptic springs are used in front and three-quarter elliptic in the rear. The method of mounting these is shown in Fig. 3. There are ten leaves in the rear springs while for the heavier bodies such as the limousine, the number of leaves is increased. The spring clips used to fix the rear springs to the rear axle are nickel steel drop forgings. The spring connection at the front is also made by nickel steel clips. As the front axle is driven through the spring they are made extra heavy and the heads of the clip bolts are also upset so as to preclude the possibility of losing one of the clips. The front axle is of I-beam section, with a drop at the center. The spring pads are integral with the upper flange. This axle is drop-forged from a one-piece nickel steel bar. A heavy dowel pin passes through the center of the spring and into the front axle to stiffen the construction against side motion. Tensile strength of front axle is 87,000 pounds.

The frame is a pressed steel channel bar, 4.5 inches in depth and with a flange ranging between 1.5 and 3 inches in width. The entire bar is pressed from 3-16 inch stock.

Twelve-spoke wood artillery wheels are used throughout. These wheels are all fitted with quick detachable demountable rims. The tire sizes differ for front and rear on the big six and for the three models are as follows:

Model	Front	Rear
M	36x4.5 inches	37x5 inches
R	36x4.5 "	36x4.5 "
L	34x4.5 "	34x4.5 "

Timken roller bearings are used for the front wheels. Roller bearings are also used on the steering gear which is of the worm and full gear type. The worm and gear are so arranged that six adjustments for wear are possible by removing the steering lever and turning a hexagonal nut. This brings a new portion of the gear in mesh with the worm and takes up the lost motion which occurs after a long period of use. Both the worm and the gear are case-hardened and if properly lubricated should not require adjustment for a long time. The roller bearings upon which the steering mechanism is carried are adjustable and wear is not likely to occur at that point.

A refinement incorporated on the 1913 Locomobiles is the cast aluminum cowl which is made a unit with the dash by bolting it

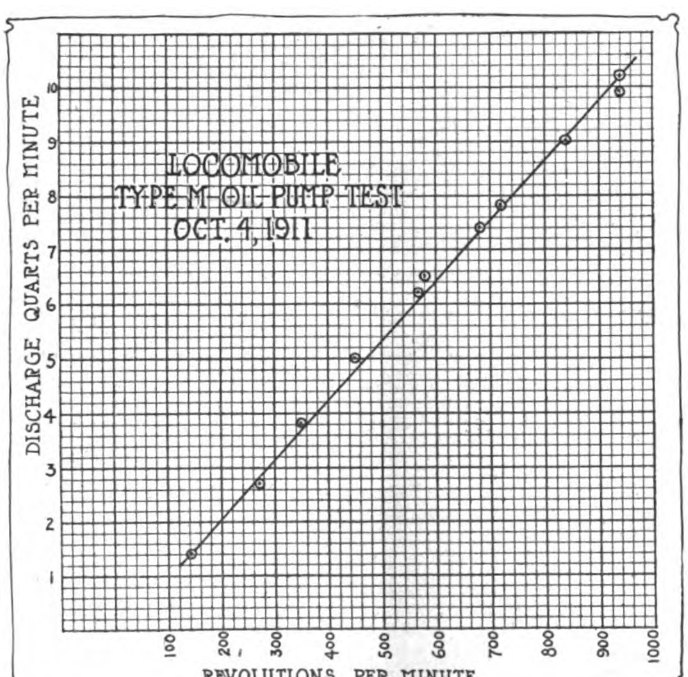


Fig. 7—Curve showing test results of model M oil pump

to the body sills. This silences body squeaks between the cowl and the dash.

Between the body and the frame is a layer of woven cotton belting material while the doors close against rubber blocks which silence their action and eliminate rattles. The drop-forged rear tire brackets are made a unit with the frame of the car so that there is a great amount of extra strength in these parts and they are not apt to shake loose. A refinement which may be mentioned is that the exhaust is carried out behind the car and is not allowed to escape beneath it. The muffler is very silent and is made up of a series of concentric perforated tubes, the perforations are at opposite ends of the tubes.

The 1913 cars are equipped with a single cylinder air com-

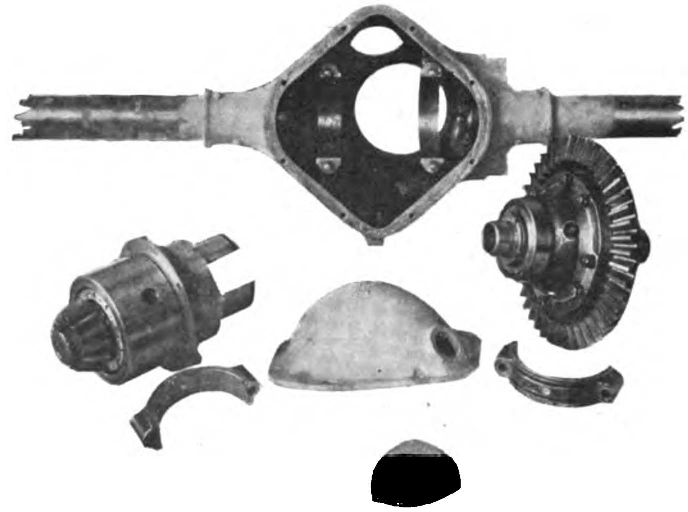


Fig. 8—Locomobile rear axle unit disassembled in parts

pressor, having a bore of 2.5 inches, and a stroke of 2.5 inches. It is mounted on an extension of the front end of the transmission counter shaft, and driven by means of jaw clutches, which can be thrown in and out of engagement by a T-handle located on the left side of the car, and reached by opening a door in the running-board side shield. By drawing handle outward about 3-16 of an inch, advancing one notch to the left in a serrated segment and releasing jaw, clutches are interlocked, and pump is ready for use.

Air is drawn into cylinder through holes drilled around same below radiating fins. Foreign matter is excluded by means of a removable screen. On the upper stroke of the piston the air is forced out of the cylinder by unseating a flat valve into a small tank placed at the right of the air compressor, and mounted in front of the transmission carrying channel. The purpose of this tank is to overcome the pulsation of the pump only, and not to act as a reservoir.

By means of a two-way fitting, air is drawn out of the tank through a delivery tube leading to a fitting which projects through the left side member of the frame adjacent to the T-handle mentioned above. One end of the tire hose is screwed on to this fitting when tires are to be inflated. The location of the two-way fitting on the tank is such that any sediment or oil falls to the bottom of the tank, and is not drawn out through the delivery tube. With the motor running at normal speed the air compressor will inflate a 37 by 5 inch tire to 90 pounds pressure in about two minutes.

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THE MOST EFFICIENT rubber tire is naturally the tire that will roll along and offer the least resistance to rolling. In rolling over the relatively hard road surfaces the softness of the rubber allows it to spread, giving more surface in contact with the road; as against this the steel tire retains its shape, making an indentation in the road as it rolls along. As the composition of the road is not as efficient a spring as the rubber tire, the road resistance is naturally higher.

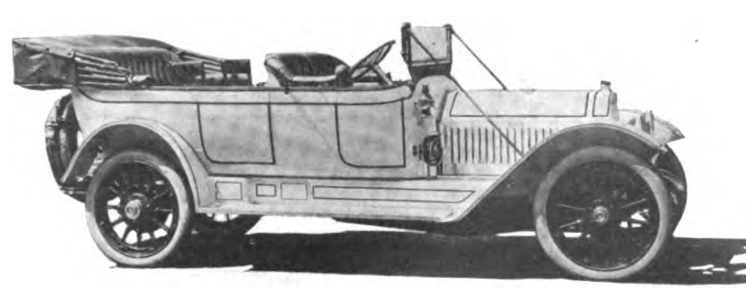
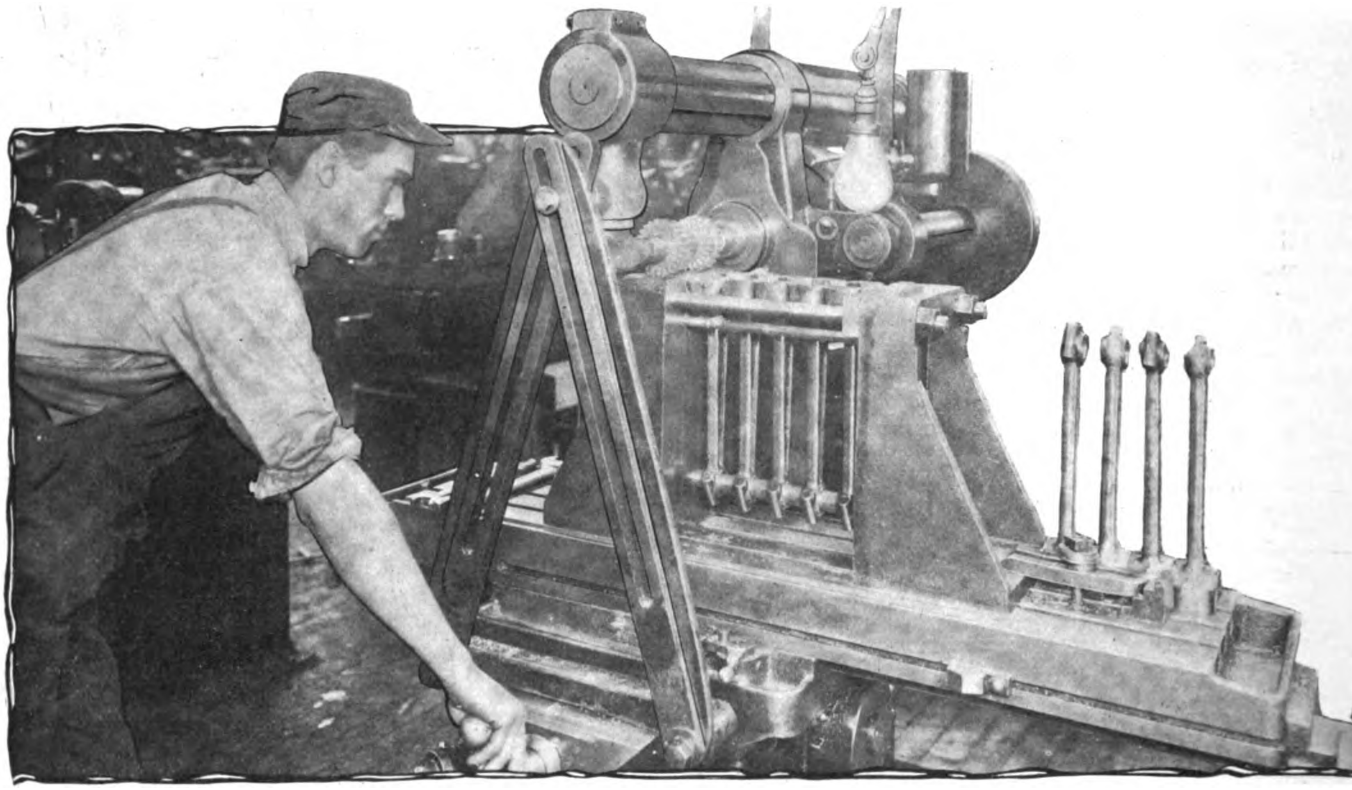


Fig. 9—Seven-passenger touring body on 1913 Locomobile



Gang milling machine for milling connecting-rods in use at the factory of the White Company, Cleveland, O.

AT the White factory the connecting-rods are turned out in quantities. That is to say, production in quantity is possible with quality. This is accomplished by the use of machines which do several things at a time. They are called gang machines because the tools are grouped together in the same manner as a gang of men. In the above illustration one of the gang milling machines is shown at work. It is milling the big ends of five connecting-rods. It is doing this work in the space of time generally required to do two. It is saving the White company time and therefore money and is one of the instruments that enables the concern to put a low price on a high quality product. It is in machines of this kind that quantity production is given its true value. One man takes care of this machine. While it is doing the milling work on one set of five rods the workman is setting up the next set. It takes a half hour to finish a set of five and the machine can work steadily all day turning out in the neighborhood of a hundred in a working day. Naturally, such a machine as this, though expensive, pays for itself in a short time.

ATWATER-KENT Adds Equipment—The Atwater-Kent Manufacturing Company, Wayne Junction, Pa., has recently installed a considerable amount of new machinery to take care of the machine work on the new model K Unisparker. The added equipment will increase the capacity of the plant to a marked degree.

Briggs-Detroiter Adds—The Briggs-Detroiter Company, Detroit, Mich., has acquired a tract of 3 acres adjoining its plant, to provide for future extensions.

Maritime Plant Nearly Completed—The Maritime Motor Car Company has its factory at Coldbrook, N. B., far advanced toward completion.

Willard's Four Plants—The Willard Storage Battery Company, Cleveland, O., has added to its plant, No. 1, three more buildings, affording 50,000 square feet of additional manufacturing space.

Interstate Tire Leases Land—The Interstate Automobile Tire & Rubber Company, Atlanta, Ga., has leased 33 acres and four buildings and will manufacture rubber tires and automobile accessories.

Precision Die-Casting Moves—The Precision Die-Casting Company, Syracuse, N. Y., has moved into its new office and plant which was formerly the factory of the E. C. Stearns Manufacturing Company.

Premier's Additions—The Premier Motor Manufacturing Company, Indianapolis, Ind., will build two additions to its plant. The new structures will be two stories high, one 40 feet by 140 feet, the other 48 feet by 140 feet.

Morris Purchases Factory—A. W. Morris, Philadelphia, Pa., has incorporated under the name of the Morris Manufacturing Company, and has negotiated for the purchase of the Wetherill Finished Casting Company's factory.

Firestone's New Building—The Firestone Tire 7 Rubber Company, Buffalo, N. Y., will erect a new four-story and basement building containing 30,000 square feet of space, which will be ready for occupancy about January 1, 1913.

Paige Building—The Paige Auto Hoist Company, Grand Rapids, Mich., will build a factory on a site recently purchased in that city. The company will manufacture a device for lifting the weight of an automobile from its tires when the car is not in use.

Will Increase Plant—Building plants and operations are under way at the Baker Motor Vehicle Company, Cleveland, O., which will increase the size of the factory by about 30 per cent. The first of the new buildings will be occupied by the truck department.

Kline Plant Opened—The Kline Motor Car Company recently opened its Richmond, Va., plant. It will give employment to approximately 750 skilled workmen, and will have a capacity of 2,000 machines a year. The new plant was built at a cost of $100,000.

Fiat Head Inspects Factory—Chevalier Giovanni Agnelli recently arrived on the Mauretania on an inspection trip to the Fiat factory at Poughkeepsie, N. Y. He will be accompanied by E. R. Hollander, president of the Fiat Motor Sales Company, New York City.

Federal Arranging New Plant—The Federal Motors Company, Indianapolis, Ind., is making arrangements to erect a new plant, which will consist of a one-story building, costing approximately $150,000, exclusive of machinery. The structure is to be of brick and steel.

Brockway Building—The Brockway Motor Company, Cortland, N. Y., is taking bids for the construction of a manufacturing plant 40 feet by 268 feet, one story, of concrete block construction. A considerable amount of machinery equipment will be installed.

Students Inspect Rambler Factory—Fifty students of the senior class of engineering from the University of Wisconsin visited the Rambler factory, Kenosha, Wis., recently and made a close inspection of the unit gasoline and electric motor with which the 1913 Rambler is equipped.

Hudson Adds Space—Hard on the heels of the recent announcement that the Hudson Motor Car Company, Detroit, Mich., was to erect a large new factory building, comes the news of still another. A second addition to the plant is to be built, which will result in the doubling of the factory in a year.

Everitt's Branch Factory—A branch factory of the Everitt Motor Company, Detroit, Mich., will be established at Windsor, Ont. The plant will be erected by the Tudhope Automobile Manufacturing Company. It will cost $100,000 and will occupy a 10-acre site. Building operations will commence in April of next year.

Palmer-Moore Buys—The large plant owned by the Syracuse Stove Company, Syracuse, N. Y., has been sold to the Palmer-Moore Company, that city, which will manufacture motor trucks. A 1,500-pound delivery wagon will be manufactured. According to the company's plans, there will be 150 hands employed and 200 trucks will be put out the first six months of 1913.

Packard Enlarges—To expedite the manufacture of the 38 and future models, the Packard plant, Detroit, Mich., already comprising 37 acres of floor-space, is being enlarged. Three buildings, constructed entirely of glass, concrete and steel, have been erected to conform to the Packard factory's system of shop units. The additions are practically complete and will be ready for occupancy by January 1.

Palmer's Ecorse Factory—The Palmer Motor Car Company will occupy the large automobile plant being constructed at Ecorse, Mich. It is expected that manufacturing in the new plant will be started about the first of the year. A large force of workmen is pushing the construction on as rapidly as possible. The new plant has a frontage of 358 feet on the main lines of all the railroads entering Detroit from the south.

Tire Plant Enlarged—The Goodyear Tire & Rubber Company, Akron, O., is adding three buildings. The company has acquired the entire property of the Akron branch of the Great Western Cereal Company. When the additions are entirely completed, the company will have a capacity of 8,000 tires a day. The three latest additions will aggregate 335,300 square feet of floor-space. This brings the total up to 1,935,300 square feet.

Shows, Conventions, Etc.

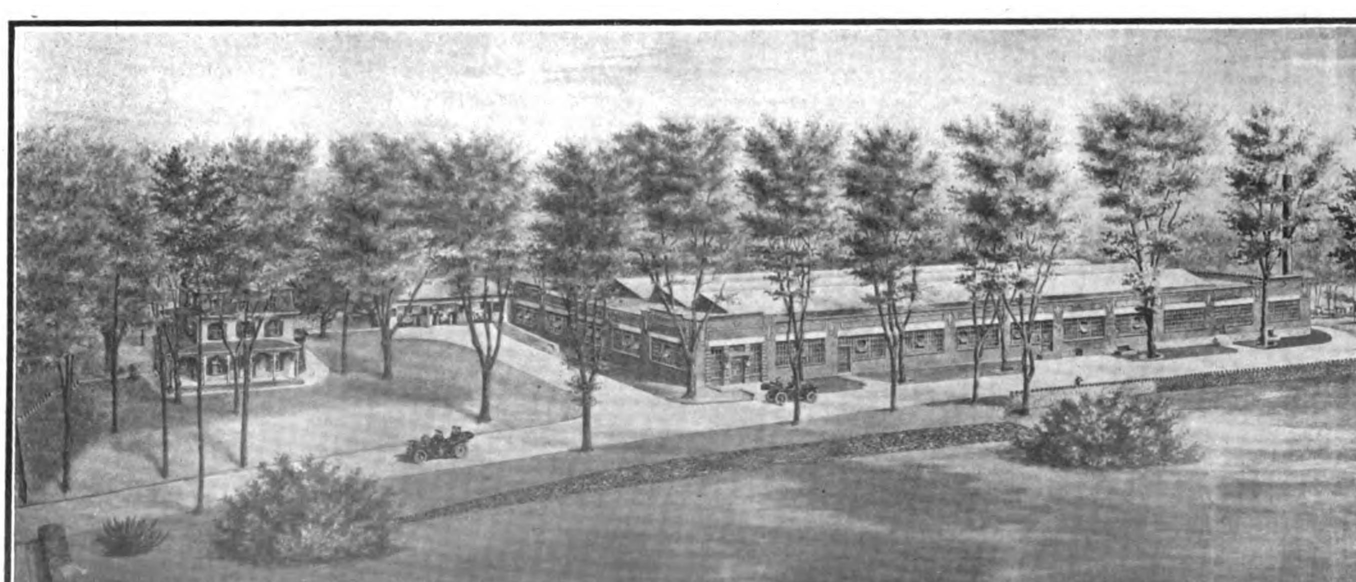
Jan. 2-10..........New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 4-11..........Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-18..........Milwaukee, Wis., Annual Show, Auditorium, Milwaukee Automobile Dealers' Association.
Jan. 11-25..........New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 18-25..........Philadelphia, Pa., Annual Automobile Show.
Jan. 21-26..........Toledo, O., Annual Show, Exposition Building, Toledo Automobile Shows Company.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Philadelphia, Pa., Truck Show.
Jan. 27-Feb. 1.....Buffalo, N. Y., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1.....Ottawa, Ont., Ottawa Motor Show, Howick Hall, Louis Blumenstein.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8..........Chicago, Ill., Annual Automobile Show.
Feb. 10-15..........Chicago, Ill., Truck Show.
Feb. 10-15..........Minneapolis, Minn., Annual Automobile Show.
Feb. 12-15..........Geneva, N. Y., Automobile Show, Armory, Louis Blumenstein.
Feb. 15-22..........Newark, N. J., Annual Automobile Show, First Regiment Armory, New Jersey Automobile Exhibition Company.
Feb. 17-22..........Kansas City, Kan., Annual Automobile Show.
Feb. 18-22..........Baltimore, Md., Annual Show, B. A. D. A.
Feb. 19-22..........Bloomington, Ill., Annual Show, Coliseum, McLean County Automobile Club.
Feb. 20-22..........Canandaigua, N. Y., Automobile Show, Louis Blumenstein.
Feb. 22-Mar. 1.....Brooklyn, N. Y., Annual Show, 23rd Regiment Armory
Feb. 24-27..........Kansas City, Mo., Truck Show.
Feb. 24-Mar. 1.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1.....Paterson, N. J., Annual Show, Paterson Automobile Trade Association.
Feb. 26-Mar. 1.....Glen Falls, N. Y., Automobile Show, Louis Blumenstein, Manager.
March 3-8..........Pittsburgh, Pa., Annual Automobile Show.
March 3-14..........Des Moines, Ia., Annual Show, Coliseum.
March 8-15..........Boston, Mass., Annual Automobile Show.
March 12-15..........Ogdensburg, N. Y., Automobile Show, Louis Blumenstein, Manager.
March 18..........Syracuse, N. Y., Annual Show, Syracuse A. A.
March 19-26..........Boston, Mass., Annual Truck Show.
March 20-24..........New Orleans, La., Annual Show, N. O. A. D. A.
March 24-29..........Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

May 30..........Indianapolis, Ind., 500-Mile Race, Speedway.

Foreign

Dec. 7-22..........Paris, France, Paris Automobile Show, Grand Palais.
Jan. 11-22..........Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.
March ....France, Sealed-Bonnet 3000-Mile Run.



Factory of the Atwater-Kent Manufacturing Company, Wayne Junction, Pa. Mr. Atwater-Kent's house and garage at the left

Gathering of the American Automobile Association at its annual Banquet during the recent session of the organization in Chicago

WANT Automobile Laws Amended—A delegation representing different automobile clubs in Canada waited on the provincial treasurer recently in Quebec, Que., asking for certain amendments in the law governing automobiles. Among the important amendments asked is the increase of the speed limit to 15 miles in the cities and to 20 in the country. It is also asked that the distance for judging the speed of an automobile should not be less than .125 mile in cities and .5 mile in the country.

National Hartford Equipped—The National car is now being equipped with Truffault-Hartford shock absorbers.

Berry Apointed Manager—The H. W. Johns-Manville Company, New York, has appointed C. S. Berry manager of its Atlanta, Ga., office.

Overland Branches Established—The Overland Automobile Company, Phoenix, Ariz., has opened branches in Tucson, Yuma and Kingman, that state.

Grant Leaves Racing Game—Harry Grant has joined the staff of the Jackson's Boston, Mass., branch. Mr. Grant says he has left the racing game.

Holley at Foreign Shows—Holley Brothers Company, Detroit, Mich, manufacturer of the Holley carbureter, will exhibit at the Olympia and Paris shows.

Grossman Sails—Emil Grossman has sailed for Europe to attend the automobile Salon at Paris, and the Olympia Show at London. He will return in time for the Madison Square Garden Show.

Holley Coventry Branch—Holley Brothers Company, Detroit, Mich., manufacturers of the Holley carbureter, has established a branch in England at 46 Northumberland Road, Coventry.

Duncan with U. S. Motors—Announcement is made of the appointment of Henry M. Duncan as supervisor of the eastern district of the United States Motor Company in place of W. F. Smith, resigned.

Mesker Resigns—L. H. Mesker, manager of the St. Louis, Mo., branch of Manning, Maxwell & Moore, Inc., has resigned his position to be connected after January 1 with the Ferro Machine & Foundry Company, Cleveland, O.

Montreal's Show—Two hundred and fifty automobiles, 210 of the pleasure type and 40 trucks, will be on exhibition at the coming annual automobile show, to be held under the auspices of the Automobile Club of Canada, Montreal, Que.

Matheson Branch Closes—The Matheson Automobile Company has closed its branch in Boston, Mass., after an existence of about one year. The branch was taken over from an agency conducted by Roy Faye, who had the car for some years.

Minneapolis Club Elects—The annual election of the Minneapolis, Minn., club officers was held recently, the following officers being elected: President, H. J. Clark; vice-presidents, W. P. Devereux and T. N. Kenyon; secretary, G. Roy Hill; treasurer, J. H. Prior.

Canadian Good Roads Movement—The work of raising $100,000 to build a tourist road between Ottawa, Ont., and Prescott, will be commenced at once, according to a decision reached at a recent general meeting of the Ottawa Valley Motor Car Association.

By Way of Correction—In the November 14, 1912, issue of THE AUTOMOBILE, under the heading New Agencies Established During the Week, the address of Brownell & Burt, handling the Federal truck, should have been given as Taunton, Mass., and that of H. Baxter, also Federal truck agents, as Springfield, Mass.

Marmon Reaches Los Angeles—The Marmon hundred century car reached Los Angeles, Cal., recently. The car, because of its schedule to cover 10,000 miles in 100 running days, was slightly ahead of its schedule when it reached Los Angeles, having covered the 2,828 miles in 27 days. The return trip to Indianapolis, Ind., will be begun next spring.

Cuyahoga County Leads—The annual report of Registrar J. A. Shearer of the State Automobile Department, Ohio, on the number of chauffeurs in that state, shows some interesting figures. Cuyahoga County leads with 1,770, while Hamilton is second with 1,322 and Franklin third with 772. Vinton is the only county appearing without a licensed chauffeur.

Marker's Road Plans—State Highway Commissioner J. M. Marker, Ohio, has made his plans known in reference to road building in Ohio for 1913. He will request that the legislature appropriate $1,700,000, which would give every one of the 88 counties in the state $20,000 each. He will ask the legislature to provide for a one-half mill levy on good roads construction during 1914.

New Agencies Established During the Week

COMMERCIAL VEHICLES

Place	Car	Agent
Albany, N. Y.	Stewart	Dominant Motor Car Co.
Ankeny, Ia.	Empire	Blewett Auto Co.
Arapahoe, Neb.	Cartercar	C. W. Gearhart
Archer, Neb.	Nyberg	W. T. Grace
Auburn, Neb.	Little	Workman & Rozean
Auburn, Neb.	Reo	Workman & Rozean
Avoca, Ia.	Little Four	Nort & Derby
Ashton, Ia.	Empire	Yappen & Son
Baltimore, Md.	Metz	International Mfg. Co.
Belleville, Ill.	Empire	G. W. Sahlender
Blairsville, Pa.	Lozier	Blairsville Auto Co.
Boone, Ia.	Empire	Boone Auto Co.
Boston, Mass.	Stewart	C. B. Johnson Co.
Boston, Mass.	Stewart	C. B. Johnston & Co.
Boston, Mass.	Flanders	C. A. Malley
Boonville, Ind.	Empire	Boonville Auto Co.
Braddock, Pa.	Empire	C. R. Baldrige
Bristow, Ia.	Empire	Bristow Automobile Co.
Cambridge, Mass.	Empire	John J. Gibson Co.
Buffalo, N. Y.	Atterbury	Blake Auto Co.
Cheyenne, Wyo.	Cole	Boyle & Joffee
Chicago, Ill.	Stewart	Voltz Bros.
Chicago, Ill.	Empire	Ralph Temple Auto Co.
Cleveland, O.	Empire	C. J. Reeve
Cleveland, O.	Moon	The Brandt Motor Car Co.
Cleveland, O.	Empire	C. J. Reeve
Calgary, Alta.	Cole	Central Garage & Machine Shop
Columbia, Mo.	Cole	Columbia Automobile Co.
Columbia, S. C.	Lozier	Philip D. Kohn
Columbus, O.	Empire	S. W. Schott & Co.
Columbus, O.	Moon	E. A. Smith
Colorado Springs, Col.	Haynes	E. D. Marr.
Columbus, Nebr.	Cartercar	Murnan Taxicab Co.
Columbus, Neb.	Empire	Columbus Auto Co.
Connersville, Ind.	Empire	Ye Motor Shop
Corning, Ia.	Empire	Sherman Bradley
Corwith, Ia.	Empire	F. B. Glidden Co.
Dayton, O.	Cole	Cole Sales Co.
Decatur, Ill.	Moon	N. Main St. Garage
Detroit, Mich.	Standard	Standard Motor Truck Co.
Detroit, Mich.	Empire	Wahl Motor Sales Co.
Durham, N. C.	Cole	John H. Harris
Earlham, Ia.	Empire	Moreland Automobile Co.
Edmonton, Alta.	Cole	International Motor Co.
Emerald, Wis.	Cole	W. S. Fleming
Erie, Pa.	Empire	Stirling Bros.
Fall River, Mass.	Cole	F. W. Davis & Co.
Glenwood, Ia.	Empire	J. M. Michelwait
Hempstead, L. I.	Cole	W. T. Hutcheson
Hillsdale, Mich.	Cole	Dr. H. C. Miller
Houston, Texas	Moon	Northrup & Clark Co.
Indianapolis, Ind.	Mais	Archey-Atkins Co.
Knightstown, Ind.	Cole	M. E. Reagan
Lawrence, Mass.	Cole	Jackson St. Garage
Lewisburg, Pa.	Empire	Jordan-Warneke Motor Car Co.
Lincoln, Neb.	Cole	Joe Simon
Little Rock, Ark.	Lozier	H. Tysinger
Los Angeles, Cal.	Moon	L. C. Buxton
Lynn, Mass.	Cole	W. W. Whitney & Co.
Lynnfield, Mass.	Cole	E. M. Elder
Madison, Wis.	Empire	Spooner McConnell Motor Car Co.
Maitland, Mo.	Cole	Rowlette Auto Co.
Marks, Miss.	Cole	J. H. Edwards
Martin, Tenn.	Cole	G. E. Bowden
Massillon, O.	Empire	Wm. F. Wagner
McCools, Neb.	Cartercar	McCools Mach. & Iron Wks.
McMinnville, Ore.	Cole	Younger & Prigmore
Memphis, Tenn.	Empire	McDonald Auto Co.
Memphis, Tenn.	Moon	Chickaway Motor Car Co.
Memphis, Tenn.	Moon	Chickasaw Motor Car Co.
Milwaukee, Wis.	Empire	Oakland Wisconsin Motor Co.
Mitchell, S. Dak.	Moon	Central Auto Supply Co.
Mitchell, S. D.	Moon	Central Auto Supply Co.
Moira, N. Y.	R-C-H	W. S. Lawrence
Mondovi, Wis.	Detroiter	G. P. Goddard
Mokane, Mo.	Empire	R. W. Taylor
Moneta, Ia.	Moon	Louis Ruwe
Montreal, Que.	Brockville-Atlas	V. O. Reed
Montreal, Que.	Hupmobile	V. O. Reed
Morgantown, W. Va.	Cole	Colonial Motor Car Co.
Mount Carmel, Pa.	Haynes	Dr. B. F. Bartho
Mt. Auburn, Ill.	Cole	H. S. Armstrong
Mt. Carmel, Ill.	Empire	Beauchamp & Horton
Muscatine, Ia.	Haynes	F. C. Vetter
Mystic, Conn.	Franklin	Mystic Auto Station
Nevada, O.	Empire	G. E. Eckert
Newark, N. J.	Lozier	Lozier-Stutz Sales Co.
New Bern, N. C.	Cole	H. Evans Sledge
Newton, Ill.	Cole	Newton Motor Car Co.
New York City	R-C-H	Julius Lichtenstein
Norfolk, Va.	Haynes	Tidewater Auto Gar. Co.
North English, Ia.	Haynes	E. J. Smith & Sons
Onawa, Ia.	Empire	M. B. Pullen
Otterbein, Ind.	Empire	John B. Opp
Ottona, O.	Empire	Hank Bros.
Pine Bluff, Ark.	Cole	Hearn Auto Co.
Phoenix, Ariz.	Case	McArthur & Morse
Phoenix, Ariz.	Hupmobile	J. C. Morrison
Phoenix, Ariz.	Little	H. G. Murphy
Phoenix, Ariz.	Michigan	Wilson & Jones
Phoenix, Ariz.	Oakland	Geo. Hageman
Piqua, O.	Franklin	Meinder's Garage
Pittsburg, Pa.	Empire	Williams-Hasley Motor Car Co.
Pittsburgh, Pa.	Haynes	McKeesport Clariton Trans. Co.
Plattsmouth, Neb.	Cartercar	Kroehler Bros.
Providence, R. I.	Stewart	Portland Garage
Providence, R. I.	Velie	Providence Auto Co.
Punxsutawney, Pa.	Cole	W. L. Simpson
Regina Sask., Can.	Cole	H. A. Gordon
Roanoke, Va.	Lozier	Hunter Motor Co.
Schaller, Ia.	Empire	C. H. Reuber
Severy, Kan.	Empire	R. A. Reese
Shenandoah, Ia.	Rambler	Hand & Woodard
Shreveport, La.	Empire	C. F. Brown Auto. Co.
Shreveport, La.	Moon	Orme Motor & Transfer Co.
Sidney, Neb.	Franklin	McIntosh & Brewer
Sioux City, Ia.	Empire	Central Machine Works
Somerset, Pa.	Empire	Somerset Auto. Co.
Somerville, N. J.	Cole	Augustus Duryea
Spencer, Neb.	Nyberg	W. P. Moore
Springfield, Mass.	R-C-H	Shean Auto Station
Stewart, Ill.	Haynes	Shearer Bros.
Springfield, O.	Cole	Valentine King Garage
St. Louis, Mo.	Kentucky	Wiemeyer Motor Car Co.
St. Louis, Mo.	Staver	Moss & Kavanaugh
St. Paul, Minn.	Cole	The Motor Truck Co.
Tacoma, Wash.	Cole	E. M. Streeter
Tifton, Ga.	Lozier	H. H. Tift, Jr.
Timewell, Ill.	Empire	H. K. Patterson
Toledo, O.	Moon	Moon Sales Co.
Toronto, Canada	Empire	W. W. Campbell
Toronto, Ont.	Henderson	American Motor Sales Co.
Troy, O.	Franklin	Troy Auto Co.
Uniontown, Pa.	Lozier	Keystone Automobile Co.
Vandergrift, Pa.	Empire	S. M. & E. R. Painter
Washington, Mo.	Moon	C. A. Krumsick
Washington, D. C.	Stewart	David S. Hendrick
Wellsburg, W. Va.	Cole	W. J. Hervey
Wichita, Kan.	Empire	Peru Van Zandt Implement Co.
Wilkes-Barre, Pa.	Moon	Thos. W. Haines, Jr.
Worcester, Mass.	Flanders	Cashman Auto Co.
Wilkes-Barre, Pa.	Haynes	C. D. Hersberger
Wilkes-Barre, Pa.	Moon	T. W. Haines, Jr.
Wilmington, Del.	Stewart	Gomery-Schwartz Motor Car Co.
Youngstown, O.	Empire	C. F. Erb
Youngstown, O.	Moon	Regal Sales Co.
York, Neb.	Cole	Corcoran & Foley

Opens Branch House—The Riddell Automobile Company, Des Moines, Ia., has opened a branch house at Oskaloosa, Ia.

Acquires Fire Apparatus—Grand Rapids, Mich., has just placed into service a combination White hose and chemical wagon.

Overland Cars for Polo—President John Willys, of the Willys-Overland Company, Toledo, Ohio, has become so interested in the lately invented game of automobile polo that he is discussing seriously the construction of Overland cars with planetary system gears for use in the game.

Hunting by Automobile—Hunting by automobile has become a favorite sport in the ranch region of South Texas. It is now a common practice for parties of sportsmen to take a spin over the ranch roads into the heart of the mesquite and wilderness and return with a load of wild game. The cars are also convenient for hauling in the game. It is not an uncommon thing to witness the arrival of parties with their cars literally loaded down with the fruits of their marksmanship. The accompanying illustration shows a car returning from a very successful hunt, loaded down with deer, jack rabbits, cotton tail rabbits, possums, badgers and coyotes.

The way they go after the game in Texas and how they get it

White ten-passenger bus carrying tourists over mountainous roads in Mount Rainier National Park, Wash.

Tourists traveling through Mount Rainier National Park embarking in motor buses at Longmire's Inn

Willman with Studebaker—G. L. Willman has taken an advertising position with the Studebaker Corporation, Detroit, Mich.

Leisaw Sales Manager—The Abbott Motor Car Company, Detroit, Mich., has appointed W. J. Leisaw as district sales manager for the states of Indiana, Michigan and Ohio.

Tire Salesrooms Opened—The new salesrooms of the Southern Tire Repair Company, Baltimore, Md., on Mount Royal avenue, near Maryland avenue, were opened recently.

Baltimore's Municipal Garage—An appropriation of $4,500 for the establishment of a municipal garage for Baltimore, Md., is included in the building inspector's account by the board of estimates.

Occupy New Salesrooms—The Baltimore, Md., branches of the Goodrich and Diamond tire companies, which consolidated recently, are now occupying the new salesrooms on Mount Royal avenue, near Maryland.

Boston Buys Buicks—The Boston, Mass., branch of the Buick Company sold last week to the fire department, wire department and the board of health three of the new model 30 roadsters for municipal work.

Cain, Chief Engineer—James W. Cain has been appointed chief engineer of the McCord Manufacturing Company, Detroit, Mich., with direct jurisdiction over the engineering, testing and experimental departments.

Columbus Has Eleven—The last of the motor-driven fire apparatus was received by the Columbus, O., Fire Department from the Seagrave Company recently and there are now four fire companies equipped with the apparatus.

Marion Gets Fire Auto—Marion, Mass., now has a motor combination chemical and hose wagon which was installed recently. It was presented to the town by Colonel Harry Converse, of Boston, Mass., a summer resident.

Beehler Company Odds—The Beehler & Ogden Motor Company, Baltimore, Md., has taken in the two-story building in the rear of its building at Lexington and Carrollton avenues to equip it for an up-to-date repair shop.

Powers Philadelphia Manager—F. W. Powers, manager of the Goodyear Tire & Rubber Company's branch, Washington, D. C., has been promoted to the managership of the Philadelphia, Pa., branch. His successor has not yet been appointed.

Greenburg Sales Representative—Alfred A. Greenburg, secretary of the Detroit, Mich., section of the Society of Automobile Engineers has undertaken the sales representation in that city of the products of the Baltimore Tube Company.

Murphy Succeeds Troutman—Ralph Murphy, formerly head of the inspection division of the H. H. Franklin Manufacturing Company, Syracuse, N. Y., has taken the managership of the service department, succeeding J. F. Troutman, resigned.

Martin, Traveling Representative—J. J. Martin has become a traveling representative of the Commerce Motor Truck Company, Detroit, Mich., which concern is working out a new line of machines to be brought out around the first of the year.

Detroit Firm Busy Again—The Detroit, Mich., Seamless Steel Tubes Company is again in position to accept orders for its products for shipment after January 1, it having been practically out of business since July 1, owing to a disastrous fire.

Metz Branching Out—Because of the demand for its cars in other sections the Metz Company, Waltham, Mass., has decided to open a branch in New York City that will be used as a station for distributing the cars to the middle Atlantic and western states.

More Oil Branches—E. A. Buck & Company, Worcester, Mass., one of the independent companies, has added two new stations to their chain in Massachusetts by opening branches at Greenfield and Medford, covering both the eastern and western parts of the Bay State.

Bus Service in Huntington—Motor bus service will be established in Huntington, Ind., by the newly organized Huntington Auto Transit Company. The city has ten thousand inhabitants, but has never had street car service, and there are no prospects of any in the near future.

Olean Wants Truck—The Adams Brothers Company,

Automobile Incorporations

AUTOMOBILES AND PARTS

Akron, O.—Motor Starting Company; capital, $25,000; to deal in automobiles and supplies and manufacture motors. Incorporators: R. A. Woods, M. Paul, E. W. Paul, A. M. Tschantz and C. L. Dinsmore.

Alton, Ill.—Alton Automobile Company; capital, $10,000; to repair automobiles. Incorporators: H. F. Horstman, William Winter, L. F. Winter.

Asbury Park, N. J.—Croce Automobile Company; capital, $250,000; to deal in automobiles. Incorporators: L. P. Croce, H. A Watson, T. G. Appleby.

Bedford, O.—Bedford Supply Company; capital, $10,000; to deal in automobiles and supplies. Incorporators: F. B. Senter, F. H. Calvert, G. W. Show, N. C. Boyd, A. B. Condon.

Brooklyn, N. Y.—American National Motor Bus Company; capital, $1,000,000; to purchase, lease and otherwise deal in motor buses, trucks, etc. Incorporators: C. A. Clarke, S. L. Conklin.

Cincinnati, O.—Northway Motor Company; capital, $600,000; to manufacture automobiles and engines. Incorporators: R. E. Northway, Wm. Pabodie, W. D. Friste, E. E. Decebach, F. B. Enslow.

Detroit, Mich.—Superior Motor Company; capital, $100,000; to manufacture a two-cycle motor. Incorporators: Henry Fraser, G. C. Brimmer and W. C. Schneider.

Indianapolis, Ind.—Huntington Automobile Transit Company; capital, $25,000; to engage in automobile service. Incorporators: J. M. Hicks, S. A. Stemen, J. W. Caswell, W. W. Hawley, O. E. Bradley.

Kansas City, Mo.—England Brothers Motor Car Company; capital $2,000; to manufacture automobiles. Incorporators: Edward England, E. W. England.

Mansfield, O.—Brucker Motor Car Company; capital, $5,000; to deal in automobiles and accessories. Incorporators: David D. Brucker, Wm. F. Voegle, Jr., Lewis Bruckert, Arthur E. Courtney and J. M. Ottinger.

Muskogee, Okla.—Pioneer Motor Company; capital, $5,000; to manufacture automobiles. Incorporator: G. S. Waddell.

New York City.—Rector Engine Corporation; capital, $150,000; to manufacture machinery. Incorporators: E. Gore, W. Magowan, S. C. Yeaton.

New York City.—Rolaff Oil Carburetor Company, Inc.; capital, $25,000; to manufacture and sell carburetors. Incorporators: R. Wolfsky, J. W. Stone, Wm. G. Van Vleck.

New York City.—The Kells Motor Radiator Corporation; capital, $650,000; to manufacture and deal in automobile radiators. Incorporator: H. R. Bingham.

New York City.—F. W. Ofeldt & Sons, Inc.; capital, $20,000; to deal in motor trucks, power wagons, etc. Incorporators: E. Y. Eltonhead, E. G. Ofeldt and Frank A. Ofeldt.

New York City.—Motor Trading Co., Inc.; capital, $10,000; automobile business. Incorporators: W. A. Shepard, Robt. W. Tindall and Albert Donces.

GARAGES AND ACCESSORIES

Chicago, Ill.—Illinois Tire Filler Company; capital, $10,000; to deal

Findlay, O., entertained one day recently a committee from the Olean, N. Y., fire department, headed by the fire chief, S. T. Rogers. The committee was looking over the Adams plant with a view of purchasing an automobile fire truck.

Kingsley's Racer Burned—The big 70-horsepower, six-cylinder Thomas car with which John J. Kingsley won the amateur championship of New England at races at Readville, Mass.; Rockingham Park, Salem, Mass., and elsewhere, was destroyed by fire recently at his summer home at Franklin, Mass.

Connell with Commerce—H. L. Connell, member of the recently established motor testing division of the Society of Automobile Engineers, Detroit, Mich., is engaged in engineering work for the Commerce Motor Car Company, of that city, which intends to bring out a line of motor trucks about the first of the year.

Nankivel, Foreign Distributor—Claude M. Nankivel, 17 State street, New York City, has been appointed foreign distributor for Stewart delivery trucks, manufactured by the Stewart Motor Corporation, Buffalo, N. Y. Mr. Nankivel will handle the sale of these trucks in Europe, Australia, New Zealand, South Africa and South America.

Reiman Sues Service Truck—Charles S. Reiman, of Chicago, Ill., has brought suit in the circuit court at Wabash, Ind., against forty-nine stockholders of the Service Motor Truck Company. He asks $50,000 damages because he was restrained from selling $20,000 worth of stock in the plant. The restraining order has since been dissolved.

Discharges 400 in Day—Every one of the 400 employees of the Catle Lamp Company, Battle Creek, Mich., makers of automobile lamps, from superintendent down to the boy, has been discharged from an order from the board of directors. On the following Monday the plant will re-open, hiring an entirely new force and affecting a thorough organization.

Physicians Win Their Case—The Boston physicians who protested to the Boston Street Commission against the ordinance that prevented them leaving their cars outside their residences or the places where they were on a professional visit have won their case, for recently the commission amended the ordinance excepting doctors from its provisions as well as clergymen.

League Conference—The Lowell, Mass., Automobile League had a conference recently with Commissioner Brown, of the Street Department, and City Engineer Kearner relative to the bad conditions of the streets and the Merrimac Valley boulevard. Specific instances were brought to the attention of the officials and they gave orders to have repairs made at once.

Baltimore Owners Fight Tax—Dealers and owners of automobiles in Baltimore, Md., are aroused over the municipal plan to introduce an ordinance for taxing cars from $5 to $50 in addition to the present three taxes now being paid by the owners—namely, $20 for owners' license, $2 for operator's license and a personal tax to the city and state. The Automobile Club of Maryland and all the dealers and owners will fight this unjust tax, if passed, by carrying the fight to the highest courts.

Indiana Clubs Joined—There is a movement on foot to organize all of the automobile clubs in Indiana into a state organization. A meeting will be held in the rooms of the Hoosier Motor Club in Indianapolis, Ind., on December 14, at which time a ways and means committee will be appointed to secure the formation of the state organization. An effort will be made to bring the clubs of Logansport, Indiana Harbor, Jeffersonville, South Bend, Fort Wayne, Kokomo, Salem, Muncie, Madison, Terre Haute and Winchester into the organization.

U. S. Rubber Adds—The United States Tire Company, operating four plants, is planning an expenditure of over $3,000,000 in factory improvements and extensions. First of all, the Morgan & Wright plant, which is located in Detroit, Mich., is to be doubled in both area and production. Six thousand workmen will be required when all improvements are finished. The output of the factory will be in excess of 5,000 tires daily. It is the intention of this company to also increase the facilities of the three remaining plants in Indianapolis, Ind., Hartford, Conn., and Providence, R. I.

In the heavily-wooded section of Mount Rainier National Park. Automobile buses conveying sight-seeing tourists

Party of tourists at the height of the season starting on a tour of Mount Rainier Park by motor bus

in vehicle wheels, tires, rims, etc. Incorporators: Albert Jacobs, Anton Percival, C. B. Stafford.

CINCINNATI, O.—The Citizens' Auto Service Company; capital, $7,000; to engage in automobile service. Incorporators: W. H. Davis, F. W. Kelly, L. J. Hoppe, A. Putman, J. L. Kohl.

CLEVELAND, O.—Dayton Airless Tire Sales Company; capital, $10,000; to deal in automobile tires and supplies. Incorporators: Wm. A. Carey, H. Krejoi, F. W. Chandler, R. M. Edwards and M. Otter.

CLEVELAND, O.—Dayton Airless Tire Sales Company; capital, $10,000; to deal in automobile tires, supplies, etc. Incorporators: W. A. Carey, B. Krejel, F. M. Chandler, R. W. Edward, M. Otter.

COLUMBUS, O.—Bracken Stauton Tire Company; capital, $5,000; to manufacture automobile tires. Incorporators: W. F. Bracken, M. B. Stauton, L. A. Stauton, May Bracken, T. E. Curtin.

GLEN COVE, N. Y.—Glen Cove Garage, Inc.; capital, $1,000. Incorporators: T. F. Meade, Edward Lewis and Lillian Lewis.

HAGERSTOWN, MD.—Hagerstown Automobile Club; to promote good fellowship, the use of automobiles, secure improvements to the roads and highways, assist in the enforcement of laws relating to motor vehicles and to secure legislation, and protect the interests of automobile owners. Incorporators: Albert Heard, S. H. Weihenmayer, Dr. Victor D. Miller, Jr., J. E. Stonebraker, Geo. A. Zook, E. W. Byrson, Wm. B. Littleton, Dr. J. McP. Scott, Dr. Royer Laughlin, Dr. W. Preston Miller, John A. Beck and Chas. M. Danzer.

INDIANAPOLIS, IND.—Ham-Meix Company; capital, $150,000; to manufacture acetylene self-starters and generators.

INDIANAPOLIS, IND.—Auto Lamp & Number Company; capital, $3,000; to manufacture a combination illuminated registration number and tail light. Incorporators: R. Griffin, A. P. Conklin, R. H. Bruce, W. F. Johnson and Geo. L. Maas.

LYNN, MASS.—Suffolk Street Garage; capital, $5,000; to repair automobiles. Incorporators: Daniel Lynch, John Buckley, Henry Thomas.

NEW YORK CITY.—Queensboro Garage, Inc.; capital, $10,000. Incorporators: F. A. Jockers, Augusta Jockers, D. J. Stack and Angelica M. Stack.

NEW YORK CITY.—Motor Dealers' Contest Association of New York, Inc.; capital, $30,000. Incorporators: Inglis M. Uppercu, Emanuel Lascaris and James C. Nichols.

NEW YORK CITY.—United Rubberine Supply Company, Inc.; capital, $200,000; to deal in tire fillings, rubberine, etc. Incorporators: Herman Maver, T. H. Royce, C. L. Bookheim.

PHILADELPHIA, PA.—Auto Safety Signal Lamp Company; capital, $100,000; to manufacture lamps and lighting devices of all kinds. Incorporators: L. Ables, Jesse Drew, J. G. Gray.

ROCHESTER, N. Y.—Rochester Macandaruba Tire Filler Company; capital, $10,000; to deal in tires, tire fillers, etc. Incorporators: Chas. S. Morris, John S. Crosier and Albert C. Olp.

CHANGES OF CAPITAL AND NAME

DETROIT, MICH.—Change of name from Republic Motors of Michigan to Republic Motor Car Co. of Michigan.

GALION, O.—Cleveland-Galion Motor Truck Company; capital increased from $300,000 to $1,000,000.

RICHMOND, VA.—Westcott Motor Car Company; capital increased $100,000.

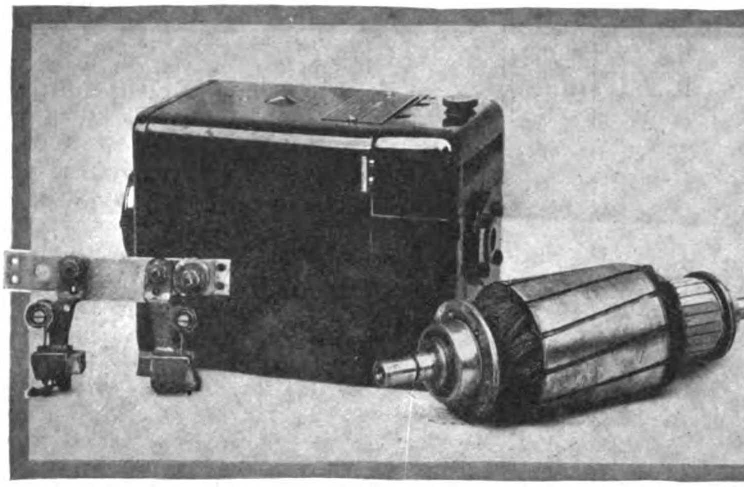


Fig. 1—Ward Leonard charging and lighting dynamo dismantled.

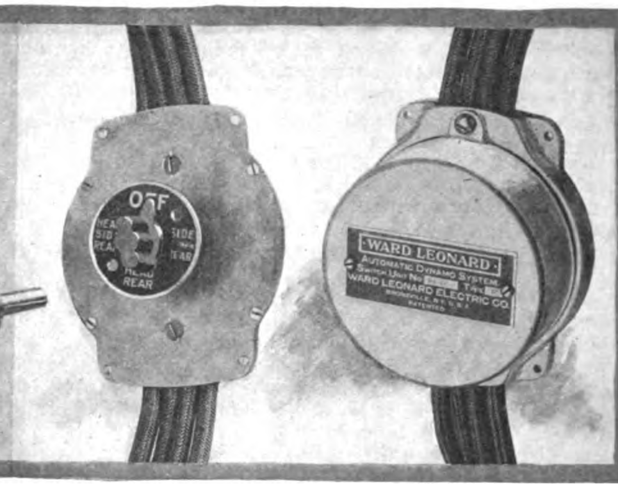


Fig. 2—Combined switch and distribution box

Ward Leonard Electric Lighting System

Automatically Keeps Battery Charged and Lights Supplied—Has Only One Hand-Operated Switch—Ingenious Design of Magnetic Controller

EVER since it was realized that electric lighting for the automobile possessed innumerable advantages over all other methods of illumination, inventors have directed their efforts toward the design of an electrical system that would have the merits of extreme simplicity as well as certainty of action, so as not to require that the driver be a trained electrician in order to keep his lighting in working condition. The necessary components of such a system are a dynamo that will furnish current while the car is in motion and a battery arranged to receive its charge from the dynamo so as to provide current for the lamps when the car slows down or stops. It is further necessary for successful operation that the dynamo supply a constant current while charging and lighting, and it is here that the real difficulty of the problem lies. Owing to the varying speeds and stoppages which are associated with the automobile some kind of control is essential in the relation of the dynamo to the system; otherwise a varying current that would be dangerous would result. Numerous and various solutions have been offered, only a small proportion of which can be said to be satisfactory from all points of view. These can be divided roughly into two classes: first, those in which the required constancy of current is obtained by a mechanical control of the dynamo speed to render it independent of the speed of the car; and second, those in which the same result is attained by electrical control of the generating power of the dynamo, even though its speed varies with the car. In the former case, resort was generally made to the slipping clutch with centrifugal governor; while in the latter some method of field adjustment, either through brush position or rheostatic resistance was tried.

The Ward Leonard automatic dynamo lighting system is a successful system belonging to the second of the two classes mentioned. Its most notable feature is its extreme simplicity. It consists, so far as the owner need know, of a single switch fixed on the dash or under the driving seat, which is to be turned on when light is wanted and turned off when it is not wanted. All the operations of charging, connecting and disconnecting dynamo and battery are automatic. The switch is shown in Fig. 2, the central circular portion with the thumb lever in the left hand view being the only part visible on the dash.

Actually, the system, as supplied from the factory, comprises a shunt dynamo to be driven from the engine by silent chain or gear; an automatic electrical controller which switches on the dynamo when its speed is high enough to generate the necessary amount of current for charging and lighting, disconnecting at lower speeds; and the rotary snap lighting switch mentioned above, together with armored cable correctly wired up and provided with plugs ready for insertion into the lamp sockets.

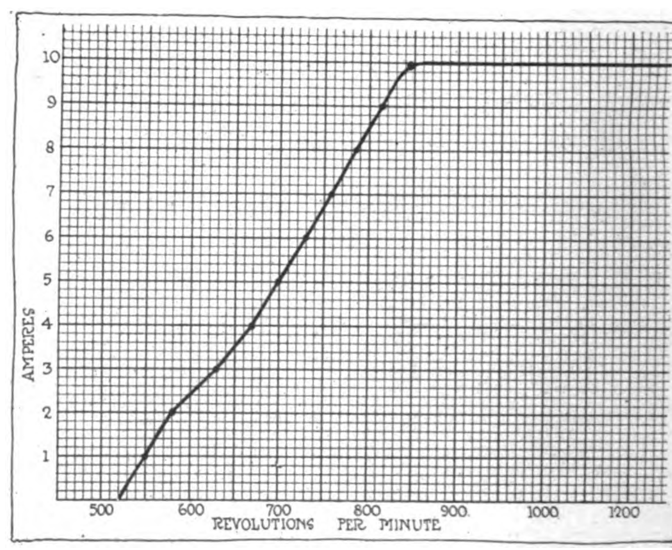


Fig. 3—Current output curve of dynamo in relation to speed

Fig. 1 shows the dynamo with the armature and brushholder removed. It will be seen that the magnet casing is of totally enclosed rectangular box form, allowing the maximum of power for a given space. It is a two-pole shunt wound machine weighing 24 pounds and supplying 10 amperes at 800 revolutions per minute. The armature is skew slotted and is run on Hess-Bright ball bearings of ample size. The commutator is large and is built up of many segments giving good wearing qualities with the least amount of sparking at the brushes. Carbon brushes, spring controlled, bear on each side of the commutator. They are fitted to a single brush holder, shown at the left of Fig. 1, which is fixed by four screws to the magnet casing. The current output of the machine, in relation to revolutions per minute is shown in the curve, Fig. 3, which has been plotted from actual tests. It will be seen that a current of 10 amperes is supplied when the speed reaches 800. At this speed the automatic controller is in action, preventing a larger output irrespective of any increase of the dynamo speed.

The automatic controller, shown with the cover removed in Fig. 4, consists of two magnetically operated switches and a small resistance unit, all three contained in a box 4 3-4 inches long. V is a coil of fine wire surrounding an iron core, which when sufficiently magnetized by the current flowing in the coil, attracts the iron arm V1 against the pull of the light spring V2 and closes the two contact points at V3. These are so wired as to permit the main current from the dynamo then to pass to the battery and lights. S is a coil of heavy wire wound on a similar core, which when magnetized with the main current allowed to flow by the action of the voltage switch as described above, attracts the arm S1 against the pull of the spring S2 and opens the contact points S3. This action puts the resistance coil R in circuit with the field magnet coils of the dynamo, weakening the latter to such an extent that the output in amperes is below that necessary to hold the arm S1, which is therefore released, cutting out the resistance again. It will be seen how this action repeats itself so long as the dynamo speed is kept up. In actual practice the switch arm S1 is vibrating at such a high rate as to have no effect whatever on the lights. In consequence of this rapid vibration the platinum contact S3 on the switch arm is not attached direct thereto but is fitted to a flat spring mounted on the arm. This construction is common electric practice, and its purpose is to give a slightly rubbing contact between the two platinum surfaces, thus keeping them perfectly clean. The switch arms swing on an extremely short phosphor bronze strip firmly riveted to the core casing. This does away with the danger of the wear which accompanies a pivoted hinge. In addition to the two coils V and S, a third auxiliary series coil is wound on the same core as V, the chief purpose of which is to insure the perfect demagnetizaton of the core should a reversal of current take place.

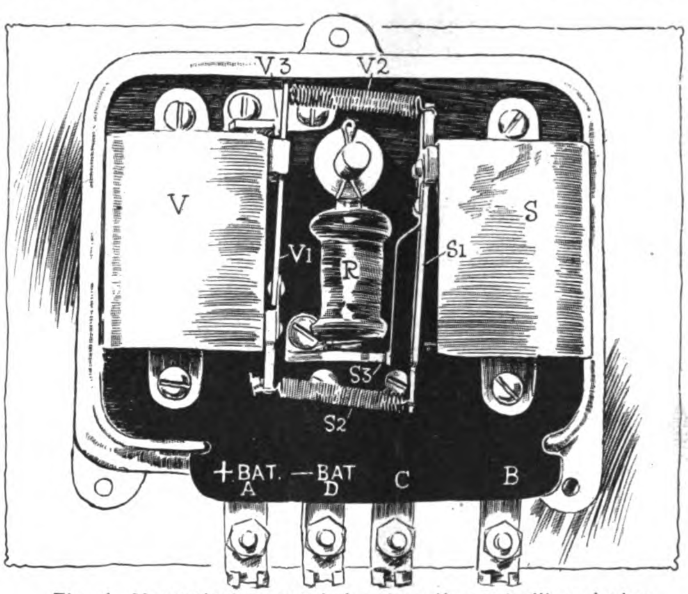


Fig. 4—Magnetically operated automatic controlling device

In Fig. 2 are given back and front views of the combined lighting switch and distribution panel. The latter is screwed to the back of the dash or inside the front seat panel and from it issue the brass-armored twin cables to the lamps, dynamo and battery. All inside connections are permanently soldered, so that there is no possibility of loosening through vibration. The switch itself is of the widely used rotary snap type, having four positions as follows: 1, side and rear lights; 2, headlamps and rear; 3, head, side and rear, and 4, off position.

Throughout the entire manufacture absolute interchangeability of all parts is secured by the use of well designed dies and drilling jigs and each set when complete undergoes a thorough test with lamps and battery arranged exactly as required on the car. All cables are cut to the proper length for the particular car to be fitted before leaving the factory, and provided with specially made plugs. The method of operation of the system as a whole can be seen by referring to the outline diagram of connections Fig. 5. Assume the dynamo to be turning, current will proceed to flow from the brush B1 along to the right as indicated by the heavy lines, through the coil of the series switch and thence to the arm of the voltage switch. At this point the main current suffers an interruption through the gap between the contacts V3. A small quantity of current, however, can pass through the shunted coil of the voltage switch, shown in fine lines, and return by the lower heavy lead to the dynamo brush B2; and when the speed of the car, and consequently of the dynamo, increases so as to bring up the voltage to a certain pre-determined amount necessary for charging the battery, the current so flowing is sufficient to pull over the switch arm of the voltage switch, thus connecting the main current to the battery and lighting circuit. The dynamo can now supply its full output of 10 amperes, running at 800 revolutions per minute, which corresponds to a car speed of roughly 14 miles per hour. Assume, now, that the speed of the car is increased so that there is a tendency on the part of the dynamo to generate more than the necessary 10 amperes. The increased amount passing around the coil of the series switch attracts the arm, opening the contacts S3 and thereby making it necessary for the shunted current of the dynamo field coil, shown at the left, to pass first through the resistance unit, which previously had been short-circuited. This weakens the field and consequently the output of the dynamo, and the switch arm flies back. As described above, there follows a constant vibration of the switch arm, alternately inserting and cutting out the resistance unit at an extremely rapid rate, resulting in an absolutely constant supply of current.

When the car is standing still or running slower than 7 miles per hour the dynamo is entirely disconnected from the battery by the gap V3 and the battery is automatically connected.

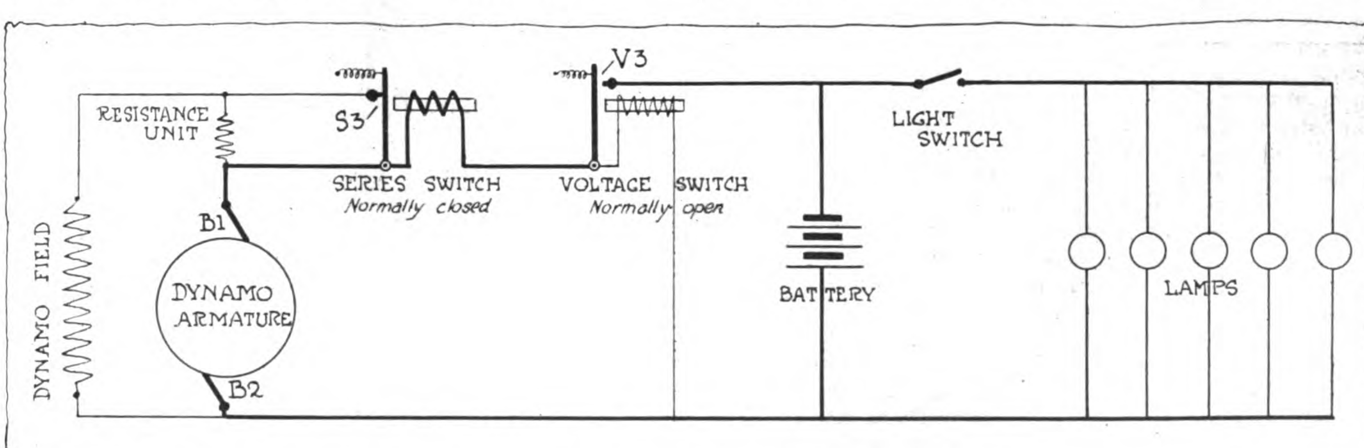


Fig. 5—Outline wiring diagram of the Ward Leonard lighting system for automobiles

Roberts Sectional Cell Tube; Comfortable Automobile Spectacles; New Spring Bumper; Nickel-Plating Compound; Winter Side Curtains; Standard Vulcanizing Bag; Splitdorf Coil-Switch

Roberts Sectional Pneumatic Tire

AN IDEA original in its specific field, although tried with success in other departments of engineering, is used in the Roberts sectional tube, Figs. 1 and 2. This tire is designed to take the place of the pneumatic inner tube and is practically punctureproof, inasmuch as, even if the rubber is punctured in any one place, the tire does not give out as in case of a conventional inner tube. The Roberts substitute for the tube consists of ten sections which when placed in the tire casing fill it completely, exactly like an inner tube. Each tube in turn is formed of thirty hexagonal cells, each of which is individually closed at both ends. The air in each cell is under the pressure corresponding to the size of the casing in which the tube is used. In the making of the tube each section, with the cells closed at one end, is placed in a special machine, where the cells are filled with the proper amount of air to obtain the right pressure, being vulcanized after the sufficient quantity of air has been introduced in every cell. As each casing is thus filled with 300 independent inner tubes in each of which the proper inflation pressure exists, it stands to reason that even if, say, seven cells of a section are punctured, the remaining twenty-three will keep it in good working shape. If a section has so suffered that it gives no more good service it may be replaced by a new section. It is intended by the Roberts Rubber Manufacturing Company, New York City, to guarantee the tube for a great number of miles and to soon take up its manufacture in large quantities.

Willson's Albex Folding Goggles

T. A. Willson & Company, Reading, Pa., are the manufacturers of the goggles, Fig. 2, which are made of soft material excepting the lenses. The sides of the goggles are made of soft leather and formed with a number of holes each, so as to permit of some ventilation for the eyes and to prevent sweating of the lenses. The latter are held in silver-plated rings and are furnished in amber, smoke tint, white and Fieuzal, according to the wish of the purchaser. A soft strip of material forms the bridge which rests on the nose and flexible cable temples permit of holding the goggles in place with great ease. The appearance of these goggles is very distinguished and decidedly sportsmanlike. The goggles are furnished in a handy leather case finished in seal grain, which is small enough to go into a pocket and which in itself adds materially to the appearance of the outfit.

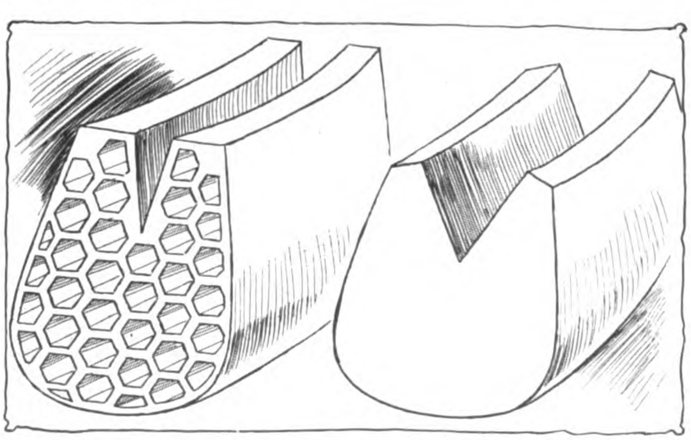


Fig. 1—Roberts sectional, cellular inner tube

New Randerson Steel Bumper

The new bumper of the Randerson Auto Parts Company, 110 West Thirty-fourth street, New York City, is distinguished by being made of steel throughout. The construction features, which have not been altered, are seen in Fig. 6, while the appearance of the double type of bumper is shown in Fig. 7. The principal new point is the use of steel for the connecting arms C, in which the bumper bar is supported and which are secured to the side members of the chassis. These bars are fashioned with a clamp at one end, into which fits the bumper bar, while the other end fits into a cylinder containing the shock-absorbing elements of the bumper. These consist of a piston P slidable in the cylinder C1 and a large spring S which is compressed between the piston P and the end E of the cylinder, when the bumper car strikes an object. The small spring S1 coiled inside of S serves another purpose; one of its ends is secured to E and the other to the head Q of the piston P, tending to pull the latter as far as possible toward E. The joint J connects the head Q and the connecting bar C, permitting of a swivel motion of the latter when it is pulled out of the end E1 of the cylinder C1. By this expedient the bar connection C may be turned up or down, to clear the starting crank. Fig. 7 shows another type of bumper in which two bars are used. The Randerson company makes a variety of types, some of which include the up-and-down feature and which differ principally by the kinds of bumper bars used. Round and square tubes as well as I-beam forgings may be obtained for the bars.

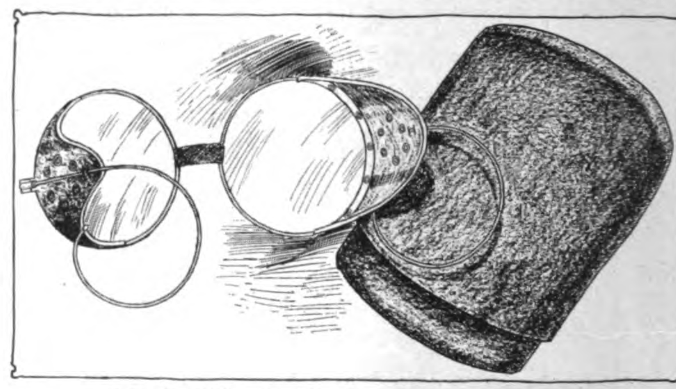


Fig. 2—Willson's Albex comfortable spectacles

Zeuss Royal Nickel-Plating Salt

R. F. Lang, 31 Broadway, New York City, is the importer of a nickel-plating salt specially adapted for plating metal ware used on automobiles, which is exposed to the inclemency of the weather. The salt furnished for this purpose is emerald green and crystalline in structure. To prepare the electroplating bath, 1 part by weight is dissolved in about 4 parts of water, the best proportion being 25 gallons of water to 55 pounds of the plating salt. The dissolving should be done in lukewarm water and the bath be slightly acid; which means that it should redden blue litmus paper slightly. If the litmus is reddened intensely the bath contains too much acid and should be weakened by adding caustic soda until the paper shows a faint red. A current from .6 to 1 ampere at 2.5 or 3.5 volts should be used for electroplating, the exact voltage depending on the number of pieces treated simultaneously in the bath and on the distance of cathode and anode. The exact voltage is, therefore, a matter which only experiment can teach. The temperature of the bath should not fall below 65 degrees Fahrenheit.

Studebaker 20 Side Curtains

The Studebaker Corporation, Detroit, Mich., has just developed a new side-curtain scheme for its Twenties, a type of car favored by doctors, etc. These side curtains are so constructed and mounted that they swing with the doors, their front edge being attached to the windshield frame, while the lower edges are secured to the door. A flap arranged to fall in line with the top edge makes a tight close there, while the back edge is fastened to the top by means of spring clips. In this way the curtains become units with their doors and may be opened and closed from inside the car, thereby saving the owner a great deal of uneasiness, which is ordinarily encountered in attaching the side curtains in Winter. By this arrangement the Studebaker 20 is transformed into a real Winter automobile, giving the passenger all the comfort of a larger car.

Splitdorf Coil Switch TS

The Splitdorf Electrical Company, New York City, has brought out a new type of coil switch which serves for both controlling and stepping up the ignition current generated in the Splitdorf low-tension magneto. As the schematic view, Fig. 4, shows, the coil switch is designed to be fitted to the dashboard, with the nickel-plated face protruding through the same and being in reach of the driver. The instrument consists, as its name implies, of a step-up coil and condenser working in combination with a switch. The latter is composed of two pieces of metal insulated from one another, which make contact between the several terminals to which the current flows after entering the device. The battery current enters through B1 and B2, flowing thence to B3 and B4, respectively. The magneto current flows through the contacts N, N1, M1, C3 and D. The contacts C3 and M1 are fitted with extension contacts, as shown by dotted lines in Fig. 4. The operation of the coil, with battery and magneto current used, is as follows:

When the switch is the magneto position, the two connector pieces on the switch face connect N1 with M1 and the extension of M1 with C3. The current produced in the magneto enters at N, passes to N1, M1 and C3, whence it flows—to the right in Fig. 4—through the primary winding of the coil shows as a heavy zigzag line and to D which is grounded. As the current passes through the primary winding, it induces a high-tension impulse in the secondary winding, which latter is connected to the grounded contact D and to G which is wired to the timer. When the battery system is used for ignition, the current enters through B1 and from B3 flows to the extension contact of M1, while B2 leads to B4 and through the switch contact to the extension of C3. From M1 it passes through the condenser C1 into the primary winding and thence back to C3, closing a complete primary circuit. The secondary circuit is excited in the same manner as in the case of the magneto current being used.

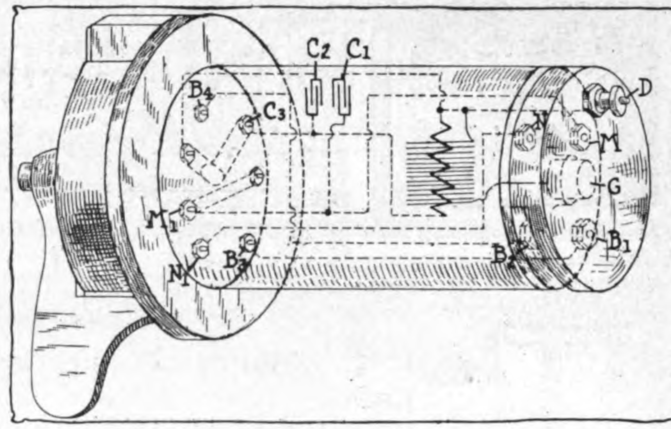


Fig. 4—Schematic view of TS Splitdorf coil switch

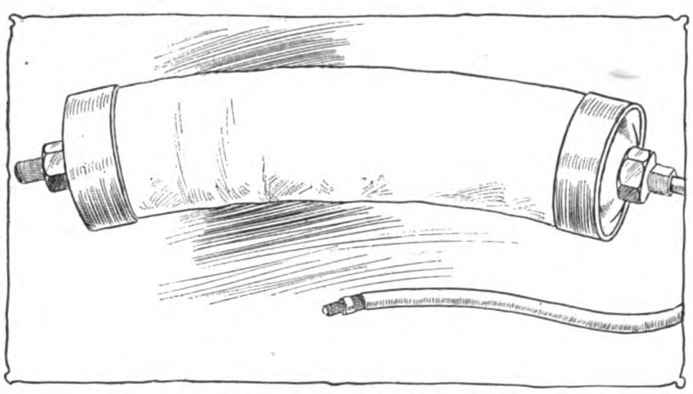


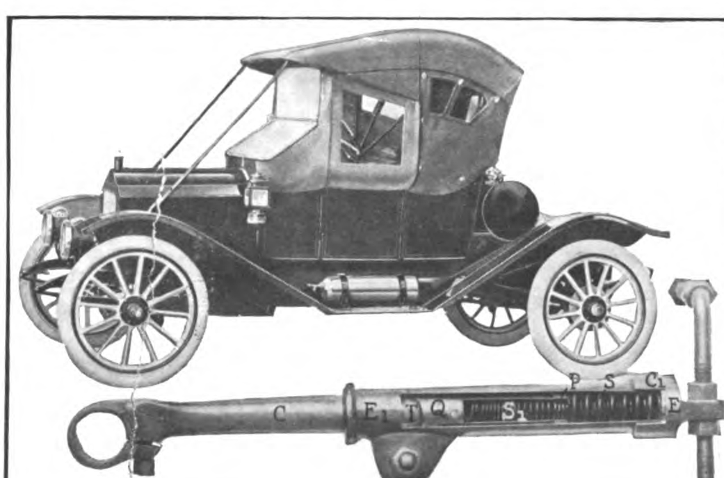
Fig. 3—Standard air bag for casing vulcanization

Thermite Anti-Freezing Solution

The Northwestern Chemical Company, Marietta, O., has begun to manufacture a compound which is added to the radiator water to prevent its freezing. This solution is called Thermite and in its pure state freezes at about 70 degrees below zero, while if mixed with an equal volume of water freezes at about 15 degrees, and if mixed with half its quantity of water, at 40 degrees below zero. The price of the compound is very reasonable, so that even a rich mixture of it may be used.

Standard Vulcanizing Air Bag

Operators of vulcanizing plants will find the Standard air bag, Fig. 3, a very useful accessory in their businesses. This bag is made of a canvas cylinder closed at each end by a metal head tapped for a screw-threaded plug. A plain plug is fitted into the hole of one plate, while the other one is equipped with a coupling to the end of which a piece of fabric-wound rubber hose is attached. This hose is fitted with a regular inflation valve, which permits of forcing compressed air into the bag, either by means of a tire pump or from an air compressor. The canvas is wound many times to form a wall practically impenetrable for the compressed air, and it is held tight against the end plates by two welded rings. The use of this bag is identical with that of any other vulcanizing bag; it is placed in the section of a tire casing which is to undergo heat treatment in the vulcanizing mold, so as to press the casing tightly against the mold. This bag is made by the Standard Tire & Rubber Company, Boston, Mass.



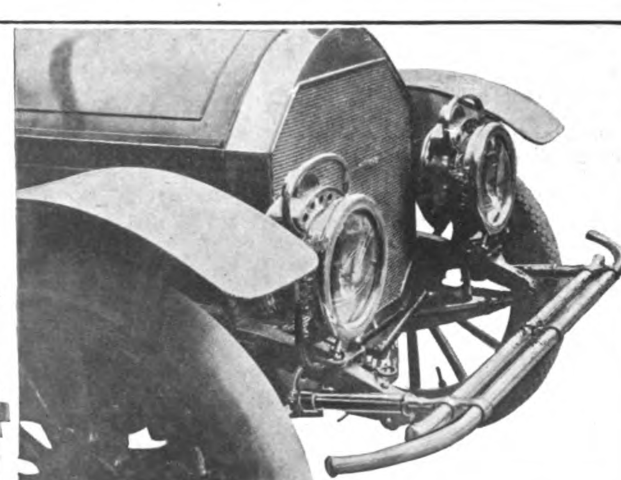


Fig. 5—Studebaker close winter side curtains. Fig. 6—Interior view of Randerson bumper mechanism. Fig. 7—Randerson double-rail bumper on car

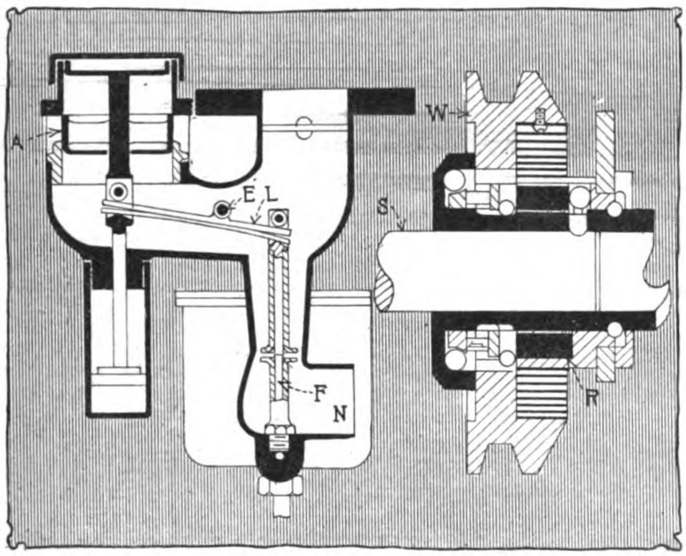


Fig. 1—Schulz positive carbureter. Fig. 2—Sharpe starter

CARBURETER Construction—In which air and fuel admission are both regulated by valves actuated by common lever means.

The subject matter of this patent, a carbureter, is shown in Fig. 1. It is of the float-feed type and fitted with a nozzle of variable orifice. The latter is regulated by means of the fuel valve F, the upper end of which is pinned to the lever L which is fulcrumed at E. The other end of the lever L is connected to the air inlet valve A which is of the sleeve type and serves as auxiliary supply, while the normal supply at low speeds enters through N, blowing past the fuel nozzle, where it vaporizes the gasoline. In connection with this construction, means are provided for moving the lever in two directions and holding it in any adjusted position.

No. 1,046,111—to Carl F. Schulz, Brooklyn, N. Y. Granted December 3, 1912; filed August 21, 1911.

Engine Safety Starting Device—Comprising a constructional detail for engaging the crankshaft when starting and for disengaging it after the engine has begun to work.

This patent has reference to a ratchet construction useful in engine-starter constructions, the subject matter being illustrated in Fig. 2. The crankshaft is seen at S and a wheel W is mounted on it, but not keyed to it. Between the shaft and the wheel a ring R is interposed which serves as a bearing for the wheel. Both the wheel and the shaft are formed with ratchet recesses in which balls are located, and the ring has openings registering at their opposite extremities with these recesses; the effect thereof being that when the wheel is turned in one direction it actuates the shaft, or if the shaft is turned in the opposite direction it actuates the wheel. Means are provided by which the ring is shifted longitudinally along the shaft, if the crankshaft rotates contrary to its operating direction, whereby the balls are disengaged from the ratchet recesses of the engine shaft, permitting the latter to move without producing a reversed torque in the starter mechanism.

No. 1,046,030—to William A. Sharpe, Denver, Col. Granted December 3, 1912; filed October 16, 1911.

Valve Spring Compressor—In which the members used for compressing the spring are adjustably connected.

Fig. 3 shows the device described in this patent consists of two spreader members, one of which M is pivoted to the end of a screw-shaped connector piece S and the other M1 is mounted on S, so that it may be worked along its thread by actuating a thumb-nut N. The opposite ends of M and M1 are shaped with forks which engage the valve springs; the forked end of M being larger than that of M1 and being formed with inwardly projecting lugs. A bail is pivoted at the end of M and adapted to be fastened over the end of M1.

No. 1,045,321—to Philip F. Pillines, Philadelphia, Pa. Granted November 26, 1912; filed July 20, 1912.

Tire Inflation Valve—Which is fitted with a closing device at its inner end to prevent leakage.

The tire valve described in this patent is shown in Fig. 4. This valve has a tubular portion T which extends within the tire tube and is positioned inside of an outer Tube T1 clamped upon the tire. A packing is in place between the two telescoping members T and T1. A valve through which the tire is inflated is contained in T; T is movable outwardly in T1 by air pressure inside of the tire. A head H formed on T1 forms a seat for the closing device C which is subject to the pressure obtaining in the pneumatic tube inside the tire, thereby keeping the inflation valve closed tightly.

No. 1,045,330—to Maximilian Charles Schweinert, West Hoboken, N. J. Granted November 26, 1912; filed February 10, 1909.

Automatic Lamp-Controlling Device—Consisting in a connection between the tie-rod and the lamp supports.

This patent refers to a lamp-controlling device in which the lamps are mounted on U-shaped forks, the single ends of which are fitted with one laterally extending arm each. These lateral extensions are made to engage the tie rod of the steering gear in such a manner that, if the tie rod is moved. the lamps are brought to turn in the same direction as the front wheels.

No. 1,046,010—to Oliver W. Page, Ione, Wash. Granted December 3, 1912; filed September 28, 1911.

Automobile Muffler—Being of the baffle plate type.

The muffler referred to in this patent comprises a casing, a series of inner baffles aligned along the axle of the casing and a series of outer baffles attached to the wall of the casing and spaced somewhat from the inner ones. Thus an unobstructed substantially straight passage is provided for the exhaust gases, as the baffles are mounted in staggered relation.

No. 1,045,936—to Eugene Bivert, Chicago, Ill. Granted December 3, 1912; filed January 22, 1912.

Pneumatic Tire Patch—A shield and guard flap protecting a repaired portion of an inner tube.

This patent has reference to a repair patch comprising a flexible strap encircling the tube, which is adjustable in length by means of members attached to its ends. Inside the strap is a member which spans the punctured portion of the tube; the ends of this member extend beyond the corresponding end of the strap.

No. 1,045,955—to Mark A. Dees, Pascagoula, Miss., assignor to American Tire Company, St. Louis, Mo. Granted December 3, 1912; filed January 3, 1911.

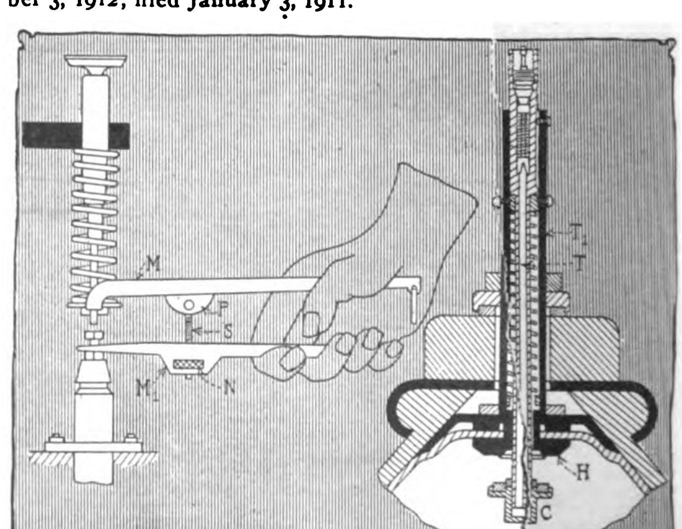


Fig. 3—Pillines spring compressor. Fig. 4—Schweinert valve

View of the Paris Salon, looking across the main exhibition space in the Grand Palais

Within the Walls of Paris

Paris Salon Opens with 565 Exhibit Stands—Twenty American. Is of a More International Character Than Olympia Show. Floor Space of 260,000 Square Feet Proves Inadequate.

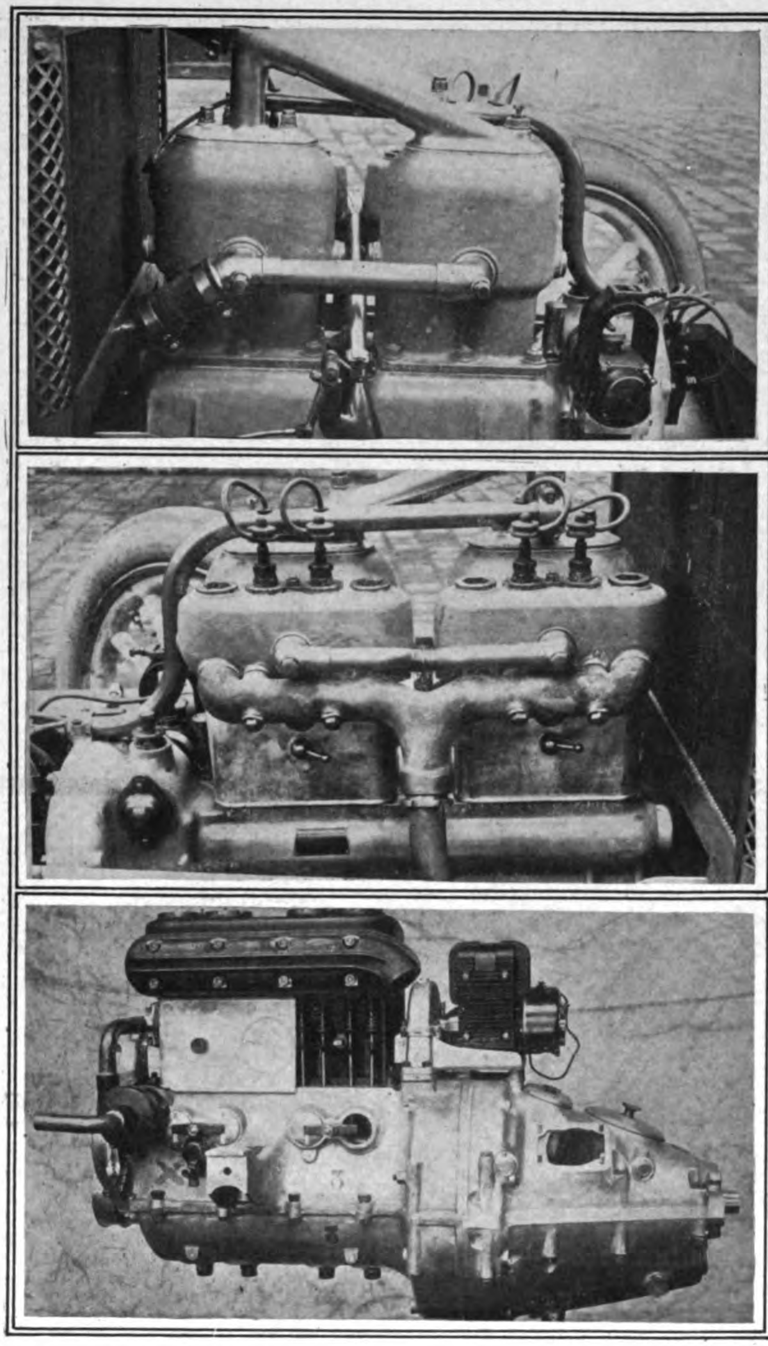
PARIS, Dec. 7—The Paris Salon, which opened this evening in the Grand Palais, attended by President Fallieres and half a dozen of his ministers, together with local dignitaries, is the largest exhibition of motor vehicles ever assembled under a single group. There are 565 exhibit stands, and the total floor area is 260,000 square feet. Although the largest numerically, the Salon which opened here today is less international than the Olympia show at London a few weeks ago. In the present Salon, which is the thirteenth to be held in this city, the majority of the exhibitors are French, there being relatively few foreign makers, and the number of these exhibitors being often largely made up of accessory people. Here are some of the figures:

America	20 exhibitors
Great Britain	34 exhibitors
Belgium	9 exhibitors
Germany	12 exhibitors
Italy	9 exhibitors
Switzerland	6 exhibitors

Although Great Britain shows thirty-four exhibitors, only eight of these are exhibiting cars, the remaining twenty-six showing accessories. Of the twenty American firms exhibiting, the following show cars: Abbott, Anderson Electric, Buick, Cadillac, Case, Century, Ford, Flanders, Hupmobile, Mitchell, Oakland, Overland, R. C. H., Reo and Studebaker. Some of the accessory exhibits are: Bowser, Goodrich, Klaxon, Vacuum, Potter & Johnston, T. Pilter and Oildag.

Germany shows twelve makes of cars; Italy and Belgium each have nine, and Switzerland is represented by six car and body manufacturers. Altogether there are ninety foreign and 565 home firms in the Grand Palais, this being a higher proportion of foreigners than on any previous occasion. In making this count only firms having a separate stand have been considered. There are a number of foreign manufacturers in the accessory business whose goods are handled by French houses; these have been counted in with the French firms.

Big as it is—for there is doubtless no other hall in Europe offering a floor space of 260,000 square feet, the Grand Palais has proved too small for its needs. As far back as July every inch of space had been rented. The 200 firms having been crowded out appealed to the organizing committee to open an



Two New French Motors

Top—Renault 11-horsepower motor, 75 x 120 mm.
Center—Renault 11-horsepower motor, valve side.

Bottom—Exhaust side of new Panhard 10-horsepower motor designed with gearset as a unit construction. The method of inclosing the valve tappets is shown. Gearbox inspection plates are numerous

overflow section, but this request was not acceded to. Consequently an independent organization undertook to get together an overflow section and for this purpose secured the Jardin de Paris, one of the amusement centers in the Champs Élysées, usually only open during the summer months. This section will open December 14, and will keep open until the new year. On the opposite side of the river, within a stone's throw of the Grand Palais, there is a third exhibition, devoted entirely to second-hand cars and accessories. Doubtless by facilitating the sale of used cars an impetus will be given to business in the main hall.

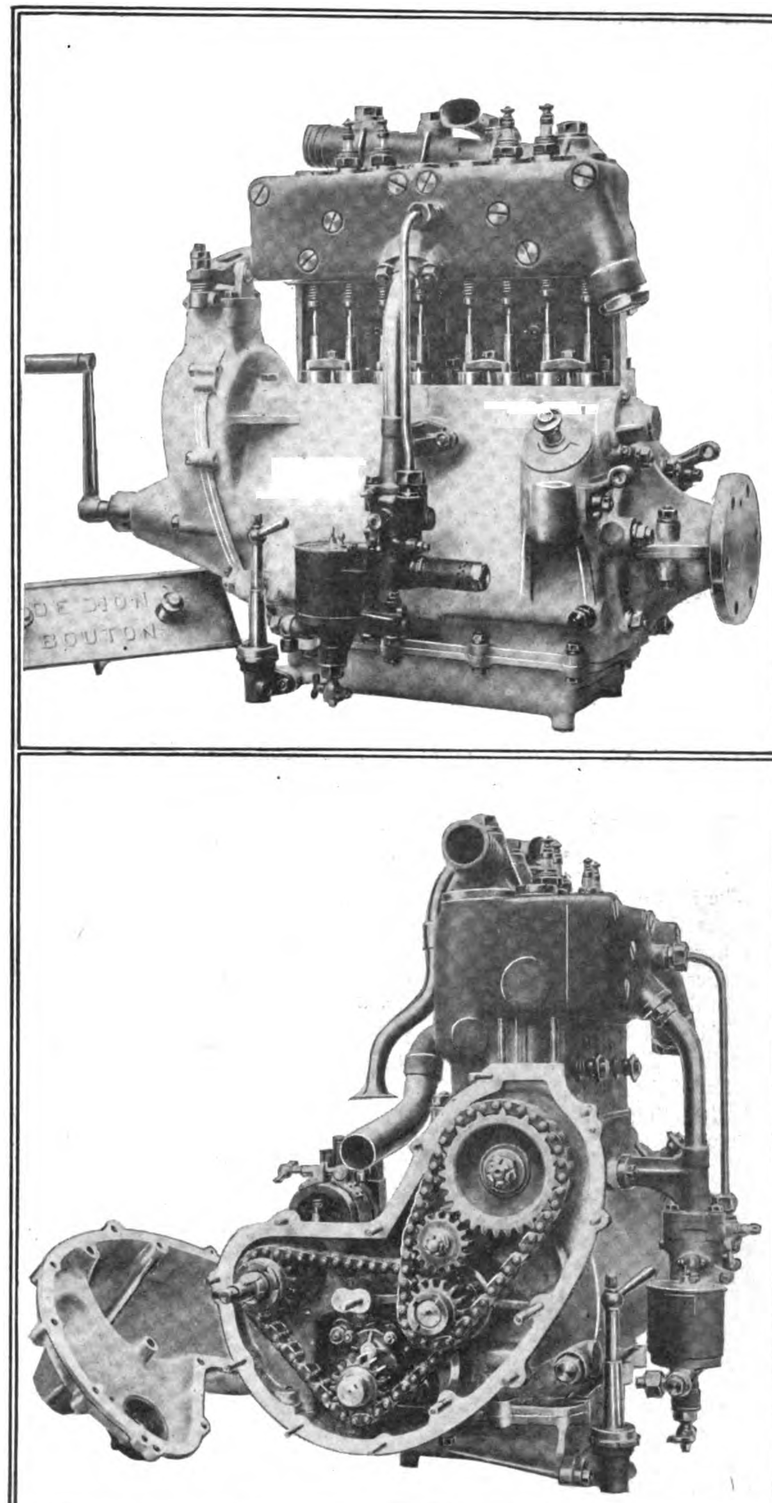
As stated in the special cablegram to THE AUTOMOBILE, tonight (this cable appeared in last week's issue, page 1209) France has gone unmistakably on record in favor of the long-stroke motor. She is also in favor of the small motor. The following figures show how the country stands in this respect, these figures, of course, including those cars on exhibition,

Comparison Continental Motor

1912 Bore and stroke m.m.	Inches	1913 Bore and stroke m.m.	Inches	R.A.C. hp.
		ADLER		
75 x 103	2.9 x 4.0	75 x 120	2.9 x 4.7	13.9
85 x 115	3.3 x 4.5	80 x 130	3.1 x 5.1	15.8
90 x 125	3.5 x 4.9	92 x 148	3.6 x 5.8	21.0
105 x 140	4.1 x 5.5	114 x 160	4.4 x 6.2	32.0
115 x 140	4.5 x 5.5	125 x 160	4.9 x 6.2	38.8
		ALCYON		
75 x 120	2.9 x 4.7	75 x 130	2.9 x 5.1	13.9
80 x 130	3.1 x 5.1	No change		15.8
		ARIES		
60 x 100	2.3 x 3.9	No change		10.1
65 x 100	2.5 x 3.9	No change		10.5
75 x 140	2.9 x 5.5	No change		13.9
84 x 130	3.3 x 5.1	No change		17.5
105 x 160	4.1 x 6.2	No change		27.3
		AUSTRO-DAIMLER		
80 x 110	3.1 x 4.3	No change		15.8
....		90 x 140	3.5 x 5.5	20.1
105 x 130	4.1 x 5.1	No change		27.3
120 x 157	4.7 x 6.18	120 x 154	4.7 x 6.06	35.7
105 x 165	4.1 x 6.4	No change		27.3
		BARRE		
65 x 110	2.5 x 4.3	65 x 110	2.5 x 4.3	10.5
75 x 120	2.9 x 4.7	Not made		
75 x 130	2.9 x 5.1	No change		13.9
		BAZELAIRE		
75 x 100	2.95 x 3.9	No change		13.9
76 x 120	2.99 x 4.7	No change		14.3
84 x 130	3.3 x 5.1	No change		17.5
		BENZ		
72 x 120	2.8 x 4.7	No change		12.8
80 x 130	3.1 x 5.1	No change		15.8
90 x 140	3.3 x 5.5	No change		20.1
....		95 x 140	3.7 x 5.5	22.4
25 x 150	4.9 x 5.9	No change		38.8
....		130 x 160	5.1 x 6.2	42.0
....		185 x 200	7.2 x 7.8	84.5
		BERLIET		
70 x 100	2.7 x 3.9	No change		12.1
80 x 120	3.1 x 4.7	No change		15.8
....		90 x 140	3.3 x 5.5	20.1
100 x 140	3.9 x 5.5	No change		24.8
120 x 140	4.7 x 5.5	No change		35.7
		BIANCHI		
90 x 115	3.3 x 4.5	No change		20.1
....		100 x 140	3.9 x 5.5	24.8
110 x 150	4.3 x 5.9	No change		30.0
....		130 x 160	5.1 x 6.2	42.0
....		130 x 150	5.1 x 5.9	42.0
		BOLLEE, LEON		
83 x 110	3.2 x 4.3	No change		16.9
95 x 130	3.7 x 5.1	Not made		
98 x 130	3.8 x 5.1	Not made		
106 x 130	4.17 x 5.1	Not made		
125 x 150	4.9 x 5.9	Not made		
130 x 150	5.1 x 5.9	Not made		
		BOZIER		
67 x 110	2.6 x 4.3			
65 x 130	2.5 x 5.1	No change		10.5
75 x 120	2.9 x 4.7	75 x 130		13.9
75 x 150	2.9 x 5.9	No change		13.9
		BRASIER		
67 x 110	2.6 x 4.3	No change		11.1
70 x 120	2.7 x 4.7	No change		12.1
80 x 130	3.1 x 5.1	Not made		
85 x 140	3.3 x 5.5	No change		17.9
90 x 140	3.5 x 5.5	Not made		
100 x 150	3.9 x 5.9	No change		24.8
		BUCHET		
76 x 120	2.9 x 4.7	76 x 120	2.9 x 4.7	14.3
		BUIRE, LA		
....		65 x 130	2.5 x 5.1	10.5
70 x 150	2.7 x 5.9	No change		12.1
75 x 130	2.9 x 5.1	Not made		
80 x 160	3.1 x 6.2	No change		15.8
85 x 140	3.3 x 5.5	No change		16.8
90 x 140	3.5 x 5.5	Not made		
90 x 160	3.5 x 6.2	No change		20.1
105 x 150	4.1 x 5.9	Not made		
		CHARRON		
65 x 120	2.5 x 4.7	No change		10.5
80 x 120	3.1 x 4.7	No change		15.8
95 x 130	3.7 x 5.1	No change		22.4
110 x 150	4.3 x 5.9	No change		30.0
		CHENARD & WALCKER		
65 x 120	2.5 x 4.7	70 x 130	2.7 x 5.1	12.1
75 x 120	2.9 x 4.7	75 x 150	2.9 x 5.1	13.9
80 x 150	3.1 x 5.9	No change		15.8
		C. I. D. (NON-POPPET)		
75 x 120	2.9 x 4.7	No change		13.9
		C. L. C. (NON-POPPET)		
80 x 140	1 cyl.	No change		3.9
....	3.1 x 5.5	65 x 130	2.5 x 5.1	10.5

at Paris Salon for 1912 and 1913

1912 Bore and stroke m.m.	Inches	1913 Bore and stroke m.m.	Inches	R.A.C. hp.
		CLEMENT-BAYARD		
60 x 120	2.3 x 4.7	No change		10.1
....		65 x 120	2.5 x 4.7	10.5
70 x 110	2.7 x 4.3	75 x 110	2.9 x 4.3	13.9
80 x 120	3.1 x 4.7	80 x 130	3.1 x 5.1	15.8
....		85 x 140	3.3 x 5.5	17.5
....	(Knight)	90 x 130	3.8 x 5.1	20.1
100 x 140	3.9 x 5.5	Not made		
....	(Knight)	100 x 140	3.9 x 5.5	24.8
		CORRE LA LICORNE		
70 x 120	2.7 x 4.7	75 x 120	2.9 x 4.7	13.9
65 x 130	2.5 x 5.1	No change		10.5
75 x 150	2.9 x 5.9	No change		13.9
80 x 140	3.1 x 5.5	Not made		
100 x 140	3.9 x 5.5	Not made		
		COTE (TWO CYCLE)		
65 x 85	2.5 x 3.3	Not made		
75 x 105	2.9 x 4.1	75 x 120	2.9 x 4.7	13.9
80 x 105	3.1 x 4.1	80 x 120	3.1 x 4.7	15.8
90 x 120	3.5 x 4.7	No change		20.1
100 x 120	3.9 x 4.7	No change		24.8
		COTTIN & DESGOUTTES		
70 x 120	2.7 x 4.7	Not made		
80 x 160	3.1 x 6.2	No change		15.8
100 x 140	3.9 x 5.5	100 x 160	3.9 x 6.2	24.8
120 x 160	4.7 x 6.2	No change		35.7
130 x 200	5.1 x 7.8	No change		42.0
		CRESPELLE		
65 x 110	2.5 x 4.3	Not made		
65 x 130	2.5 x 5.1	No change		10.8
75 x 120	2.9 x 4.7	No change		13.9
75 x 150	2.9 x 5.9	No change		13.9
85 x 160	3.3 x 6.2	Not made		
		DARRACQ		
68 x 120	2.67 x 4.7	Not made		
75 x 120	2.9 x 4.7 (non-pop.)	75 x 120	2.9 x 4.7	13.9
80 x 120	3.1 x 4.7	Not made		
100 x 140	3.9 x 5.5	No change		
....	(non-pop.)	85 x 130	3.3 x 5.1	17.9
95 x 140	3.7 x 5.5	Not made		
80 x 130	3.1 x 5.1	Not made		
		DELAGE		
62 x 110	2.44 x 4.3	Not made		
65 x 110	2.5 x 4.3	No change		10.5
75 x 120	2.9 x 4.7	75 x 130	2.9 x 5.1	13.9
80 x 149	3.1 x 5.8	Not made		
		DELAHAYE		
62 x 100	2.44 x 3.9	No change		9.1
75 x 110	2.9 x 4.3	No change		13.9
85 x 130	3.3 x 5.1	No change		17.9
95 x 130	3.7 x 5.1	No change		22.4
		DELAUNAY-BELLEVILLE		
85 x 130	3.3 x 5.1	No change		18.5
100 x 140	3.9 x 5.5	No change		24.8
		DE DION BOUTON		
66 x 120	2.5 x 4.7 (2 cyl.)	No change		5.4
84 x 130	3.3 x 5.1 (1 cyl.)	Not made		
75 x 130	2.9 x 5.1 (2 cyl.)	Not made		
66 x 120	2.5 x 4.7	No change		10.8
70 x 130	2.7 x 5.1	75 x 130	2.9 x 5.1	13.9
80 x 140	3.1 x 5.5	No change		15.8
100 x 140	3.9 x 5.5	No change		24.8
		D. P. F.		
65 x 120	2.5 x 4.7	No change		10.5
70 x 130	2.7 x 5.1	No change		12.1
80 x 150	3.1 x 5.9	No change		15.8
		EXCELSIOR		
85 x 130	3.3 x 5.1	No change		17.9
		F. L.		
80 x 100	3.1 x 3.9	No change		15.8
		F. N.		
74 x 90	2.9 x 3.5	69 x 130	2.7 x 5.1	11.8
80 x 120	3.1 x 4.7	85 x 120	3.3 x 4.7	17.9
125 x 140	4.9 x 5.5	Not made		
		FIAT		
70 x 120	2.7 x 4.7	No change		12.1
80 x 130	3.1 x 5.1	80 x 140	3.1 x 5.5	15.8
100 x 140	3.9 x 5.5	No change		24.8
110 x 150	4.3 x 5.9	No change		30.0
130 x 170	5.1 x 6.7	Not made		
130 x 190	5.1 x 7.4	Not made		
		GERMAIN		
86 x 110	3.38 x 4.3 (Knight)	No change		18.4
92 x 110	3.6 x 4.3	No change		21.0
80 x 130	3.1 x 5.1	No change		15.8
102 x 110	4 x 4.3	No change		25.8
120 x 130	4.7 x 5.1	No change		35.7
		GOBRON		
70 x 150	2.7 x 5.9	No change		13.9
....		80 x 160	3.1 x 6.2	15.8
90 x 180	3.5 x 7	No change		20.1
110 x 250	4.3 x 9.8	No change		30.0



New De Dion 1913 Model

Upper—The De Dion-Bouton 12-horsepower model, valve side
Lower—Front De Dion motor, showing chain drive for camshaft

the tabulation showing the numbers of motors exhibited with different bore expressed in millimeters and also in inches:

No. of Motors	Bore, mm.	Bore, Inches
7	60	2.36
40	65	2.55
31	70	2.75
62	75	2.95
72	80	3.14
18	85	3.84
50	90	3.54
7	95	3.74
38	100	3.93
37	110-140	4.33-5.51

Further analysis shows that of all the motors exhibited there are thirty-three models with a stroke-bore ratio of 2 to 1, that is, the stroke is double of the bore. These 2-to-1 motors are not confined to newer companies building for sensational purposes, but conservative leaders like Panhard have brought out new types of this dimension.

While the 2-to-1 motor has a big showing, 50 per cent. of the entire French motors for next year have a stroke-bore ratio of 1.5 to 1. A very careful analysis of the situation shows that there is not a square type of French poppet-valve motor on the market. By square motor being meant one in which the bore equals the stroke.

The four-cylinder motor is the great leader; the six comes second, the single-cylinder third, and the two-cylinder last. The figures are:

Four cylinder motors	321
Six cylinder motors	20
One cylinder motors	15
Two cylinder motors	11
Eight cylinder motors	2

Up to the present De Dion-Bouton is the only company marketing eight-cylinder makes, and in this respect it is specializing on a smaller model for next year.

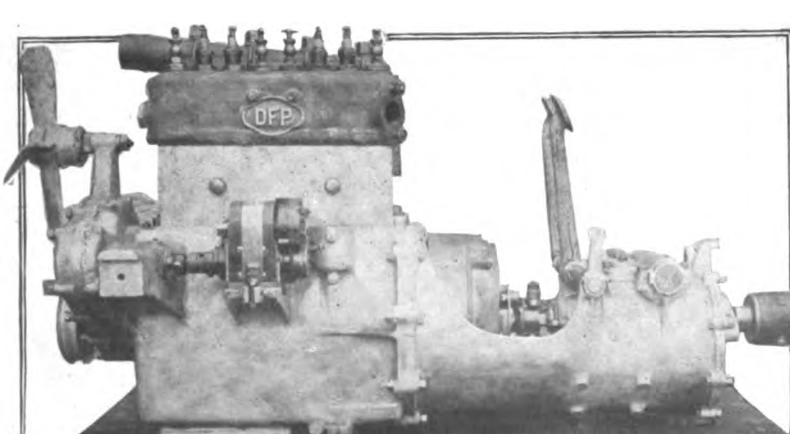
The non-poppet motor is not shown in the profusion it was a year ago. There are six different types, of which the Knight sleeve-valve type is the popular leader. It has gained several adherents during the year, who, while they could not procure manufacturers' licenses are purchasing the motors from companies that have such licenses. In this class are such concerns as Mors, Clement-Bayard, Gregoire, Aires, N. A. C., Kraft, Martini, Sigma, and, of course, Panhard, Mercedes, Rossell, Minerva, Daimler, Austrian Daimler, etc. Some of the other non-poppet concerns are: Darracq, Rolland-Pilain, Itala, Schneider, Piccard-Pictet, C. I. D., C. L. C., and in addition to these regular listed ones, Peugeot and Delahaye have announced that they may bring out some before the middle of next year.

Practically No Startling Designs

Like its London predecessor, the show is one of only moderate changes and practically no startling designs. Statistics would show that the average horsepower has not shown any increase, but this is the fault of the statistics. The official European formula for calculating horsepower practically ignores stroke, and as piston strokes have been steadily increased, and horsepower has gone up a little with the larger cylinder capacity. This, of course, is not brought out in the statistics; as examples of the errors into which the uninitiated may be led by the method of calculating horsepower, may be mentioned the Sizaire & Naudin 70 by 170 millimeters which is officially of lower horsepower than the same firm's 75 by 120-millimeter model; also the Hispano-Suiza's 80 by 180 millimeters, which has the same rating as the firm's 80 by 110 millimeters.

The average horsepower stands at 16, European rating, which is slightly in excess of that of 2 years ago.

The average cylinder bore, considering four-cylinder models only, is about 80 millimeters, 3.1 inches. Only a very small number of cars are being made with more than 4-inch cylinder bore, while a very big proportion of the French models are built with motors of 70 and 75 millimeters, 2.7 and 2.9 inches. About 50 per cent. of the French makers limit the size of their motors to 80 millimeters, while, where larger types are



Unit power plant of D. F. P., a new French motor

Comparison Continental Motors

1912 Bore and stroke m.m.	Inches	1913 Bore and stroke m.m.	Inches	R.A.C. hp.
		GREGOIRE		
80 x 110	3.1 x 4.3 (2 cyl.)	Not made		
....	(1 cyl.)	100 x 170	3.9 x 6.7	6.2
....		65 x 130	2.5 x 5.1	10.5
80 x 110	3.1 x 4.8	No change		15.8
....	(Knight)	80 x 130	3.1 x 5.1	15.8
80 x 160	3.1 x 6.2	No change		15.8
		HISPANO-SUIZA		
80 x 110	3.1 x 4.3	No change		15.8
80 x 130	3.1 x 5.1	No change		15.8
80 x 180	3.1 x 7	No change		15.8
		HOTCHKISS		
80 x 120	3.1 x 4.7	No change		15.8
95 x 130	3.7 x 5.1	No change		22.4
110 x 150	4.3 x 5.9	No change		30.0
		HURTU		
70 x 100	2.7 x 3.9	70 x 110		12.1
80 x 110	3.1 x 4.3	75 x 120		13.9
90 x 120	3.5 x 4.7	Not made		
105 x 130	4.1 x 5.1	Not made		
		ISOTTA-FRASCHINI		
74 x 130	2.91 x 5.1	75 x 130	2.95 x 5.1	13.9
85 x 130	3.3 x 5.1	No change		17.9
....		100 x 140	3.9 x 5.5	24.8
110 x 160	4.3 x 6.2	No change		30.0
105 x 180	4.1 x 7	No change		27.3
....		130 x 200	5.1 x 7.8	42.0
		ITALA		
75 x 110	2.9 x 4.3	Not made		
77 x 120	3 x 4.7	No change		14.7
90 x 130	3.5 x 5.1	No change		20.1
115 x 130	4.5 x 5.1	No change		32.8
90 x 130	3.5 x 5.1 (non-pop.)	No change		20.1
130 x 140	5.1 x 5.5	Not made		
130 x 140	5.1 x 5.5	Not made		
105 x 150	4.1 x 5.9	No change		27.3
140 x 150	5.5 x 5.9	No change		48.6
127 x 160	5 x 6.2	No change		39.9
		LANCIA		
100 x 130	3.9 x 5.1	No change		24.8
		LORRAINE-DIETRICH		
75 x 120	2.7 x 4.7	No change		13.9
90 x 130	3.5 x 5.1	No change		20.1
110 x 150	4.3 x 5.9	Not made		
125 x 160	4.9 x 6.2	125 x 170	4.9 x 6.7	38.8
		MARTINI		
80 x 120	3.1 x 4.7	No change		15.8
90 x 140	3.5 x 5.5	No change		20.1
110 x 140	4.3 x 5.5	Not made		
125 x 140	4.9 x 5.5	Not made		
....	(Knight)	90 x 140	3.5 x 5.5	20.1
		MERCEDES		
70 x 120	2.7 x 4.7	No change		12.1
80 x 130	3.1 x 5.1	No change		15.8
90 x 140	3.5 x 5.5	No change		20.1
110 x 150	4.3 x 5.9	No change		30.0
110 x 130	4.3 x 5.1 (Knight)	No change		24.8
120 x 160	4.7 x 6.2	No change		35.7
140 x 160	5.5 x 6.2	No change		48.6
130 x 180	5.1 x 7	No change		42.0
		METALLURGIQUE		
....		75 x 96	2.9 x 3.7	13.9
80 x 130	3.1 x 5.1	No change		15.8
90 x 140	3.5 x 5.5	No change		20.1
102 x 150	4 x 5.9	No change		25.8
125 x 150	4.9 x 5.9	No change		38.8
		MINERVA		
82 x 110	3.2 x 4.3 (Knight)	75 x 120	2.9 x 4.7	13.9
102 x 125	4 x 4.9	Not made		
124 x 130	4.8 x 5.1	Not made		
80 x 125	3.1 x 4.9 (Knight)	90 x 130		20.1
100 x 140	3.9 x 5.5 (Knight)	No change		24.8
124 x 150	4.8 x 5.9 (Knight)	No change		38.2
		MORS		
75 x 120	2.9 x 4.7	No change		13.9
80 x 120	3.1 x 4.7	85 x 150	3.3 x 5.9	17.9
100 x 140	3.9 x 5.5	Not made		
....	(Knight)	75 x 120	2.9 x 4.7	13.9
....	(Knight)	90 x 130	3.5 x 5.1	20.1
....	(Knight)	100 x 140	3.9 x 5.5	24.8
....	(Knight)	124 x 150	4.8 x 5.9	38.2
		MOTOBLOC		
65 x 120	2.5 x 4.7	No change		10.5
80 x 120	3.1 x 4.7	No change		15.8
80 x 148	3.1 x 5.8	No change		15.8
90 x 130	3.5 x 5.1	No change		20.1
90 x 160	3.5 x 6.2	No change		20.1
100 x 140	3.9 x 5.5	Not made		
		N. A. G.		
....	(Knight)	75 x 85	2.9 x 3.3	13.9
....	(Knight)	75 x 118	2.9 x 4.6	13.9
....	(Knight)	83 x 120	3.2 x 4.7	16.9
....	(Knight)	90 x 130	3.5 x 5.1	20.1
....	(Knight)	115 x 125	4.9 x 9.9	32.8
....	(Knight)	130 x 160	5.1 x 6.2	42.0

Paris Salon for 1912 and 1913

1912 Bore and stroke m.m.	Inches		1913 Bore and stroke m.m.	Inches	R.A.C. hp.
NAGENT FRERES					
70 x 118	2.7 x 4.6		75 x 118	2.9 x 4.6	13.9
90 x 120	3.5 x 4.7		83 x 120	3.2 x 4.7	17.1
90 x 130	3.5 x 5.1		No change		20.1
106 x 130	4.17 x 5.1		115 x 125	4.5 x 4.9	32.8
106 x 150	4.1 x 6.2		130 x 160	5.1 x 6.2	42.0
NAZZARO					
100 x 140	3.9 x 5.5		No change		24.8
OPEL					
65 x 95	2.5 x 3.74		65 x 98	2.5 x 3.85	10.5
70 x 100	2.7 x 3.9		No change		12.1
75 x 115	2.9 x 4.5		No change		13.9
....			70 x 135	2.7 x 5.3	12.1
....			84 x 118	3.3 x 4.6	17.5
....			90 x 130	3.5 x 5.1	20.1
....			105 x 135	4.1 x 5.3	27.3
115 x 150	4.5 x 5.9		No change		32.8
....			120 x 144	4.7 x 5.6	35.7
130 x 165	5.1 x 6.4		No change		42.0
PANHARD-LEVASSOR					
80 x 120	3.1 x 4.7	(2 cyl.)	Not made		
....			70 x 140	2.7 x 5.5	12.1
80 x 120	3.1 x 4.7		No change		15.8
....		(Knight)	80 x 130	3.1 x 5.1	15.8
90 x 130	3.5 x 5.1		Not made		
100 x 130	3.9 x 5.1	(Knight)	100 x 140	3.9 x 5.5	24.8
PEUGEOT					
....			55 x 90	2.1 x 3.5	7.5
70 x 130	2.7 x 5.1		68 x 130	2.6 x 5.1	11.3
80 x 130	3.1 x 5.1		No change		15.8
....			80 x 140	3.1 x 5.5	15.8
90 x 150	3.5 x 5.9		No change		20.1
92 x 150	3.6 x 5.9		No change		21.0
....			95 x 160	3.7 x 6.2	22.4
100 x 160	3.9 x 6.2		No change		24.8
110 x 160	4.3 x 6.2		Not made		
....		(non pop.)	120 x 200	4.7 x 7.8	35.7
PICCARD-PICTET					
80 x 120	3.1 x 4.7		No change		15.8
....			80 x 140	3.1 x 5.5	15.8
90 x 130	3.5 x 5.1		90 x 150	3.5 x 5.9	20.1
....			90 x 170	3.5 x 6.7	20.1
100 x 140	3.9 x 5.5	(non pop.)	100 x 150	3.9 x 5.9	24.8
PILAIN					
65 x 120	2.5 x 4.7		No change		10.5
....			55 x 110	2.1 x 4.3	7.5
75 x 110	2.9 x 4.3		No change		13.9
90 x 120	3.5 x 4.7		No change		20.1
....			85 x 185	3.3 x 7.2	17.9
100 x 120	3.9 x 4.7		100 x 140	3.9 x 5.5	24.8
124 x 140	4.8 x 5.5		No change		38.2
PIPE					
75 x 110	2.9 x 4.3		No change		15.9
80 x 150	3.1 x 5.9		No change		15.8
100 x 180	3.9 x 7		No change		24.8
90 x 105	3.5 x 4.1		Not made		
140 x 180	5.5 x 7		No change		48.6
RENAULT					
70 x 110	2.7 x 4.3				
80 x 120	3.1 x 4.7				
90 x 140	3.5 x 5.5				
100 x 160	3.9 x 6.3				
130 x 160	5.1 x 6.3				
ROLLAND-PILAIN					
70 x 110	2.7 x 4.3				
80 x 110	3.1 x 4.3				
80 x 140	3.1 x 5.5				
85 x 140	3.3 x 5.5				
105 x 150	4.1 x 5.9				
110 x 165	4.3 x 6.4				
130 x 165	5.1 x 6.4				
130 x 270	5.1 x 10.6				
ROSSEL					
65 x 130	2.5 x 5.3		No change		10.5
75 x 150	2.9 x 5.9		No change		13.9
90 x 110	3.5 x 4.3		No change		20.1
80 x 110	3.1 x 4.3		No change		15.8
GEORGES ROY					
80 x 120	3.1 x 4.7		80 x 130	3.1 x 5.1	15.8
90 x 140	3.5 x 5.5		No change		20.1
SAVA					
70 x 110	2.7 x 4.3		Not made		
75 x 140	2.9 x 5.5		No change		13.9
80 x 140	3.1 x 5.5		82 x 140	3.2 x 5.5	16.6
....			100 x 160	3.9 x 6.3	24.8
S. C. A. R.					
69 x 140	2.7 x 5.5		Not made		
80 x 140	3.1 x 5.5		No change		15.8
S. C. A. T.					
85 x 130	3.3 x 5.1		No change		17.9
102 x 140	4 x 5.5		No change		25.8
SCHNEIDER					
70 x 120	2.7 x 4.7		No change		12.1
....			75 x 130	2.9 x 5.1	13.9
80 x 130	3.1 x 5.1		80 x 140	3.1 x 5.5	15.8
95 x 130	3.7 x 5.1		95 x 150	3.1 x 5.9	22.4
105 x 150	4.1 x 5.9		110 x 160	4.3 x 6.3	30.0
SIZAIRE-NAUDIN					
120 x 140	4.7 x 5.5	(1-cyl.)	Not made		
70 x 170	2.7 x 6.7		No change		12.1
....			65 x 110	2.5 x 4.3	10.5
....			75 x 120	2.9 x 4.7	13.9

built, they generally comprise a small proportion of the firm's total output. Delaunay-Belleville, Hotchkiss, Mercedes, Metallurgique, Lancia, Itala, Unic, Leon Bollee and Minerva are at present the leading firms which produce a majority of their cars with motors of more than 3.1 inches bore.

The longest stroke on the practically commercial models is 180 millimeters, 7.08 inches, on one of the Hispano-Suiza cars, the cylinder bore of which is 3.1 inches. Pipe has also 180-millimeter stroke for a bore of 100 millimeters. Sizaire & Naudin is second with 170 millimeters, 6.69 inches, stroke for a bore of 2.7 inches. Other long strokes are Gregoire with 80 by 160, La Buire 80 by 160, Chenard & Walcker 80 by 150, Renault 100 by 160, Brasier 100 by 150, and, significant, Panhard with 70 by 140.

There is no case in which the stroke has been reduced, but a considerable number in which it has been increased a little. Delage, for instance, has changed his four-cylinder from 75 by 120 to 75 by 130 millimeters, and his six-cylinder from 66 by 120 to 65 by 130; Piccard-Pictet has changed from 90 by 130 to 90 by 150 and 90 by 170; Bozier and Alcyon have each changed from 75 by 120 to 75 by 130. Finally, Ballot, one of the largest motor makers for the trade, has added 10 millimeters to the stroke of nearly all his motors.

For motors of 65, 70 and 75-millimeter bore it is the common practice to fit two-bearing crankshafts, the crankchamber having no horizontal division. This method is adopted by Unic, Ballot, Chapuis & Dornier, Sizaire & Naudin, Delahaye, Chenard & Walcker, De Dion-Bouton, D. F. P. and Pilain. Delage, after using two-bearings for his 75-millimeter motor has adopted three for the coming season, and all the firms mentioned above adopt three main bearings whenever their motors exceed 75-millimeter bore. Panhard, it may be mentioned, has decided on three bearing for the new 70 by 140-millimeter type just put on the market.

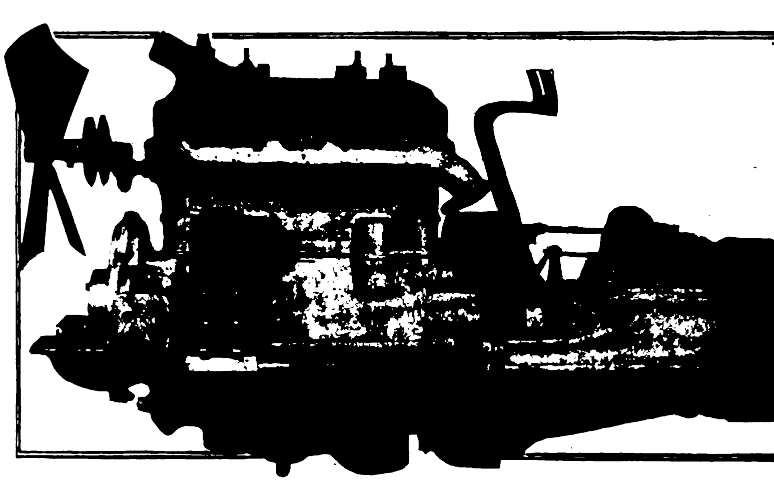
The disadvantages of two-bearing crankshafts outweigh the advantages when the size of the cylinders gets beyond 75 millimeters, and among the firms mentioned there are some who have had to redesign their motors with a stiffer shaft and longer bearings to get rid of the suspicion of whip when running heavily loaded.

Six-Cylinders Not Increasing

Six-cylinder motors are not on the increase. Delaunay-Belleville makes a specialty of this type of motor and is one of the few firms building more sixes than fours. There are about half-a-dozen firms having abandoned some or all of their six-cylinder models, among these being some factories never having built more than a very small number of sixes, and there are about three firms bringing out a six for the first time. Improvements in the flexibility of the four and the increasing cost of fuel are important factors against the further extension of the six-cylinder motor.

Although far from being in the majority, there is a pronounced tendency towards the adoption of unit construction for motor and gearbox. Panhard took this up a year ago and has extended it to all the models; D. F. P. has adopted it for the coming season; Gregoire has one model with the clutch and gearbox united; F. L. has a power plant of this type; Hispano-Suiza and Piccard-Pictet have adopted this construction from the beginning; Motobloc, generally admitted to be the originator of this

(*Continued on page* 1284.)



Unit power plant with rigid mounting of Hispano-Suiza

Janney Joins R. C. H. As General Manager

Succeeds J. F. Hartz, Who Resigns on Account of Other Business—Hartz Retains the Treasurership

Conference of Branch Managers Taking Steps to Replace a Number of Branch Houses by Dealers

DETROIT, MICH., Dec. 17—*Special Telegram*—P. R. Janney, at present general manager of the Peninsular Motor Company, Saginaw, Mich., maker of the Marquette car, will on January 1 become general manager of the R. C. H. Corporation to succeed J. F. Hartz, who was chosen to direct the concern's affairs on November 8, following the reorganization of the company. Mr. Hartz's resignation is ascribed to his inability to devote sufficient time to the R. C. H. affairs owing to his other business interests. Mr. Janney has been associated with the General Motors for some time prior to taking hold of the Marquette affairs, he having been engaged to look after the Randolph Motor Car Company's business. Mr. Hartz retains the office of treasurer.

A hurried conference of R. C. H. branch managers from all parts of the country was held in this city today, the new management being made known to them. One of the objects of this conference was to take steps for the discontinuance of a number of branch houses and to replace them by dealers. This move should greatly decrease the corporation's operating expense.

Huber Suit Fought by Kelly Company

DETROIT, MICH., Dec. 17—Hearings were begun in Detroit this week in the alleged patent infringement case of the North American Vehicle Company against the Detroit Taxicab and Transfer Company. The hearings are being conducted before E. P. Voorheis, clerk of the United States court, special examiner for the case, and are being held in the office of R. A. Parker, of the law firm of Parker & Burton, counsel for the plaintiffs.

The vehicle company alleges infringement of the Emil Huber patent relating to three-point suspension of the main frame of an automobile. The Kelly Motor Truck Company, of Springfield, O., whose cars the Detroit company is using, is defending the case for the Detroit concern through its attorneys.

$1,000,000 Company to Make Vaughan

The Vaughan Motor Car Company, capital $1,000,000, has just been incorporated to take over the Woods Manufacturing Company, of Kingston, N. Y., and to continue making the Vaughan car. It is tentatively proposed to make 500 automobiles in 1913.

The new company will have $300,000 of cumulative preferred stock and $700,000 of common. Aside from the bare announcement of incorporation, no details as to the personnel of the new company and its manufacturing program were made public.

Grabowsky Property on the Block

DETROIT, MICH., Dec. 14—Lee E. Joslyn, referee in bankruptcy, has given notice to creditors of the Grabowsky Power Wagon Company, of Detroit, bankrupt, that property of the company will be sold by the Security Trust Company, Detroit, trustee, which will receive sealed bids in its office in Detroit up to December 23. Each bidder is required to deposit a certified check, payable to the trust company, to the amount of 15 per cent. of its bid, and each bidder may bid upon the whole or any separate parcel of the property, the deposit to be forfeited should the bidder, after being declared successful, refuse to carry out the provisions of the bids.

The inventory includes real estate to the amount of $168,552.98, which is appraised at $140,000. Other items are: Machinery, inventory $60,777.84; appraisal, $42,456.68; equipment, $10,255.10; appraisal, $6,026.26; furniture and fixtures, inventory, $6,809.73; appraisal, $5,144.42; jigs and tools, inventory, $19,517.04; appraisal, $16,032.19; patterns, inventory, $11,913.41; appraisal, $5,848.31; material, inventory, $122,023.30; appraisal, $100,696.88; miscellaneous, inventory, $448.01; appraisal, $436.60. The inventory total is $400,297.41, while the total of the appraisal is $316,641.34.

Of the amount bid 15 per cent. must be paid by December 25 and the balance as soon as the property is turned over. The Grabowsky Power Wagon Company was adjudicated a bankrupt by Judge Tuttle in the United States District court in Detroit, November 23.

Briscoe Men To Make Radiator

DETROIT, MICH., Dec. 16—With a capital of $30,000, which soon will be increased to $125,000, former employees of the Briscoe Manufacturing Company and others have organized the Farlinger Manufacturing Company for the purpose of placing on the market a new automobile radiator, the invention of George E. Farlinger, of Detroit, for many years superintendent for the Briscoe company, and after whom the new company is named.

The plant of the Waterman Marine Company has been leased and the manufacture of the new radiator will be begun within a month, by which time the marine motor company will be occupying its new plant now in process of construction on the east

Automobile Securities Quotations

Few automobile stocks made any gain during the past week: quite a number were steady and the majority fell back. Trading was not heavy and there was no evidence of bear aggression. The sales were mostly for the long account as realizing, liquidating and profit taking business had been finished at higher figures. Miller, which was one of the three issues to show a sharp advance last week, continued its upward course, making a net gain of 2 points but Firestone and Swinehart fell back. The tire stocks generally were weak. Nothing discouraging of an industrial nature transpired. The table follows:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	155	190
Ajax-Grieb Rubber Co., pfd	..	..	97	102
Aluminum Castings Co., pfd	..	..	97	100
American Locomotive, com	36	37½	41	41½
American Locomotive, pfd	105	105	105	106½
Chalmers Motor Company	..	..	130	145
Consolidated Rubber Tire Co., com	5	12	11	14
Consolidated Rubber Tire Co., pfd	12	20	54	60
Firestone Tire & Rubber Co., com	178	185	300	307
Firestone Tire & Rubber Co., pfd	108	110	105½	107
Garford Company, preferred	..	..	100	102
General Motors Company, com	36	37½	32	34
General Motors Company, pfd	75	76	76	78
B. F. Goodrich Company, com	..	..	63	65
B. F. Goodrich Company, pfd	..	..	105	106½
Goodyear Tire & Rubber Co., com	245	255	402	411
Goodyear Tire & Rubber Co., pfd	104	106	105	106
Hayes Manufacturing Company	..	..	..	90
International Motor Co., com	..	..	10	20
International Motor Co., pfd	..	..	40	60
Lozier Motor Company	..	..	..	38
Miller Rubber Company	..	..	160	170
Packard Motor Company, pfd	104½	106	104	106
Peerless Motor Company	..	..	115	118
Pope Manufacturing Co., com	40	43	26	28
Pope Manufacturing Co., pfd	66	68	69	70½
Reo Motor Truck Company	8	10	9¼	9¾
Reo Motor Car Company	23	25	20	21
Studebaker Company, common	..	..	35	37
Studebaker Company, preferred	..	..	90	93
Swinehart Tire Company	..	..	100	105
Rubber Goods Mfg. Company, pfd	100	105	103	107
U. S. Motor Company, com	..	..	No market	
U. S. Motor Company, pfd	..	..	"	"
White Company, preferred	..	..	104	109
Willys-Overland Company, com	..	..	68¼	68¾
Willys-Overland Company, pfd	..	..	99¼	99¾

side. Special machinery has been ordered and at present the work of getting out the dies is being conducted. The Farlinger company will have a building 75 by 100, one story in height, but will have a lot large enough to accommodate an addition to the plant, which, it is expected, will have to be built within a short time.

The officers of the new company are: President, George E. Farlinger; vice-president, Otto J. Groehn; secretary, William H. Arthur, Marshall, Mich.; treasurer, Charles R. Talbot; general manager and chairman of the board, Frederick C. Arthur; directors, the officers and Maurice Friedburg and Alex. J. Ranstadtler.

All the officers are Detroit men with the exception of William H. Arthur, and all, with the exception of William H. Arthur, Charles R. Talbot and Maurice Friedburg, formerly were employed by the Briscoe company.

The new radiator is of the honeycomb type, and, instead of having from 500 to 5,000 pieces, as is the case with most radiators of standard size, has only 25 pieces of metal. The radiator proper is a series of hollow plates which may be standardized and made interchangeable.

Crude Rubber Easier All Around

After touching a level of $1.11 a pound for up-river fine, the crude rubber market sagged off to $1.09 1-2 in response to slackening demand as compared with conditions last week. The fortnightly auction in London begins Tuesday and a preliminary survey of the situation shows about 800 tons to be marketed. Importations over Sunday amounted to about 5,000 packages, of which nearly half was guayule from Tampico. Sales in the open market are less in volume than they were last week when the market was stiffer, but the majority of transactions were consummated privately.

Market Changes of the Week

Considerable activity reigned in the various markets this week, and the usual fluctuations in prices occured. A stronger tone was developed in the New York City market for tin yesterday, following a sharp advance abroad. Tin closed at $5.00 per 100 pounds at an increase of $.07. Lead remained dull and easy, closing at a loss of $.02 1-2. Electrolytic copper remained dull and nominally unchanged. Consumers continue out of the market, or are only buying small lots from second hands at prices from $.00 1-4 to $.00 1-10 under the asking prices of the combined producing interests. There were no developments in the local market for scrap rubber. Dealers report a moderate demand from reclaimers.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.	.08⅞	.08⅞	.08⅞	.08¾	.08¾	.09	+.00⅛
Beams & Channels, 100 lbs..	1.61	1.61	1.61	1.61	1.61	1.61	....
Bessemer Steel, ton	27.50	27.50	27.50	27.50	27.50	27.50	....
Copper, Elec., lb....	.17 7/20	.17 7/20	.17⅜	.17⅜	.17⅜	.17¼	—.00 1/10
Copper, Lake, lb.....	.17½	.17½	.17½	.17½	.17½	.17½	....
Cottonseed Oil, Dec., bbl.....	6.30	6.29	6.30	6.28	6.28	6.20	—.10
Cyanide Potash, lb........	.19	.19	.19	.19	.19	.19	....
Fish Oil (Menhaden) Brown	.33	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals......	.21	.21	.21	.21	.21	.21	....
Lead Oil, prime.	.96	.96	.96	.96	.96	.96	....
Lead, 100 lbs...	4.32½	4.31½	4.31½	4.31	4.31	4.30	—.02½
Linseed Oil....	.46	.46	46	.46	.46	.46	....
Open-Hearth Steel, ton.....	28.00	28.00	28.00	28.00	28.00	28.00	....
Petroleum, bbl., Kansas crude..	.76	.77	.76	.78	.77	.80	+.04
Petroleum, bbl., Pa., crude....	1.95	1.95	1.98	2.00	2.00	2.00	+.05
Rapeseed Oil, refined	.69	.69	.69	69	.69	.69	....
Silk, raw Ital...	....	....	....	4.35	....	4.35	....
Silk, raw Japan.	....	....	....	3.72½	....	3.72½	....
Sulphuric Acid, 60 Beaumé...	.90	.90	.90	.90	.90	.90	....
Tin, 100 lbs....	4.93	4.94	4.95	4.96	4.97	5.00	+.07
Tire Scrap......	.09⅞	.09⅞	.09⅞	.09⅞	.09⅞	.09⅞	....

Kilbourne Cancels Dayton's License

Step Was Taken in Accordance with Clause Permitting the Cancellation of Concern if Involved in Litigation

Hereafter Company Must Buy Its Motors from a Licensed Manufacturer—Same Applies to Columbia

CHICAGO, Dec. 17—Formal notice of the cancellation of the license of the Dayton Motor Car Company, Dayton, O., maker of the Stoddard-Dayton car, to manufacture the silent Knight motor was mailed the receivers of the United States Motor Company, in New York today, by L. B. Kilbourne, of the firm of Knight & Kilbourne, holders of the patents. This step was taken in accordance with a clause in the contract which gives to the holders of the patents the right to cancel any license when the concern to which the license has been granted has become involved in litigation.

This cancellation does not necessarily mean the Knight engine can no longer be used by the Stoddard-Dayton people. They can continue to use the sleeve-valve but they must buy the motors from some other concern which is licensed to manufacture them. This also applies to the Columbia. It had been generally supposed that the Columbia company also was a licensee but such is not the case. The Columbia was supposed to buy its engines from the Stoddard-Dayton but this was not done, the Columbia making Knight engines at the Hartford plant.

This cancellation of the Stoddard-Dayton license leaves three concerns in this country with the right to make Knight motors, the Lyons-Atlas Company, of Indianapolis, the F. B. Stearns Company, of Cleveland, and the makers of the Edwards-Knight, at Long Island City.

Gray Patents in Holding Company

INDIANAPOLIS, IND., Dec. 16.—The Gray Engine Starter Company has been organized and will be a holding company for the patent rights of an invention of Thomas J. Gray on a self-starting device, the right to manufacture which has been let to the Gray & Davis Company, of Boston, a branch of the General Electric Company.

The Indianapolis company has been incorporated with an authorized capitalization of $300,000, the directors and principal stockholders being Mr. Gray, William Bosson and Dr. Robert C. Light, all of Indianapolis.

Court Orders Findlay Sale

TOLEDO, O., Dec. 16—Judge Killits, of the United States District Court at Toledo, has ordered the sale of the Findlay Motor Company's plant and equipment at Findlay, O., as the result of a petition filed against that company by the Ewing-American Motor Company. Fred Kruse, special master, is directed to sell the property for not less than $50,000 January 18 at 2 p. m. Of the proceeds the court will retain $1,500 pending adjudication of claims of the Lucas Machine & Tool Company, American Motor Company, and other creditors.

Roy D. Chapin, of the Hudson Motor Car Company, has been elected secretary of the Automobile Board of Trade, vice Benjamin Briscoe, resigned. John North Willys, of the Willys-Overland company has been chosen to the vacancy in the board of directors caused by the election of Mr. Chapin and the resignation of Mr. Briscoe.

International Gets Cash

Syndicate Pledges to Furnish $1,500,000 in Exchange for 6 Per Cent. Notes and 200 Per Cent. Common

Control of Company To Be Held by Lenders After Stock Issue Is Scaled Down Under Plan Adopted

MUCH misapprehension has resulted from the publicity given to alleged plans of reorganization of the International Motor Company without any substantial basis, but the facts in the case as here presented show that the rumors that have been circulated during the past 2 weeks are unfounded.

The situation is as follows: When the control of the company passed into the hands of the present operating company there was an excessive inventory. Business for the first 10 months of the calendar year covered orders for about 1,150 trucks of various types and the gross earnings were $4,500,000, with net of $335,000, or about twice the amount required for the regular preferred dividend and 90 per cent. more than in the corresponding period of 1911. But the working capital was not large and the merchandise claims on account of the inventoried material drew upon the capital account so that further financial help was needed to carry the company to a turnover.

A plan was worked out to secure between $5,000,000 and $6,000,000 for this purpose, embodying the idea of having some of the large stockholders take over the whole of an underlying issue of preferred stock and until 3 weeks ago it seemed certain that such a plan would be adopted. It was discovered after the plan had been arranged that there was a legal flaw in the proposal in that the minority stockholders were not given an opportunity to participate. Consequently the whole matter was abandoned and with only a few weeks in which to make a turn the management was obliged to devise another plan.

Under date of December 12, President C. P. Coleman issued a notice to the stock trust certificate holders in which he called their attention to the imperative need of $1,500,000 to continue the business and take advantage of its opportunities. Under the plan proposed, all stockholders have an opportunity to subscribe to the loan which will be for 1 year and bear 6 per cent. interest. Cash dividends on the preferred stock are to be suspended for 2 years, but the company is authorized to issue scrip dividends in place of the cash in case the earnings of the company warrant such procedure. The holders of common stock are requested to turn in their certificates and to agree to surrender 55 per cent. of their shares in order to provide a bonus to the financial interests who will advance the money. This bonus will be 200 per cent. in common stock as measured by the amount of the subscription. The scrip to be issued as dividends is convertible into preferred stock.

Thus if a stockholder of 100 shares, subscribes for $10,000 of the loan, he will participate in the syndicate operation to that extent and in addition will receive 200 shares of common stock in the corporation surrendering 55 shares.

The common stock is quoted nominally around $20 a share and the preferred around $64 a share.

The acquisition of $3,000,000 of common stock by the syndicate which has pledged the money, in addition to present holdings will be sufficient to place control of the company in the hands of the lenders, and while they are already represented on the board of directors the names of several additional representatives will be selected for the new board.

Vice-president Dickerman, of the American Car and Foundry Company, has been secured by the financial interests to make a detailed inspection of the properties of the company and will devote 4 months to the work.

The syndicate has selected a number of prominent executive men to carry on the work either in advisory or active capacities, but this does not mean necessarily that the present organization and its personnel will be radically changed for the present at least.

According to one of the directors of the company, the financial troubles have been due to an attempt to stretch out its working capital too thinly.

The reports recently formulated show that the assets exceed the liabilities and that the earning power of the company has been doubly sufficient to pay its dividends after settling all its operating obligations.

The addition of $1,500,000 in liquid capital to the funds of the company will serve to settle all current debts, complete the liquidation of the old inventory account which was inherited by the present company and leave about $700,000 free and clear for working capital.

Prospects for Australian Trade

SYDNEY, Nov. 25—The motor trade in Australia promises not to be quite so flourishing as that of the present season, owing to a depression in the money market, and the effects of the prospects there appeared at the beginning of the winter, of a drought, for although the dry spell only lasted 2 months, the loss the country sustained has been greater than was first realized, and the wool clip and the wheat crop are somewhat lower than those of previous years.

Both the wool and wheat are up to the usual standard, but the quantity is less.

The American makers who are aiming at developing their trade with Australia must bear in mind some of these points:

Not too heavy, anything over 2,500 pounds is considered to be very heavy; a good style of detachable wheel or rim will soon be absolutely necessary, as the makers of light British cars are doing this. A good finish and a good looking body.

Cars rated over 30 horsepower sound in most people's ears as something extravagant and only intended for the rich.

Makers of six-cylinder cars will not find a ready market for their cars, as there are very few sixes here even in the higher-priced European cars.

Right hand drive is absolutely necessary.

Clark Creditors to Hold Meeting

LANSING, MICH., Dec. 16—Notice has been given by Charles F. Poxson, of Lansing, appointed receiver of the Clark Power Wagon Company, in the Ingham County Circuit court, that all creditors are required to deliver their respective accounts and demands against the company to the receiver on or before January 28, together with proof by affidavit of the amount due. All persons indebted to the company are required to render an account of such debts and to pay the same to the receiver on or before January 28. All persons having in their possession property belonging to the company are required to deliver the same to the receiver on or before the date previously mentioned. All persons holding contracts with the company are required to present them in writing. A general meeting has been called for February 27.

Changes Made in Briscoe Staff

DETROIT, MICH., Dec. 16—Fred Aldis has become superintendent for the Briscoe Manufacturing Company to succeed George E. Farlinger, who resigned to become head of the Farlinger Manufacturing Company, which is to place upon the market an automobile radiator invented by him. Ed. Robinson succeeds Frederick C. Arthur in the sales department, Mr. Arthur also having gone to the Farlinger company. Both appointments are in the nature of promotions, Messrs. Aldis and Robinson having been with the Briscoe company for some time.

Use of Trucks in Mexico

Splendid Opportunities Offered for This Class of Trade in Place of Old Method of Transportation

Biggest Field for Motor Trucks Is Hauling Ore and Supplies in Different Mining Districts

CITY OF MEXICO, MEX., Dec. 9—In this capital, as well as in the other larger cities of the country, motor trucks are just beginning to be introduced. It is a virgin field and is believed to offer splendid opportunities for this class of trade. While there is some difference of opinion among the manufacturers and concerns that would be expected to find use for this modern vehicle as to whether it can be made to serve profitably in place of the present cheap laborers that are almost universally used as a means of carrying burdens in the cities and towns of the country, it is the general opinion that motor trucks will be found so much more serviceable than the old method of transportation that they will gradually be adopted.

In Mexico the licensed carriers of burdens known as cargadores take the place of delivery and other kinds of hauling vehicles except for the very heaviest articles. These men are able to perform remarkable feats of strength and endurance in the matter of carrying loads upon their backs. Owing to the cheapness of this class of service, modern delivery vehicles have found it impossible to compete with them. All baggage is carried to and from the railroad stations and hotels by these cargadores. They trot along the streets with heavy trunks upon their backs with as much ease and nonchalance as though the burden was of no weight. Whenever there is any moving of household furniture the work of transporting the articles from place to place is done by these men. Many of the largest stores, even those of large trade, make deliveries by this means. It is this cheap manual labor that has so far prevented an extensive trade being done in this country in the matter of selling motor delivery wagons. It is thought, however, that even this hindrance to the trade will in time be overcome as the cities of the country become more modernized.

In the matter of heavy hauling, such as is required by many manufacturing establishments and dealers, motor trucks are better suited to carry on the work expeditiously than the present method. When it comes to heavy machinery it is impracticable for cargadores to handle the different parts and the comparatively few trucks now in use in the country are employed for this purpose.

Biggest Field Is in Mining Work

The biggest field, however, for motor trucks in Mexico is that of hauling ore and supplies in the different mining districts. Already these vehicles are taking the place of wagons drawn by mules in many of the mining camps. But for the fact that the country has been disturbed by revolutionary activities for the last 2 years there would have been by this time many motor trucks in use by different mining concerns. Tentative orders for these vehicles have been placed and will be filled as soon as the country is in a state of tranquillity. There has been an evolution in the method of handling ore in the older camps. Originally the product of the mines was carried to the ore reduction mill or the railroad shipping point upon the backs of the peon laborers. In time this method gave way to the use of burros for the purpose and in many of the camps these patient animals are still serving as carriers of ore. Where it was possible to construct good roads it was found it was cheaper to haul the ore in large wagons pulled by mules and these latter are now being substituted by the modern motor truck. The evolution which has taken place in ore transportation is expected to be brought about gradually in the hauling of heavy articles in the towns and cities of the country.

During the last few years there has been inaugurated an era of street improvements not only in this city but in Guadaloupe, Monterey, San Luis Potosi, Puebla, Tampico, Vera Cruz, Chihuahua, Torreon and a few other cities of the country. Many streets have been paved in these different cities and it is now possible for motor vehicles of all kinds to be operated with a degree of smoothness that could not have been done prior to the making of these improvements. The accomplishment of this street paving has stimulated the sale of motor trucks as well as of automobiles and it is believed that it will not be long before there will be created a large demand for motor delivery vehicles.

Guatemala Fosters Automobiles

GUATEMALA CITY, Dec. 9—Action on the part of the federal government offering generous subsidies to any of the state of district authorities for the construction of roads will have a decided effect on automobile imports. No roads to be subsidized are to be built until the plans are approved by government engineers and no plan will be approved unless the roadway is to be constructed sufficiently well to permit the use of motor cars.

The successful use of motor cars in several sections of the republic has proven that great stimulus can be given many industries by the extension of such lines. This is especially true in the coffee districts where this method of haulage has proven most efficient. There are many isolated sections of the country not producing sufficient tonnage to justify the building of railroads, but as the cost of ordinary roadways is so much less and as they can be kept up with little expense the districts can be developed by the use of motor trucks.

Government engineers believe that the extension of good automobile roads will give the country most of the advantages of a widely extended railway system at one-tenth the cost.

Truck to Move Regiment to Coast

INDIANAPOLIS, IND., Dec. 16—A plan for transporting the Twenty-third United States Infantry from Fort Benjamin Harrison, near this city, to the Pacific Coast and return during the summer of 1913, using motor trucks for the trip, has been worked out by Col. Edwin F. Glenn and other officers of the regiment. The plan is to be submitted at once to the experts of the War Department for consideration, and if it meets with their favor Congress will be asked to appropriate $450,000 for the experiment.

Col. Glenn has long held a theory that the motor truck, in the very near future, is to take an important part in the mobilization of troops and in actual warfare. He believes the experiment to be proposed would be well worth the cost involved if it would establish the unquestionable efficiency of the motor truck for army work.

According to the plan worked out, it would require 140 motor trucks for the trip, and it is estimated the regiment could advance at the rate of 60 miles a day. The average daily march for infantry on foot is 15 miles a day, and for cavalry 25 miles.

Col. Glenn believes each truck could carry two squads, consisting of fourteen privates, two corporals, one surgeon and a driver, together with their necessary equipment and baggage. Additional trucks would be required for hauling gasoline, oil, tires, spare parts and other necessary things.

It is estimated that if a regiment were equipped with motor trucks, and internal strife developed within 600 miles of an army post, the regiment could reach the scene in much less time than it would require to assemble a railway train and transport the troops in this manner.

Statistics of the War Department show it costs $1,080 a day to maintain a cavalry regiment on march, at 25 miles a day. It is estimated a regiment using motor trucks could be maintained for $620 a day, and cover 60 miles.

Electric Car Men Meet

S. G. Thompson Delivers Essay on the Influence of the Central Station on the Vehicle Industry

Increase in Numbers of the Electric Pleasure Car Has Been Continuous—Truck Growth Recent

THE December meeting of the Electric Vehicle Association of America was held Tuesday evening at the Engineering Societies Building and about fifty central station men and electrical engineers attended to hear the address of S. G. Thompson, of the Public Service Electric Company, of Newark, N. J., who delivered an essay on Central Station Influence on the Electric Vehicle Industry.

Mr. Thompson presented figures, data and conclusions showing the prime value of electric vehicle business to the central stations and outlined what had been done to foster the vehicle business by his company and its effect upon earnings during the past 2 years.

He treated particularly of electric trucks and showed that at present vehicles of that type represent 26 per cent. of the total power wagons operated in the territory served by his company. The figures are 731 trucks of all kinds, and 191 electrics. He showed that only nine manufacturers of electric trucks are represented by the 191 vehicles in service.

Gas Versus Electric Trucks

Comparing the high grade gasoline trucks with the electrics he showed that 185 of the gasoline trucks cost more than $1,000 and represented ninety-eight manufacturers, thus giving the electric trucks more than 50 per cent. of the high grade business.

In part his paper was as follows:

Probably no better example of the influence of the central station on the electric vehicle industry exists than in those sections of New Jersey served by the Public Service lines. Two years ago this territory presented a virgin field for electric vehicle exploitation. The manufacturers themselves were but casually attempting to market their product, and the public at large was not sufficiently informed of the merits of electric vehicle operation to take kindly to its adoption. Aside from a few commercial vehicles operated by manufacturing plants and by New York business houses, but few of these machines were in use, and, with the exception of those power wagons owned by the Edison Storage Battery Company and allied interests, there were no large installations in the state. Pleasure vehicles had met with little favor, there being a total of but eighty machines—many of an ancient type and nearly all but infrequently used.

An investigation of the electric vehicle conditions in those cities which were leaders in the use of these machines influenced the Public Service Electric Company to attempt their introduction in its territory, and for that purpose an automobile department was established, whose accomplishment in the introduction of vehicles is represented in the increase in the number of vehicles since the inception of this department.

The increase in the number of pleasure vehicles has been practically continuous. This is accounted for by the fact that the attitude of the Public Service company immediately influenced the manufacturers of these machines to engage actively in marketing their product in this territory.

The commercial vehicle increase is shown to be of a slower growth during the early period of activity, while the rise in the last few months is quite marked. This is a natural condition, as the development of power wagon use necessarily required a longer introductory period of education than that of the pleasure machines.

An analysis of the power wagon conditions in this territory today discloses some rather astonishing facts regarding the status of the electric commercial vehicle, and if these conditions may be accepted as an indication of the general trend throughout the country, we need have no fear for the future of the electric commercial power wagon industry.

At the present time we find a total of 731 commercial vehicles of all types employed within this territory. From the curve it will be observed that 191, or 26 per cent. of these are electrics. The balance are gasoline machines. As this 26 per cent. in electric machines represents the produce of but 9 vehicle manufacturers, while the 74 per cent. of gasoline machines were marked by 158 makers, it would appear that the electric vehicle manufacturers are certainly obtaining their full share of the total power wagon business.

If we go further into the analysis of these figures, we discover that of the 540 gasoline machines in operation, 355 are low-grade cars whose selling price is in the neighborhood of $1,000. In this class are represented sixty vehicle makers, while the balance of 185 gasoline cars are the product of ninety-eight different companies. In other words, over 50 per cent. of the total number of high-grade power wagons employed are of the electric type. Let me impress this statement upon you more strongly. Nine electric vehicle manufacturers, in competition with ninety-eight gasoline makers, have marketed 50 per cent. of the total number of machines of similar quality employed within the territory under discussion. Under the circumstances it would appear that the acceptance of the gasoline power wagon is the influence of numbers rather than of quality or of possible application.

The increase in kilowatt consumption and income will appeal strongly to the central station manager; it indicates just what the use of power wagons means to his department.

It will be observed that the rapid increase in power consumption follows a marked increase in the use of commercial vehicles, and points to the fact that the introduction of these machines is of far greater importance to the central station than is that of the pleasure vehicle.

The decrease in the average kilowatt-hour rate from 4.15 to 3.35 cents, is attributable to the fact that a majority of these commercial power wagons are in the larger installations and public garages, paying for their service at the wholesale power rates. The rates have not been lowered.

Rise Throughout December

While my figures are to December 1, it is interesting that the indications point to a continued rise throughout December because of the vehicles which have been sold, but are not yet delivered, and assurances of additional business from cars not now charged from the Public Service lines. In these are included some forty machines of the commercial type.

It is evident from the foregoing that the influence of the central station on the electric vehicle industry is far-reaching in its results, and from reports of the vehicle manufacturers themselves, I have every reason to believe that educational campaigns in other sections have produced a marked increase in the number of electric commercial vehicles employed. I am strongly of the opinion that if central station managers would make a market investigation of the local conditions, with a view to promoting the use of electric power wagons, they would find the field to be much larger than is generally believed; and, further, that the business can be secured with a very reasonable expenditure of money. This is borne out by the fact that in the operation of our automobile department our income has always exceeded the amount expended in promoting the use of electric machines, and we shall finish the year 1912 with a good profit. From our experience and our faith in the future of the electric vehicle, we feel that the ultimate wholesale introduction of power wagons can best be attained by continued effort along the lines which we have pursued during the past 2 years, rather than through extensive expenditures of a more or less speculative nature. Possibly we are wrong in our premises, but at any rate it is good business procedure.

Mr. Thompson's address was illustrated with two slides showing series of curves outlining changes made in the electric vehicle business in his territory in 2 years and its relation to the sale of current.

Mr. Thompson's presentation was greeted with astonishment by many of those present and the discussion brought out only a few sidelights on the paper.

One of the interesting things that developed was a statement by Mr. Hillman, of the General Vehicle Company, that careful scrutiny of the central station field shows that the average annual return from the investment represented per kilowatt used in the business of charging electric trucks was $156 while no other class of business approached that figure. He said that the saloon business was next in order of profit but that it was much lower in returns. He concluded that as the business was so profitable it should be fostered.

A rather amusing point was brought out during the discussion when a New Jersey delegate told a story on himself that provoked much laughter. He said that he was soliciting a potential user of current and was about to close the contract when the prospect noticed the car in which the Jerseyman had ridden to the door.

"Hey there," exclaimed the prospect, "if electric vehicles are so good why don't you use one yourself; I see you have a gas car."

The Jerseyman had to admit the palpable fact and the contract is still unclosed.

This led to a discussion of the abandonment of gasoline automobiles by the big electric companies. The expressed opinion of many of those present was that the gasoline automobile would not be abandoned by the companies where its service was more economical and efficient than the electric.

The next meeting of the association will be held January 20. A banquet will be tendered the past president, W. H. Blood, at Delmonico's, January 16.

Tradesmen to Form New York Club

Plans for organizing automobile men of New York into a club along broader lines than the Automobile Club of America, are making progress. The first call was made October 1 by E. E. Schwarzkopf and since that time 122 names have been added to the list of founder members. Those who have identified themselves with the movement include leading dealers, officers of the national organizations and members of the motor and accessory trades.

The preliminary list shows that the new club, which will be called the Automobile Club of New York, is to be an association of the automobile industry. Sidney S. Meyers has been named counselor.

The objects of the club as announced in its prospectus are as follows: To provide a social club in the neighborhood of Columbus Circle; to stimulate public interest in the automobile; to cultivate closer relations between the trade and the users; to secure the advantages of co-operation and to provide a center of information and advice.

Enthusiasm at Cadillac Convention

DETROIT, MICH., Dec. 16—The convention of Cadillac dealers came to a close with a big banquet at the Ponchartrain Hotel, at which K. P. Drysdale, advertising manager of the Cadillac company, was toastmaster. During the four days' sessions, which were held at the Ponchartrain, points of general interest along the lines of salesmanship were discussed, and especially plans for service to the owner. Trips through the factory were arranged for the dealers in small parties. About 250 were in attendance, about 200 of these being dealers and the others men connected with the various agencies, all parts of the United States and Canada being represented.

Hoosier Clubs Organize

Local Bodies Combine to Form Indiana State Automobile Association to Be Affiliated With the A. A. A.

Motor Dealers' Contest Association Meets—Mutual Insurance for Wisconsin Automobilists

INDIANAPOLIS, Dec. 18—(*Special Telegram*)—The Indiana State Automobile Association has been formed by representatives of the various automobile clubs of the state. Clubs which have a charter membership in the state organization are the Hoosier Motor Club, of this city, the Salem Automobile Club, of Salem, the Madison Automobile Club, of Madison, the Terre Haute Automobile Club, of Terre Haute, the Winchester Automobile Club, of Terre Haute, and the Evansville Automobile Club, of Evansville. Officers of the organization are: President, P. C. Rubush, an Indianapolis architect and vice-president of the Hoosier Motor Club; first vice-president, W. A. Koch, president Evansville Club; second vice-president, Samuel Lane, president of the Hoosier Motor Club; third vice-president, Samuel Lane, president of Terre Haute Club; secretary-treasurer, W. S. Gilbreath, secretary Hoosier Motor Club. The State Club will be affiliated with the American Automobile Association. A. G. Batchelder, chairman of the executive committee of American Automobile Association addressed the meeting at which the club was formed.

Dealers' Contest Association Meets

The Motor Dealers' Contest Association held an informal meeting at the Elks clubhouse Friday, December 12. About thirty were present. It was decided to hold its meetings on the first Monday of each month. A discussion arose as to the advisability of the name decided on at the last meeting, it being shown that there was a prevailing opinion among the trades people that the organization was for racing only, and after a few extemporaneaus speeches on that subject by different members, it was decided to send out a circular to the various agencies throughout the city, showing that the plan of the organization was to conduct contests only for the welfare of the industry in New York City. Twelve committees were appointed. The election of offcers and the adoption of the by-laws and the constitution will take place at the next meeting of the directors.

Mutual Insurance for Motorists

MILWAUKEE, WIS., Dec. 13—The first Wisconsin insurance company catering exclusively to owners of motor vehicles has just been organized at Juneau, Wis., under the style of Motor Vehicle Mutual Insurance Company of Wisconsin. The headquarters of the company will be at Juneau, where offices have been established at the Citizens' Bank Building. The officers are: President, Edward T. Heinemann; vice-president, Louis C. Pautsch; secretary, H. A. Henning; treasurer, Peter Peters. It is interesting to note that the principal figures in the new mutual insurance project are officers and moving spirits in the Juno Motor Truck Company, of Juneau, Wis., manufacturing the Juno commercial car, formerly the Brodesser, of Milwaukee. The Motor Vehicle Mutual Insurance Company begins operations with about 100 policies in force and excellent prospects. It will engage in direct competition with the stock companies, which are charging approximately 2 per cent. for protection from fire and 1-2 per cent. for protection from theft. The mutual rates will be considerably lower, in fact, bearing the same relation to old line rates as do ordinary fire risk rates of the mutuals and old line companies.

Undue Prominence of Winnipeg Agricultural Motor Contests Sidetracks Design of Interest to Automobile Industry, Says Prominent Critic—Example of New Window Lifts—Long Stroke Valveless Motor of Revolutionary Efficiency

DESIGN of Agricultural Motor Implements.—In proportion as the business world is accepting the motor vehicle as indispensable for commercial transportation work, the still larger field which awaits the automobile industry in the manufacture of self-propelled and power-actuated tools for the cultivation of the soil begins more and more to engage the attention of those designers and manufacturers who would rather build up a new kind of automobile manufacture than struggle against an already established and strong competition in the making and marketing of pleasure cars. With regard to the opportunities which exist in this new field—destined to become larger than that of the motor truck, according to the views voiced in Europe—K. von Meyenburg, who is recognized as a leader in the manufacture of light farming machines equipped with tools of new types which till the soil in new fashion, brings out some interesting viewpoints in an article dealing with the arrangements for comparing the merits of competing machines at the trials held at the third agricultural exhibition at Winnipeg, Canada, this year. He denies that these competitive trials, or those held in 1908 and 1909 at the same city, which is the world's center of agriculture by motor power on a large scale, have had any effect to demonstrate the value of small motor-driven machines for meeting the general needs of farmers.

The great steam tractors and plows have been of inestimable service for western Canada, he admits. Thousands of miles of new railways have followed their tracks. Villages, towns and cities have sprung up like mushrooms, and factories are being built all over this northwestern country which the motor plow had opened up. By its aid this empire was colonized at the turn of a hand. And millions of acres of virgin soil still await the breaking-plow before the "last West" will be under cultivation. In this work there are still ample opportunities for continuing to prove the special utility of the large tractors.

A much more important work is reserved for motor power in general, however, as an aid in maintaining the fertility of all the old farming area. Intensive cultivation is the refrain of all who have the slightest interest in agriculture and of all who have watched with deep misgivings the marked reduction in the yield per acre which everywhere, lately, accompanies the insufficient working of the soil, itself the result of insufficient and high-priced farm labor. The remedy which is usually recommended consists in work, many different forms of work and nearly all requiring tractive power and tool-working power, but where shall this work come from if not from the motor machines of small power which are the only ones which may be made suitable for the average farmer's conditions and for the kind of work which is required in intensive cultivation?

The competitions at Winnipeg have given no clue whatever as to what the farmer can do with motor machines for this class of work. They were highly important of their kind but they were heralded all over the world as the best occasions for obtaining reliable information with regard to the design and sizes of motor vehicle machines for general farm work. They have been very misleading, for this reason.

The plowing tests this year were somewhat more extensive than in 1908 or 1909, but they were not sufficient for proving or disproving the reliability of the competing machines. If all the six days of the trials had been used for preparing an area for seeding, from plowing to drilling, there would have been obtained not only useful figures on fuel cost and area-efficiency but it would have become possible to show farmers reliability figures and the adaptation of the machines to many different forms of work.

There were fewer entries than in 1909, but this was offset by a larger number of new types whose work at the trials was awaited with tense interest. The double-opposed two-cylinder type of motor was represented for the first time, coming from the automobile camp. Three firms had been using this style of motor in four different machines, but unfortunately two of the firms withdrew their entries during the last month—the 45 horsepower I. H. C. and the 25 horsepower Avery—leaving the field to Goolds, Shapely and Muir. A crude-oil motor was shown for the first time; namely the "Oil-Pull" of the Rumely company, but the Hart-Paar company could not be induced to place its crude-oil machine in the field against it, and no comparison could be had. The Gas Traction company of Winnipeg had built a machine in which great local expectations were centered. The I. H. C. met up with its two-cylinder motors, and among the steam tractors there was a Case machine of nominally 12 horsepowers which it would have been interesting to see pitted against the gasoline motors of about equal power; but it was alone in class D, and no comparison could be made under the rules. Kinnard-Haines brought two of his high-wheeled 40-horsepower machines. Of the same high-wheeled type were the machines of the Gas Traction company of Minneapolis which were considerably stronger than those built in Winnipeg. The Avery farm wagon made itself noticed, circulating like an errand boy over the testing ground and giving good service. The Birrell motor which came too late in 1909 was on hand this year.

The point plan according to which prizes were awarded was as follows:

At the brake test: 100 points for motor power per fuel unit; 10 points for water consumption divided by tractive power; 10 points for average steam pressure; 10 points for steadiness in running, vibrations and general behavior; 20 points for horsepower-hours per 100 gallons of water, and 20 points for drawbar pull divided by brake horsepower.

At the plowing test: 90 points for fuel consumption per horsepower-hour for plow-pull; 30 points for water consumption per horsepower-hour of plow-pull; 20 points for acreage plowed per brake horsepower-hour; 10 points for the quality of the plowing; 15 points for ground covered with one load of fuel; 15 points for general behavior, troubles, etc., and 50 points for design, construction and workmanship.

From this it may be seen that practically everything depended upon the maximum power developed during one-half of an hour at the brake test. On the other hand, the real interest was centered in the actual work. It swarmed with manufacturers, engineers, agents, representatives, editors and farmers, and they all wanted to go to the plowing field to see "the real thing."

Out of the over-rich tabulated material which resulted from the competition no figures can be compiled which do not relate only to the average local soil condition. The old prairie turf, which was mostly in question, is easy on the heavy machines in not causing the wheels to sink in or the plow shares to jump out. The conditions of general farming are widely different, and those who would build motor plows must know where they will be able to sell them, as the soil conditions must determine the type and the size. Two-thirds of the tillable area of the earth comes in the class of semi-arid land where dry-farming must be resorted to, and the customary farming tools are not adapted for this work. Motor tools must be developed for it. Germany, though known as a country of many large country estates, has according to the statistical yearbook only 23,000 farms of more than 100 hectares and comprising a total of 7 million hectares, where the machines of great size, power and weight might be applicable to a part of the work, but she has 260,000 farms of from 20 to 100 hectares, comprising in all 9 million hectares, and one million farms of from 5 to 20 hectares, totalling 10 million hectares. France has even a much lower percentage of farmers who control more than 100 hectares, and in America there are 5 million farmers who have from 40 to 100 hectares [1 hectare equals 2.4 acres].

The chance of having the motor-plowing on these millions of small farms done by association and, in this manner, with large machines and tractors, is remote, because plowing depends far more on weather and season than threshing does. Those who would nevertheless build tractors should copy the Americans and build them large. In England, where the Joel & Saunderson small tractors are better known than the Stock tractor is known in Germany, only the types weighing from 5 to 8 tons are making headway.

In America the tendency is now to change from the motor running at 250 to 350 revolutions per minute to upright four-cylinder motors running at 700 to 1,000 revolutions—again under the influence of the automobile industry—and to try to reduce the gross weight of 300 kilograms per horsepower for the agricultural machines to 200 or less.

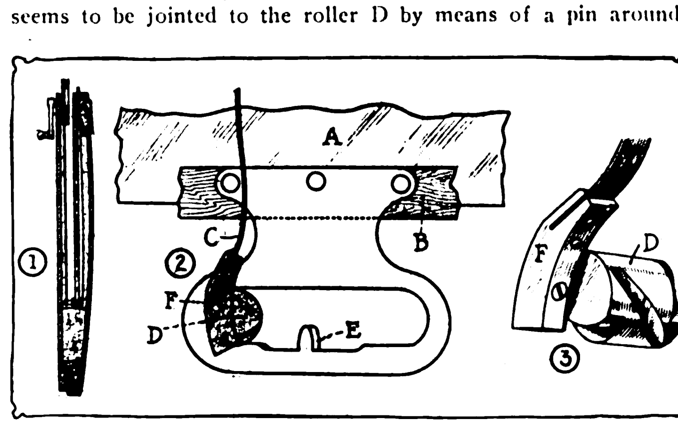
At a weight of 200 kilograms per horsepower, from one-half to two-thirds of the power is required for moving the machine; frequently much more. A speed over the ground of 1 meter per second is a good average. It would be inadvisable to gear to a lower speed, trying to utilize a larger percentage of the power for work, as in that case the wheels would simply skid. And if a higher speed than 1 1-2 meter per second is used in a plow-field, both man and machine suffer. The computations which are offered of the cost of motor-plowing are mostly illusory, and those relating to the required dimensions of wheels, with a view to the calculation of rolling friction, neglect the essentials, which are always the nature and condition of the ground. At all events the question of adhesion overshadows that of power consumption. As the farmer is a plant manufacturer he will eventually measure the cost of motor-plowing not by the cost per acre but by the crops he gets after it, and from this point of view the aim should be to plow better rather than to plow cheaper.

Those who would build motor plows should first study thoroughly all the existing forms, and still more thoroughly those which have already disappeared as well as the evolution through which the existing forms in each case have passed. Then he should study plant life and the local peculiarities of the farming to which he intends to cater. He should not blindly transfer his automobile experiences upon motor plows, for the step from rail and train to road and automobile is a far shorter one than that from road and automobile to field and plow. Let him first read Greig's official report of the three motor plow competitions at Winnipeg and go thoroughly through all the text, illustrations and tables.—From *Der Motorwagen*, Nov. 20.

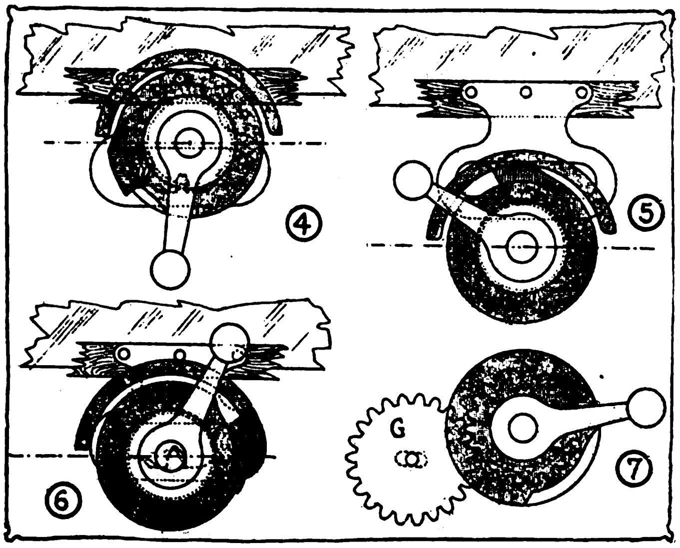
WINDOW Lift and Adjuster.—Since the unframed plate glass windows for closed automobiles have come into fashion, the little but not insignificant problem of raising and lowering these windows with perfect ease and of adjusting them at any desired degree of opening has entered upon a new phase, partly by reason of the general tendency to adopting something more luxurious than that which has been used for ages in ordinary carriages, and partly because the unframed window leaves some spare room in the slot-space of the door in which a mechanism may be introduced which will do the required work more simply and with less effort than when it is done by hand and with one of the old-time straps with the traditional leather grip or tassel which in course of time becomes soiled and unsightly, not to say unsanitary.

A new French device, called the Hera window lift, embodies an interesting solution of this problem in luxuriousness, and it has appeared sufficiently final to the well-known Rothschild firm of carriage body builders in Paris to warrant its adoption, while its ingenious cam movement appeals directly to the mechanical connoisseur. The object of the designer was to produce a thin and reliable mechanism which would transform an effortless and continued simple movement of a weak hand into (1) the raising of the window to above the level of the lip on the sill of the door frame, (2) the outward push by which this lip is cleared and (3) the short drop by which the window comes to rest on the sill outside of the lip; and it was furthermore necessary that the mechanism should be located below the sight face of the glass. A simple reversal of the movement should slowly and deliberately reverse these three movements, without danger of the glass dropping to the bottom of the slot-space, and, during either the up or the down movement it should be possible to stop actuating the mechanism with the result of having the window stay just where it was when the mechanism ceased to be operated.

Among the illustrations, Fig. 1 represents the lower part of a coach door and shows how an ordinary crank-and-pulley lift would be quite inadequate for the purpose in view; it would not lift the window high enough and would not push it out over the lip even if a rack were employed to make the lift sufficient. Figs. 2 to 7 show parts of the mechanism actually used for accomplishing all the desired movements. To the lower edge of the window pane, or to its frame B if one is used, a sheet steel plate is secured, in which there is formed a horizontal slot whose lower edge is of a certain cam formation serving to make the roller D move transversely as it is moved from one side to the other in the slot. Especially, the dog E serves to turn the roller completely around by entering the oblique groove formed in the latter, and as the dog advances in this oblique groove, the plate and the window pane are gradually pressed away from the guide block F, and as the latter cannot move inward, being flush with the inside panel of the door at the moment when this movement takes place, it is the window which must move outwardly. It is thus the dog E which makes the window clear the lip on the window sill. The guide block F seems to be jointed to the roller D by means of a pin around



Figs. 1, 2, 3—Design features of Hera window lift



Figs. 4, 5, 6—Successive steps in operation of Hera window lift. Fig. 7—Provision for easing lift and drop

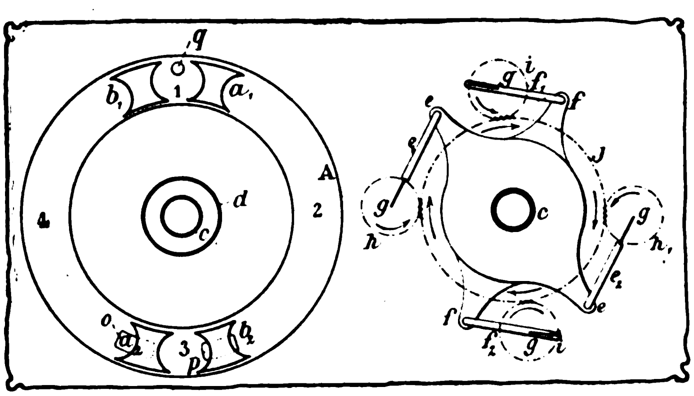
which the roller can turn. It is hung from the pulley by the tape C, which seems to be the same kind of very thin metallic tape that is used for bracing aeroplanes. An examination of the plan for operating this window lift shows that this tape must be of strictly unvarying length in order to have the three stages in the operation which are represented in Figs. 4, 5 and 6 materialize faultlessly. At all other stages of the operation the window is simply suspended from the pulley by the tape and resting upon the roller D—as in Fig. 2.

It is stated that an "autoloc" prevents the tape from unwinding by the weight of the window, by pressure brought to bear upon it or in fact by any other mode of operation than that of turning the crank backward, but the mechanical nature of this "autoloc" is not explained.

Fig. 4 shows the position of the parts at the moment when the window has been hoisted up so far that the guide block for the roller gets into engagement with a cam disk which is mounted upon the same shaft with the pulley and is formed with a circumferential cut-out in which the guide block finds lodgment. Thereafter, until the end of the movement, the guide block with the roller is turned around with the cam-disk, being held against it by means of a semi-circular guide secured upon the door panel, and when the crank is turned in the opposite direction, to lower the window, it is this position of the guide block between the cut-out and the semi-circular guide—and not the connection with the pulley by the tape—which compels the guide block and the roller to follow the crank movement.

Fig. 5 represents the moment when the window has been raised above the level of the lip on the sill and when the dog E, by continued turning of the crank, turns the roller around on its pin, thereby shoving the window outward as explained before, and Fig. 6 shows how, by turning the crank still a little farther around, the window is set down upon the sill outside of the lip. As the roller is now at the end of the slot the crank can be turned no farther in the same direction. Fig. 7 indicates the method adopted for reducing the effort required for the operation of the device. To the spur wheel G is secured one end of a spiral spring and this is wound by means of a similar spur wheel on the pulley shaft whenever the window is lowered, the weight of the window acting as the power. When the crank is turned in the other direction, to raise the window, this power, now stored in the spring, is returned in part and assists the hoisting movement.—From *Omnia*, November 30.

[The Rawlence window lift shown at Olympia and based on the use of strong coil springs, an extension rest—of the lattice-work pattern widely used by physicians and dentists—and an operating button secured in the upper part of the window pane, supplies another intimation of a public want with regard to the perfecting of window lift devices.—Ed.]



Figs. 8 and 9—Diagrams indicating main working principle of the valveless 60-horsepower Esselbe motors

New Motor Types—The valveless 60-horsepower Esselbe (S. L. B.) motor weighing 35 kilograms attracted much attention at the recent aviation show in Paris. Its general design bespoke for it a possible application to other than aviation purposes and suggested that its lightness might be found consistent with reliability without the constant and superlative maintenance care which must be bestowed upon the high-powered aviation motors with rotary individual cylinders grouped in star formation. The principle of its operation may be partly understood from the following description and the accompanying diagrams, Figs. 8 and 9.

On a common axis which is perpendicular upon the planes of the two diagrams there are mounted, first, a hollow ring-shaped body or tore which is provided with external cooling flanges and constitutes the motor "cylinder," in so far as it acts as the furnace for internal combustion and two pairs of pistons of special shape have a reciprocating movement in it, each piston covering an arc of somewhat less than 90 degrees while the tore in which they move is rotated at the same time; secondly, a stationary casing enclosing the mechanical organs which are instrumental in timing the rotation, though they receive the impulsions to this effect from the explosions taking place inside of the rotated body. Fig. 8 is a section through the middle of the ring-shaped body or tore A. The two pairs of pistons *a1*, *a2* and *b1*, *b2* are secured respectively to two plates *a* and *b* (not shown) which are made integral with the two concentric tubes *c* and *d*. [The exact form and position of these plates is not made clear, but it seems that they must be in juxtaposition, one being mounted upon tube *d* and the other upon the inner tube *c* the latter projecting beyond the end of *d*, and that these plates must be in constant sliding contact with the interior edges of the tore, which is formed in two parts bolted together.—Ed.]

The tubes *c* and *d* constitute the axles for the rotary and reciprocating movements of the plates *a* and *b* and, farther back, carry the cross-beams *ee* and *ff*, Fig. 9, to the ends of which are jointed the connecting-rods *e1*, *e2* and *f1*, *f2*, which by means of small crankarms *g*, mounted in a stationary casing which protects the whole mechanism, actuate the gear pinions *h*, *h* and *i*, *i*. These pinions mesh with a spurwheel *j* of twice as large diameter, whose movement is transmitted bodily to the tore A by means of a tubular connection not shown in the diagrams [but which it seems must enclose the two tubes *c* and *d*]. For each stroke of the pistons the tore thus makes one-half of a revolution, which brings the exhaust port *p* into the position at the end of the stroke where the spark-plug *q* was at the beginning. The tube *c* communicates at one of its ends (the rear) by means of an attached tubular connection with the carbureter, while its other end communicates by means of an annular space and the admission port *o* with the interior of the tore. The

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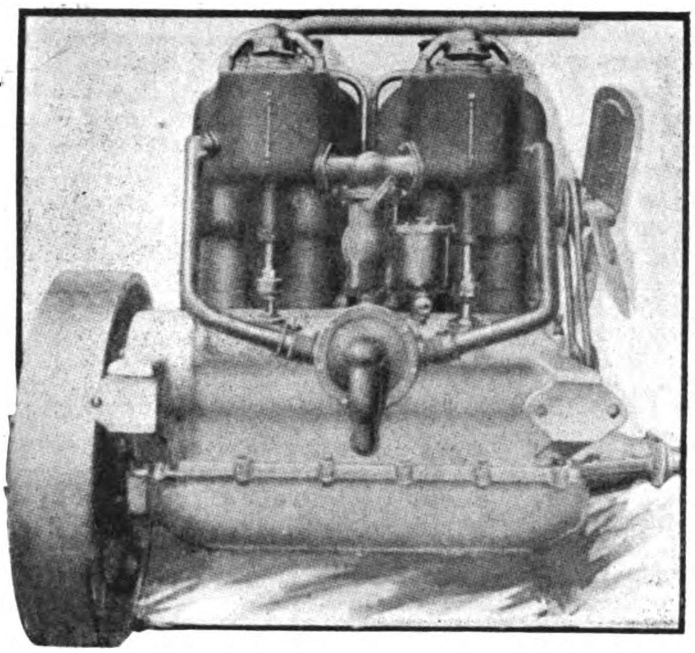


Fig. 1—External view of Itala rotary-valve motor

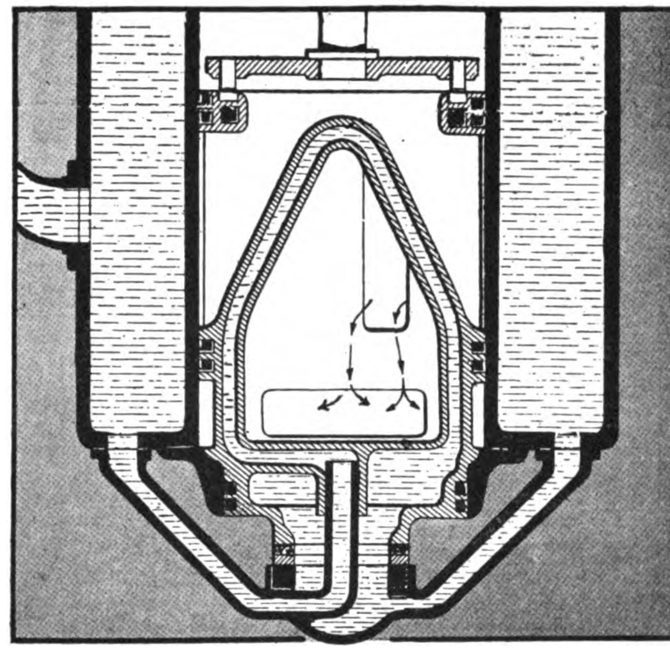


Fig. 2—Section through valve of Itala rotary-valve motor

Criticisms of Non-Poppet Valves To-Date

Critical Review of Present-Day Engineering Practice in the Construction and Design of Various Types of Rotary and Sleeve-Valve Motors in Europe and America—Essential Features Discussed

Most Notable Developments Have Been Made in Rotary Valve Motors—Chief Feature Is Protection of the Valves from High Temperatures—Some Ingenious Means for Water Cooling

By Eugene P. Batzell Installment I

THE past year marked a notable step forward in the field of non-poppet valve motors, because it witnessed that state of development when a number of makers found it practical to put their line of such motors on the market. New inventions and constructions in this line continue to appear, but only in a few cases do these possess any merit.

The sleeve and piston-valve engines have added some to the number of their followers, but the most notable developments have been made in the rotary-valve motors. This latter type of valve seems to be a favorite with American inventors. The chief feature of the present trend in rotary-valve design lies in valve protection from high temperatures. It is being accomplished either by preventing the valve from getting much of the heat from the combustion or by providing intense cooling of the valve. The correct operation of rotary valves of the barrel type is extremely sensitive with regard to the permanency of clearance around the valve. The shape of the valve and the amount of clearance can be retained only through a small temperature range.

In this respect the disk-rotary valve has shown itself less troublesome. On the other hand, the circumferential speed and the pressures between the rubbing valve surfaces have only secondary importance, because they remain far below those permissible for lubricated bearings. Nevertheless, the operation of rotary valves causes trouble as long as the valve temperature is high. Low bearing pressures, low bearing velocity and low temperatures go hand in hand to facilitate the valve lubricating problems, but judging from past and present experience with these valves it is of much greater importance to keep them comparatively cool than it is to further reduce their bearing pressures or circumferential speed. The valve which undergoes but little change in its temperature not only removes much uncertainty in regard to its lubrication, but, what is more important, its general functioning can remain at its highest efficiency, with uniformity as a result. Such a condition can be established from tests or otherwise, and it is for the motor designer to plan his construction so that these conditions will prevail unaltered.

Thus far better success in practice has followed the rotary valves with intense cooling; there are fewer representatives of the heat-protected valve type. The Henriod Darracq motor belongs to the latter class with a barrel-type valve. In this motor some of its power and efficiency is sacrificed to protect the valve against the highest pressures and temperatures of combustion, which is accomplished by letting the motor piston overtravel the valve port near the end of its stroke. By this means the valve is shielded effectively when the spark is properly advanced, but it has little value when running on a retarded spark, because the moments of highest pressure and temperature can be shifted beyond the instant when the piston begins to uncover the valve port. In the hands of an average driver this can occur frequently, reduc-

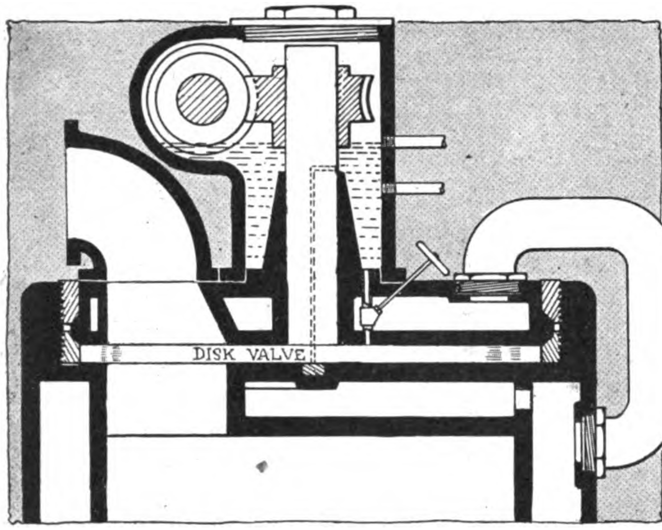


Fig. 3—Section of Beck disk-valve motor

ing considerably the practical value of the basic principle of this invention.

Another representative of the shielded valve belonging to the disk-valve class is the Beck type, Fig. 3. Little can be said in regard to this construction and practical results with the same at present. It seems, however, to remove all the objections attached to the unprotected-disk valve, when used for high-compression and large-bore engines. Not only does it keep the valve cooler, but it removes also some of the presssure on it and consequently simplifies the valve drive problems associated with disk-valve motors. It is known that the unprotected-disk valve requires a considerable amount of driving power due to its large surface exposed to the cylinder pressure.

Reviewing the rotary valves with intensified cooling one must acknowledge the Itala construction with internal water cooling, Fig. 2, to be the best so far accomplished. Objections can only be raised against the arrangement for water-cooling the valve, in that the water passes it on its way from one cylinder into the other. Though each valve cannot cause a great change in the water temperature, nevertheless, the cylinders will have different temperatures and therefore different actions. It would be better to have the cylinders at even temperatures so as to prevent unequal expansion which may affect the valve operation. However, practice does not seem to have disclosed any marked disadvantage with the existing cooling system of this motor, which otherwise has great merit in the arrangement of joints for the water where entering the valve and leaving it.

Experiments have shown that a comparatively large clearance around the valve would not interfere with the operation of the motor so long as it is not great enough to allow an escape of gas between adjacent cylinders, but any clearance, even a very small one, cannot stop the spreading of the gases to a certain depth from the valve port zone, which interferes with the lubrication of the valve bearing in that space. A very small clearance of .002 inch or below cannot be considered sufficient for more or less heated cylindrical valves. The larger clearance which is essential for the proper functioning of a long valve would be followed by a corresponding wider spread of gases into the valve bearing zone and consequently by more trouble, unless this spread is stopped by some means.

From facts revealed by different rotary-valve systems it is certain that the straight, smooth cylindrical valve is unsatisfactory, and that other means are required besides the small clearance around the valve to keep the latter in the best working condition. The spreading of the gases from the valve port zone into its bearing zones is particularly harmful and must be prevented in every case. The Itala valve illustrates this point, Fig. 2. Expansion rings are employed to prevent the lengthwise spread of gases and also to keep the working valve surfaces protected from the outside harmful influence of foreign matters, such as dusty water, etc. Good results are obtained when leaving these rings free on the valve, not anchoring them to it, so that when expanding they take hold of the outside surface and remain stationary though the valve rotates. A good labyrinth type of packing is effected in this manner, and considering it as such, it is better to have narrow rings, but of a greater number than a single wide ring in the same space; nevertheless, one ring is better than none and if space is restricted or if the valve is of small diameter a single ring might be sufficient.

Referring to the Henriod-Darracq method of preventing valve leaks by employing circular and longitudinal grooves on the body of the valve, in which the oil is supposed to accumulate, one is obliged to consider it inferior to the construction with rings. Judging from other instances when grooves are used on rotating shafts they become clogged up in time by any kind of solid foreign matter which has a chance to penetrate therein, unless the grooves are continuously and vigorously washed out. In valves of the Darracq type the exhaust gases will invariably fill up the grooves with carbon and other solid deposits, filling first the grooves nearest to the ports, thus not only their beneficial influence is reduced, but there is a danger of the valve sticking should some of the accumulated solid mass in them become loose.

As stated above, this deduction is drawn from observations made elsewhere, but it would be of great interest to hear on this point from the Darracq company. Anything like the above objection has little reason to be anticipated where expansion rings are used, because the solid particles have to work into the labyrinth against the tendency of valve rota-

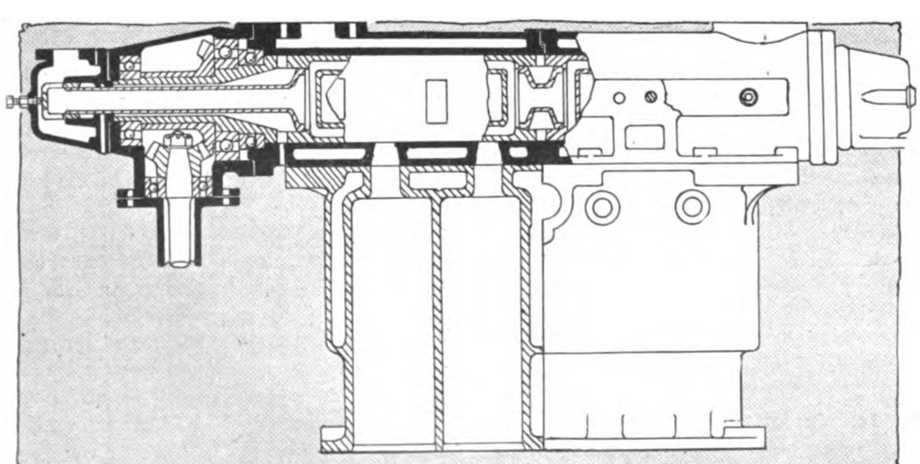


Fig. 4—Sectional view of Castiglione and Bolton rotary-valve motor

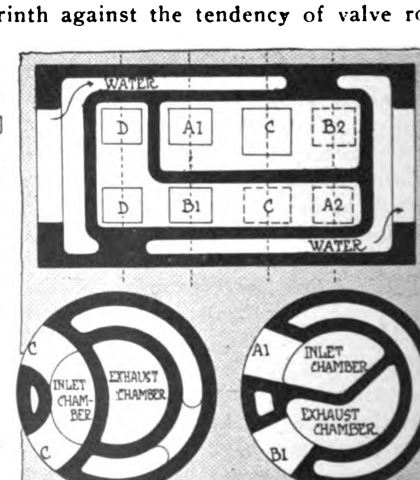


Fig. 5—Castiglione and Bolton valves

tion. Moreover, the labyrinth passages are effectively cleaned by the oil overflowing from the bearing between the rings, whereas the open grooves are merely touched by this oil flow which remains at the extreme of the valve clearance.

The Itala valve is a good example of what can be accomplished by employing a cooled valve while retaining comparatively high bearing pressures. The valve itself, though large in diameter to give a proper size of opening at one-quarter crankshaft speed, nevertheless does not interfere with a clean design of the motor, Fig. 1.

A rotary-valve motor of recent English origin, Castiglione and Bolton, Fig. 4, can be given credit for the thoroughness of working out in the details of internal water cooling for the valve, together with the means employed to lead the water in and out without any dangerous leaks. Any water leak must be considered dangerous if it is apt to occur so that the water penetrates into the lubricated valve bearings, as it is more than likely to cause the valve to stick. The motor, Fig. 4, is provided not only with stuffing-boxes at the places where the water connects with the inside of the valve, but also has separators for the water and oil, which, notwithstanding the stuffing-boxes, might still leak through. These separators should reduce to a minimum the chance of having water interfere with the lubrication of the valve. On that the merits of this system practically stop. It is difficult to see an advantage in the rather complicated shaping of the valve and its inlet and exhaust passages, Fig. 5. The large valve diameter, the valve drive, etc., result in a motor of great bulk entirely inappropriate for automobile use, and it would require much simplifying to make it attractive.

In connection with the foregoing motors a special point has been made of the arrangement of connections for internal valve cooling. It is of great importance to have the water separated from the oil valve lubricant and on this basis the construction of the Von Bottweiler motor, Fig. 6, cannot be given much credit. Disregarding the doubtful arrangement and size of the valve ports and gas passages in this motor one remains confronted with its top heaviness and extraordinary height. Expansion rings on the valve, a good point in itself, is not worked out well in detail because single wide rings are used and each ring, which should be stationary, is located opposite the oil conduct leading to the valve. Rotating rings cannot be used properly. This motor can be well classified as an experimental attempt and would need much refinement to become a marketable product.

A similar line of reasoning can be carried out in regard to another class of motors, namely, those employing other

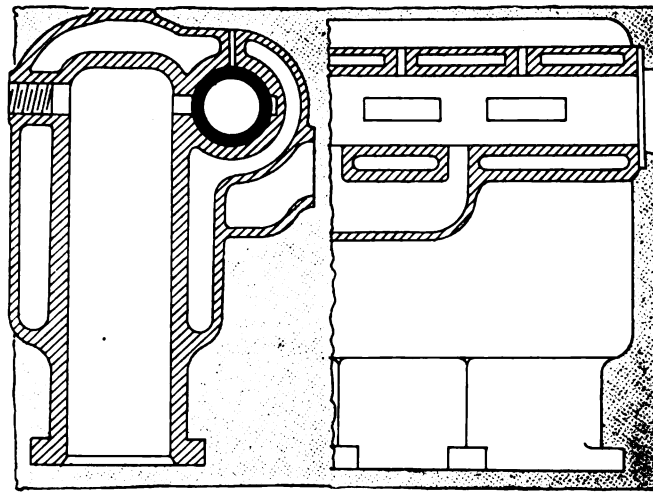


Fig. 6—Sectional views of Von Bottweiler motor, showing rotary-valve arranged alongside of cylinders

means for intense valve cooling, chiefly air or intake gases. The Henriod-Darracq of the latest design belongs to this class, using the intake gases for internal valve cooling. This would indicate that, notwithstanding their method of shielding the valve, some trouble must have been experienced in keeping it at low temperature.

The Walker motor, Fig. 7, also belongs to this class, because apparently it draws the intake gases through the inside of the valve from one of its ends. This method in itself can be approved, but the manner in which the exhaust gases are dealt with by this motor could easily offset the benefit from internal valve cooling by the intake gases. Not only is the inside inlet gas-carrying section of the valve restricted by the exhaust channels, but they also add materially to the heat-absorbing surface of the valve. Their irregular direction would make valve distortion very probable. The feature of balancing the pressure on the valve may appear satisfactory on paper, but practice demonstrates that heat is the greatest enemy and it is therefore preferable to let the valve resist pressure rather than to double its heat-exposed surface. By leading the gases under pressure to the opposite, or cylinder port valve side, additional places are created where the gases have to be prevented from spreading alongside the valve surface in addition to reducing the exterior water-cooled surface in contact with the valve.

(To be continued)

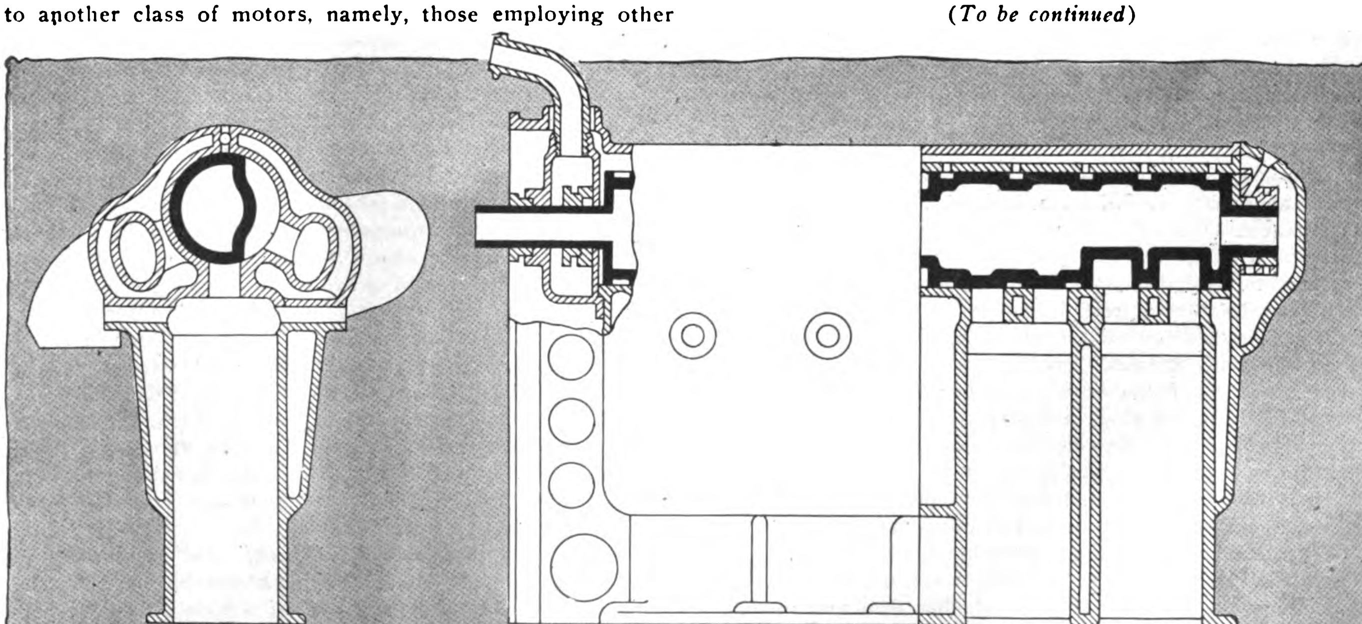


Fig. 7—Walker rotary-valve motor in which the intake gases are drawn through the valve for cooling

Engineers Discuss Slide-Valve Motor

New Swiss Engine Employs Long Slide Valves of Crescent Section with a Travel of Over 1 Inch

Fischer Valveless Type Subject of a Paper Presented Before Detroit Section of the S.A.E. by L. B. Brown

ONE of the most interesting features of the regular monthly meeting of the Detroit section of the Society of Automobile Engineers, held in that city last week, was a paper on the new Swiss Fischer sectional slide-valve engine recently brought to this country by L. B. Brown and George Radcliffe, London, Eng., and which since its arrival in this country has been subjected to a comprehensive dynamometer test at the Hudson plant, Detroit, under the direction of Howard Coffin, chief engineer. The promotion of this motor in America, as reported in THE AUTOMOBILE for December 12, has been undertaken by the Motor & Gear Improvement Company.

This motor has as a substitute for poppet valves two slide valves V disposed oppositely in the cylinder walls, Fig. 1. These slide valves are crescent-shaped in cross-section and operate in crescent-shaped recesses V1 in the opposite sides of the cylinder bore, which, by the way, is not a circle, but an irregular figure composed of approximately two nearly semi-circular parts connected by two crescent-shaped parts. These slide valves occupy each approximately 69 degrees of the cylinder wall circumference. They are of cast iron, and extend the entire length of the cylinder, and approximately 2 inches below it. At their lower extremities they carry slots for the engagement of the operating mechanism consisting of box cams, the shafts of which are driven by Coventry silent chains from the crankshaft, thus insuring positive reciprocation in both directions and entirely dispensing with the use of springs, thus giving silent action.

These slide valves have a travel of 1 inch and carry in their upper ends a single port or opening P in each, the port at one side being for intake gases and that at the other side for exhaust. Each port has .7 square inch area.

The reciprocation of the sleeves is such as to give the following timing:

Inlet opens 11 degrees after upper dead center.
Inlet closes 71 degrees after lower dead center.
Exhaust opens 63 degrees before lower dead center
Exhaust closes 19.75 degrees after upper dead center.

The timing is thus not standard as the intake and exhaust overlap approximately 8 degrees, which is claimed to give additional power. With this timing and with a peculiar box-cam construction of the actuating mechanisms there is obtained a characteristic long dwell after the closing of the ports, so that the slide valves are at rest during the compression and power strokes. The dwell on compression is 149 degrees. The exhaust is opened for 262 degrees.

The motor is a four-cylinder monobloc type, with a bore and stroke of 3 5-16 and 4 3-4 inches; to be more exact, 85 by 120 millimeters. It has thermosyphon cooling, splash and force-feed lubrication, and high-tension ignition. To this extent the motor is entirely conventional. The special features which make it interesting as compared with other motors are its valve mechanism and its small clearance volume.

The clearance is about 18 per cent. of the total cylinder volume, giving a compression which is higher than that in use in general practice. It would seem that this high compression would cause spontaneous combustion, and while the makers have certain reasons of their own to account for the fact that this does not take place, it is hoped that tests on this point will either confirm their reasoning or evolve some other. It is relevant to state that during the several months in which the engine has been under observation there has been no instance of spontaneous ignition or of overheating.

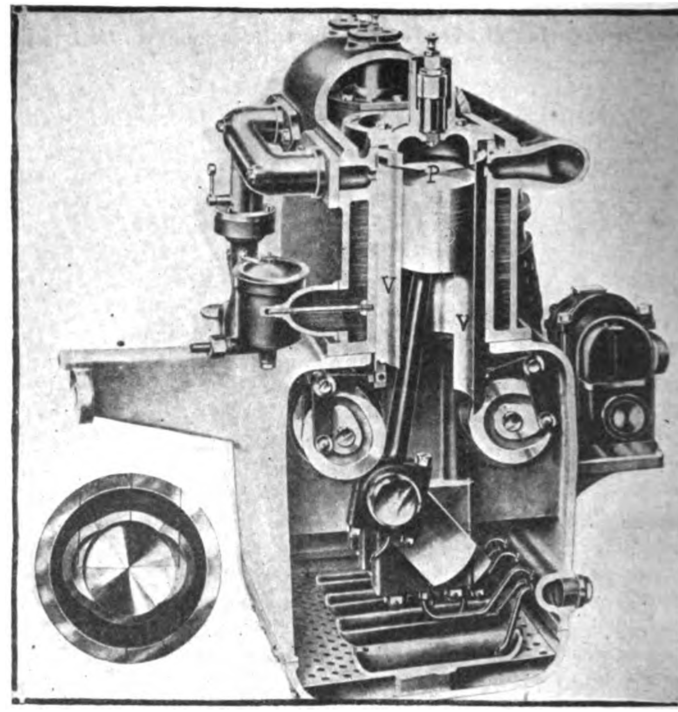


Fig. 1—Sectional view of the Fischer vertical slide-valve engine discussed at a recent meeting of the Detroit section of the S. A. E.

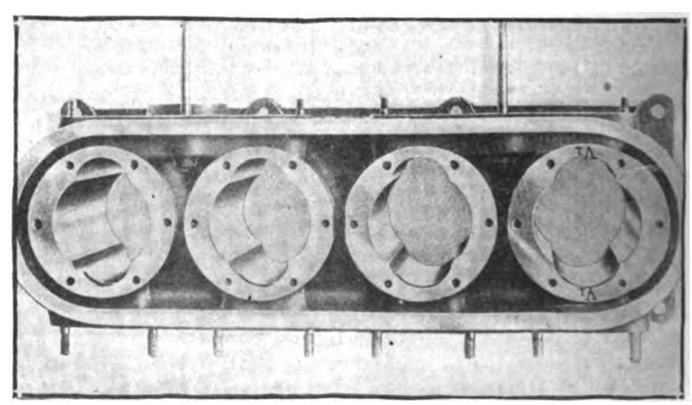


Fig. 2—Showing the top of the casting of the Swiss slide-valve motor with the recesses in which the valves operate

The cylinders have semi-spherical shaped heads with cylindrical extensions passing through the waterjacket into which the spark-plugs are fitted. This construction places the spark-plugs in the ideal position and provides convenient means for attaching the waterjacket cover. The cylinder heads are removable, having the conventional flange construction for bolting to the cylinders. In addition to the cylindrical extensions to accommodate the spark plugs, which are on top of the heads, there are also extensions which project downward into the cylinders, these acting as bull-rings or guides for the valve slides, being intended to hold the latter on their seats. Cored passages connect the cylinder ports to the flanged openings to which the inlet and exhaust manifolds are attached.

"In early experience with this engine," said Mr. Brown, "we were at a loss to account for its high power, having in mind its small dimensions, and a great deal of speculation on this point failed to evolve any tangible explanation until the engine was brought here to Detroit, where dynamometer tests and a more

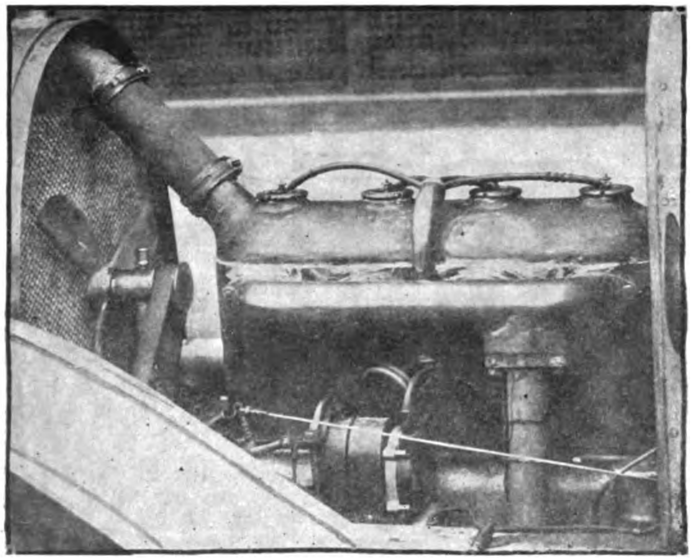


Fig. 3—Exhaust side of the Fischer vertical slide-valve motor showing the position of the magneto

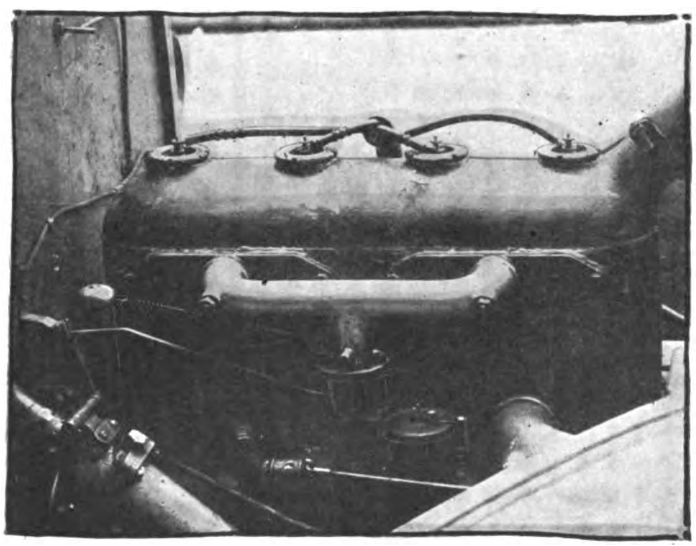


Fig. 4—Intake side of the Swiss slide-valve engine with mounting of carbureter and T-shaped manifold

thorough examination disclosed certain facts which indicate that in addition to the structural difference existing between this engine and the more conventional types there are differences in the thermal conditions which make the motor unique. It is doubtless to these features that the relatively high power must be attributed. The small clearance is one factor.

"Another feature which must have a marked effect on the thermal efficiency is the small surface exposed to the combustion temperature. It will be noticed that with the exception of the bull-ring every bit of metal is in close proximity to the cooling water.

"Reference to the brake horsepower curve shows that the power increases steadily up to 2,000 revolutions per minute, and that it is in direct proportion to the speed up to 1,500 revolutions per minute. You are familiar with the characteristics of brake horsepower curves of poppet-valve types, and will perhaps be interested in comparing these with the curve of the Fischer engine. Comparison with the curve indicating mean effective pressure, Fig. 5, will also be interesting and you will note that the peak in the curve shown is reached at 1,400 revolutions per minute and that it is in excess of 105 pounds throughout the entire range of speed."

Mr. Radcliffe, who collaborated with Mr. Brown in the preparation of the paper and who has had more to do with the

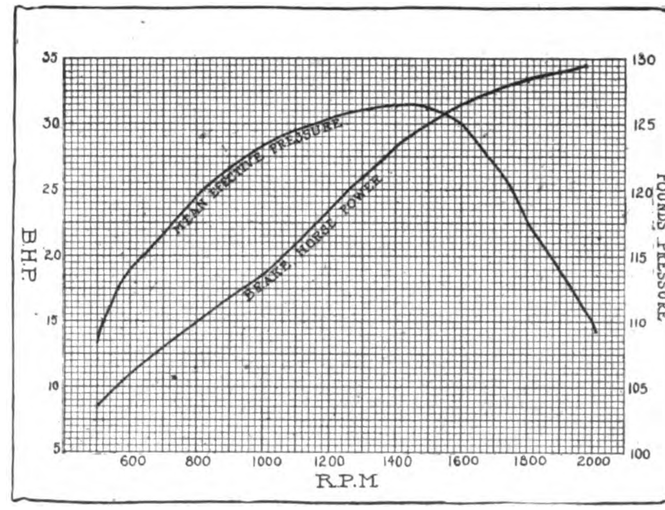


Fig. 5—Diagram showing results of tests made at the factory of the Hudson Motor Car Company, Detroit, Mich., on the new Swiss slide-valve motor

operation of this engine than anyone else in this country, answered the many questions which were brought up in the discussion. What are the reasons for lack of pre-ignition? The reasons are the perfectly-shaped combustion chamber of the motor, efficient cooling and the peculiar timing.

E. R. Fried, in the discussion before the society, brought up the question of cylinder-wall expansion, stating that in his opinion it would be uneven, due to the fact that the wall is exposed to the cooling for about 220 degrees, while the rest of the circumference is covered by the valves. Mr. Fried further stated that the sleeves also would not expand evenly. To refute these statements, Mr. Radcliffe cited the examination of the cylinders when the engine was recently taken down at the laboratory. The micrometer tests showed that the cylinders were out of true round only a negligible amount. The motor has a gasoline consumption of 20 miles to the gallon in a car with a total weight of 4,300 pounds. The oil consumption is 1 pint to 160 miles.

Electric Furnace for Brass Work

Various forms of electric furnaces are making their appearance upon the market and this serves to stimulate the desire to harness the electric current to the brass foundry.

Investigations, calculations and results of experiments have demonstrated one thing and that is in the matter of cost. To compete with oil melting at the present time, electric current will have to be obtained at a cost less than it can be made except, perhaps, by means of an internal combustion engine or by water power. It has been stated that current will have to be obtained at a price of from 0.40 to 0.80 cent per kilowatt hour in order to compete. This price is very much less than power can be purchased from any city power plant, or can be made by the ordinary method of generating with a generator and steam engine.

The cost of the current, therefore, is such as to preclude the use of the electric current for melting in competition with coal, coke or oil. The field for it, however, is in the manufacture of special alloys or work that cannot be done in the ordinary way. It is probable that the near future will see the electric furnace extensively used in melting metals, but upon special work, as it cannot compete in cost with ordinary methods of melting as practised at the present time.—*Brass World*, November.

There is no formula for finding the radiator cooling surface necessary for any four-cylinder motor that is applicable to all types and makes of motors or radiators. This is because of the great variation in the cooling efficiency of the various designs of motors and radiators made. Each radiator maker, however, will be able to very closely approximate the amount of surface of its own design most suitable for any particular motor.

Gear Ratio for Speed Roadster—Dealers in Honolulu—Packard Clutch Adjustment—Overhauling Hudson Roadster—Removing Carbon Deposit—Lighting with Dry Battery—Misfires on Grade—Rayfield Carbureter Adjustment

Constructing Speed Roadster

EDITOR THE AUTOMOBILE:—I am rebuilding a 1910 model Jackson 30 into a speed roadster. It has a Northway high-speed motor and a three-speed and reverse Brown-Lipe gearset. I wish to use a four-speed gearset and am wondering if the following ratios would give satisfaction with my motor. You will notice that the following table is the same as Table No. 2 given in THE AUTOMOBILE of November 28, with the exception of third and fourth speed:

	Speed	Tran.	ratios	Ratios engine to wheels
Direct drive	4	....	1	2
Direct drive	3	....	1	4
Direct drive	2	2.1	1	7.35
Direct drive	1	3.76	1	13.16
Direct drive	R	4.57	1	15.99

Where can I get such a transmission and about what would it cost?

How can I get into the racing game? I wish to drive in some of the large races next year, including the 500-mile at Indianapolis, the Grand Prize and Vanderbilt. I am unable financially to enter and drive my own car and the only encouraging reply I have had from factories was from the National Motor Vehicle Company. They stated that if they went into the racing game again this season they would write to me. Are there not men who have cars entered in the larger races and who hire drivers? If so, can you refer me to any of them? The only trouble in this game seems to be in getting started, and if I go into it I wanted to start in the right way.

Hilton, N. Y. B. W.

—The table you give would seem to be satisfactory for a car of the type you mention. Such a gearset may be procured from any of the gear manufacturers who make a specialty of gears for automobiles. The cost would depend on the material and whether the concern had to make the gears specially for you or if they had them on hand. If they had to make them special the cost would be tremendous. THE AUTOMOBILE is in receipt of many inquiries from persons who would like to become racing drivers. It is solely a matter of securing the sanction of the American Automobile Association's contest board, and then of convincing some one that you are the man to pilot his car to victory. We have no record of any one who desires to enter his car in any of the races and who is in search of a driver. The majority of successful drivers are those who either attract attention while engaged as factory testers or who gain prominence in amateur events.

Honolulu Has Score of Dealers

Editor THE AUTOMOBILE:—In the issue of THE AUTOMOBILE for November 7 you accredit Hawaii one dealer. There are at least a score. Honolulu has more than 1,000 registered automobiles and over 300 cycles, with a few trucks and $5,000 cars in livery service here are common. Fine roads on all islands of group. Many tourists bring cars. They can motor to brink of volcano.

Honolulu, Hawaii EDWARD TOWSE.

Adjustment of Packard Clutch

Editor THE AUTOMOBILE:—Kindly advise me how to adjust 1907 Packard clutch. I have had it relined and oiled up but it does not seem to take hold at all and I have to lay the car up because I can't run it.

New York City. J. HEITZMAN.

—The clutch used in this car was one of the most delicate clutches manufactured. It is very susceptible to the slightest amount of oil on the surface of the leather. The tension on the clutch spring is very light, owing to the reduction gear used in its application and a very light pressure on the pedal is required to disengage it. A method which has been used with success in adjusting this clutch is to press down the pedal and hold it there while the link at the traveling nut which operates on the screw passing through the small gear is disconnected. The small gear is then turned over one tooth on the large gear. Now connect the linkage again, and the clutch will give a stronger engagement. One user of a 1907 Packard has removed the leather and replaced it with asbestos fabric. He claims much greater satisfaction can be obtained with this arrangement than with the leather, as it is not so susceptible to oil and can be slipped indefinitely without glazing. As the clutch on this car is very apt to become soaked with oil thrown up from the flywheel and drip pan, this arrangement should be very satisfactory.

Tuning Up a Hudson 20

Editor THE AUTOMOBILE:—I am overhauling my Hudson 20 model 1910, and would thank you to give me some information through Letters Answered and Discussed.

1. How can one remove a valve cap that sticks and is obstinate? I am grinding in my valves and find that No. 7 valve cap cannot be removed, although I have tapped it while exerting pressure upon it, heated up the motor and placed ice in the cap, etc., but without avail.

2. The levers that control the spark and gas mounted above the steering wheel have a tendency to stick together so that when one advances the spark the gas lever goes with it and *vice versa*. I have oiled, tried to adjust, etc., but only after working them back and forth several times can they be used independently.

3. Lately the Stromberg carbureter has been working strangely. After the motor has stood all night, and when endeavoring to start in the morning, and I might state the maximum temperature during the night is about 48, it is necessary to prime through the cocks twice or three times before the motor will work at all, then if the throttle is opened the least bit wide there is a mighty cough and the engine stops, then more priming, etc., until it gets heated up, then it will work very satisfactorily.

4. In grinding valves would you advise the use of the breast drill? It would facilitate the work greatly and I can see no reason why its use would impair the work, although I have been told it was better to use the screw driver. Some good in-

struction along the lines of valve grinding, adjusting, timing, etc., I know would be appreciated by your readers.

Oregon City, Ore. W. R. Logus.

—1. The method employed in the Hudson service department in New York, and which they state will remove the most stubborn valve cap, is to drive in a piece of hexagonal stock in the manner shown in the diagram, Fig. 1. The stock can be secured of a size that will just fit the opening. A wrench can then be put on the hex and if necessary a pipe can be slipped over the wrench for extra leverage. In this way you will surely be able to move the cap.

2. If you will bend the levers apart at the lower end of the steering column the chances are that they will not work together. In case the rods within the hollow steering column are rusted together, a little kerosene poured down the steering column will loosen them.

3. The difficulties are with the weather rather than your carbureter. As long as the carbureter works well after the motor becomes warmed up, a proceeding that takes but a few minutes, you are not in a bad position. Many motorists have trouble in starting in cold weather and as a general rule it may be stated it is necessary to adjust the carbureter for a rich mixture after the winter sets in. The fuel is harder to vaporize on account of the cold weather and deficiency in vaporizing powers must be made up by the increased amount of fuel. This fact has been clearly brought out in Robert Brewer's articles on carbureters now appearing in The Automobile. In case the cold weather has necessitated a change of adjustment of your carbureter in order to meet the climatic conditions of winter, a few words on the adjustments of the Stromberg may be in place. The carbureter, model B type, is illustrated in Fig. 2. Turn the low speed adjusting nut up or down until the spring controlled by same seats the valve lightly. See that the high speed spring has plenty of play and is free. Start the motor and turn the low speed adjustment nut up or down until the motor turns over smoothly at low speed. Advance the spark and open the throttle until the motor speeds up considerably. If the motor then backfires through the carbureter, turn the high speed adjusting nut up until backfiring ceases. If the mixture is too rich turn the nut down. In order to avoid too rich a mixture it is best to turn the nut down until backfiring occurs and then turn it slightly up so that it will just run at high speed without backfiring. The high speed spring should have at least 1-32 inch play when the motor is at rest.

You should not have any trouble starting with this carbureter if you close the shutter in the fixed air intake.

4. The breast drill is perfectly satisfactory for valve grinding if you do not try to do the work in too much of a hurry by exerting too much pressure on the valve which you are grinding. The reason that the screw driver is preferred by many is because it is easier to give a light pressure and to gauge the force with which the grinding is being done. A brace, such as that shown in Fig. 3, is better than a breast drill and also quite fast. When using a breast drill do not put any weight on the work as the weight of the drill is sufficient. Turn about three of four times one way and then back again, lifting the drill after every second or third reverse. If you use emery dust and oil you should be particularly careful not to have the emery too coarse. The finest procurable emery dust should be secured because the chances are strongly in favor of your grooving the valve seat if coarse emery is used. Many valve-grinding compounds are excellent and give as good service as can be secured from the regular oil and emery mixture.

Suggests Rather Expensive Plan

Editor The Automobile:—I believe you are wrong in your answer to Transmission in the November 28 issue, page 1126. I have also the same trouble; new gears are only a little better. A good clutch can be made out of the transmission by taking out the gears and putting in fiber and metal disks, then put a sliding gear transmission just back of the present location of the ball joint universal, then couple the driveshaft to the back of the new housing and support it with a cross-member. It would, of course, be necessary to lengthen the frame to do this. Another way is to replace the entire rear axle with a new transmission rear axle of unit construction. I am thinking of doing this this winter and would like to know the address of parts makers who would supply suitable parts for this machine. These machines drive fine on high gear, but the planetary gearset is a noisy power-consuming contraption that should never have been put in an automobile.

Any information or advice your readers can give me on this subject would be appreciated.

Battle Creek, Mich. Albert B. Metcalf.

Mixed Fuel as Carbon Remover

Editor The Automobile:—What effect would 1 gallon of kerosene have when mixed with 5 gallons of gasoline on a gas engine? Would it be good as a carbon remover and would it injure the engine in any way?

Schenectady, N. Y. Herbert M. Stark.

—So far as The Automobile has any record the effects of the mixture of kerosene and gasoline on carbon deposit has never been recorded. It has been suggested to use a double carbureter which would take pure gasoline for starting and use the mixed fuel after the motor has become warm. The trouble of mixing fuel every time it was necessary to put in a new supply has deterred many from making the experiment, although it has been said that satisfaction was obtained from the mixture so far as the power developed was concerned. The vapor of kerosene is one of the best carbon removers and solvents that we have, and since this is the case it seems as if the occasional use of the mixed fuel would result in cleansing the cylinder. It is doubtful, however, that the advantages gained would repay the necessity of making radical alterations in carbureter adjustment and in fact of the design of the carbureter itself. Kerosene injected into the cylinder while it is hot would be vaporized, and would act in the same manner as the method you suggest.

Dry Batteries for Lighting

Editor The Automobile:—How many hours will five No. 6 Columbia igniter dry batteries run (and make a good light) on a 2-candlepower burner, the batteries testing 26 to 30?

Iuka, Kan. M. & P.

—The New York representative of the National Carbon Company, which makes these batteries, states that he will get about 30 hours' service with a 6-volt, 2-candlepower lamp on five Colum-

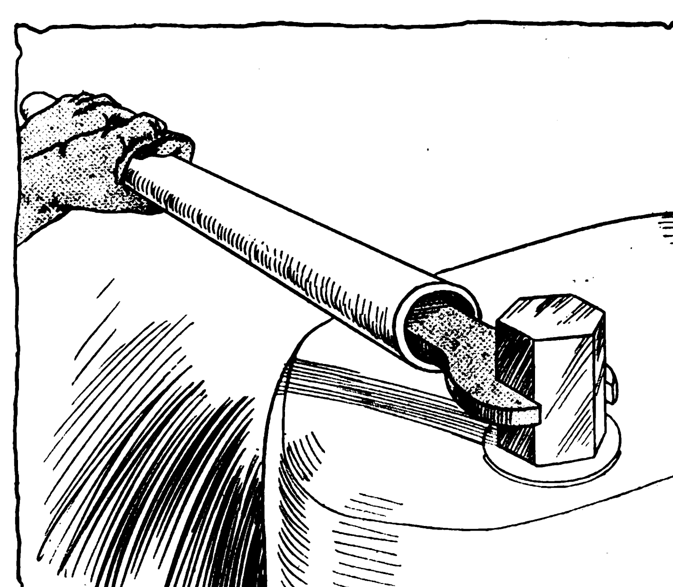


Fig. 1—Removing troublesome valve cap on Hudson 20 Roadster

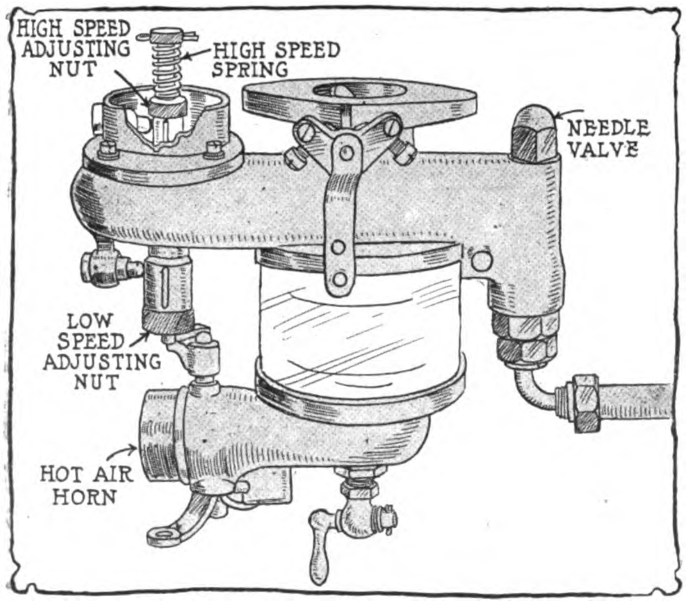


Fig. 2—Stromberg carbureter, showing adjustment points

bia cells. This is merely an estimate, however, as you will probably be able to get a longer time if the battery is not constantly at work, but has a period in which to recuperate. If you would use a multiple-series set of fifteen batteries, three series of five, the time would be increased to a considerable degree. In fact, the makers of the battery claim that a service of 250 hours could be expected on one burner.

Misfires When Climbing Grade

Editor The Automobile:—I have on my hands a Chalmers 36 which is giving me trouble and I would like to have a little of your advice. My car while on level fires all four cylinders, but on a hill fires only on three, although all plugs and carbureter are apparently in good condition. Car has run only 800 miles since last grinding. Kindly advise me as to what remedy to use.

New York City. F. Erber.

—About the only thing that could cause the trouble you mention is a spark plug whose gap is too wide. The distance between the points should be 1-64 inch. When it is much greater than this, the high-tension current generated at high motor speeds will be sufficient to cause a spark to cross the electrodes, but when the motor speed falls off no spark occurs. It must be remembered that the resistance to a spark is much greater under the conditions which exist in the cylinder than in the open air at atmospheric pressure. If you will close up the gaps of the plugs until they are 1-64 inch in width the trouble will no doubt disappear.

Adjusting the Rayfield Carbureter

Editor The Automobile:—Being a subscriber to your journal, I would appreciate it very much if you would explain the proper way to adjust a Rayfield carbureter. I am using one of these carbureters on a Ford model T and I do not think I have the adjustment quite correct.

Lindsay, Ont., Can. Madison Williams.

—A view of the Rayfield carbureter is given in Fig. 4. The various points which have to do with its operation and adjustment are lettered in the illustration. Start your motor and throttle it down as far as it will possibly go and still run steadily, hitting on all four cylinders. After the motor has been running at this speed for a period of 3 or 4 minutes indicating that it would not be choked up and stopped after a short time turn the low speed adjustment out or in other words the fuel adjustment nut to the left until the screw leaves contact with the cam. When this condition has been reached the needle valve is just seated. Now turn the fuel adjustment nut to the right for a distance of one and one-quarter turns. Now try the motor again. If it does not run steadily turn the fuel adjustment screw to the right, thereby increasing the fuel supply, until it does run evenly. It must be remembered, however, that it is an advantage to run with this screw to the left as far as possible as this cuts down the flow of gasoline and hence makes running more economical. When the least throttle opening at which the motor will run steadily is found the stopscrew which prevents the throttle from closing any further should be turned up as far as it will go. When you have succeeded in getting the motor to run evenly at low speed open the throttle and advance the spark, allowing the motor to run at high speed. Should backfiring occur, the high speed adjustment screw should be turned to the right until it ceases. It would be a good idea to turn this screw to the left until the motor starts to backfire or power seems to show a marked decrease, at which point it should be turned back until the motor runs properly. Turning to the right increases flow of fuel and to the left decreases it; therefore, it should be made an object to run the motor with the high speed adjustment screw as far to the left as possible. When you have made what you think to be the proper fuel adjustments on high and low speeds, open the throttle slowly. Should backfiring occur between the low and high speeds turn the automatic air adjustment to the left. This increases the tension on the automatic air valve spring and maintains a slightly richer mixture at the intermediate and high speed. As a general rule it may be remembered that backfiring to the carbureter is due to too little fuel and therefore either the high-speed or low-speed adjustment nuts should be turned to the right, depending upon whether the motor is turning over at higher or lower speed and if it runs steadily with the throttle closed. First, be sure that the motor idles properly before trying adjustments at high speed.

A simple test to determine if the mixture of any speed is too rich is to press with the finger the auxiliary air, giving surplus air. If the motor speeds up it shows that as it stands it is too rich, and the automatic air adjustment should be turned to the right until the motor begins to reduce speed or starts to

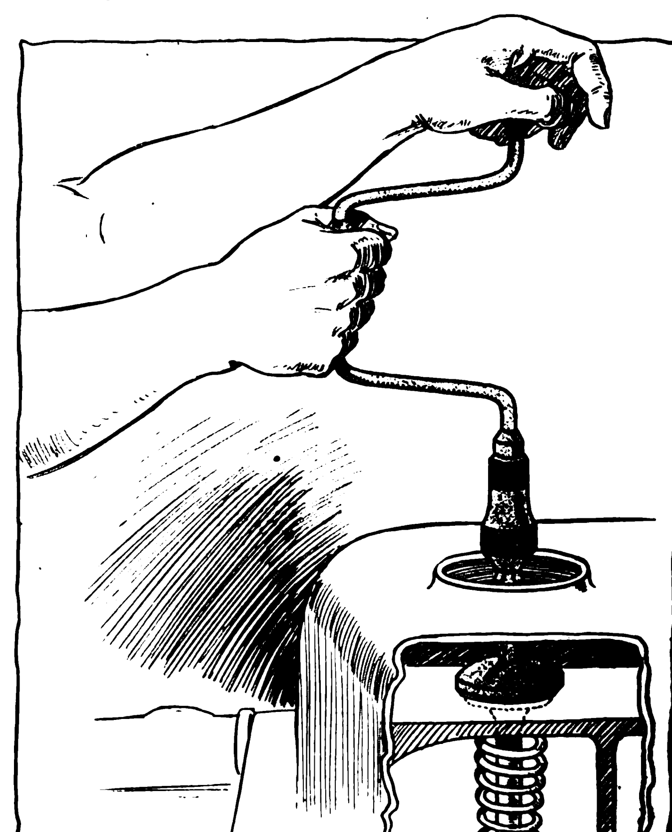


Fig. 3—Using brace and bit for grinding in valve

backfire: it should then be turned to the left until the motor runs smoothly. This should be done with the throttle about one-eighth open. If you follow these instructions carefully, the Rayfield carbureter should give you the best of satisfaction on your car, provided that you are using the correct size.

Silencing Noisy Magneto Gears

Editor THE AUTOMOBILE:—For the benefit of your readers who may be having the same trouble, I wish to give my experience with the Hupmobile 20 runabout:

After having been run about 2,000 miles my engine developed a slight knock which gradually grew more noticeable. After taking off the cylinders and removing what little carbon there was, and taking up the connecting-rod bearings I found the knocking a little worse if anything, the magneto having been returned as near as possible to its former position on the bracket.

I next tried placing the magneto so as to mesh the gears a little deeper and the knocking disappeared immediately and engine runs as quietly as when received from the factory.

Magneto can be shifted by simply loosening the bolts which hold it without taking them out, thereby avoiding the difficulty of getting the correct teeth in mesh, should magneto be removed far enough to let the teeth slip out of position.

Kensington, O. E. W. DIBBLE.

Some Questions of Motor Design

Editor THE AUTOMOBILE:—How is the lubrication of the rotary valve in the Darracq motor effected? Is this valve not very similar to the Duryea rotary valve brought out a few years ago, except that it is located further down upon the cylinder wall, below the compression space, instead of even with it?

2. What advantage has the new 1, 3, 4, 2 timing over the old 1, 2, 4, 3 timing?

3. What compression is commonly used in Knight sleeve-valve motors?

4. Does not the flywheel in front construction used by some makers have the same effect in damping vibrations as the vibration damper used upon Daimler and other motors? Does the radiator have to be made larger if located between the motor and dash, and how much? How many square inches of radiating surface per square inch of flame-swept cylinder wall is considered good practice?

5. What was the trouble with the pin-gear drive? I believe a transmission of this nature was brought out a few years ago by a Mr. Belden and used in a machine driven by an air-cooled motor which took part in a Vanderbilt elimination race, and worked all right, although the motor did not. Such a drive would have some advantage, principally that of being able to get several different speed ratios and all direct, with only two moving parts.

6. Does not the carrying of the gasoline tank in an exposed position as on some roadsters and touring cars result in a loss by evaporation, much more than from a tank covered up or under the seat?

Mentone, Cal. JOHN LEFLER.

—1. Lubrication in the Darracq motor is accomplished by a force-feed pump which delivers a stream of oil through the space between the sleeve and its housing. The film of oil between the sleeve and the part containing it is depended upon to maintain the gastightness of the passage. This motor is of a different principle than the Duryea motor, except that in both cases a rotating sleeve is depended upon for gas distribution.

2. It has been found easier to balance and to manufacture crankshafts having the two central cranks on the same side of the turning axle. This is especially the case in the three-bearing crankshaft where the condition of having the two front pistons down and the rear pistons up at the same time would have tremendous influence towards causing unbalanced stresses.

3. Compression averages between 60 and 70 pounds.

4. THE AUTOMOBILE has no record of any test to determine the

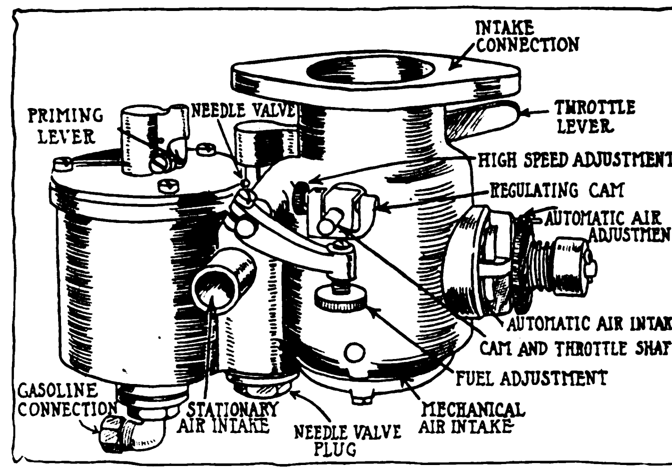


Fig. 4—Various adjustment points on Rayfield carbureter

effect of front flywheels as vibration dampers and sees no reason why they should have that effect. The size of a radiator naturally depends upon the area exposed to cooling influences. When covered over, the air which strikes the radiator is warmer than when the radiator is at the front of the car, and hence, in order to secure the same cooling capacity, its area must be correspondingly larger. Your question regarding radiator surface could not be answered in definite figures, as there is no specific ratio between radiating surface and cylinder wall area that is considered good practice. This depends on the type of radiator, size of the waterjacket, capacity of the pump, thickness of the cylinder and numerous other questions of design.

5. The pin gear is still on the market, although it has not met so far with much success. The difficulties are said to be in keeping the pins tight and also to back up the thrust on the plate holding the pins.

6. A tank which is heated by a strong sun in the summertime or by the exhaust pipe at any time is more apt to sustain loss by evaporation than one which is tight. This is due to the volatile nature of the fuel.

Size of Peugeot Racer

Editor THE AUTOMOBILE:—In one issue of THE AUTOMOBILE in which was a description of the Peugeot car you stated that it had a bore of 4.3 inches and a stroke of 7.8 inches, giving a piston displacement of 453.087 cubic inches.

In another issue you say the bore and stroke are 100 millimeters by 200 millimeters which is, of course, different from the above in that it equals a bore of 3.947 inches and a stroke of 7.874 inches.

Then, from another article I learn that the piston displacement is 470 cubic inches. This being entirely different from either of the above. Now would you kindly tell me which one is correct? Are the valves inclined 45 degrees to the vertical or 45 degrees to each other?

Also would like to know the compression pressure piston clearance gear ratio on high, and the meaning of B. N. D. chrome nickel steel.

In a recent article you stated that the National Motor Vehicle Company, Indianapolis, Ind., makes its own rear axles. As far as I know, the American Axle Company makes these parts on the series V cars.

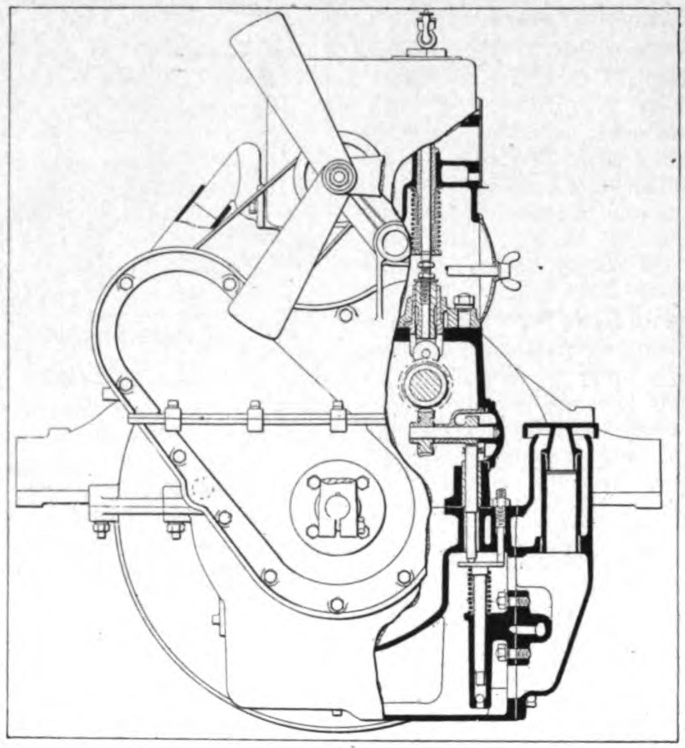
New York City, N. Y. F. HOLLIS WELLS.

—The bore of the Peugeot racer is 4.3 inches and the stroke 7.8 inches, giving a piston displacement of 453 inches. The valves are inclined 45 degrees to the vertical. The B. N. D. chrome nickel steel is steel made by a process used in the Derihon Works of France and Germany. It is a brand name for steel made by this process.

The National Motor Vehicle Company has its pressed steel work done outside. The machining, however, is done at the National factory.

Oakland Adds a Six—Continues Three Fours

FOR 1912-13, which may very aptly be called the season for sixes, the Oakland Motor Car Company, Pontiac, Mich., has fallen into line and has added a six-cylinder chassis to its most attractive line of cars. Oaklands for the coming year are all distinctive in body design, whether they be fours or sixes, and they reflect credit upon their designers. In addition to the six, there are three four-cylinder types, known as models 35, 40 and 42, the first of which has a 3.5 by 5-inch motor, while the other two are equipped with a power plant having a cylinder bore of 4.125 inches and a stroke of 4.75 inches. These cylinder dimensions also apply to the 6-60, as the new six is designated.



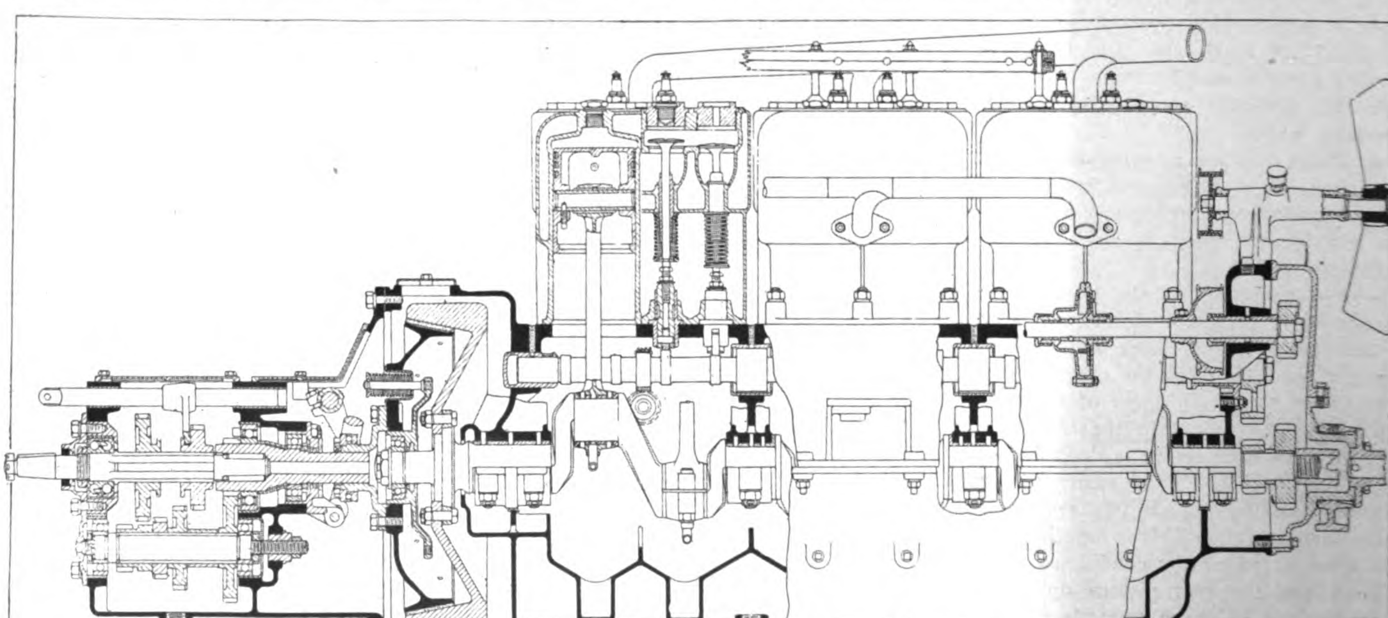
Part sectional front view of the Oakland 6-60 motor, showing inclosed valves and inclosed silent chain drive of magneto and pump

In all models, the same general constructional features are incorporated, although minor differences are to be noted. By having one general design, it is possible to standardize a great many parts, and the Oakland concern has not lost sight of this growing tendency in automobile manufacture.

The last-named two models, namely the model 42 and the 6-60, are practically alike in all constructional details, although not all of their respective parts are of the same dimensions. All features of the two motors are alike, the only difference being that the six motor has its magneto, water pump and camshaft driven by silent Coventry chains, whereas these parts of the four-cylinder motor, which is of the same bore and stroke, are driven by gears. The motor of the model 40 is identical with that of the 42, while the smaller engine of model 35 carries out all the design details of the others on a smaller scale.

Models 35 and 40 differ from the other two in that the rear axles are semi-floating instead of floating; they have a single-drop frame in place of a double-drop construction; their radiators are flat and not V-shaped; they carry 15-gallon gasoline tanks under the front seats and feed the fuel to their motors by gravity, whereas the other models have force-feed and have their gasoline tanks slung under the rear of the frames; and their wheelbases are, of course, less. The two higher-priced models are also provided with Deaco combination lighting and ignition systems, while model 35 is equipped with Remy ignition and storage battery electric lighting and model 40 carries a Briggs magneto and acetylene gas lamps. In all other respects they are the same as the 6-60 and the 42.

Having mentioned wherein the two smaller Oaklands differ from the two just named, it will perhaps be less confusing to the reader if the description of the line is confined to the 6-60 and to the model 42. The six has a rated horsepower of 40.9 and the model 42, 27.25, according to the S. A. E. formula, but these figures are much below the actual power output, each cylinder being able to deliver a little over 10 horsepower under average



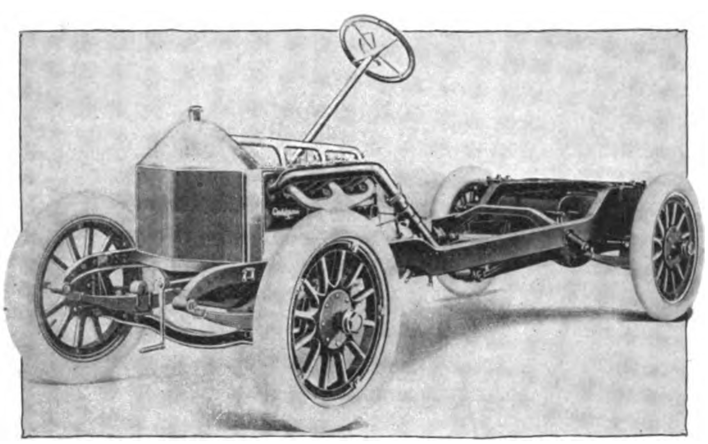
Unit power plant of the 1913 six-cylinder Oakland, including section through transmission and part sectional view of motor running conditions. The long stroke of 4.75 inches has a bearing on this.

The various dimensions of these two motors, which are representative of the Oakland line, are given:

	Four-cylinder	Six-cylinder
Bore	4.125 in.	4.125 in.
Stroke	4.75 in.	4.75 in.
Number crankshaft bearings	Three	Four
Front crankshaft bearing	1.125 by 3.5 in.	1.25 by 3.5 in.
Center crankshaft bearings	2 by 2.5 in.	2 by 2.5 in. (two)
Rear crankshaft bearing	2.25 by 4 in.	2.25 by 4 in.
Front camshaft bearing	1.25 by 2.5 in.	1.25 by 2.5 in.
Center camshaft bearings	2.25 by 1.5 in.	2.25 by 1.5 in. (two)
Rear camshaft bearing	1.25 by 2 in.	1.25 by 2 in.
Length of connecting rods	11 in.	11 in.
Connecting rod bearings	2.125 by 2.25 in.	2.125 by 2.25 in.
Wrist pin bearings	1 by 2.25 in.	1 by 2.25 in.
Piston length	5.25 in.	5.25 in.
Valve diameter	1.75 in.	1.75 in.
Valve lift	.34375 in.	.34375 in.
Diameter magneto and pump shaft	.4375 in.	.4375 in.

It will be seen from the above table that the two motors are practically the same in all details, and this may also be extended to apply to the chassis. Although of shorter wheelbase, that of model 42 is identical in all details of importance with that of the six. There is only one exception to this: model 42 has a gear ratio of 4 to 1, which is the same as that of the other three fours, while the six has a ratio of 3.5 to 1. And so, model 42 may now be eliminated from the description, and this is justifiable, since the new 6-60 is typical of Oakland practice.

In keeping with previous Oakland design, the six motor is in combination with a unit power plant, the gearbox being bolted directly to the flywheel housing. The cylinders are of L-head type, in pairs. Water-jackets are integral; valves are all on the left side and the valve-stems and springs are inclosed by cover plates. These features are conventional, and, in general, it may be said that there is nothing unusual about any of the Oakland power plants. They are in accord with present-day American practice. Connecting-rods are H-section drop forgings, the wrist-pin bearings being bushed with bronze. Each wrist-pin is fixed to one of the piston bosses by a set screw. At the crank ends, the connecting rods are provided with die-cast, babbitt metal bearings, while shims are used for adjustment. The pistons have flat heads and they are provided with three rings each, above the bosses. The crankshaft is forged, the flywheel web being integral with the rest of the shaft. The flywheel has a diameter of 16 inches. Four main bearings support the crankshaft, these bearings fastening to the upper half of the crankcase, permitting of the easy removal of the lower half.



Three-quarter view of 6-60 chassis, showing double drop frame

Valves are of conventional design, and are provided with double hex-nut adjustments, while the lifters are of the roller type, operating in guides located in the upper half of the crankcase.

One feature of the six motor which marks a step forward in motor design is the use of silent chains for the driving of the magneto, pump and camshaft, as already mentioned.

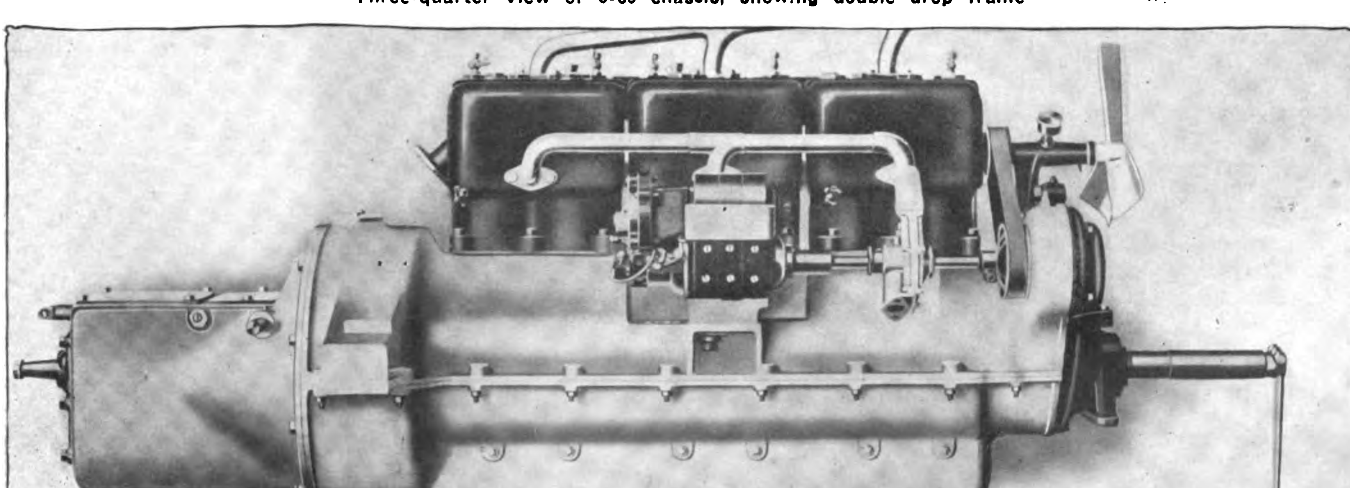
As is usually found with unit power plant construction, the motor and gearset are suspended at three points, the front support being on a cross frame member and in the form of a trunnion which is an integral part of the gearcase. The two rear supports are provided through the use of arms, cast as a part of the upper half of the crankcase and fly-wheel housing.

For ignition the Deaco system is used, and the generator, which, in addition to furnishing current for ignition, provides for the lights, is located about half way forward on the right side of the motor. It is held on a crankcase bracket and driven by a flexible coupling from the pump shaft. The generator furnishes current primarily for ignition purposes and the surplus is transferred to a storage battery from which it is carried to the various lights. Both ignition and lighting are within control of the driver.

Splash lubrication is used in the motor, and circulation is kept up in the usual way by a plunger pump, cam operated from the camshaft through gears. Below each connecting rod there is an oil trough into which the end of the rod dips, splashing the oil to the bearings and into the cylinders. The lubricant eventually runs into a sump in the lower center part of the crankcase from which point it is returned to the oil troughs and to the chains at the front of the motor by the oil pump.

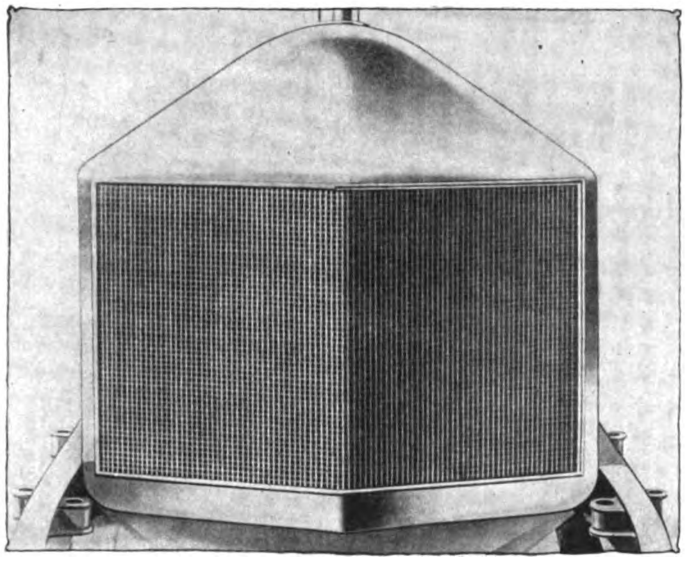
Positive water circulation is provided in the accepted way by means of a centrifugal water pump located forward of the magneto and driven by silent chain. The cooling fan, which is a three-blade propeller type, is driven by a belt from a pulley on the pump shaft. The radiator is one of the distinctive features of Oaklands for this season, in that it is V-shaped and is fitted with a German silver top, also V-shaped. The radiator is of the square-tube type.

On the new six, a 1.5-inch Stromberg carbureter is pro-



Showing the clean design of the right side of the Oakland six unit power plant. All valves are on the left side, inclosed vided, whereas, on the four-cylinder model of similar construction a Schebler, Model O, is used. The gasoline tank, which has a capacity of 21 gallons, is located at the rear of the car under the frame and hence pressure feed of the fuel is required. The tank is provided with a gauge which gives the gasoline level at any time.

The drive and control are on the right, the gears being shifted by a lever within the car. Service brake, clutch pedal and other control apparatus is standard. Steering is through a worm-and-nut gear. There is a drag link which is provided with ball joints and shock-absorbing springs. This link has a diameter of .875 inch, while the cross connection back of the axle is 1 inch in diameter. The front axle, which is of standard I-beam type, carries integral lugs which act as steering stops.



V-shaped radiator used on Oakland six and model 42

Passing to the drive and chassis construction, it will be seen that the propeller shaft is not inclosed, the drive being taken care of through substantial rear springs and through a torque arm running parallel to the propeller shaft from a cross member of the frame at the gear-box to the rear axle housing. The front end of the torque arm is provided with a spring buffer. Two universal joints are used in connection with the drive shaft, one of these at the gearbox and the other at the rear axle.

The rear axle is of the floating type, which means that the entire load is carried by the housing and none of it by the rear axle shafts.

The front springs are half elliptic, 2.25 inches wide and 41 inches long. The rear three-quarter elliptic springs, which are mounted outside of the frame, have the same width, but they are 53.75 inches in length. Great flexibility and easy riding qualities are claimed for these springs by the maker. A new feature of the spring suspension is that the rear springs are underslung; that is, they are suspended from the axle tubes rather than resting on plates on top of the axle housing, as in ordinary construction. All the spring clips are constructed of .62.5-inch material.

As to the frame, this is provided with a double drop; that is, it is lowered just to back of the power plant and raised again at the rear so that it will clear the rear axle. By so constructing the frame a low center of gravity and reduction of side sway to a minimum are claimed. The low drop construction makes possible the elimination of side aprons, spring pockets, step hangers, running boards and so on, as inspection of the body views will bring out.

Oakland bodies are exceedingly attractive, and, in addition to the V-shaped radiator feature, that of replacing the running boards with four aluminum steps, one for access to each door of the car, is an innovation. Bodies of any type may be had. Upholstery is very heavy. The designers have looked carefully into the comfort of passengers, and roominess in all models has been striven for. Ventilators have been put in the sides of the hoods of some of the models. All the bodies are flush-sided, with door handles and hinges concealed. The low angle to the cowl dash on all Oakland body designs lends a finishing touch. In the roadsters, the seat is made wide enough to accommodate three.

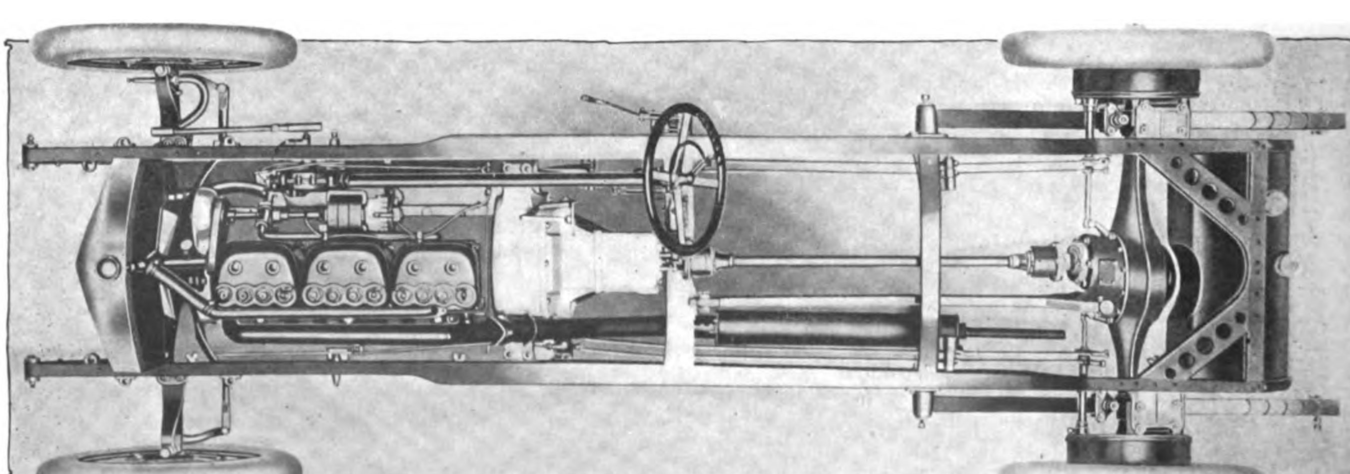
All models are provided with demountable rims The trimmings are of nickel, a feature which is now looked upon as standard by most American motor car designers. Electric headlights, side lights and tail lamp, Klaxon horn, complete toolkit, tire repair outfit, pump and jack are standard equipment on the six and its four-cylinder counterpart, Model 42. On Model 40 the lamp equipment consists of acetylene gas headlights and oil side and tail lights, in addition to robe rail, horn, gas tank and full tool outfit. Model 35 has an electric lighting system and carries other accessories similar to those of model 40

Recovery of Scrap Zinc

A method of recovering zinc from galvanized iron scrap has been patented by Eduard Broemme, of St. Petersburgh, Russia and Rudolf Steinau, of Nuremberg, Germany. The process is:

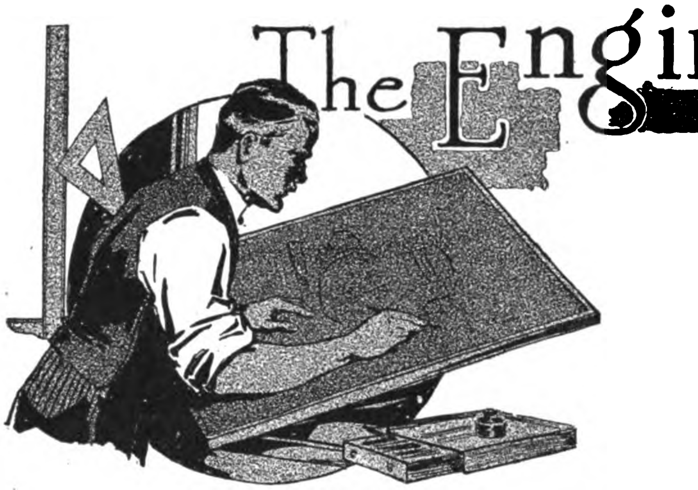
The scrap is boiled in a solution of sodium bisulphate and common salt (equal parts of each are used) until the zinc has gone into solution. It is stated that a very pure solution of chloride of zinc is obtained that contains sodium sulphate, sodium chloride and only traces of iron and manganese.

This solution, it is stated in the patent, can be used for the manufacture of lithophone, a material used in the making of rubber goods, and which is a compound barium and zinc sulphide.—*Brass World*, November



Plan view of the 6-60 Oakland chassis, showing shape of radiator, unit power plant, brake rods and rear construction

The Engineers' Forum



3-Point vs. 4-Point

Respective Merits of These Systems as Means for Supporting the Motor and Gearbox

Schimpff Believes in Four-Point Suspension for Motor and Three-Point for Gearbox

Part IV

A. Schimpff Thinks Three-Point Practicable

J. Demmler Considers Four-Point as Standard

CINCINNATI, O.—Editor THE AUTOMOBILE:—We have found on our pleasure car that a four-point suspended four-cylinder engine with legs made heavy enough to withstand any strains due to twists in frame from road inequalities is the proper thing, as our subframe takes twists at points past these legs.

Our transmission is three-point suspended, set amidship with universal joint between it and the motor. We have yet to receive the first complaint of any trouble caused from this construction.

The proper construction of trucks seems to be the vital question. On our trucks we have had the same suspension of motor and transmission as on the pleasure car, and in very few instances we have had one of the rear legs on the engine crack or break off. This we attributed to the stiffness of the subframe and the subframe anchorage over the strength of the leg.

We have been testing several trucks lately arranged with three-quarter platform rear springs, thus making the frame three-point suspended, using 40 inches diameter wheels, giving easy riding on account of missing all small ruts in the roads.

Three-point suspended transmission, four-point suspended motor with the two front legs flexibly connected to the subframe, allowing the engine legs at this point to move in a vertical position when the frame is distorted. These two fasteners are arranged with a coil spring of suitable tension to prevent the motor from vibrating when the truck is in a normal position.

This construction is proving satisfactory in our estimation, after being given the most severe tests on the worst roads we could find.

We are having one of our motors arranged for a third-point suspension in the front and will test this out in combination with all the features of this test now going on with the four-point suspension motor.

As we have yet to try this three-point suspended motor and it being our first, we, of course, are not in a position to speak for it from practical experience. However, we believe it is going to help matters a great deal, especially with larger wheels, three-quarter platform springs, and our special features enumerated above.—A. SCHIMPFF, Engineering Department, Schacht Motor Car Company.

GROVE CITY, PA.—Editor THE AUTOMOBILE:—In comparing three-point with four-point suspension from an engineering standpoint, and, in theory, I prefer the former to the latter.

Considering the matter from a practical standpoint experience is teaching us that all the advancements made in industry are built on compromise between theory and practice. We make many sacrifices in theory in order to make a design practical and commercial. We condemn our gear-shifting device in theory. In practice we use it, because we don't know of anything better that would satisfy the formulas of theory and also be possible for practical use.

In a four-cylinder motor are unbalanced forces and momentums which are the cause of vibrations and thus having the motor bolted to the frame rigid can only be of advantage to the motor.

I have been connected with leading companies in Germany and France and all of them have used four-point suspension for some time and still use it today, and their troubles with breaking crankcases on account of four-point suspension have been very few.

Using something more flexible than iron blocks between the motor arms and the side members gives good results.—J. DEMMLER, Bessemer Motor Truck Company.

PARIS, FRANCE.—Editor THE AUTOMOBILE:—True three-point suspension is used on the 175-horsepower Peugeots, acknowledged the fastest European cars of the 1912 season. The entire power plant, motor, clutch and gearset, is carried on an elongated U subframe. There is so little transverse rigidity in the subframe that it would be possible to make the two ends meet without any great effort. The necessary rigidity, however, is given by the motor base and the gearbox. When disassembling, the entire plant with its subframe is taken out of the chassis; the different organs are put together on the subframe, and the rigid block thus formed is fitted into the frame. It is this entire block which is three-point suspended, there being a central trunnion attachment to a very substantial double transverse frame member at the front, and ball and socket attachments at each end of the frame, all three attachments being provided with lubricators. The entire power plant is so completely isolated from the twisting strains imparted to the frame members that it has not been found necessary to place a universal joint between motor and gearbox.

W. F. BRADLEY

DETROIT, MICH.—Three-point suspension, in my opinion, misses its point when the transverse member is not so arranged as to furnish a rigid connection to the side-frame, at the same time giving a flexible connection to the rear suspension point of the motor. With too rigid a connection the three-point suspension can in reality become a virtual four-point, and I would state that for this reason flexibility is important.—T. B. MORLEY.

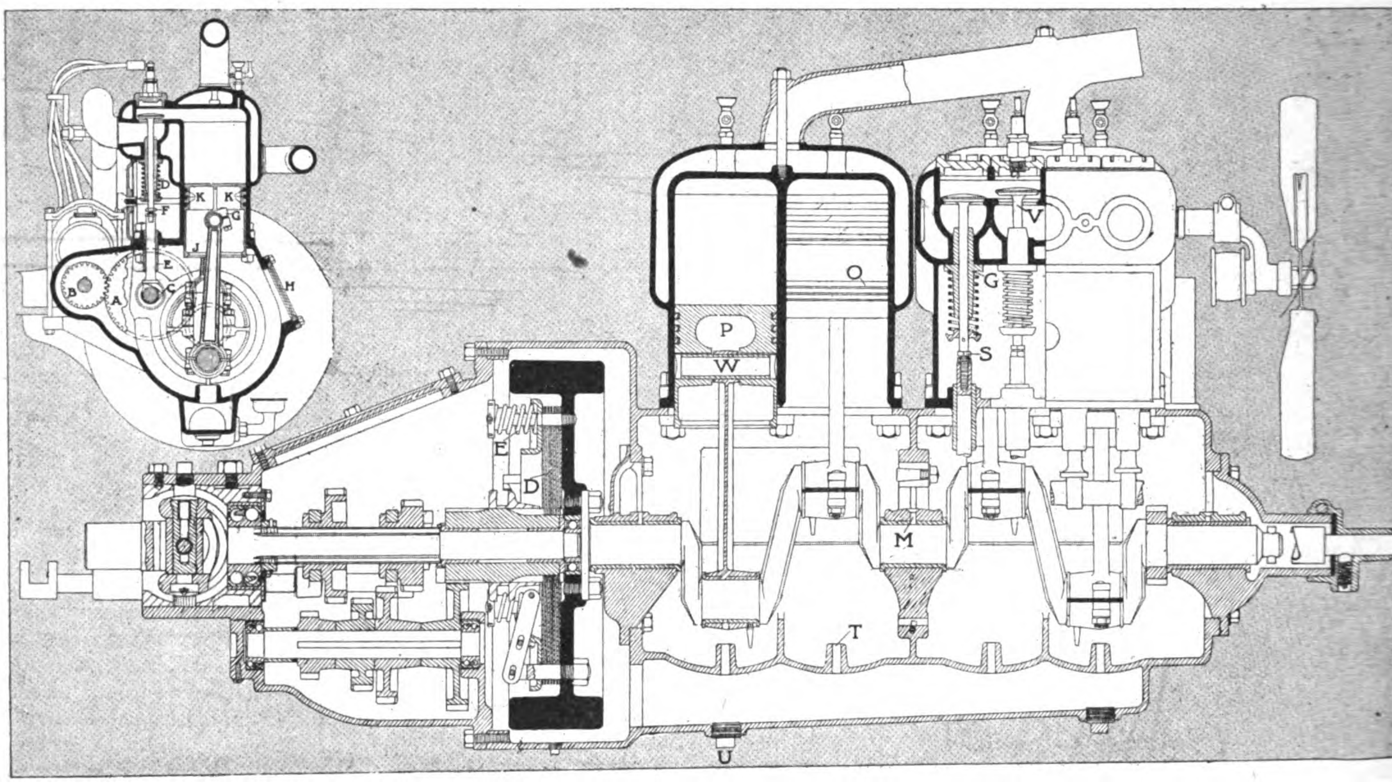


Fig. 1—Sectional views of the motor, clutch and gearset showing the distinguishing features of design common to all models

Marathon Drops One Model; Continues Three

Increased Wheel Base and Added Body Comforts Feature 1913 Line, Change in Nomenclature of Models

MARATHON racing has been used as a basis in naming the new Marathon cars. The three models which will be on the market for 1913 will be known as the Runner, Winner and Champion. One model has been dropped, while the three just mentioned will be continuations of the cars put on the market for the previous season with refinements. These refinements have not been very radical, the same general features of design being continued with one exception, this being the enlargement of the motor in the Runner model. The model which was dropped was that known as the L-30, while the former models which corresponded with the Runner, Winner and Champion were the K-20, M-40 and N-50 respectively.

In making the alterations necessary in improving the new cars and bringing them up to date many details have been taken up. Among the more important are included an increased bore and stroke in the Runner, floating rear axle construction in the two larger chassis, with semi-floating rear axle in the small one. In all models, however, the rear axles are incased in a one-piece steel housing. The wheelbases have been increased in the Runner and Champion models, in the former from the 90 and 96 inches used in the roadster and touring chassis, respectively, this year to 104 inches for 1913; in the Champion model the wheelbase is 123 inches instead of 120 inches in the 1912 design. The Winner model has a 116-inch wheelbase, the same as the model L-30 of the season just closing. Tires are the same in size except in the case of the smallest model, where they have been increased from 32 by 3 inches to 32 by 3 1-2 inches. The springs have been lengthened in all three models to increase the easy riding qualities of the car. The most general changes have occurred in the body designs rather than in the chassis. For 1913 the bodies have been widened considerably and also have been given more leg room in the front of the car. On the roadster body the length has been increased 8 inches.

Uniform design throughout the line is particularly noticeable in the power plants, in which there is little difference except as to dimensions.

The design embraces in each case a unit power plant with a four-cylinder motor of which the cylinders are cast in pairs, a multiple disk clutch operating in oil in the flywheel housing and a sliding gearset with straight line drive to the rear axle through a single universal joint. Among the other features common to all the models are a dual system of ignition comprising a magneto and storage battery, a front axle of I-beam section with ball bearings and a worm-and-gear type of steering mechanism with four full positions to take up wear.

Some of the engine details which are present in all three sizes are the L-type of cylinder head, the valves V are on the right side and driven by spiral timing gears B, A; interchangeable exhaust and inlet valves; push rods E, of the mushroom type, offset to allow for even wear and provided with means of easy adjustment; thermo-syphon circulation of the cooling water with a belt-driven fan; and a crankcase cast in one piece to obviate the chance of leaking joints and to provide a rigid support for the crankshaft. In the two larger models the valves are inclosed on aluminum plate for each pair of cylinders and which is quickly removable. The camshaft is a single forging, the cams G being forged on the shaft and then hardened and ground. The crankshaft M is offset and is a drop forging of nickel steel, as are the connecting-rods. The bearings are of special nickel babbitt and are supported from underneath in the one-piece crankcase. This permits adjustment of the bearings from the top. Lubrication is obtained through a flywheel circulating system with a constant level and splash to the cylinder. The flywheel housing is in the lowest place in the crankcase reservoir and here the oil is picked up by the rotation of the flywheel and carried by centrifugal force to a pocket near the top of the flywheel housing, from which it is distributed by gravity to the motor bearings. Cooling is on the thermo-syphon principle with a vertical tube radiator. The magneto is fastened to a lug cast on the crankcase and is driven through a special gear and Oldham coupling.

Within the flywheel is located the clutch. This consists of twelve saw steel plates running in oil. As it is supported on two bearings, the plates are always in alignment and the possibility of grabbing is minimized. It is claimed that the leverage in the clutch pedal is great enough to allow it to be disengaged by one finger. Three springs are used in the clutch and an easy means of adjustment is provided through a handhole on the gearset housing. This type of clutch has been a feature of Marathon construction for the past 7 years.

Arranged in the housing bolted to the flywheel housing are the transmission gears of the gearset. Final drive is through a shaft inclosed in a torsion tube, and a single universal joint inclosed in a ball on the end of the gearset case. Radius rods from the rear system to the end of the torsion tube are added. Channel section frames of pressed steel are employed and springs are semi-elliptic in front and elliptic in the rear. Rear axles are of Hess construction.

With the foregoing details of general design in view a discussion of the individual models becomes simplified. The smallest model, the Runner, has cylinders of 3 1-2 inches bore and 4 1-2 inches stroke. This is quite an increase in size over the corresponding model of last year whose cylinders were 3 1-4 inches by 3 1-2 inches bore and stroke. The gearset of this model provides two forward speeds, although, like the others, it is of the sliding type. The rear axle in this model is semi-floating. Both roadster and five-passenger touring bodies are fitted to this chassis. The roadster body has a gasoline tank of unique shape. This shape is called the cam and the reason for the name is apparent from the illustration. The shape is such that every drop of fuel in the tank will be drained from it no matter in what position the car may be standing.

The Marathon Winner chassis carries three bodies, a roadster, touring and coupé. Its motor is rated by the makers at 35 horsepower, the cylinder dimensions being 4 1-4 inches by 4 1-2 inches bore and stroke. The Champion model has a motor of 4 1-2 inches by 5 1-8 inches bore and stroke and is supplied with roadster and five or seven-passenger touring bodies.

Aside from the usual equipment of top, top boots, windshield, speedometer, tire iron, demountable rims, and so on, there is supplied as regular equipment special seat covers, a rather unusual offering in the list of regular equipment.

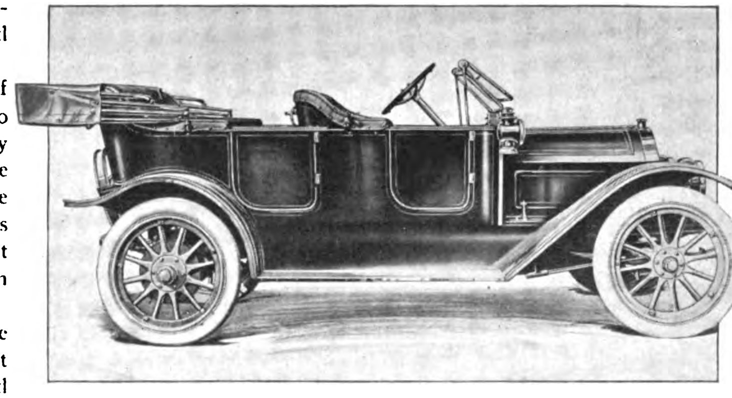


Fig. 2—Marathon Winner touring car with standard equipment

Harking Back a Decade

FROM *The Automobile and Motor Review*, Dec. 20, 1902: Special apparel for motoring began to make its appearance as soon as cars became capable of making 20 miles an hour. For the male automobilist the clothing was strictly utilitarian but the eternal feminine demanded that something beside warmth, protection and service should enter into the new styles. As a result of this demand some chic and at the same time useful costumes have been evolved for miladi. So far as the men are concerned, nothing in the clothing line has been developed that will not show transmission grease on the front and yellow mud behind.

The lawmakers of Buffalo now propose to frame an ordinance levying a special tax on all vehicles using the city streets. Automobile owners have filed a protest based upon the fact that as their machines are equipped with rubber tires they do the streets no damage and consequently should not be taxed.

Thieves in Pittsburgh entered the barn of William Williamson and stole the motor from his automobile. They displayed no ingenuity in loosening the motor as they apparently used a crowbar to break the supports.

Saks & Company, of New York, have established complete motorization of the delivery system employed by the store. The battery consists of eight light delivery wagons and two 1-ton trucks all made by the Vehicle Equipment Company.

Frederick A. Halsey recently has republished the articles written by him several years ago for the *American Machinist* on the efficiency of the worm gear. Mr. Halsey maintains that 90 per cent. efficiency can be obtained by this transmission.

The secretary of the Automobile Club of Great Britain and Ireland is now making an inspection of various Irish courses to select a route for the next Gordon Bennett Cup race. A 64-mile circuit has been tentatively decided upon but a protest is expected from the French automobile authorities.

The present French automobile show is pronounced to be the greatest in automobile history. President Loubet opened the show on December 10. The new type honeycomb radiator of Mercedes pattern; the Panhard reproduction of the electro-gasoline system wherein the current is generated for driving purposes by a gasoline engine; an eight-cylinder C. G. V. motor that does away with transmission gearing and numerous other improvements in construction are the main features of the show. A host of Americans have been in attendance at every session.

Alexander Winton has declined to receive the challenge of Barney Oldfield for a match race. Mr. Winton does not race for money and Oldfield's challenge contemplated a purse and side wager.

Rules for the Gordon Bennett race have been promulgated by the Automobile Club of America. The rules provide for a deposit of $600 by each entrant; if the entrant is not selected to start by the committee, the deposit shall be returned. Besides Alexander Winton, H. S. Harkness, of Brooklyn, L. P. Mooers and W. T. White, of Cleveland, and Percy Owen, of New York, have signified their intention of entering. The rules about the deposit money are supplementary regulations of the A. C. A. The actual rules of the contest are provided for under the deed of gift and the ideas of the club holding the race.

The Houck Automobile Company of England has placed an order for $250,000 worth of automobiles to be made by the International Company of Toledo.

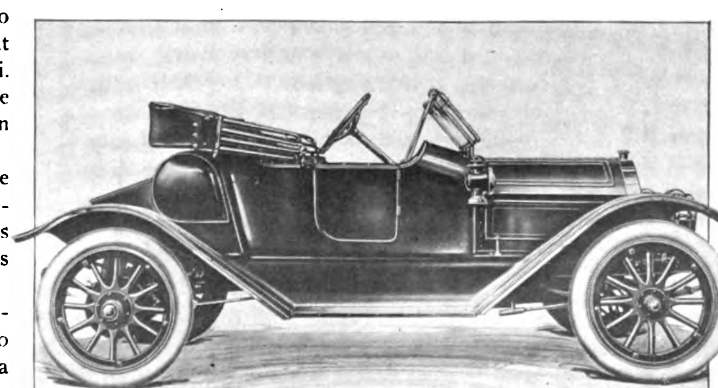


Fig. 3—New Marathon roadster; note cam-shaped gasoline tank

The Automobile

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French Cars for 1913

ALTHOUGH the French manufacturer feels somewhat humiliated in that the recent Paris Salon has been eclipsed by the annual exhibition across the channel, he, nevertheless, has the satisfaction of knowing that so far as the development of the modern automobile is concerned he is still keeping well to the fore. In fact, the engineering departments of the French factories are as busy to-day as they were 6 or 8 years ago.

To America belongs some of the credit of this activity; the French engineer has at last realized that he wasted time in the development of the single-cylinder motor, which was at best a monstrosity, and while satisfactory for racing and high-speed country work was not successful for touring and city use. The development of the small-powered four-cylinder car in America and the reduction in price, together with the aggression of American exporters, have led to this exceptional French activity.

In their aim to develop small cars the French engineers have not forgotten the good engineering and careful constructions of the high-powered car, neither have they aimed at a cheap car which is being sold on its accessory equipment. They have set boldly to work to develop a high-class, efficient, low-powered car, one whose initial cost is not so low but whose upkeep figures will be relatively low, because of good materials, careful workmanship and light weight. The engineering effort expended on these models is as great as that on the larger cars.

The French verdict on motor design is an unmistakable one; long-stroke motors are used everywhere. In fact, there is scarcely a square motor listed for next year. One-half of the entire list of manufacturers show stroke-bore ratio of 1.5 to 1, and there is a goodly number with a stroke-bore ratio of 2 to 1, this number including several of the most conservative makers. This increase in stroke has been brought about because of necessary fuel consumption and also the horsepower tax.

The non-poppet valve has made little progress, excepting in that the sleeve type has gained a great many French adherents. The apparent reason why many of the non-poppet designs of a year ago are missing to-day is that they have failed to stand up under strenuous tests.

Two tendencies of French construction for next year are very apparent, one being the adoption of worm drive, and the other the demountable wire, steel, or wood wheel. Originally France was stoutly opposed to both of these measures because they were looked upon as English developments. The leading manufacturers have been experimenting carefully with both for 2 years, and now not a few of them list the demountable wire wheel as stock, with the demountable wood wheel or steel wheel as optional. The same is true of worm drive. Several concerns list this as stock with a bevel option. One of the biggest French houses in designing its worm-driven axle has mounted the worm above the axle, a difficult design, if a low-body support is to be had. This difficulty has been surmounted by a longitudinal ridge in the car floor to accommodate the propeller shaft, a construction similar to that used with some American underslung constructions. All French concerns do not use the overhead worm, but mount it underneath and mount both motor and gearbox at a slight angle to give straight-line drive.

Silent-chain drive in the motor for camshaft, magneto shaft, water pump, and in some cases oil pump, has become almost universal. The chain manufacturers in Europe have been particularly aggressive in the development of a satisfactory chain to meet these exacting conditions, so that the adoption of the chain has not been retarded in the slightest by the lack of a satisfactory product. The difficulty of mounting the sprocket through proper centers to meet chain requirements has been speedily overcome by the co-operation of the chain engineer and the car designer.

There is a wealth of minor improvement in many of the French machines. The spring suspension is unsettled. Some, who have used three-quarter elliptic gears have reverted to the semi-elliptic. Shock-absorbers are more general. Universal joints have been improved and radius and torque rod constructions have been improved upon. The double-drop frame has come in for more general consideration. Lastly, one of the best business manufacturers has adopted the American idea of selling a completely equipped car, which, if it takes hold, can be readily seized upon by the American exporter and the movement will work more or less of a revolution in the French selling field, as well as one which will aid in the exportation of American cars to South America, Australia, etc., where they are in competition with French products, and where the European product has largely dictated the selling situation.

Detroit to Produce 385,150 Cars for 1913

Total Output of the City's Automobile Factories for 1912 Was 192,695 Machines—95.4 Per Cent. of 1913 Production To Be Pleasure Cars—Commercial Vehicle Output to Increase 198.6 Per Cent. for This Season—Thirty-Six Companies Now Manufacturing

DETROIT, MICH., Dec. 15—More automobiles will be built in the city of Detroit alone during 1913 than were manufactured in the entire country in 1912. Carefully compiled statistics show that the combined production of all classes of vehicles will be close to double that of last year in this, the hub of the industry. In thus estimating their market and laying their plans for the greatest year in their history, the manufacturers have apparently given little thought to the coming change of politics, being more interested, as was expressed at the recent banquet of the National Association of Automobile Manufacturers in Detroit, in the problems connected with supplying the demands of the trade than they are in the change in the political situation.

Following is the comparative production of Detroit cars of all classes for 1912 and for 1913:

	1912	1913
Gasoline pleasure cars	185,560	367,450
Gasoline commercials	4,310	12,875
Electric pleasure cars	2,315	3,675
Electric commercials	510	1,150
	192,695	385,150

These figures show that the contemplated production for the coming year is 100.5 per cent. greater than that of 1912, or about double.

Pleasure Car the Main Issue

The compilation further brings out the city's pre-eminence as a pleasure car center, the production of this type of vehicle greatly overshadowing that of commercial vehicles. Of course, one big factor in this great pleasure car showing is the tremendous production of one factory—the Ford plant—which will endeavor to turn out 200,000 complete machines, all of the pleasure car type. Even the making of light delivery cars is to be stopped, concentration on the one class even more deeply than heretofore being the future program.

Analysis of the totals shows that 95.4 per cent. of Detroit's output for 1913 will be of the gasoline pleasure car class, 3.35 per cent. of the gasoline commercial, 0.96 per cent. of the electric pleasure and 0.29 per cent. of the electric commercial.

The percentage increases over 1912 are surprising when viewed in cold figures, as follows:

Gasoline commercial car increase over 1912	198.6 per cent.
Electric commercial car increase over 1912	125.0 per cent.
Gasoline pleasure car increase over 1912	98.3 per cent.
Electric pleasure car increase over 1912	96.6 per cent.

Thus, although producing far less commercials than pleasure cars, Detroit's commercial vehicle output has increased proportionately faster than has its pleasure car output. This is further evidence of the fact that while business vehicle manufacture is about 10 years behind that of the passenger car it is growing by leaps and bounds and will need only a few years to assume the proportions which it should have.

Another interesting feature of Detroit's factory statistics is the proportion of the country's entire car manufacture for the coming year that is centered here. The following table will serve to bring out forcibly the marvelous growth of the Michigan city as the greatest automobile center of the world, the figures previous to 1912 having been obtained from the Detroit Board of Commerce statistics:

Annual production of cars—total of all classes	
1905	10,736
1906	(Estimated)
1907	(Estimated)
1908	18,200
1909	45,000
1910	114,120
1911	135,000
1912	192,250
1913	385,150

The state census report for 1904 shows that in that year there were twelve concerns actively engaged in the manufacture of automobiles in Detroit, while a year later this had swelled to twenty-two. Last year (1911) there were about thirty, while at present thirty-six companies are actively manufacturing.

There is considerable speculation as to what will become of the great number of machines which will be produced. Some with pessimistic views have said that there will be over-production, but such great increase has not been decided upon without deep consideration of this point, and there seems to be an opinion among the makers that there will be difficulty in supplying the demand even now. Yet the makers do not depend solely upon their American trade to buy all their product. The increasing foreign market is to take care of a large share of the cars. Although imports of automobiles have fallen off greatly, government export figures show that exports have nearly doubled their volume of a year ago. The following table showing the export automobile business from Detroit to Canada and England is given by the government export figures:

1903	$82,933
1904	162,529
1905	255,597
1906	269,554
1907	422,101
1908	399,010
1909	699,706
1910	2,106,615
1911	3,864,994
First 2 months of 1912	1,296,873

At this rate the 1912 foreign shipments of automobiles from Detroit will be approximately $7,780,000 and should reach $15,000,000 in 1913.

New York Has More Cars than France

PARIS, Dec. 12—France possesses 76,771 private automobiles that number having paid taxes during the year 1912. The figures show an increase in the number of cars during the year to the extent of 12,562. These figures are generally accepted as an estimate of the number of cars in use in France, but they are, in reality, of a very conservative nature.

The official figures for the last 6 years are as follows:

1907	31286	1910	53669
1908	37586	1911	42609
1909	44769	1912	76771

The total falls far below the number of automobiles registered in New York State at the present time, and, for that matter, considerably below the number in California. New York had 102,870 cars on October 1, while California had 83,728.

Philadelphia Club Opens New Clubhouse

Powell Evans, President of Club, Officiated and Made Dedication Address at Laying of Cornerstone

Open House Was Order of Day and All Afternoon Members and Friends Inspected Building

PHILADELPHIA, PA., Dec. 14—With ceremonies appropriate to the occasion, the formal opening of the new club house and garage of the Automobile Club of Philadelphia on Twenty-third street between Market and Chestnut streets took place today. At the same time the announcement was made that the proposition submitted to members to lease the mammoth building to the Philadelphia Automobile Trade Association from January 15 to February 5 for the purpose of holding the annual automobile show there, had been approved. The show will extend over two weeks, from January 18 to February 1.

Powell Evans, president of the Automobile Club of Philadelphia, officiated today and made the dedication address at the laying of the cornerstone in the Ludlow street corner of the structure. Mr. Evans in a brief talk reviewed the object and aims of the organization and what it hopes to accomplish, with the co-operation of the members, in the working out of legislative problems of interest to the motorist and public alike and in the development of good roads. Open house was the order of the day, and all afternoon members and friends inspected the new quarters.

The Automobile Club of Philadelphia's building formally dedicated this afternoon represents the growth of an agitation inaugurated years ago for the ownership of a building containing a garage for the use of members. The building is a handsome fireproof concrete and steel structure occupying a lot containing 3-4 acre. The entire front, extending 237 feet along Twenty-third street south of Market, is wired glass enclosed in steel framework, giving the interior of the building perfect natural lighting facilities during the daytime. The lot has a depth of 140 feet.

Location of Club Ideal

The location is an ideal one, being on the traveled line to the business section of the city, Broad street and Fairmount Park, and is readily accessible to all the outlying districts. As at present constructed the building is three stories in height, each floor containing 30,000 square feet of space. Ultimately it will be six stories high, with an estimated capacity for storing 750 automobiles. In addition the building is equipped with every modern convenience and necessity, which include spacious club rooms, offices and board of directors' quarters, perfectly appointed chauffeurs' quarters provided with lounging rooms, wash and bath rooms; repair and machine shops, and the like.

The club is one of the most influential in the automobile world, and in connection with its activities operates a touring information bureau, law and ordinance bureau, a co-operative supply bureau, and issues a monthly bulletin and yearly route book. Born in 1901, the organization has grown from an initial membership of sixteen, occupying a single room on the top floor of the Manufacturers' Club, to a present membership of 1,600, the largest in Pennsylvania and one of the largest in the country. Powell Evans, as chairman of the finance and construction committee, was most active in carrying the plans for the present magnificent structure to completion.

The officers of the club are: Powell Evans, president; Howard Longstreth, vice-president; S. Boyer Davis, secretary, treasurer and counsel. Board of directors: Powell Evans, S. Boyer Davis, Henry P. Baily, Jacob J. Seeds, Stedman Bent, Winfred J. Foss, Howard Longstreth, Robert P. Hooper, W. O. Griffith, J. Hartley Merrick, W. W. Atterbury and Charles W. Pickering, Jr.

The chairman of the various active committees are: Law and ordinance, S. Boyer Davis; touring information, W. O. Griffith; good roads, Howard Longstreth; membership, Henry P. Baily; finance and construction, Powell Evans; supplies Winfred J. Foss, and garage, Powell Evans.

Machine Tools Transferred to Garden

Preliminaries in preparation, decoration and arrangement for the annual automobile show have been taken up in earnest and despite the fact that Madison Square Garden is scheduled to be used for a big ball the week before the opening of the show the actual work is going forward rapidly. Some of the principal decorations will be installed before the ball. The chief change announced in the show program is the transfer of the machine tool exhibit from Grand Central Palace to the Garden. It was intended to place this interesting feature of the show on the balcony floor of the Palace but it was learned that on account of the floor structure it would be necessary to reinforce the underpinning and to do other expensive work in order to make the exhibit there a possibility. Therefore the management decided to transfer the machine tools to the Garden where they will be installed in the basement where there is a cement floor and where more space can be devoted to them. It is expected that at least a dozen concerns will take part in this section of the show.

PARIS, Dec. 17—Announcement has just been made that the Automobile Club of France, has selected a course for the running of the 1913 grand prix. The committee has selected a circuit in the vicinity of Amiens.

Washington Dealers Organize

WASHINGTON, D. C., Dec. 14—The motor car show proposition took a new angle this week when a number of the dealers met, organized and incorporated the Automobile Dealers' Association of Washington, the primary object of which will be to promote the show scheduled for February 3-8. The new organization will have complete control of the show. T. Oliver Probey was elected chairman of the show committee; C. W. Semmes, vice-chairman; E. A. Garlock, secretary; F. C. Sibbald, treasurer; governors, Arthur Foraker, J. H. Miller, F. W. Robartes, I. J. Henderson, J. H. Earle, T. Lamar Jackson, Bruce Emerson.

Additional Exhibitors for Big Shows

The following concerns, members of the Motor and Accessory Manufacturers, have been assigned space, in addition to those already reported, for the New York, Chicago and Boston automobile shows mentioned:

Madison Square Garden, New York

First and Second Week

Baldwin Steel Company, 30 Church Street, New York City.
Dean Electric Company, Elyria, O.
Findeisen & Kropf Manufacturing Company, Twenty-first and Rockwell Streets, Chicago, Ill.
Homo Company of America, 3202 Oxford Street, Philadelphia, Pa.
McCue Company, 1700 Elmwood avenue, Buffalo, N. Y.
New Departure Manufacturing Company, N. Main street, Bristol, Conn.
Warner Instrument Company, 689 Roosevelt street, Beloit, Wis.

First Week Only

Detroit Electric Appliance Company, 264 Jefferson avenue, E., Detroit, Mich.
Electric Auto-Lite Company, 133-137 Michigan street, Toledo, O.

Grand Central Palace, New York

First and Second Week

Dean Electric Company, Elyria, O.
Homo Company of America, 3202 Oxford street, Philadelphia, Pa.
U. S. Light & Heating Company, 30 Church street, New York City.
Westinghouse Electric & Manufacturing Company, E. Pittsburgh, Pa.

Second Week Only

Hess Steel Castings Company, Bridgeton, N. J.

Chicago

First and Second Week

Baldwin Steel Company, 30 Church street, New York City.
Detroit Electric Appliance Company, 264 Jefferson avenue, E., Detroit, Mich.
James L. Gibney Rubber Company, 215-217 N. Broad street, Philadelphia, Pa.
C. T. Ham Manufacturing Company, 731 Oak street, Rochester, N. Y.
Homo Company of America, 3202 Oxford street, Philadelphia, Pa.
Pittsfield Spark Coil Company, Dalton, Mass.
A Schrader's Son, Inc., 28-32 Rose street, New York City.
Westinghouse Electric & Manufacturing Company, E. Pittsburgh, Pa.

First Week Only

Dean Electric Company, Elyria, O.
McCue Company, 1700 Elmwood avenue, Buffalo, N. Y.

Boston

First and Second Week

Dean Electric Company, Elyria, O.
James L. Gibney Rubber Company, 215-217 N. Broad street, Philadelphia, Pa.
Homo Company of America, 3202 Oxford street, Philadelphia, Pa.

First Week Only

Gabriel Horn Manufacturing Company, 970 Hamilton street, Cleveland, O.
Hood Rubber Company, 99 Bedford street, Boston, Mass.
McCue Company, 1700 Elmwood avenue, Buffalo, N. Y.

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exhaust port *p* leads directly to the atmosphere, and the spark-plug *g* is secured nearly diametrically opposite to it in A. The flywheel, which may be a propeller, is mounted upon a piece which is made integral with A.

When functioning, the two pairs of pistons are alternately moved toward and away from one another, imparting a scissors movement to the plates *a* and *b* as well as to the cross-levers *ee* and *ff*, and the variations produced by this movement in the annular expansion chambers correspond to the phases of an eight-cylinder, four-cycle motor.

In Fig. 8, the two pistons are shown as close together as they can get, the movement being limited by the diameter of the pinions *h i*. When the spark-plug passes the space between them in this position, the charge is fired—this feature being easily regulated in connection with the stationary gear work of the motor—and the pistons are driven apart, causing the tore A to rotate at the same time, and when they reach the limit of the stroke the exhaust port passes into communication with the larger annular space now separaing pistons *a*1 and *b*1, and the exhaust begins while A continues to turn in the same direction as before. The end of the admission stroke is indicated in the position of the lever arms in Fig. 9. As said, an explosion occurs each time the spark-plug passes an explosive mixture compressed between two pistons; that is to say that it occurs four times during one revolution of A; namely, in the positions marked 1, 2, 3 and 4 in Fig. 8. It is stated that arrangements have been made for the manufacture of this motor (with regard to the construction of which more precise data may be expected) in sizes up to 300 horsepowers.—From *La Vie Automobile*, Nov. 23.

EXPLOSIONS of Oxygen Containers—A number of explosions are reported to have occurred at small autogenous welding establishments in different parts of France incidentally to the use of tubes containing oxygen under strong compression. An investigation of these accidents disclosed the fact that in all cases the oxygen had been produced by electrolytic action upon water and that it was impure, containing from 3 to 10 per cent. of hydrogen. It has been proposed to place the manufacture of compressed oxygen under public supervision, so as to insure its purity and consequent harmlessness, and it is contended that under proper safeguards it may be manufactured from water as well as by other methods.—From *Revue de la Soudure Autogène*, November.

Milwaukee Decides On One 1913 Show

Entire Motor Trade of the City Will Unite to Promote—Exhibition To Be Held in the Auditorium

Eighty-Five Pleasure Cars in 225 Models of Various Makes To Be Shown January 11 to 17

MILWAUKEE, WIS., Dec. 17—After a week of turmoil, during which a new organization of dealers was actually organized and articles of incorporation filed; an exposition hall leased for a second motor show to compete with the regular Milwaukee show, and several skirmishes in a warfare between two factions of dealers fought, it was announced on Monday that there will be but one motor show in Milwaukee for 1913, and it will be promoted with the united efforts of the entire motor car trade of the city.

A week ago today the Milwaukee Motor Show Association, organized by members of the Milwaukee Automobile Dealers' Association, and incorporated without capital stock, issued blanks for space in the 1913 Milwaukee show, to be given from January 11 to 17 inclusive in the Auditorium. The blanks were issued to all of the dealers in Milwaukee, about sixty in number, of which twenty-two are affiliated with the M. A. D. A. Tuesday night twenty-four of the dealers who are not affiliated met in the office of Hustis Bros., and organized the Milwaukee Progressive Automobile Dealers' Association, the principal object of which was to conduct a motor show according to its own ideas of how a motor show ought to be run. A tentative lease was made with the management of the Hippodrome, an exposition palace of lesser proportions than the Auditorium, which, by the way, was the home of Milwaukee's first motor show, when the Milwaukee Automobile club started the ball rolling in 1908. The tentative dates were January 11 to 17 inclusive, or the same period set for the regular show of the Milwaukee Motor Show Association.

It appears that the progressive dealers were dissatisfied with the conditions made by the motor show society and determined to run their own show on a co-operative plan. The progressives or insurgents claim that not only was the price per space increased 50 per cent. over that charged at the 1912 show, but certain other conditions were imposed which made it advisable for them to get busy and run their own exposition.

As soon as the progressives announced their plans, the regular organization got busy and negotiated for a compromise, so that Milwaukee would not be called upon to support two shows at the same time, a condition which might result in either two failures or two successes. The conferences lasted over Sunday, and on Monday it was announced that a compromise had been effected and there would be but one exhibition, supported by the combined forces of the Milwaukee dealers, representing about eighty-five or ninety pleasure cars of various makes, to be shown in no less than 225 models on the floors of the numerous halls and annexes of the mammoth Auditorium building.

Ghent Show Will Have Strict Rules

BRUSSELS, Dec. 5—The announcement that both French and Belgian Societies of Motor Manufacturers are arranging collective displays of motor cars for the international exhibition to be held at Ghent next year, and have already booked space for their exhibits is of much interest. The conditions of display are of the most stringent nature and the authorities stipulate that no manufacturer or agent will be permitted to show a foreign body on a Belgian chassis nor the reverse.

Within the Walls of Paris

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method, continues it; La Buire has adopted it, and it is very much favored by the Italian firms, S. C. A. R., S. C. A. T., etc. De Dion-Bouton makes use of it on some of the smaller models. Although not likely to oust separate construction in the near future, the unit idea has made real progress. There are two distinct methods of treating the unit type. In the minority is the Hispano-Suiza school, where the unit is rigidly bolted to the frame or to inswept extensions of the frame so as to stiffen the entire construction, and in the majority of cases the unit is hung on three points.

Tendency Is Toward Monobloc

The tendency is more and more toward monobloc motors, some of the four-cylinder castings being enormous pieces. Berliet, for instance, has cylinders of 100 by 140 cast together; Gregoire has changed from pair casting to bloc; Delage casts six cylinders of 65 by 130 together; La Buire has single castings up to 90 by 160. Practically all motors up to 85 bore are in one casting, above this size opinions are divided, the majority favoring pair casting. Single casting is practically unknown except by some of the firms using the Knight motor in big sizes.

Silent-chain drive for cam and magneto shafts has made enormous progress. It would perhaps be easier to give the names of the firms not using it than those having adopted it. The former list would include some important firms, for it is precisely those factories having such a reputation that they can afford to be conservative which have remained true to meshing pinions. Panhard, usually classed with the conservative school, has made use of a chain for the poppet-valve models, after having had lengthy experience with it on the Knight motors. Sizaire-Naudin, after using it on one model, has extended it to all. Chenard-Walcker uses it throughout the series, from the small four to the big six.

The use of one or two chains and the provision for adjustment or not are debatable points. The majority appear to have made use of a single chain on three points, one of these—the magneto-shaft—being adjustable. It is the method adopted by Chenard-Walcker, where the magneto platform has a transverse adjustment to take up the slack of the chain. The same idea is used by Ballot on most of his motors. Delage, on the other hand, prefers the use of two chains, crankshaft to camshaft and camshaft to magneto shaft, without adjustment. **The main feature is that after a couple of years' experience chains have not given trouble, are being continued by those having tried them, and taken up by others.**

Thermo-syphon cooling is in a majority, if the exhibition as a whole is considered. But if the cars are separated into classes it will be found that pump and natural flow are about equally divided for the more powerful motors. Hotchkiss, Delaunay-Belleville, Panhard, Unic, Peugeot retain the pump for all their models or at any rate for all those of more than moderate power. The claim is no longer made that natural circulation is inefficient under strenuous conditions, but the claim is made that for very big motors the quantity of water that must be carried outweighs the advantage of abolishing one supplementary organ. Renault and Charron still head the list of firms making use of thermo-syphon for the whole series of motors.

High-Tension Ignition Best

There can only be one opinion regarding ignition. A single high-tension magneto, with fixed advance in the small powers and variable advance for the larger models, is found on at least 95 per cent. of the cars in the show. Storage batteries for ignition purposes are as dead as the dodo. Even the attempts to popularize a double ignition with one set of plugs, as brought out a couple of years ago, has failed to find favor. In most cases this was fitted with a view to starting up on the switch, but results were so uncertain, some motors starting well and other equally good makes refusing to start except under most favorable circumstances, that it was usually not considered worth while to keep a battery in service. It should be borne in mind that European motors, as a rule, are of comparatively small size, and the cranking of them does not present any great difficulty. Both magneto and carbureter manufacturers have made it their business to build appliances which make for easy starting, and as to the possibility of a breakdown, the average European motorist looks upon his magneto as the most reliable piece of mechanism on the car. Automatic advancing magnetos have not made much progress. Fixed-point ignition is in the majority, but this is merely because of a desire to make the car foolproof. In the higher-grade cars, generally handled by skilled men, it is the custom to fit variable spark advance.

Continental Europe manifests a decided lack of enthusiasm for the self-starter. All automatic methods of starting up the motor complicate the car, and so long as the craze is for extreme simplicity and clean-cut lines a mechanical starter will not find much favor. There is the fact, too, that the

Comparison Continental Motors

1912 Bore and stroke m.m.	Inches	1913 Bore and stroke m.m.	Inches	R.A.C. hp.
		S. P. A.		
70 x 120	2.7 x 4.7	No change		12.1
85 x 120	3.1 x 4.7	No change		17.9
100 x 140	3.9 x 5.5	No change		24.8
130 x 145	5.1 x 5.7	110 x 200	4.3 x 7.8	30.0
		STIMULA		
70 x 110	2.7 x 4.3	75 x 120	2.9 x 4.7	13.9
80 x 110	3.4 x 4.3	No change		15.8
80 x 110	3.1 x 4.3	No change		15.8
		TURCAT-MERY		
80 x 130	3.1 x 5.1	No change		15.8
90 x 130	3.5 x 5.1	No change		20.1
100 x 130	3.9 x 5.1	No change		24.8
....		110 x 160	4.3 x 6.3	30.0
		UNIC		
....		65 x 110	2.5 x 4.3	10.5
75 x 120	2.9 x 4.7	No change		13.9
90 x 120	3.5 x 4.7	90 x 130		20.1
102 x 116	4 x 4.5	Not made		
		VERMOREL		
....		66 x 120	2.6 x 4.7	10.5
74 x 120	2.9 x 4.7	No change		13.4
90 x 130	3.5 x 5.1	No change		20.1
		VINOT		
70 x 110	2.7 x 4.3	No change		12.1
80 x 110	3.1 x 4.3	80 x 130	3.1 x 5.1	15.8
102 x 130	4 x 5.1	101 x 130	3.97 x 5.1	25.2
		VIVINUS		
80 x 120	3.1 x 4.7	No change		15.8
90 x 130	3.5 x 5.1	No change		15.8
		ZEBRE		
68 x 120	2.6 x 4.7	50 x 100	1.96 x 3.9	6.2
50 x 100	1.96 x 3.9	No change		6.2
68 x 120	3.6 x 4.7	No change		11.3
		ZEDEL		
72 x 120	2.8 x 4.7	No change		12.8
82 x 120	3.2 x 4.7	Not made		
90 x 140	3.5 x 5.5	No change		20.1
		SIX-CYLINDER CARS		
		ARIES		
60 x 100	2.3 x 3.9	No change		15.0
75 x 120	3.9 x 4.7	No change		20.9
		BAZELAIRE		
75 x 110	2.9 x 4.3	75 x 120	2.9 x 4.7	20.9
		BOLLEE, LEON		
83 x 110	3.2 x 4.3	No change		25.6
106 x 130	4.1 x 5.1	Not made		
130 x 150	5.1 x 5.9	Not made		
		BRASIER		
90 x 140	3.5 x 5.5	No change		30.2
112 x 130	4.4 x 5.1	Not made		
		BUIRE, LA.		
85 x 140	3.3 x 5.5	No change		26.4
90 x 140	3.5 x 5.5	No change		30.2
		CHARRON		
80 x 120	3.1 x 4.7	No change		24.4
95 x 130	3.7 x 5.1	No change		33.6
		CHENARD & WALCKER		
80 x 150	3.1 x 5.9	No change		23.8
		CLEMENT-BAYARD		
....		70 x 110	2.7 x 4.3	18.2
80 x 120	3.1 x 4.7	No change		24.4
100 x 140	3.9 x 5.5	No change		37.2

European car owner rarely goes out without a mechanician, and there is a natural feeling that as the man is paid wages he might as well earn them. If cranking occasioned a serious delay, the owner would doubtless be willing to put down extra money to save time; but so long as it calls for an effort during but a few seconds, money will not be spent to save the driver this amount of labor. At present Delaunay-Belleville appears to be the only manufacturer making a specialty of a mechanical self-starter, but even in this case it is only fitted as an extra and does not find its way to the majority of cars of this make.

Electric lighting is considered a much more desirable feature than a self-starter. There is this difference, however, between European and American practice that in the former case the lighting outfit is generally an added accessory for which provision has been made in the original design of the chassis. This is explained by the fact that in Europe only the cheaper and medium-priced cars are sold all complete for the road, and in order to keep prices low these cars are fitted with ordinary oil lamps. The higher grade cars, which when completed always have electric lights, are sold by the manufacturer as a chassis and have their bodies made to order by a coach builder. Panhard, for instance, now specializes on a couple of series of completely equipped cars, and on one of these chassis there is a platform for an electric lighting dynamo and a pinion for driving it by silent chain. When catalogued, however, the car is given with oil lamps. This appears to be the general method of dealing with the problem in continental Europe.

Firms Still Make Many Models

So far as France is concerned, the average number of models per firm has not shown any decrease. The old idea was that each firm should have a sufficient range of models to satisfy every client from the poorest to the richest. Renault is a conspicuous example, with cars varying from two small-cylinder cars to six big-cylinder ones. Certain firms, having attempted to follow this example, have not failed to discover its disadvantages, and with a view to cutting down overhead charges have abolished the models for which there was the least demand.

The matter has been given a lot of attention by French manufacturers and some unsuccessful attempts have been made to mutually agree on what types of cars should be produced by each firm. This ambitious scheme having failed to materialize, a certain number of manufacturers have reduced their number of models, while others are continuing the full range with special attention to one particular type. Delage has cut his models down to three, a couple of fours and a six; Chenard & Walcker has got the number down to four, of which three are fours and one a six; Darracq has abolished some of the larger models, now specializing on three four-cylinder types; and De Dion-Bouton has cut out all singe-cylinder models, one of the twins, and while having a big series is specializing on a small four and a small eight. This firm, by the bye, is the only one paying attention to eight-cylinder motors. Panhard is more interested in the high-class trade, but is now specializing on one poppet type and one non-poppet, sold fully equipped for the road.

Renault, after an extensive tour through America, has come back with the intention of building one of his models, rated at 11 horsepower and having a bore and stroke of 75 by 120, on American lines, and is putting it on the market next year fully equipped for the road. The equipment consists of four-passenger body, top, wind screen, tires, horn, lamps and tools. The price has not yet been announced.

Some Have Increased Their Types

In contradistinction to these firms having either cut down to their number of models or specialized on one or two, there are certain firms having increased their types. This is largely owing to the fact that they have adopted non-poppet-valve motors without abandoning any of their poppet-valve types. This is the case with Gregoire, having replaced a twin by a small four, put on an additional Knight motor and prepared to put a larger Knight on the market. Morse has taken up the Knight with the same results, there now being four non-poppet-valve models and four chassis of similar design equipped with the sleeve-valve motor. Peugeot, instead of decreasing has increased the number of models by reason of a desire to use worm drive on two new types without abandoning bevel drive. **Despite these contradictions, the indications are, however, towards a reduction in the number of models produced by each firm.** It is recognized that overhead charges can be reduced by this method and it is more a matter of convenience than principle in making the change.

The outstanding feature of the non-poppet valve situation is the increase in the number of Continental firms having adopted the Knight motor. Panhard & Levassor, holding manufacturing rights for France, are now building but two models with the poppet-valve motor, these being small types of 2.7 and 5.5 inches bore and stroke

at Paris Salon for 1912 and 1913

1912 Bore and stroke m.m.	Inches	1913 Bore and stroke m.m.	Inches	R.A.C. hp.
		DARRACQ		
85 x 120	3.3 x 4.7	Not made		
100 x 140	3.9 x 5.5	Not made		
		DELAGE		
66 x 125	2.6 x 4.9	65 x 130	2.5 x 5.1	15.7
		DELAHAYE		
75 x 120	2.9 x 4.7	No change		20.9
		DELAUNAY-BELLEVILLE		
72 x 120	2.8 x 4.7	No change		19.3
85 x 130	3.3 x 5.1	No change		26.2
100 x 140	3.9 x 5.5	No change		37.2
		D. F. P.		
80 x 130	3.1 x 5.1	Not made		
		EXCELSIOR		
85 x 130	3.3 x 5.1	No change		26.8
		F. L.		
80 x 100	3.1 x 3.9	No change		24.3
		FIAT		
80 x 130	3.1 x 5.1	No change		24.3
		GREGOIRE		
80 x 120	3.1 x 4.7	Not made		
		HOTCHKISS		
95 x 110	3.7 x 4.3	Not made		
95 x 130	3.7 x 5.1	No change		33.6
		ITALA		
130 x 140	5.1 x 5.5	Not made		
		MERCEDES		
120 x 150	4.7 x 5.9	No change		53.5
		MORS		
....		85 x 150	3.3 x 5.9	26.2
		MOTOBLOC		
80 x 120	3.1 x 5.1	Not made		
80 x 148	3.1 x 5.8	Not made		
		PANHARD LEVASSOR		
90 x 130	3.5 x 5.1	Not made		
100 x 140	3.9 x 5.5 (Knight)	No change		37.2
		PILAIN		
65 x 120	2.5 x 4.7	No change		15.7
		PIPE		
90 x 140	3.5 x 5.5	Not made		
105 x123	4.1 x 4.8	Not made		
		RENAULT		
80 x 140	3.1 x 5.5	No change		24.3
100 x 160	3.9 x 6.3	No change		37.2
		GEORGES ROY		
80 x 120	3.1 x 4.7	No change		24.3
		SCHNEIDER		
75 x 120	2.9 x 4.7	75 x 130	2.9 x 5.1	20.9
		S. P. A.		
95 x 120	3.7 x 4.7	Not made		
130 x 145	5.1 x 5.7	Not made		
		EIGHT-CYLINDER CARS		
		DE DION-BOUTON		
70 x 130	2.7 x 5.1	75 x 130	2.9 x 5.1	27.8
90 x 140	3.5 x 5.5	94 x 140	3.7 x 5.5	44.0

and 3.1 by 4.3 inches bore and stroke. All other models have the Knight sleeve-valve motor. Mors, Gregoire, Aries, Rossel and Clement-Bayard have secured licenses for the sale of the Knight motor and are fitting it to some of their chassis for the coming season. Mors has made arrangements for bringing out four Knight motors, the respective bore and stroke being 2.9 by 4.7, 3.5 by 5.1, 3.9 by 5.5 and 4.8 by 5.9 inches. These are in addition to four poppet-valve models, making eight models in all, but as the chassis dimensions are the same for a Knight and a poppet-valve type it is practically a case of four chassis with four alternate types of motors.

It is worth noting that the 2.9 by 4.7-inch motor is the smallest Knight type sold in France, most of the firms making their small motors with poppet valves and only the larger and more expensive types with the Knight motor. The Mors power plants are supplied by the Minerva factory, in Belgium.

Gregoire to Build Big Knight

Gregoire has at present only one model of the Knight on the market, this being a four-cylinder of 3.1 by 5.1 inches bore and stroke fitted in a chassis having worm-driven rear axle. It is intended, however, to produce a larger type at an early date, and in all probability the proportion on Gregoire-Knights will be about one-quarter of the total output. In this case the Knight power plants are imported from the Daimler factory at Coventry.

Clement-Bayard is building two Knight types for 1913, or respectively 3.5 by 5.1 and 3.9 by 5.5 inches bore and stroke. Four other models, of smaller size, are made with poppet valves.

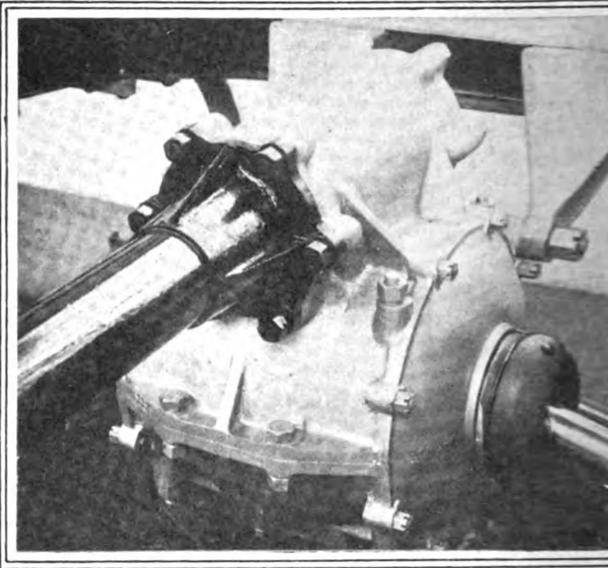
Rossel and Aries have made arrangements to equip some of their cars with the Knight motor, but particulars have not yet been given out.

The entire Minerva output now consists of Knight motors, this Belgian firm putting four distinct types on the market under its own name and building a number of power plants for other continental firms. Extensions giving 100 per cent. increased capacity and floor space have just been completed. The only other Belgian firm equipping its cars with the Knight motor is Germain. In Germany the rights are held by Mercedes and licenses have been secured by N. A. G. and the Kraftfahrzeug Aktien-Gesellschaft. In Austria Johann Puch has the rights and in Switzerland Knight motors are being marketed by Martini and the Sigma company.

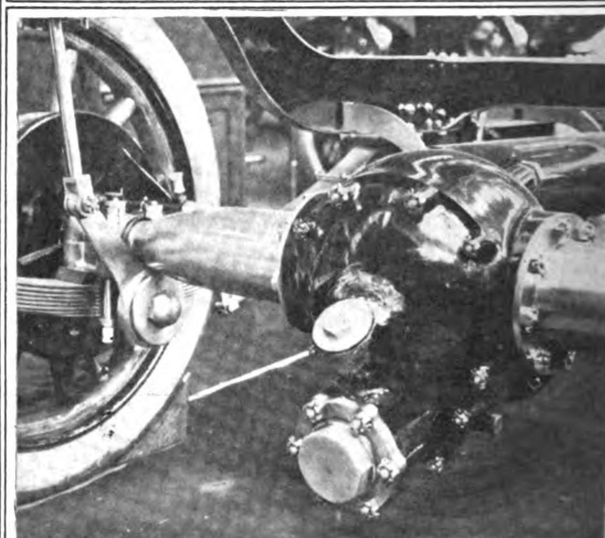
Non-poppet valve systems other than the Knight are being taken up very slowly. More than one case could be mentioned of French firms having purchased non-poppet valve patents, and tested them out only to abandon them. It must be admitted that the introduction to the European market of any rival of the poppet valve has now become a most difficult matter. Peugeot is now cataloguing a non-poppet valve type, but has not placed it on exhibition. Delahaye admits having a non-poppet valve model in preparation, but is not fixed as to the date of its public appearance. Those actually producing non-poppet valve motors are Darracq with the Henriod rotary-distributor model; Rolland-Pilain with a single-sleeve type; Piccard-Pictet with a license for the Argyll motor; Itala with a rotary distributor; Schneider with a ring-type applied to one model only; C. I. D. with a rotating-ring type, and C. L. C. with a rotary-sleeve model.

C. L. C. Now Is Four-Cylinder

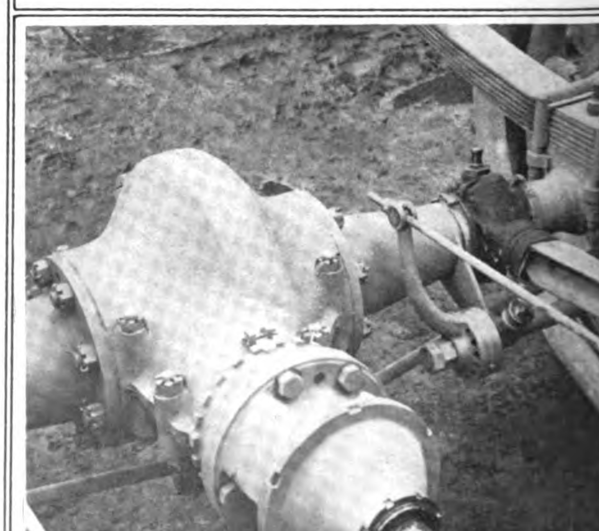
The C. L. C. with a single-rotary sleeve has been produced for more than a year as a single-cylinder model, and is now being built in a four-cylinder of 2.5 by 5.1 inches bore and stroke. The sleeve has a single opening and carries a very deep compression ring having an opening corresponding with that in the sleeve. It is prevented from rotating on the sleeve by means of a stud. There are two ports for, respectively, intake and exhaust, the width of these ports being very much greater than the width of the openings in the sleeve; thus there is a certain period during which the opening remains constant, despite the continuous rotation of the sleeve. Each sleeve has near its base a spiral gear by which it receives its motion from a half-time shaft. Above and below this gear is a radial and thrust bearing. This double bearing adds to the cost, but it simplifies the assembly compared with previous methods of construction. By reason of these bearings at the base of the sleeves the overall length of the motor is increased, this explaining the single casting of the cylinders. Because of the length



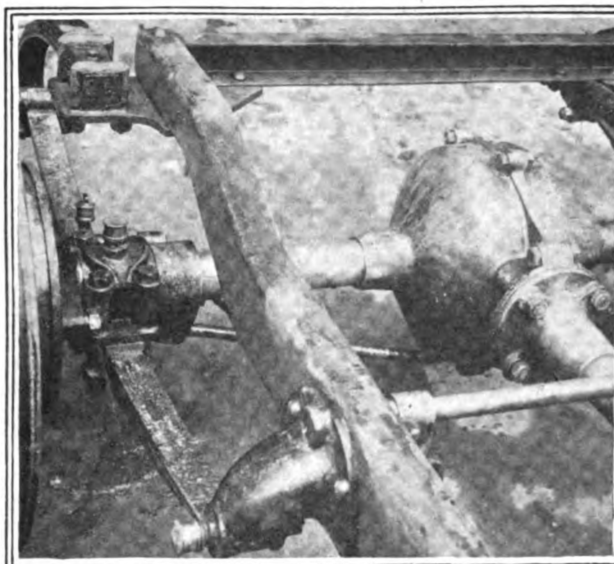
De Dion worm-driven axle with overhead worm



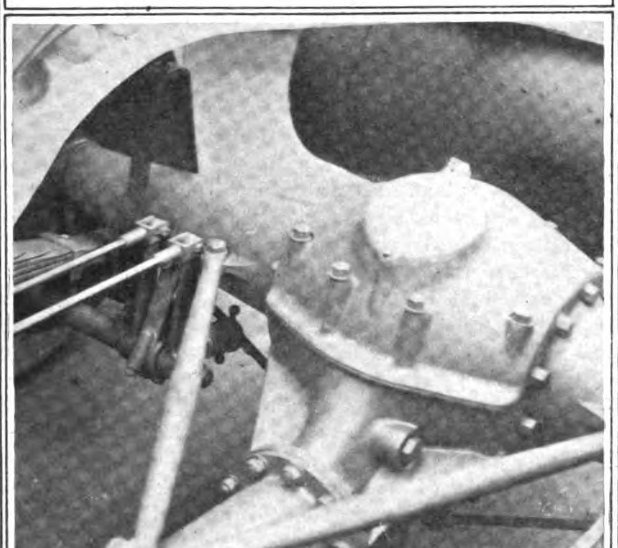
Peugeot worm-driven axle with underneath worm



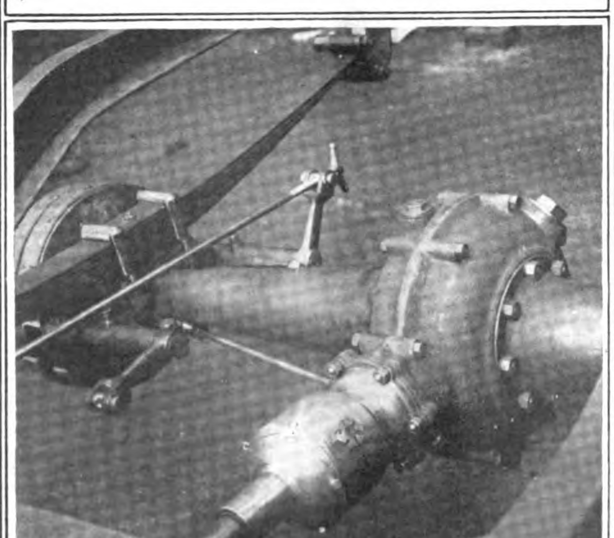
New axle on Delaunay-Belleville—note radius rod and brake adjustment



New Darracq axle with underslung springs



Sheffield-Simplex worm-driven axle—worm underneath



Sizaire-Naudin axle with ready brake adjustment

of the motor, five bearings are used for the crankshaft, this being quite unusual for a motor of such small bore. It has been decided, however, to fit only three bearings for the standard models. The half-time shaft occupies the position usually given to the camshaft, but instead of being within the crankcase it is mounted on radial ball and thrust bearings within an independent housing bolted to the crankchamber. As there is silent-chain drive from the crank to the secondary shaft, it is only necessary to take off the nuts on the holding-down studs, place the Oldham coupling horizontal, and withdraw the entire shaft with its bearings. By this arrangement it is possible to vary the timing of the sleeves with comparatively little difficulty.

C. I. D. Motor Unchanged

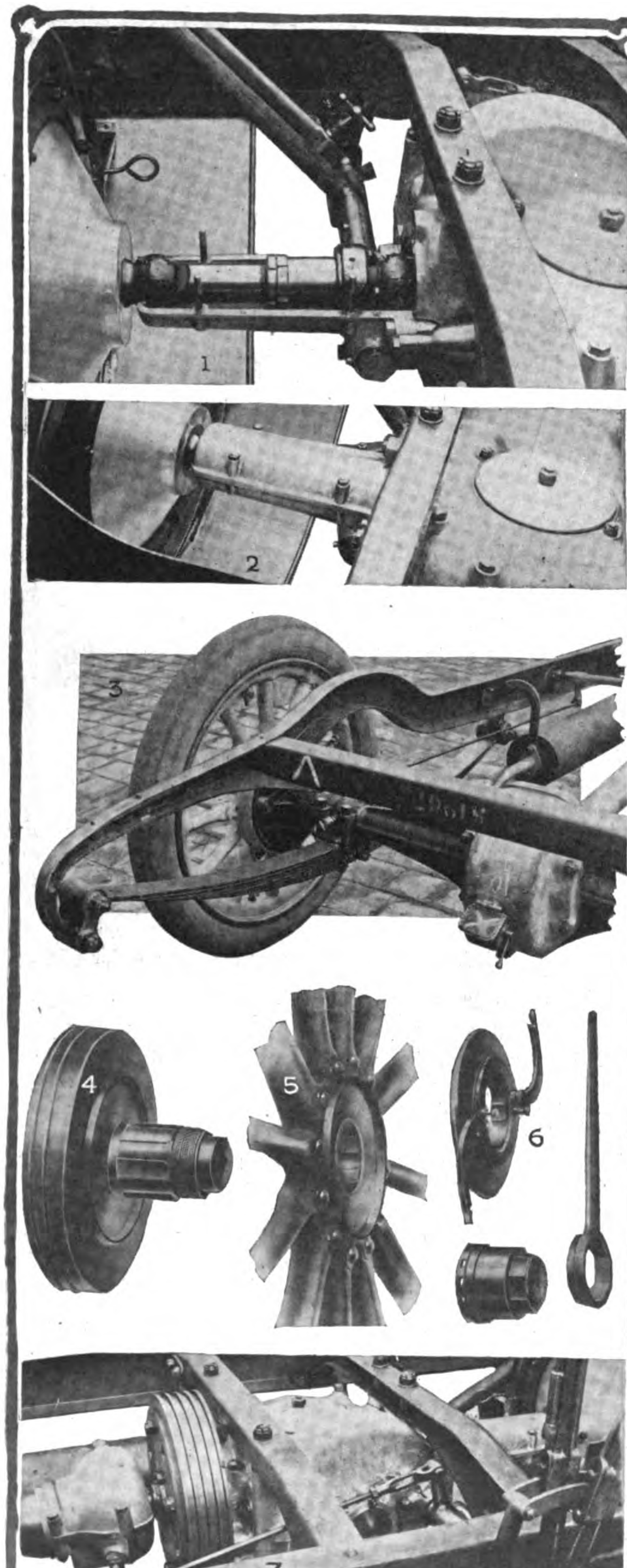
The C. I. D. non-poppet-valve motor has remained practically unchanged since its first appearance. It assured the intake of the fresh gases and the discharge of the spent gases by means of an extensible ring having a suitable opening, placed in the head of the cylinder and driven by a vertical spindle from an overhead shaft. The ring revolves at one-half motor speed, passing successively in front of the intake and the exhaust ports, and assures gas tightness by reason of its extensibility. The overhead shaft driving the distributer rings also drives the high-tension magneto, the distributer of the magneto being brought through the dashboard. The Constructions Industrielles Dijonnaise, holding the patents for this motor, produces one type only.

Renault has made important changes in the suspension of all his cars for the 1913 season. Instead of the rear underslung three-quarter elliptic springs employed on practically all models for the last 2 years, the new types will have long semi-elliptics seated under the axle. On the 16-horsepower type, 90 by 140-millimeter bore and stroke. The width of the springs is 2 5-8 inches and the length 57 inches. The frame is somewhat abruptly arched over the rear axle and downswept at the rear. The rearmost transverse member has arms which fit into the longitudinal frame members as far as the extreme rear, thus considerably stiffening this portion of the chassis. On the 16-horsepower model the rear springs have twelve leaves. The semi-elliptic springs have been adopted in order to eliminate the side sway which frequently set up with three-quarter elliptics, particularly when heavy closed bodies are carried. Shock-absorbers are made a standard fitting for the rear.

Renault, who has always been an opponent of detachable wire wheels, has now produced a detachable wood artillery type of wheel. The fixed hub carries keys corresponding with grooves on the detachable hub, and also a large-diameter shoulder with a taper to correspond with a tapered shoulder on the detachable hub. When the wheel has been placed on the fixed hub, a deep ring is also mounted on the keyways of the shaft. This ring carries on its inner face a taper-section collar corresponding with a taper ring on the outer face of the detachable hub. Thus the entire wheel is centered on two cone seatings. It is locked on by the hub cap, which, after being screwed up, is prevented from being unscrewed by a couple of semi-circular arms pivoted to the outer centering ring and entering a groove in the cap. These form the final lock and are maintained in their locking position by a spring mounted pin passing into a slot in the extremity of each arm. A single spanner is required for locking the wheel or dismounting it. With the exception of the locking ring encircling the hub cap there is nothing externally to indicate that the wheel is not of the fixed type.

Clutch Shaft Is Inclosed

There are not many new features on the chassis. Probably the only one of importance, with the exception of the springs, is the incasing of the clutch shaft in order to protect the universals from dust and to allow them to run in oil. An aluminum housing divided horizontally into halves is bolted to the front end of the gearbox around the shaft between the gearset and the clutch. The forward end of this tubular housing has inturned lips, thus preventing lubricant leaking out, unless, of course, it rises above the level of the lip. Within the upper portion of the housing there is an oil lead allowing lubricant from the gearbox to drip onto the universal joints. A return pipe in the lower portion allows this lubricant to drain back into the gearbox. The foot brake to the rear of the gearset is now of the expanding type, the drum being



Some 1913 Renault Constructions

1 & 2—Oil cover for clutch shaft, showing cover in position and cover part removed

3—Semi-elliptic springs are used instead of three-quarter elliptics to eliminate body side-sway

4, 5 & 6—Renault demountable wood wheel, hub part, 4; wheel, 5; locker, 6, and hub cap and wrench

7—New method of supporting gearbox beneath frame

ribbed. The gearbox is bolted to the underside of a couple of upswept transverse frame members. On the motor the only change appears to be the fitting of a breather between each pair of valves in order to relieve pressure at this point and prevent the leakage of oil through the valve-tappet guides which very frequently occurs on some motors.

Panhard Has Four Models

The Panhard is making four models, two of the Knight sleeve-valve type and two small models with poppet-valve motors. Although generally classed as conservative from a pioneering viewpoint, the Panhard shows aggression in many respects. Chain drive, which has been used on the Knight motors for the eccentric shaft, is introduced on the two poppet types for camshaft and magneto-shaft drive. All models are made with a unit motor and gearbox. In spite of the fact that Europe is going stronger to two-bearing crankshafts the Panhard uses three. At the same time, while the majority of the manufacturers are introducing thermo-syphon cooling, the Panhard remains with a water pump on all models. The company has taken for next year its first important step in long-stroke motors in its new small 10-horsepower, four-cylinder type, 2.7 by 5.5 inches bore and stroke, which is a stroke-bore ratio of 2 to 1. This model replaces a twin-cylinder chassis of 3.1 by 4.7 inches bore and stroke. Unit construction is adopted, but this is not altogether new, for one of the larger Panhard models was so built a year ago. The cylinders are a bloc casting with a three-bearing crankshaft. Pump water circulation is employed. When these small series were first produced thermo-syphon flow was adopted, but it was quickly dropped in favor of forced water circulation, and all Panhard models now carry a water pump. The valve-operating mechanism is somewhat unusual. Valves are all on one side, with a large-diameter plug over each pair; the camshaft with integral cams is driven by a silent chain and a transverse shaft drives the magneto and water pump. The pushrods are not fitted with the usual type of guides; they are long steel rods with hollowed heads receiving the end of the valve stems and are maintained at their base in the hollow portion of an intermediate arm between the cam and the pushrod. The shape of the top of the crankchamber is such that oil leaking out through the pushrods will drip back again without overflowing down the sides of the crankchamber. Each pair of intermediate arms between cam and tappet is secured in a circular plate on side of crankchamber and held on their seat by a clamp. Thus, when the valves have been taken out, the tappets can be withdrawn without touching any other part. This is a considerable advantage.

Improvements in Lubrication

The lubricating system is new in its details. There is a trough under each connecting-rod in which the oil level is maintained just high enough for running light. On the wall of each compartment of the crankchamber is an inclined, open oil lead cast with the chamber, and serving to lead the oil splashed up in one chamber to the adjoining chamber, the oil thus passes from the rearmost or fourth cylinder to the third, then to the second, and finally to the first. Naturally the inclination of the oil lead on the wall of the crankchamber is such as not to interfere with the flow when the car is on a gradient. In the portion of the crankchamber corresponding to the first cylinder, the oil lead is replaced by a pocket which gathers the oil splashed on the walls and returns it to the reserved oil tank cast in the right-hand crankcase hanger. The used oil, however, does not mix with the fresh supply, but is received in a funnel in the tank, is filtered and passed through a pipe to the rear compartment of the crankchamber. By means of the filler cap on the reserve tank it is possible to verify the flow of the oil. In the base of the tank already mentioned as being cast in the crankcase hanger is a needle valve connected up to the accelerator pedal. Thus, as the throttle is opened this valve is raised from its seat and oil allowed to flow down the return pipe to the trough for the fourth cylinder. On the carbureter side of the motor there is a connection between the throttle and the oil feed,, while the filler cap for the reserve oil tank is placed immediately to the right of it. The connection mentioned regulates the flow of the oil at varying motor speeds.

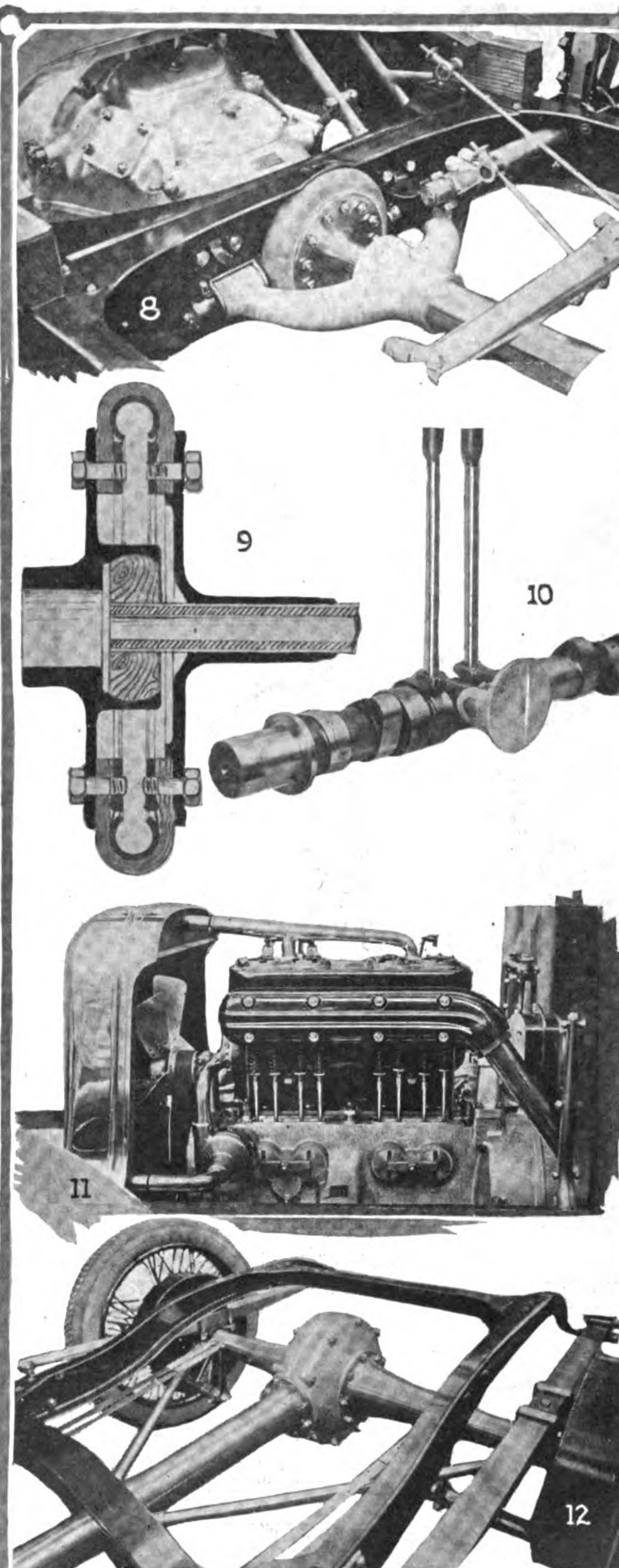
An entirely new feature is the single joint at the rear of the gearbox, with drive shaft to an oscillating type of rear axle formed of two taper tubes and a central aluminum differential housing. The universal joint is used for the first time by Panhard and consists of a rubber-and-canvas connection construction having a very close resemblance to a pneumatic tire having one of its heels secured to a disk mounted on the secondary shaft of the gearset, and the other heel secured to a plate on the propeller shaft. This allows a certain freedom of movement of the two shafts in relation to each other, without, however, preventing the second being driven by the first. This joint is known by the Panhard engineers as a flector and is built up of canvas and rubber in practically the same way as a tire; the canvas, however, is laid in the opposite way to that of a tire in order to provide for the driving effort. In order that the flector may retain its circular form a band of steel is placed inside it and the two shafts are centered by a hardwood block, so that the flector has not to carry the weight of the shaft. On this model both brakes are on the rear wheels, side by side within a single drum. This is a construction now applied to all Panhard models.

De Dion Favors Worm Drive

De Dion-Bouton is introducing worm-driven rear axle on the majority of its new models, and is also fitting wire wheels with wood wheels as optional, the hub construction being such as to permit of the optional wood wheels. The company is specializing on a high-grade eight-cylinder chassis with worm-driven rear axle. The car is really a modification of last year's small eight cylinder type. The principal change in the motor is an increase of bore from 2.7 to 2.9 inches, the stroke being 5.1 inches, as last year. The motor is V-type with each set of cylinders forming a single casting and all accessories—magneto, air pump, carbureter—mounted between the two lines of cylinders. The method of driving the motor accessories is interesting. On the fore end of the crankshaft there are a couple of pinions giving chain drive to the oil pump in the base, and to the camshaft immediately above the crankshaft. On the camshaft there is a second pinion with chain drive to the ventilator shaft. Thus in this housing there are three separate chains. At the rear of the motor a pinion on the camshaft drives the magneto and air pump by means of a silent chain. The crankshaft is carried in two plain bearings, the crankcase having bolted on end-plates, steel pistons are used, and, as on all De Dion-Bouton models, lubrication is under pressure through a hollow crankshaft.

Details of Power Transmission

Interest centers in the manner in which the power is transmitted to the road wheels. The plate clutch is unchanged except in details. There is a universal joint between it and the four-speed gearbox, this latter having the two shafts in the same vertical plane and selective type without the use of a gate. Immediately to the rear of the gearbox there is a very substantial universal joint and a similar joint at the rear end of this shaft. This shaft is divided in the center of its length, and the two parts united by a coupling. From the second universal joint the shaft is carried within a tubular housing bolted at its rear extremity to the upper portion of the differential housing and at the front attached to a tubular transverse member having its extremities received in the brackets carrying the spring hangers. The final drive to the road wheels is by the De Dion-Bouton system of transverse cardan shafts, and, so far as this portion is concerned, the car is similar to last year's bevel-gear model. Three-quarter elliptic springs with their seatings under the axle are used on all De Dion models. In the steering gear the change comprises adjustable steering pivots.



Some 1913 Panhard Constructions

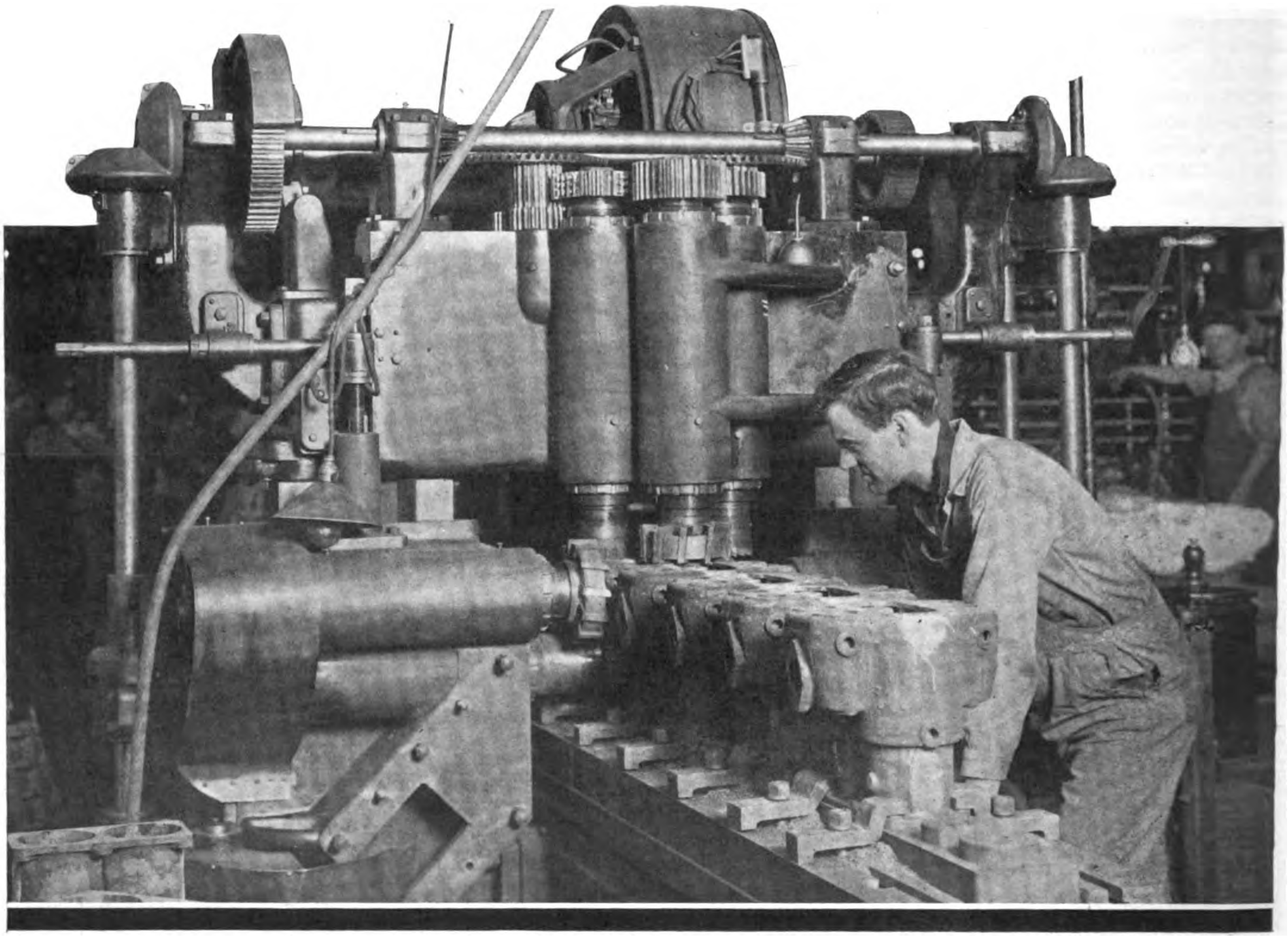
8—New pneumatic-tire type of universal in rear of gearbox, and 9 shows a section of this joint

10—Camshaft and valve tappets without guides in new 12-horsepower motor

11—Valve side of motor, showing tappet scheme

12—New axle with aluminum differential housing

Factory Miscellany



Cylinder-grinding machine in use at the factory of the Packard Motor Car Company, Detroit, Mich.

CYLINDERS of the T-head type have to be milled on both sides as well as on top. This is one of the things that makes them more expensive to manufacture than cylinders of the L-head type. In the Packard plant the cylinders are milled on both sides and on top at the same time, thus saving time and reducing the cost of manufacture to about the same as an L-head cylinder as far as the milling work is concerned. The machine shown in the above illustration can handle eight cylinders at a time. One man can handle the machine and set up the work and the machine can be worked a full 10 hours a day. The time required to finish a block of cylinders is eight minutes and the time required in setting up the work is negligible because a new casting can be inserted while the machine is working on one of the others. As may be seen, there is a milling cutter at work on every part of the cylinder at the same time and the minimum amount of time is thus required to handle the work.

HARTFORD Suspension's Factory—The Hartford Suspension Company, Jersey City, N. J., will employ 400 men in its new factory which is nearing completion. The floor space is 28,400 square feet and it is 8 stories high. The accompanying illustration shows the factory

Beaver Plans—The Beaver State Motor Company, Portland, Ore., plans to build an automobile factory.

Maxwell Closes—The Maxwell-Briscoe Motor Company, South Auburn, R. I., has closed its plant and has notified its 100 employees that their services are no longer required. The company is shipping its equipment to New Castle, Ind.

Guide Lamp's Factory—The Guide Motor Lamp Manufacturing Company, Cleveland, O., has awarded a contract for the erection of a new factory in that city. The building will be 60 feet by 130 feet, two stories high. It will be made of brick, steel and reinforced concrete.

Michelin Adds to Plant—A large wing is being added to building number 14 at the plant of the Michelin Tire Company, Milltown, N. J. This addition comprises 46,540 square feet of floor space. The new wing is one story high with a second story of 18,770 square feet over one section. This building is of reinforced concrete. The roof is of saw-tooth pattern, light and ventilation coming from above.

Tire Filler Company Builds—The Canadian Tire Filler Company, Ltd., has just been formed and has built a large factory and show rooms at Sherbrooke, Que., to make this new product. The company has the sole Canadian right of the Day's resile filler and has perfected the article and brought the filling up to date. Branches will be opened at Montreal and Toronto when suitable premises can be found.

San Francisco's Truck—San Francisco, Cal., is again on the map as a motor manufacturing point. Lee Gillig, who has been identified with the automobile trade of that city for some years, has recently built a truck which shows some new and decidedly interesting features. It is so built that either solid or pneumatic tires can be used. The left-hand drive and center control are used. Fifty of these light trucks will be placed on the market in 1913.

Shows, Conventions, Etc.

Jan. 2-10..........New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11.........Cleveland, O., Annual Automobile Show.
Jan. 4-11.........Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-18.........Milwaukee, Wis., Annual Show, Auditorium, Milwaukee Automobile Dealers' Association.
Jan. 11-25.........New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 18-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 21-26.........Toledo, O., Annual Show, Exposition Building, Toledo Automobile Shows Company.
Jan. 25-Feb. 1.....Montreal, Que., Montreal Automobile and Truck Show, R. M. Jaffray, Manager.
Jan. 25-Feb. 1.....Providence, R. I., Annual Show, State Armory, Rhode Island Automobile Dealers' Association, Inc.
Jan. 27-Feb. 1.....Philadelphia, Pa., Truck Show.
Jan. 27-Feb. 1.....Buffalo, N. Y., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8..........Chicago, Ill., Annual Automobile Show, Coliseum and 7th Regiment Armory.
Feb. 3-8..........Washington, D. C., Annual Show.
Feb. 8-15.........Hartford, Conn., Annual Show, State Armory, Hartford Automobile Dealers' Association.
Feb. 10-15.........Chicago, Ill., Truck Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 10-15.........Ottawa, Ont., Ottawa Motor Show, Howick Hall, Louis Blumenstein.
Feb. 15-22........Albany, N. Y., Annual Show.
Feb. 15-22........Newark, N. J., Annual Automobile Show, First Regiment Armory, New Jersey Automobile Exhibition Company.
Feb. 16-23........Richmond, Va., Annual Show.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 18-22.........Baltimore, Md., Annual Show, B. A. D. A.
Feb. 19-22.........Bloomington, Ill., Annual Show, Coliseum, McLean County Automobile Club.
Feb. 19-22.........Geneva, N. Y., Automobile Show, Armory, Louis Blumenstein.
Feb. 19-27.........Topeka, Kan., Annual Show.
Feb. 20-22.........Canandaigua, N. Y., Automobile Show, Louis Blumenstein.
Feb. 22-Mar. 1....Brooklyn, N. Y., Annual Show, 23rd Regiment Armory.
Feb. 24-27.........Kansas City, Mo., Truck Show.
Feb. 24-Mar. 1....St. Louis, Mo., Annual Show.
Feb. 24-Mar. 1....Memphis, Tenn., Annual Show.
Feb. 24-Mar. 1.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1.....Paterson, N. J., Annual Show, Paterson Automobile Trade Association.
Feb. 26-Mar. 1....Fort Dodge, Ia., Annual Show.
Feb. 26-Mar. 1....Glen Falls, N. Y., Automobile Show, Louis Blumenstein, Manager.
March 3-8.........Pittsburgh, Pa., Annual Automobile Show.
March 3-18........Des Moines, Ia., Annual Show, Pleasure Car Section, Coliseum, Dealers' Association.
March 5-8.........Tiffin, O., Annual Show, Tiffin *Daily Advertiser*.
March 8-15.........Boston, Mass., Annual Automobile Show.
March 12-15.......Ogdensburg, N. Y., Automobile Show, Louis Blumenstein, Manager.
March 18..........Syracuse, N. Y., Annual Show, Syracuse A. A.
March 19-26.......Boston, Mass., Annual Truck Show.
March 20-24.......New Orleans, La., Annual Show, N. O. A. D. A.
March 24-29.......Indianapolis, Ind., Annual Automobile Show.
Jan. 6............New York City, Meeting Motor Dealers' Contest Association.
Jan. 14............New York, Beefsteak Dinner, Big Village Motor Boosters.
Jan 15............New York City, Banquet, Waldorf-Astoria, Motor and Accessory Manufacturers.
Jan. 16............New York City, Meeting, Hotel McAlpin, Society of Automobile Engineers.
Jan. 17............New York City, Banquet, Hotel McAlpin, Society of Automobile Engineers.

Race Meets, Runs, Hill Climbs, Etc.

May 30...........Indianapolis, Ind., 500-Mile Race, Speedway.

Foreign

Dec. 7-22..........Paris, France, Paris Automobile Show, Grand Palais.
Jan. 11-22.........Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.
March ....France, Sealed Bonnet 3000-Mile Run.
March 31..........Montevidio, Uruguay, International Competition of Agricultural Motor Vehicles.
April ....Barcelona, Spain, International Exhibition.

Petrolea Plans Addition—The Petrolea Motor Car Company, Petrolea, Ont., is having plans prepared for an extensive addition to its plant.

Brockway Receives Bids.—The Brockway Motor Company, Cortland, N. Y., is receiving bids for a one-story manufacturing plant 208 feet by 40 feet.

Jensen Building—Rasmus Jensen, of Los Angeles, Cal., has acquired a site at that city and will erect a plant for the manufacture of a patent carbureter.

Atlanta's $50,000 Plant—The Automobile Tire & Rubber Company, Atlanta, Ga., will install a plant in that city and will spend about $50,000 for machinery.

Studebaker Placing Contracts—The Studebaker Corporation, South Bend, Ind., is placing contracts for a factory in that city to be three stories and 50 feet by 120 feet.

Morgan & Wright Building—The Morgan & Wright Company, Detroit, Mich., is planning a factory addition in that city. It is to be concrete, three stories high and 250 feet by 94 feet.

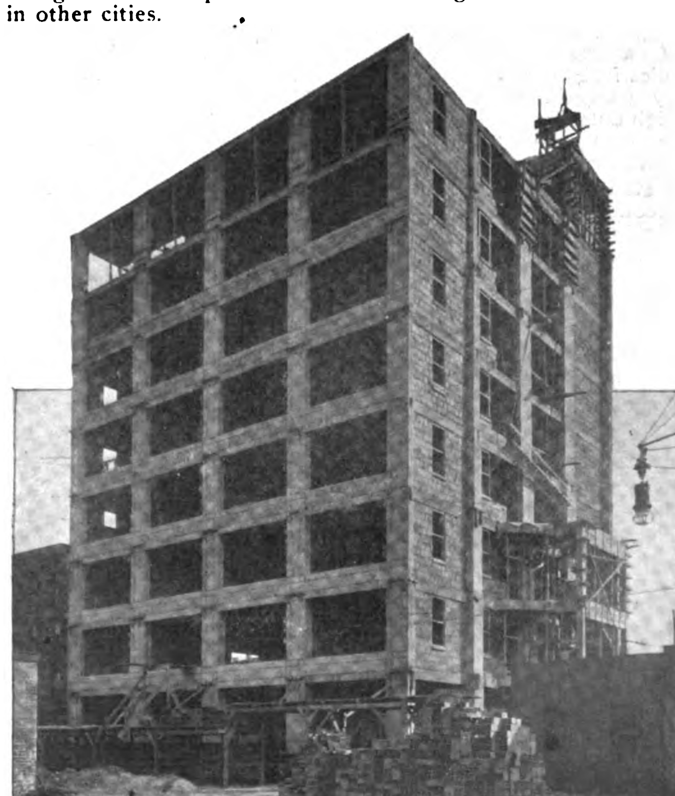
Ravenna Factory Started—The Ravenna Motor Truck Company, Ravenna, O., has given contracts for a factory to manufacture motor trucks. The building will be 50 feet by 150 feet.

Arrow's Factory—The Arrow Motor Car Company, Long Island City, N. Y., has filed plans for a four-story factory, 200 feet by 205 feet, with an extension of 54 feet by 51 feet. The estimated cost is $300,000.

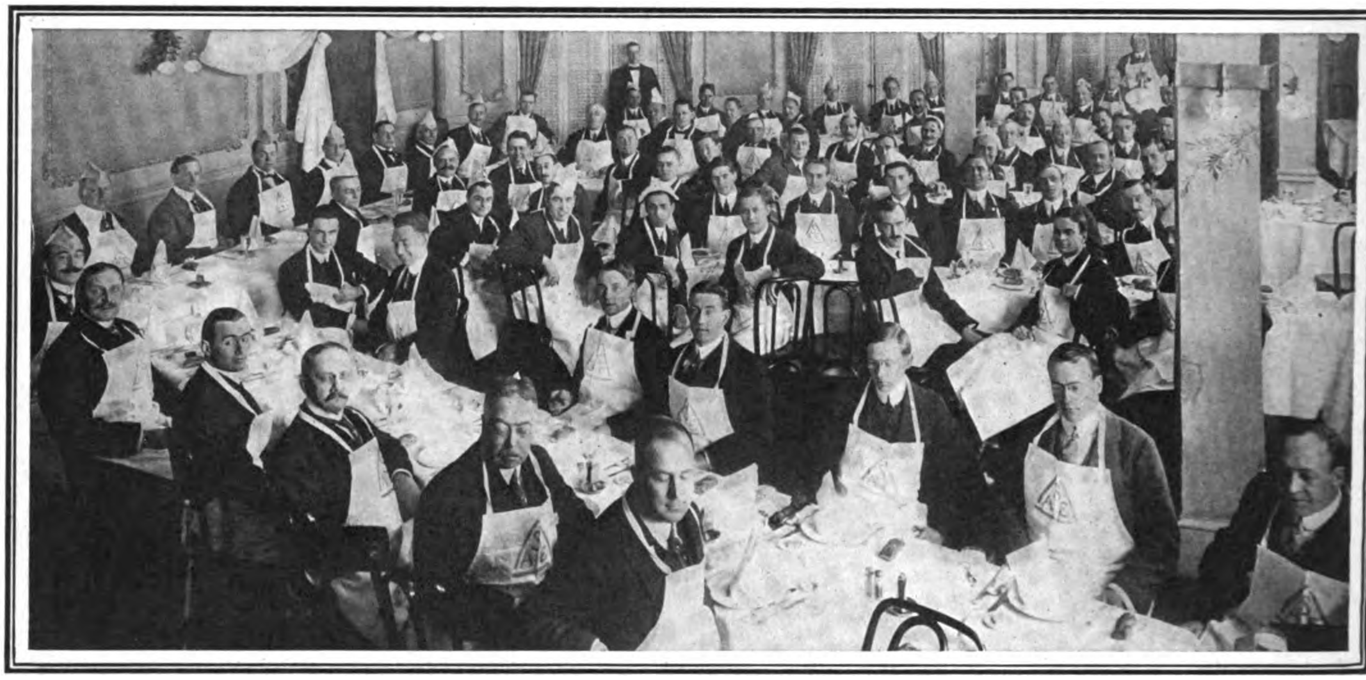
Ford's Long Island Factory—Bids have been given by the Ford Motor Company, Detroit, Mich., for a factory in Long Island City, N. Y. It is to be 70 feet by 195 feet by 75 feet, and is to be five stories high.

Sheboygan's Addition—The Sheboygan Auto & Supply Company of Sheboygan, Wis., will start work on the proposed addition doubling its capacity. It was intended to commence building operations in the spring of 1913, but the company has just taken the KisselKar agency, and this, with the enlargement of the Studebaker line, has made immediate action necessary.

Campbell Gets Contract—After much discussion as to whether the dealers' association would handle all arrangements for the automobile show or whether the management should be allowed to go to the person making the best proposition was decided by awarding the contract to T. C. Campbell. All decorations and allotments of space will be in his charge. Mr. Campbell has been in charge of similar events in other cities.



Eight-story factory of the Hartford Suspension Company, Jersey City, N. J.



Banquet of the Metropolitan section of the Society of Automobile Engineers on the evening of December 13 at George Rector's

AUTOMOBILES Admitted Free—In order to increase the number of automobiles in the Republic of Salvador the government has issued a decree admitting automobiles free of duty for a limited time. Cars are being purchased by a large number of wealthy families of the capital. The high duty assessed on luxuries in that country has added so to the cost of automobiles that the number of cars has been increasing very slowly.

Montgomery in Line—Montgomery, Ala., has installed its second motor-driven fire engine.

Join Ward Leonard Forces—Fay Morton Henkel and A. J Fisk have joined the sales forces of the Ward Leonard Electric Company, Bronxville, N. Y.

Paris Orders Fire Engine—In order to secure a lower fire insurance rate the city council of Paris, Tenn., has decided to purchase an automobile fire engine.

Kurtz with Ayer—F. W. Kurtz will return December 1 to Philadelphia, Pa., to resume his connection with the N. W. Ayer & Son advertising agency.

Opens Nyberg Salesroom—C. W. Bopp, formerly of Hawkeye, Ia., has opened a new salesroom in Des Moines, Ia., for the Nyberg Automobile Works of Anderson, Ind.

Cincinnati's Show—The automobile show in Cincinnati, O., will be held on February 24-March 1 in Music Hall. The directing heads of last season's show will be in charge of the coming one.

Annesley Diamond Manager—A. G. Annesley is the new manager of the Diamond Rubber Company in Portland, Ore., having recently been promoted from the San Francisco, Cal., branch.

Manufacturing Automobiles Chassis—The Nichoalds Company, Detroit, Mich., in the automobile parts business, has now gone into the manufacture of the automobile chassis for the trade.

Pettit Transferred—C. J. Pettit, of the Prest-O-Lite Company's New York Branch, has been transferred to Minneapolis, Minn., where he now has charge of three branches, Minneapolis, St. Paul and Winnipeg.

Mississippi's Good Roads—In a general election held in Hattiesburg, Miss., a tax to provide $100,000 for good roads carried with little opposition. Gravel will be shipped from Tennessee for surfacing the new highways.

Viehman Sales Manager—G. E. Viehman, head of the Viehman Automobile Company, agent for the Auburn Company, has returned to the Northwestern Automobile Company, Minneapolis, Minn., as sales manager.

Moon's Sioux City Building—The Motor Mart, the new home of the Bennett Automobile Supply Company, agency for Moon cars in Sioux City, Ia., has just been finished. It includes both a service department and a salesroom.

Shaw Resigns—D. M. Shaw, for 5 years identified with the MacManas Company, Detroit, Mich., advertising agents for this city, has severed his connection with that firm and will probably remain in that city in the same line of business.

Young Re-elected—The River-to-River Association, which was the pioneer in Iowa for a cross state road, held its annual meeting at Colfax recently. Lafe Young, of Des Moines, was re-elected president and B. N. Mills, of Des Moines, secretary.

Tacoma Club's First Meeting—With more than $200 to its credit and with $1500 dues payable December 1 for the first half of the coming year, and with the club incorporated and affiliated with the A. A. A., the only one so affiliated in the state of Washington, the first annual meeting of the Tacoma Automobile Club was held Tuesday, December 3.

Arranging Automobile Service—Arrangements are being made for the establishment of an automobile service between Cartago (Costa Rica), Neredia and Alajuela. Passengers, express and freight will be carried. The company holding the concession agrees to keep the road in repair in return for the exclusive right of operating such a line between the three points.

Arizona Law in Effect—The new state registration law of Arizona is now in effect. Under its provisions every owner of a motor vehicle must register each machine in the office of the Secretary of State. A complete description of each car, including the name of the make, factory number, style and motor power, must be given. The registration fee is $5 for a machine of 40 horsepower or less.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Alexandria, La.	Marathon	Adler Auto Transfer Co.
Ames, Ia.	Marathon	B. R. Nowlin
Asheville, N. C.	Marathon	Blue Ridge Motor Co.
Audobon, Iowa	Nyberg	John Martinson
Audobon, Iowa	Rambler	A. E. Beason
Augusta, Ga.	Westcott	R. J. Edenfield
Baltimore, Md.	Marathon	B. L. Gintling & S. K. Gintling
Baltimore, Md.	Premier	Walter Scott
Bedford, Ind.	Westcott	Patterson & Glover
Beverly, Kan.	Marathon	Miller & Bloomhart
Brockton, Mass.	Westcott	W. H. Marble Auto Co.
Buffalo, N. Y.	Marathon	Mutual M. C. Co.
Buffalo, N. Y.	Moon	Miller-Schulman Motor Car Co.
Campbellstown, O.	Westcott	J. C. Markey
Canton, S. Dak.	Westcott	A. N. Bragstad
Champaign, Ill.	Westcott	W. H. Miller
Charleston, Mo.	Moon	Luke Howlett
Cincinnati, O.	Smith-Milwaukee	Commercial Motor Sales Co.
Cincinnati, O.	White	Victor Gluchowsky
Cincinnati, O.	Winton	L. C. Hand
Clay, Ky.	Marathon	Cozart & Stiman
Cleveland, O.	Marathon	Goss Sup. Co.
Clifton, Ill.	Marathon	F. I. Prew
Columbus, O.	Marathon	Pausch-Selback Wagon & Auto. Co.
Crisfield, Md.	R-C-H	Crisfield Machine Co.
Dallas, Tex.	Marathon	Fetzer & Campbell.
Darlington, Wis.	Marathon	George Parson
Dayton, O.	Westcott	Westcott Motor Car Agency
Des Moines, Ia.	Detroiter	Lagerquist Carriage & Auto Co.
Des Moines, Ia.	Marathon	Means Auto Co.
Des Moines, Ia.	Moon	Van Vliet-Bradt Motor Car Co.
Durban, South Africa	Marathon	Edwin Cummins
Elkland, Pa.	Marathon	Albee & Baxter
Erie, Pa.	Westcott	H. Mankel
Fall River, Mass.	Marathon	G. E. Bennett, Jr.
Flatonia, Tex.	Marathon	Flatonia Auto. Co.
Franklin, Ky.	Marathon	Enterprise Machine & Garage Co.
Galesburg, Ill.	Westcott	Galesburg Motor Car Co.
Grand Rapids, Mich.	Marathon	J. J. Jungbaecker, Jr.
Grant, Ia.	Firestone Columbus	Grant Auto Company
Holyrood, Kan.	Moon	G. L. Baker
Hot Springs, Ark.	Westcott	Westcott Motor Car Co.
Hutchinson, Kan.	Westcott	Peru Van Zandt Implement Co.
Hutsonville, Ill.	Marathon	F. S. Dunham
Indianapolis, Ind.	Marathon	State Auto. Co.
Jackson, Miss.	Marathon	A. F. Workman
Janesville, Wis.	Marathon	F. B. Burton
Kansas City, Mo.	Moon	MacDowell Motor Car Co.
LaCrosse, Wis.	Marathon	Arenz Auto Co.
Little Rock, Ark.	Marathon	Ketcher & Co.
Little Rock, Ark.	Westcott	Westcott Motor Car Co.
Longmont, Colo.	Marathon	F. H. Hildreth
Los Angeles, Cal.	Marathon	Gilhousen Bros. Co.
Mediapolis, Ia.	Moon	Fleenor's Garage
Milwaukee, Wis.	Marathon	W. E. Allen Co.
Minneapolis, Minn.	Marathon	MacArthur-Thompson-Zollars Co.
Minouk, Ill.	Marathon	Kerrigan & Dickman
Mississippi	Paige-Detroit	T. Sydney Weber Motor Car Co.
Muskogee, Okla.	Marathon	Marathon M. C. Co.
New Haven, Conn.	Marathon	The Knight Garage, Inc.
New Orleans, La.	Moon	A. N. Kinch.
New York City	Westcott	Richardson-Orr & Co. Australian Export Agents
Ocheyedan, O.	Marathon	Ocheyedan Auto Co.
Ocheyedan, O.	Overland	Riddell Auto Co.
Louisiana	Paige-Detroit	T. Sydney Weber Motor Car Co.
Peoria, Ill.	Westcott	Geo. J. Smith
Piedmont, W. Va.	R-C-H	F. L. Fredlock
Piqua, Ohio	Westcott	G. F. Fryling
Plainfield, N. J.	Marathon	Auto Distributing Co.
Punxatawney, Pa.	Moon	G. Frank Porter
Reading, Pa.	Marathon	Marathon M. S. Co.
San Francisco, Cal.	Marathon	San Hables
Seward, Nebr.	Marathon	Hersyberger & Jantze
Shreveport, La.	Marathon	O. H. Hunter
Springvale, Me.	Marathon	Butler & Berry
St. Joseph, Mo.	Marathon	Ardery-Halliday M. C. Co.
St. Louis, Mo.	Argo	Warren Motor Car Co.
St. Louis, Mo.	Marathon	Todd Auto & Rental Co.
Syracuse, N. Y.	Pope-Hartford	Tweed Brothers
Traer, Ia.	Marathon	McGovern & McTurk
Springs, Ala.	Westcott	Charles W. Tway
Van Wert, O.	Marathon	Kauffman & Wise
Washington C. H., Ohio	Westcott	Moore & Jamison
Yankton, S. Dak.	Moon	F. J. Nyberg
Washington, D. C.	Abbott-Detroit	Davis S. Hendrick
Washington, Pa.	Moon	Washington Automobile Co.
Washington, D. C.	Century	M. E. Pearson
Waukee, Ia.	Marathon	W. P. Kent
Wichita, Kansas	Westcott	Peru Van Zandt Implement Co.
Winona, Miss.	Marathon	D. B. Turner

COMMERCIAL VEHICLES

Bowling Green, O.	Modern	Landman-Griffith Motor Co.
Minneapolis, Minn.	Hewitt	Twin City Motor Co.
Minneapolis, Minn.	Mack	Twin City Motor Co.

Warehouse in Atlanta—The H. W. Johns-Manville Company, New York City, has recently opened a new southern warehouse at Atlanta, Ga. The entire building, embracing three floors and a basement, with a total floor area of about 10,000 square feet, will be utilized exclusively as a warehouse.

Moline's Fire Apparatus—Automobile fire-fighting apparatus will shortly be installed by Moline, Ill., according to recent action of the city council. An automobile for the fire chief, two combination automobile fire engines and hose wagons and 75-foot aerial truck will supplant the present horse-drawn apparatus.

Stewart's Appointments—The appointment of two new district managers has been made by the Stewart Motor Corporation, Buffalo, N. Y., maker of the Stewart light delivery truck, E. E. Dennison, covering Illinois, eastern Iowa and Missouri, with headquarters at Chicago, and W. T. Butler covering New York State and northern Pennsylvania, with headquarters at Buffalo.

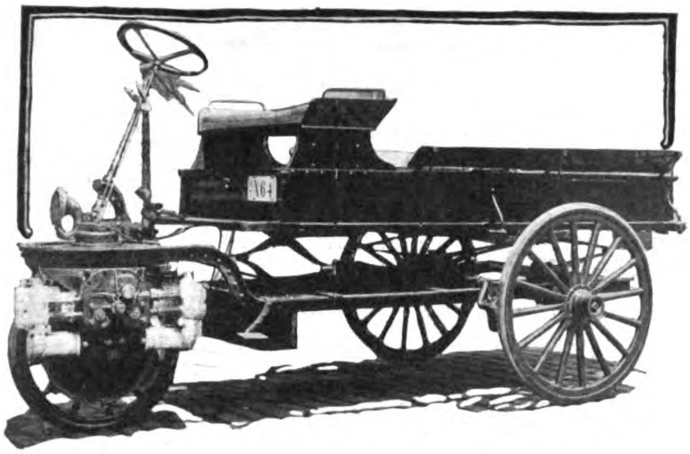
Good Roads in Brazil—A loan netting $650,000 has been floated by the Empreza Autoviaria Paulista, a company which has a government concession for building an automobile road connecting Sao Paulo and Santos, Brazil. The building of this road will mean that an automobile will become a necessity to each one of several thousand coffee planters interested in the vast territory between these two ports.

New Indianapolis Car—It is reported that a new car to be known as the Streamline will be brought out in Indianapolis, Ind., soon by a party of automobile men and capitalists whose names will not be disclosed for the present. The new car, it is understood, will be a 40-horsepower roadster with wire wheel equipment, 110-inch wheelbase, left-hand steer, center control, torpedo body, electric lights, and will sell at $1,300.

Spain's Good Roads—American motorists are invited to visit Spain when they motor abroad, and according to Louis Scatti, of Madrid, who is now visiting Boston, Mass., they will be surprised at the fine roads and the good treatment accorded them. Within the past 12 months some 37,000 miles of highways have been put in fine condition for motoring. An appropriation of approximately $10,000,000 has been made by the government for road improvements.

Whitesides in Indianapolis—In all probability the company being organized by V. F. Whitesides to manufacture a light truck to be known as the Ironsides, will be located in Indianapolis, Ind. Whitesides has announced that he will not consider a proposition to locate in Newcastle, Ind., where he was formerly identified with the Whitesides Commercial Truck Company. The new company will be incorporated and the factory ready for operation early in the new year.

Six-wheel, fourteen-passenger, sight-seeing bus built by the Lake County Automobile Transportation Company, Highland Springs, Cal. The car used is a 7-year-old Columbia



Truck manufactured by the Marsh-Walters Company, Glens Falls, N. Y. It has a two-cylinder opposed horizontal motor, air-cooled, the crankshaft being a unit with the front axle

Steinhauer with Colby—F. P. Steinhauer has become general sales manager of the Colby Motor Company of Mason City, Ia.

Huyette President Q. C. M. C.—P. B. Huyette was recently elected president of the Quaker City Motor Club, Philadelphia, Pa.

Willys Sails—J. N. Willys of the Willys-Overland Company, Toledo, O., will sail for Europe about January 30 for an extended trip.

Everitt Sails—Barney Everitt of the Flanders Motor Company, Detroit, Mich., will sail for Europe this month. He will be gone several months.

Lynch Speedwell Agent—L. V. Lynch has been appointed Western district manager for the Speedwell Motor Car Company, San Francisco, Cal.

Hood with Westcott—Wallace Hood has been appointed sales manager with supervision of advertising of the Westcott Motor Car Company, Richmond, Ind.

Reduction in Price—The Joseph Dixon Crucible Company, Jersey City, N. J., makes the announcement that the selling price of their silica-graphite paint is reduced.

Halliwell's Porto Rico Branch—The Halliwell Company, San Francisco, Cal., is still branching out and recently added a branch in Pòrto Rico. Its representative there will be R. M. Palmer.

Open New Quarters—Luckenbach Brothers, recently appointed Franklin dealers in Allentown, Pa., have opened up temporary headquarters on South Fountain street, near Jackson street.

Paris Joins Reo Truck—R. E. Paris has joined the Reo Truck Company, Lansing, Mich. His addition to the truck company is for the purpose of strengthening the managerial staff of that organization.

Cincinnati Clubs Fire—The Cincinnati, O., Automobile Club, located in the Herschede Building, suffered little from the big fire at the Gibson House recently. The club is now in temporary headquarters.

Express Company Adds Trucks—The American Express Company, Baltimore, Md., has added two more 5-ton General Vehicle trucks to its local fleet, making twenty-five now in use in that city by the company.

Tacoma Will Hold Run—As a secondary automobile feature for the Tacoma, Wash., carnival there will be a 100-mile automobile run over the country roads to be open to every automobile owner who cares to participate.

Texas Trade Good—S. J. Kuqua, vice-president of the Cole Motor Car Company, Indianapolis, Ind., recently returned with glowing reports of the trade outlook in Texas, where a bumper crop of cotton is being harvested.

Hearne Organizing Polo Team—Eddie Hearne, the young Chicago, Ill., driver, has become so interested in the rapidly developing game of automobile polo that he is organizing a team in that city and will practice with it in the winter.

Ford Columbus Branch—For the purpose of establishing a direct factory branch, C. M. Coble, representing the Ford Motor Car Company, Detroit, Mich., in Columbus, O., arrived in that city recently for the purpose of selecting a desirable location to open new salesrooms.

Thirty-five Study Automobile.—The first course in elementary automobile engineering to be given by the University of Missouri, Columbia, Mo., now has thirty-five students enrolled. A $10 fee is charged, and the course does not give credit towards any degree in any department.

Washington Dealers Incorporated—The Automobile Dealers' Association of Washington, D. C., has been incorporated by local automobile representatives for the purpose of conducting the show which will be given at Convention Hall February 3 to 8, 1913. The organization will have complete charge of the exhibition.

Club Shield Impractical—The shield of the Inland Automobile Association, of Spokane, Wash., adopted last spring, has been discarded as impractical. At the recent meeting of the association a new emblem was adopted. This is a thin circular brass plate with the letters of the association embossed on it in black enamel.

Hoosier Club's Minstrel Show—On the evening of December 9, the Hoosier Motor Club gave a minstrel show at the Murat Theater in Indianapolis, Ind., the theater being crowded. At noon, preceding the performance, there was an automobile parade through the downtown streets in which about 200 motor cars participated.

Want Seattle Club in A. A. A.—The question of the Seattle Club, Seattle, Wash., affiliating with the American Automobile Association was brought up and action urged by Ira D. Lundy and others. It was finally referred to the incoming board of trustees with power to act. There is now a paid membership of 678 in the club and the treasury shows a balance of nearly $9,000.

Morris Seattle Club's President—C. L. Morris was elected president of the Automobile Club of Seattle, Seattle, Wash., for the ensuing year at the annual meeting of the club held recently at the Arctic Club. The other officers are: Joseph Blethen, vice-president; John Henry, treasurer; Frank M. Fretwell, secretary; O. B. Williams, R. P. Rice and A. Warren Gould, board of trustees.

Automobile Incorporations

AUTOMOBILES AND PARTS

Asbury Park, N. J.—Cress Automobile Company; capital, $250,000; to do a general automobile business. Incorporators: Louis F. Grice, Harry A White and F. Frank Appleby.

Boston, Mass.—Motor Supply Shop, Inc., capital, $25,000; incorporators: M. V. O'Neil, Walter R. McDaniel.

Buffalo, N. Y.—Buffalo & Interurban Motor Delivery Company, Inc.; capital, $125,000; automobiles and motor trucks. Incorporators: J. G. Berner, W. B. Grandison, C. T. Horton.

Buffalo, N. Y.—Glide Sales Company; capital, $10,000; to deal in automobiles. Incorporators: J. F. Lynch, L. P. Fuhrmann, E. T. Danahy.

Chicago, Ill.—Lakeside Motor Truck Transportation Company; capital, $25,000; to carry on an automobile transportation business. Incorporators: B. P. Dunlap, J. M. Dunlap, E. W. Macavoy.

Chicago, Ill.—Gum Price Motor Truck Company; capital, $100,000; to manufacture automobiles, trucks and supplies. Incorporators: H. E. Rice, Jr., W. C. Haight, Paul Corkell.

Cleveland, O.—Oldsmobile Company; capital, $50,000; to deal in automobiles. Incorporator: P. D. Metzger.

Detroit, Mich.—Kessler Detroit Motor Car Co.; capital, $10,000; to manufacture automobiles and accessories. Incorporators: H. C. Brooks, Jr., Robert McCormick.

Harrisburg, Pa.—Morton Truck & Traction Company; capital, $50,000; to deal in automobiles.

Hudson Falls, N. Y.—Kingsbury Motor Sales Company; capital, $10,000; to deal in automobiles. Incorporators: Leonard Wetsell, E. H. Wells, E. I. Wells.

Indianapolis, Ind.—Premier Agency Company; capital, $30,000; to deal in automobiles. Incorporators: V. C. Vette, D. E. Sherrick, T. H. Adams, W. H. Foreman, J. W. Cowper, H. B. Wilson.

Jersey City, N. J.—Millar Supply Company; capital, $100,000; to do a general automobile business. Incorporators: J. A. Duffy, W. C. Marley, M. E. Thornton.

Kansas City, Mo.—England Brothers Motor Car Company; capital, $2,000. Incorporators: Edward England and E. W. England and others.

Lynn, Mass.—Suffolk Street Garage, Inc.; capital, $5,000. Incorporators: Daniel Lunch, John Buckley, Henry Thomas.

Muskogee, Okla.—Pioneer Motor Company; capital, $5,000. Incorporators: G. S. Waddell, H. G. Butts and M. L. Waddell.

New York City.—Hollister Standard Motor Company, Inc.; capital, $675,000; to construct and sell motor vehicles and supplies. Incorporators: W. H. Langford, Learned White and H. H. Sevier.

New York City.—K. & K. Motor Car Company; capital, $10,000; to deal in automobiles. Incorporators: A. E. Killian, F. B. Killian, L. E. Killian.

New York City.—Schacht Motor Car Company; capital, $60,000; to deal in automobiles. Incorporators: Bela Cukor, H. V. Radonitz, C. J. Terrell.

Ottawa, Can.—The Phoenix Automobile & Trunk Company, Ltd.; capital, $50,000; to manufacture and deal in automobiles, bicycles, motors, engines, conveyances and machinery. Incorporators: J. G. Charrier, S. Bordeleau, Alex. Bordeleau, Napoleon DeGrandmont, Emile Albert Brodeur.

Philadelphia, Pa.—Cole Motor Company; capital, $5,000; to deal in automobiles.

Smith Company Moves—The R. L. & H. H. Smith Company, agents in Boston, Mass., for the Mais truck, has moved from 1002 Commonwealth avenue, in the Back Bay, to 17 India street.

Louisiana's License Tags—No new license tags for 1913 will be issued in New Orleans, La., until January 1. Tags for 1912 will be good until March 1. The 1913 tags are blue with white lettering.

Frisco Franklin Moves—The San Francisco branch of the Franklin Automobile Company, Syracuse, N. Y., has moved from Golden Gave avenue to 1635-45 California street, just east of Van Ness avenue.

Posts 1,100 Miles of Roads—Eleven hundred miles of roads in the arid desert country to the northeast of Los Angeles County, Cal., has been posted recently by the Automobile Club of Southern California.

Bergstrom Rebuilding—The Bergstrom Motor Car Company of Neenah, Wis., is rebuilding its headquarters into a modern garage at a cost of $10,000. A large repair shop will be given room in the remodeled building.

Johns New England Manager—L. B. Johns has been appointed manager of the New England branch of the General Motors Truck Company, with headquarters at the company's office on Boylston street, Boston. Mass.

Toledo to Enforce Ordinance—Director of Public Service J. R. Cowell, Toledo, O., has asked the police department to enforce strictly the city ordinance regulating the size of tires on wagons using improved streets, especially asphalt pavements.

Agencies Consolidated—The American and Marion agencies in Boston, Mass., have been consolidated following a visit to the Hub recently by President J. I. Handley, of the American Motors Company and the Marion Motor Car Company, of Indianapolis, Ind.

Toledo Firm Moves—The Erie Supply Company, Toledo, O., has outgrown its present quarters and will remove in the near future to more spacious rooms at 232-244 Erie street. The concern has dealt exclusively in accessories, but with added space will add a line of cars.

New sales and service building of the Kissel Motor Company in Chicago, Ill. The company claims that the structure, which is now almost completed, is the largest in the world devoted exclusively to the sale and care of automobiles

Lack Cash Lose Sales—Hundreds of sales are lost along Los Angeles, Cal., automobile row because of the inability of the would-be purchaser to pay cash for his car. Other sales are turned down because of the inability of the dealer to carry any considerable amount of paper.

Neuman's Garage—The Neuman Machine Company, 308 East Second street, Davenport, Ia., is to have a new modern two-story garage at Third and Ripley streets. The building will have two entrances, one on Third and one on Ripley street, and will be L-shaped. The garage will cost $10,000.

Four New Bosch Appointments—The Bosch Magneto Company, New York City, has appointed Fry & McGill Motor Supply Company, Denver, Col.; D. A. Schafer & Company, Richmond, Va.; Pence Automobile Company, Minneapolis, Minn., and Johnson-Gewinner Company as its distributors.

Lillian Russell's Car—The Garford Car Company of Elyria, O., recently shipped to Mrs. Lillian Russell Moore, better known to the theatre-going public of America as Lillian Russell, a handsome 4-cylinder town car for winter driving in Pittsburgh, Pa. The exterior finish was of dark blue and white, and special gray whipcord upholstery.

Secure 5-Year Lease—According to Sales Manager Charles Newman the Bunnell Auto Sales Company has secured a 5-year lease on new rooms in the building now being erected at the corner of Madison and Fifteenth streets, Toledo, O. The change will be made about January 1. A large show room, general offices and a service department will be provided.

Want Northerners in Glidden—An effort is being made to induce New Orleans, La., residents who have cottages at Northern summer resorts to make the trip as members of the Glidden tour next spring. There are several hundred persons in New Orleans owning cottages in the North, and the novelty of making the trip through the country has appealed to many.

Findlay Officials Displeased—Some friction has developed at Findlay, O., between the city and county officials relative to the distribution of road funds. The claim is made by city officials that the city has paid into the county treasury more than $1,000,000 and that the county commissioners have expended every dollar outside the city on country roads. An effort is being made to secure a portion of the county funds for street paving.

Starts on Fifth World Tour—Albert Wyatt, San Francisco, Cal., has started on his fifth tour around the world. The former trips were made on trains, steamers, mule and camel back, but the present one will be made in a 1913 30-horsepower Overland car, which will be carried on the decks of steamers and unloaded when a day is to be spent in port. Mr. Wyatt will thus visit Tahiti, New Zealand, Australia, Colombo, Egypt, the Holy Land, Turkey, southern France, Germany, Russia, Siberia, China, Japan, the Philippines and Hawaii.

Graft in Sales—Complaint is being made by New Orleans, La., salesmen that graft is playing an important part in car sales in that city. Commissions are being paid employees who are in daily touch with the prospective purchaser, it is said. With an apparently disinterested person being supplied with information conducive to the sale of a certain kind of car and with an equally good stock of real or imagined weak points in the car of a competitor, sales are being made more difficult for dealers who do not stoop to such methods.

Automobile Incorporations

GARAGES AND ACCESSORIES

Akron, O.—Motor Starting Company; capital, $25,000; to manufacture a new type of automobile starter. Incorporators: R. A. Woods, M. Paul, A. M. Tschantz, E. W. Paul and C. L. Dinsmore.

Barnesville, Minn.—Broadway Garage Company; capital, $25,000. Incorporators: Ernest Leonhardt, Geo. H. Dahm, Gustave W. Seefeldt, James N. Fisch, John A. Cramer and Joseph H. Doltz.

Chicago, Ill.—Storm Shield Manufacturing Company; capital, $100,000; to manufacture automobile accessories. Incorporators: R. E. Wighton, L. E. Street, N. P. Street.

Cincinnati, O.—Northway Motor Company; capital, $600,000; to manufacture automobiles and engines. Incorporators: R. E. Northway, Wm. Pabodie, W. D. Fruste, Ed. E. Decebach and F. B. Enslow.

Cleveland, O.—Marvel Automobile Supply Company; capital, $5,000; to manufacture automobile accessories. Incorporators: J. B. Rosenstein, G. L. Armington, M. L. Rosenstein, S. I. Rose, E. L. Fouts.

Columbus, O.—J. Leukart Company; capital, $30,000; to manufacture mortising machines, etc., machine job work. Incorporators: J. Leukart, K. Leukart, W. J. Leukart, C. M. Leukart and M. T. Leukart.

Detroit, Mich.—The Detroit Auto Heater Company; capital, $2,000.

Gloucester, Mass.—Twin Light Garage Company; capital, $10,000. Incorporators: F. A. Corliss, J. F. Perkins.

Huntington, Minn.—Huntington Auto Transit Co.; capital, $25,000. Incorporators: James M. Hicks, Samuel A. Stemen, John W. Caswell.

Pontiac, Mich.—Pontiac Motor Castings Company; capital, $8,000; to manufacture steel and brass castings. Incorporators: Wm. J. Brown, Peter J. Donnelly and Timothy E. Lyons.

Rochester, N. Y.—Rochester Macandaryba Tire Filler Company; capital, $10,000; to manufacture a tire filler. Incorporators: C. S. Morris, J. S. Crosier, A. C. Olp.

Rockford, Ill.—Schlig Auto Repair Company; capital, $5,000; to conduct automobile and garage business. Incorporators: J. J. White, J. Schlig, Doris White.

Waco, Texas.—Waco Auto Supply Company; capital, $5,000; to sell automobile supplies. Incorporators: W. H. Montz, H. B. Lyne and James Harrison.

Richmond, Ind.—Pilot Car Sales Company; capital, $50,000; to sell automobiles. Incorporators: J. E. Hayes, Arnold Schaer, H. E. Bradford, C. E. Hayes, W. D. Williams, E. F. Goggins, T. F. Williams.

Richwood, O.—Scharf Gearless Motor Car Company; capital, $5,000. Incorporators: Geo. W. Worden, John A. Scharf, W. H. Siples, E. E. Payne, L. J. McCoy.

San Antonio, Texas.—Knight Motor Car Company. Incorporators: H. L. Knight, A. H. Danforth and A. H. Elmore.

Springfield, Mo.—Ozark Motor Company; capital, $5,000. Incorporators: M. R. Swinney, W. W. Tillman and W. C. Swinney.

Toledo, O.—Worthmore Washing Machine Company; capital, $10,000; manufacturing and dealing in washing machines, motors, appliances and supplies. Incorporators: F. M. Sala, A. J. Richie, E. M. Sala, F. A. Carabin, F. N. Alexander.

Toronto, Ont.—Foreman Motor and Machine Company; capital, $40,000; to manufacture engines. Incorporators: G. H. Foreman, W. J. Brown, T. H. Sharp.

Wilmington, Del.—Light Commercial Car Company; capital, $100,000; to deal in motor trucks. Incorporators: H. E. Latter, W. J. Maloney, N. P. Coffin.

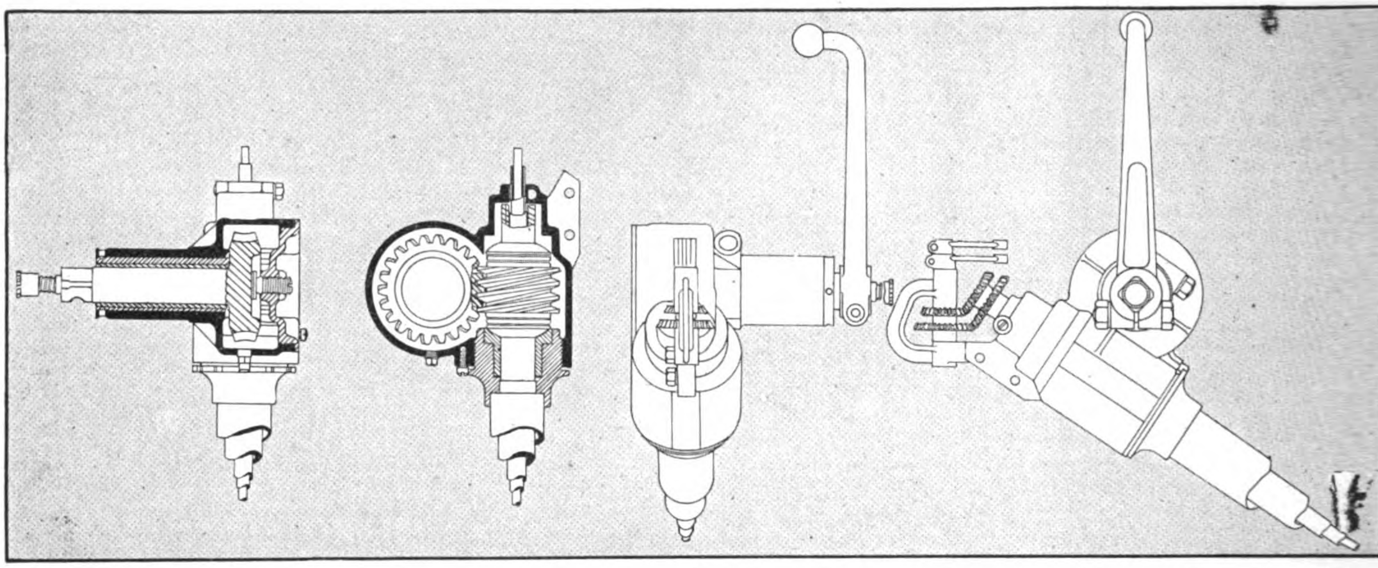


Fig. 1—Mechanical details of the new steering gear made by the Warner Manufacturing Company for heavy touring cars and light commercial vehicles

New Warner Steering Gear and Truck Gearset

Accessibility and Durability the Aims in Construction of New Designs—Gearset Is Integral with the Differential

FEW persons stop to consider what an important part the automobile parts manufacturer plays in the motor car industry as it is conducted today. It is safe to say that at least half of the motor cars manufactured contain constructive parts which were not made by the concern under whose name the cars are marketed. Indeed, many of our well-known makes of cars are entirely, or almost entirely, assembled, as distinguished from being manufactured, in the sense that all the parts are made individually for the car under its own roof.

In spite of this fact that the industry depends as much on the parts manufacturers as it does on the actual builders and makers of automobiles, the manufacturer who gets out these parts, such as steering gears, transmission gearsets, mufflers, tanks, rear and front axles and running gear and frames, is little known. This class of manufacturer in the automobile industry gets very little publicity, preferring to let his product speak through its performance in the car to which it is fitted rather than to make claims for it as a part alone and unidentified as a member of a well built whole.

A representative of The Automobile was given this explanation of the parts maker's stand, when the factory of the Warner Manufacturing Company, Toledo, O., was visited recently. Although a number of excellent parts of new design are being manufactured by this concern, very little has been said about them to the general public.

Among the newer products are those illustrated herewith. Fig. 2 shows a steering gear specially designed for heavy touring cars and light commercial vehicles. The part presents a very simple appearance, all unnecessary features having been eliminated. This gear is of the conventional worm-and-worm-wheel type. The pitch of the teeth is heavy, and the bearing surfaces are long.

The 18-inch wheel is corrugated on the inner side and the length of the steering column from the wheel to the center of the worm is 50 1-8 inches. This steering column has an outside diameter of 2 inches, the rods which connect with the spark and throttle levers and with the steering wheel being contained concentrically within the outer housing of the column, as in most steering gear constructions for the past few seasons.

The lower end of the spark and throttle rods are not housed, thir small bevel gears being open, Fig. 1, so as to be readily accessible. The worm and worm wheel are well housed. The distance between centers of the worm and wheel is 3.125 inches, and the worm has four threads. The worm wheel has twenty-two teeth. From the center of the steering column to the end of the worm wheel bearing is 4.75 inches.

One of the most important considerations with any product of this kind is that for the taking up of wear, and the designers of this new steering gear believe that they have afforded means for the taking up of all wear to which the part is subjected. It is furnished in brass, nickel or black enamel to meet the needs of the car maker of whose machines it is to form a part. The wormshaft is dulled so that lubricant from the grease cup will reach the entire bearings.

Ball thrust bearings are used above and below the worm. The radius arm with ball end is split at the upper end where it fits over the squared end of the worm shaft; the use of the square permits of using the four quarter of the worm wheel to engage with the worm in case of wear. This affords an adjustment feature.

Another new product of the Warner factory is the 5-ton truck integral gearset and differential unit shown in section in Fig. 3. It provides four speeds, with direct on third. The construction is substantial. The entire transmission is mounted on annular ball bearings, while the driving pinion and differential are carried on Timken roller bearings. The chrome vanadium steel gears have five pitch and a 1.5-inch face and are mounted on very large hardened and ground broaches on a splined shaft.

In driving on fourth speed the increase over the direct drive is 21 per cent. The revolutions of the two gearshafts, taking the main driveshaft B as the reference shaft, are given by the following table:

Speeds	Revolutions of Shaft "A"	Revolutions of Shaft "A"
Reverse	4.320	1
First	3.810	1
Second	1.750	1
Third	1.000	1
Fourth	.828	1

The housing is heavy, having a thickness of .4375 inch and being of gray iron. Heavy arms pass back for attachment to a cross-member of the chassis frame back of the jackshaft. It will be noticed that, while the gearset and differential are integral, yet they are separated from each other by a well D, cast integrally with the gearbox. This wall or partition also serves as a rear bearing for the main driveshaft as well as for the countershafts.

The master shaft A of the set is short and stout and has formed integrally with it the master gear A1 which drives to the countershaft. Within this gear is a large annular ball bearing on which the forward end of the splined mainshaft is carried, this facilitating the lubrication at this point. The short shaft A is supported on two ball bearings insuring permanent alignment and quiet meshing of master gear A1 with its countershaft gear.

Particular care has been taken at the forward end of the mainshaft to prevent oil leakage by a stuffing gland secured by a cap. This cap threading with the bearing cap and being locked by set screw K1 at any point. Similar anti-oil leak precautions have been taken where the jackshafts enter the differential housing at K2 and K3. End plates P covering the countershaft bearings preclude oil leakage at these points. Thrust between the pinion and differential is cared for by the three Timken bearings, one in front of the pinion and the others carrying the differential. In addition is a ball thrust T to resist any thrust on the splined shaft in the direction of the differential.

These parts are the result of concentration on these particular members of the automobile chassis, and they have been developed to a high state of efficiency through such concentration.

There are those who argue against the assembled car, stating that it is not the equal of the machine whose parts are all made individually designed to be assembled in connection with other individually designed parts. Yet the assembled car in performance has proven itself the equal of the other under many tests. If a judicious selection of parts is made, there is no reason why the assembled car should not be equally serviceable. The designer of this car must be just as expert as he who designs every part of his car's makeup. The former must know how to intelligently and consistently combine parts made in different factories so that the whole will be mechanically correct.

Benzol as Automobile Fuel

Syracuse, N. Y., Dec. 16—The Semet-Solvay Company, of this city, has prepared to introduce benzol, a by-product of coal tar oil, as a substitute for gasoline for automobiles. Though known to Europeans, and in use to some extent over there for 4 years, it was only introduced here a few months ago. It is obtained from coke retort ovens. As the only refining plant so far is in Solvay, near Syracuse, the automobile owners of this city have the first chance to experiment with the new propelling medium.

It is a water white liquid of a fairly high specific gravity and bears the same relation to coal that gasoline does to petroleum. Like the common motor fuel, the principal expense is the refining. Whether benzol will become eventually as popular among motorists remains to be seen. It is claimed that the demand for gasoline is so great that some dealers have taken to mixing kerosene with it to supply the market.

Motorists have been hoping for an effective substitute and the Syracuse experiments will be watched with a great deal of interest. It is claimed that benzol will not cause carbon deposits, but will on the contrary remove all such coatings. If this should prove true it would eliminate the necessity of grinding valves and frequently changing spark-plugs. It is also claimed that benzol will give 30 per cent. more mileage than the present grade of gasoline and contains certain valuable lubricating qualities.

Benzol has the chemical formula C_6H_6, meaning that each molecule of it is composed of six atoms of carbon and the same number of hydrogen atoms. Pure benzol, which however only constitutes about .5 per cent. of the coal tar, boils at about 180 degrees Fahrenheit and is chemically uniform throughout. It stands to reason, however, that the small percentage of it found in the coal tar invites adulteration, and, as a matter of fact, commercial benzol generally contains some heavier derivatives of benzol, such as toluol, xylol, etc. Their effect upon the benzol proper is that they raise its specific gravity and its boiling temperature.

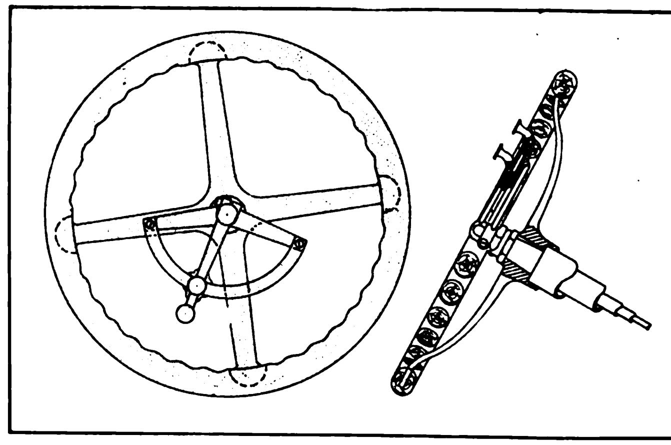


Fig. 2—Steering wheel, showing mounting of spark and throttle quadrant and cross-section

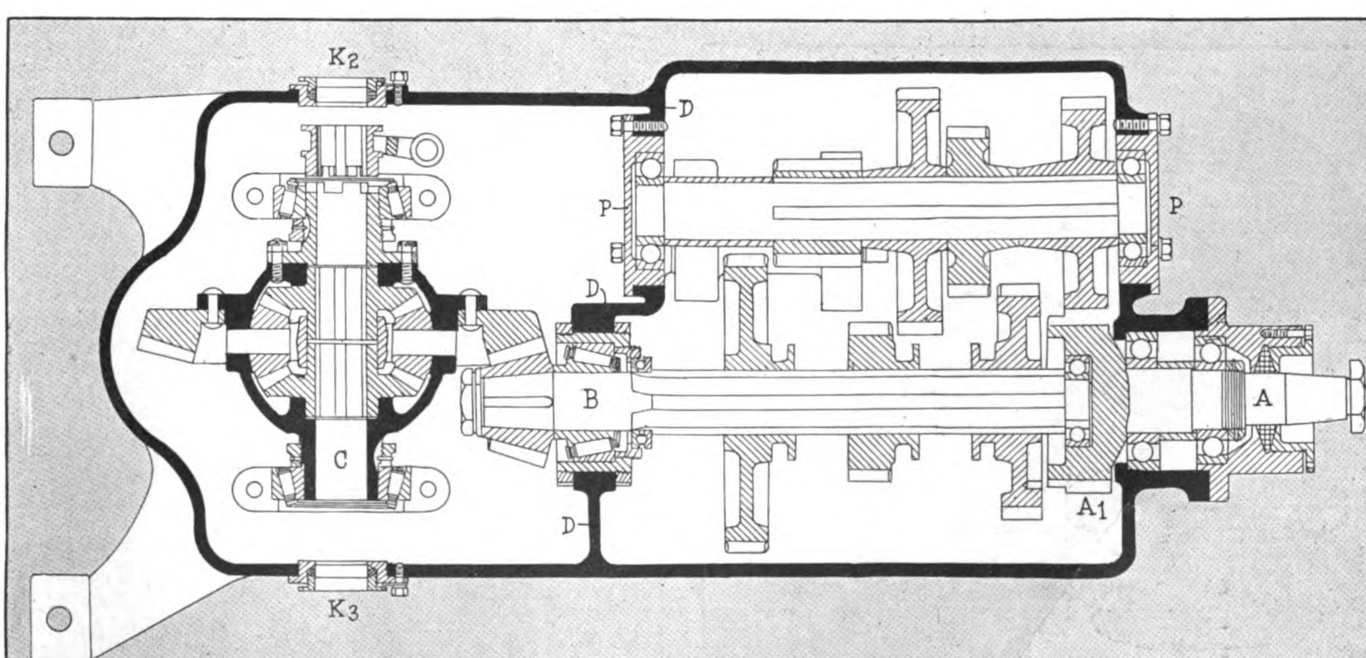


Fig. 3—Sectional plan view of the Warner integral gearset and differential unit for 5-ton trucks. Note the partition D

Novel Air-Operated Self-Starter; Carbonox Decarbonizer; Motometer Radiator Thermometer; Simplex Arrow Tread; New Radiator Cover; Electrene Fire-Extinguishing Gun; Capstan Block; Tire Preserver

Compton Pneumatic Self-Starter

A NEW self-starter is being manufactured by its inventor, Melving D. Compton, 154 Nassau street, New York City. This starter consists of a reciprocating, compressed-air motor to which air is supplied from a tank filled by way of an explosion valve, the latter being fitted into the head of one of the engine cylinders. The front and rear view of the starter proper is shown in Fig. 4, showing the mechanism inclosed in a metal casing, the motor part which serves as a moving agent, in a cylindrical case, and the transmitting gears which act directly upon the crankshaft, in a square box. In Fig. 5 the construction of the starter as well as the arrangements of the principal operating units is illustrated. The air compressed by the explosion valve is stored in a tank which is placed on the running board or in any other suitable position, and a gauge G on the dashboard shows at all times the pressure of air in the tank. The handle C controls the valve which opens the way from the tank to the starter S. The latter is connected to the crankshaft C1 in any desired manner, either in place of the starting crank or next to the flywheel, depending upon the construction of the car on which the starter is used. By means of two air inlets governed by a system of valves, air is alternately admitted at either end of the starter-motor cylinder, thereby reciprocating the piston P in the same. A connecting rod attached to the piston carries at its other end a flexible crosshead to which two oppositely toothed racks are attached, which alternately engage the pinion positioned between them, which is mounted on the crankshaft. Thereby the reciprocating motion of the piston is converted into a continuous, rotary movement, the effect of which is the starting of the engine. As soon as the latter moves by its own power a system of pawls carried by pinion and rack throws the latter out of engagement with the former, and incidentally, the flow of air into the starter cylinder is shut off by means of a specially constructed mechanism not shown in the illustration.

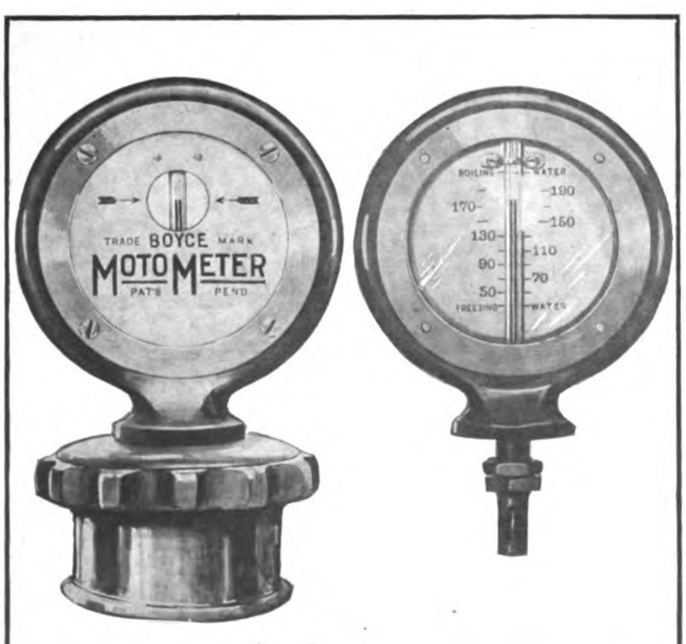


Fig. 1—Motometer cooling water gauge for radiator

Carbonox Chemical Deposit Remover

One of the latest carbon deposit removers on the market is the product of the Northwestern Chemical Company, Marietta, O., which is called Carbonox and sells in cans of various sizes, fitted with a combination cap and spout. Carbonox is a compound which loosens the carbon deposited on the cylinder walls by dissolving the oily material which binds it thereto, after which it keeps the carbon in suspension and makes its combustion possible. It is a mixture of various constituents, some of which are very volatile. To remove the deposits from the cylinders by means of Carbonox about .5 pint is used for four cylinders. The liquid is poured into the combustion chambers through the spark-plug holes, and if this is done while the engine is hot the spark-plugs should be replaced immediately to prevent evaporation of the remover; whereas, if the engine is cold it is good practice to soak the plugs in a small pan filled with Carbonox to remove oil and carbon from the sparking points. After this is done the plugs are put back in their places, and the engine is turned over a few times, with the ignition system shut off. After 20 minutes the engine is started and run until the exhaust is clear, which indicates that all the carbon suspended in the remover fluid has been burned. As soon as this is the case, a little lubricating oil should be squirted into every cylinder through the priming cup.

Motometer Cooling Water Gauge

There are few automobilists today who are not familiar with the detrimental effects caused by overheating radiators, which state of things not only indicates that something vital is amiss with one or with several parts of the motor system, but is in every case accompanied by a reduction of operating efficiency of the motor. In order to enable car drivers and owners to see from the inside of the car whether the radiator water is maintained at the right temperature or not, the Motometer has been devised, being the invention of a former racing driver and made by the Motometer Company, Inc., 1784 Broadway, New York City. The Motometer, Fig. 1, is a specially constructed thermometer which is fitted with a stem projecting into the interior of the radiator and indicating the temperature obtaining there by the use of a column of red liquid confined in a conventional type of thermometer tube. The latter is fitted with a bulb at its lower end and is closed hermetically at its upper end, there being a vacuum above the surface of the indi-

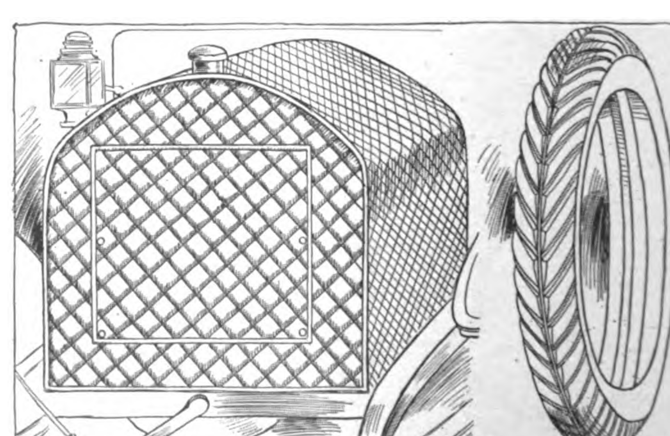


Fig. 2—New radiator cover Fig. 3—Simplex tire

cating fluid; the latter is a specially prepared chemical compound operating with equal exactness at all temperatures between the freezing and boiling points of water. The thermometer tube is placed in front of a silver-faced dial held between two crystal glass plates, and is therefore clearly visible in daytime, while at night its visibleness is insured through the effect of a hole in the dial, through which the light of the headlights may be seen. The correct level for the thermometer fluid, indicating the right temperature of the motor-cooling water, is marked clearly in the middle of the dial, as is the boiling point, while too low a temperature is indicated by the fluid sinking below the freezing level on the dial. As Fig. 1 shows, the Motometer has the shape of a watch and the stem which protrudes into the radiator through a .375-inch hole in the cap is so short as to remain above the surface of the water in the radiator at all times; the temperature measured is that of the air above the water. Consequently, if steam is developed in the interior of the cooling system, the Motometer immediately indicates 212 degrees Fahrenheit, thereby warning the driver that something is at fault, with the cooling system.

Simplex Long-Life Rubber Tire

A tire design which promises longevity of outer casings is the Simplex, Fig. 3, of the U. S. Supply Company, 1779 Broadway, New York City, being manufactured by the Simplex Rubber Company, of the same city. This casing is built up of eight plies of cotton fabric thoroughly frictioned together with rubber. This part of the construction is rather conventional, but the unusual element comes in with the tread design shown in Fig. 3. The surface is formed with a number of laterally extending ribs, flowing back from a central ring formed in relief on the outer surface of the tread in the same manner as the aftershafts are arranged on the quill of a feather. The height of the central and lateral projections is .625 inch, which portion of the tread is formed of live rubber. This construction has the double effect of giving an anti-skidding action to the tire running forward on the ground and incidentally protecting the top layers of the casing rubber as well as the fabric underneath them.

Winter Cover for Radiators

The Mutual Accessories Company, 1937 Broadway, New York City, markets a radiator cover for preventing the freezing of the cooling water in winter weather. This cover is designed to be fitted over the motor bonnet and radiator and to remain there throughout the cold season, the front being so constructed that a smaller or greater part of the radiator may be exposed to the cooling influence of the wind striking the traveling car. The cover, Fig. 2, is made of a material which is a poor conductor of heat, and its outside is finished like leather, so that it can but improve the appearance of the car and give it an exterior in harmony with the conditions obtaining at this part of the year. An opening is formed in the top of the front portion to permit of the radiator cap protruding through the cover, so that refilling is possible without any difficulty whatever. The front arrangement is clearly shown in Fig. 2, the flap which covers the radiator being capable of attaching to the bottom of the opening over which it fits; it is secured by snap fasteners formed as buttons. If partial cooling of the radiator surface is desired, it is merely necessary to unbutton the fasteners and attach the lower ones in the height of the middle of the opening, or they may be secured to the top line of the cover to give still more cooling surface. This accessory is made in three sizes, namely, for cars of more than 30 horsepower, for cars of less than that power, and for Ford cars especially.

Mutty Numotor Top Fabrics

The L. J. Mutty Company, 91 Federal street, Boston, Mass., is clear, which indicates that all the carbon suspended in the called Numotor, which is made of high-grade cotton yarns dyed in the fiber. The material is made into a double-texture fabric with an interlining of high-grade Para rubber, where the material is made for tops, while for seats a single-texture fabric is used. It is also to be had with a leather coating and in this grade is referred to as Numotor leather. Some very pretty color schemes are being used by the Mutty company, being obtained by the use of varied-color yarns woven into the material.

Electrene Fire Extinguisher

The Electrene Company, Whitehall Building, New York City, is the manufacturer of the latest development in the line of fire-extinguishing guns. The Electrene gun is filled with a chemical positively extinguishing fires of any origin and feeding upon any kind of fuel, the pumping medium being compressed air which is stored in one part of the extinguisher, while in the other half, which is equipped with the nozzle spout, the extinguishing fluid is contained. A Schrader valve is used for ad-

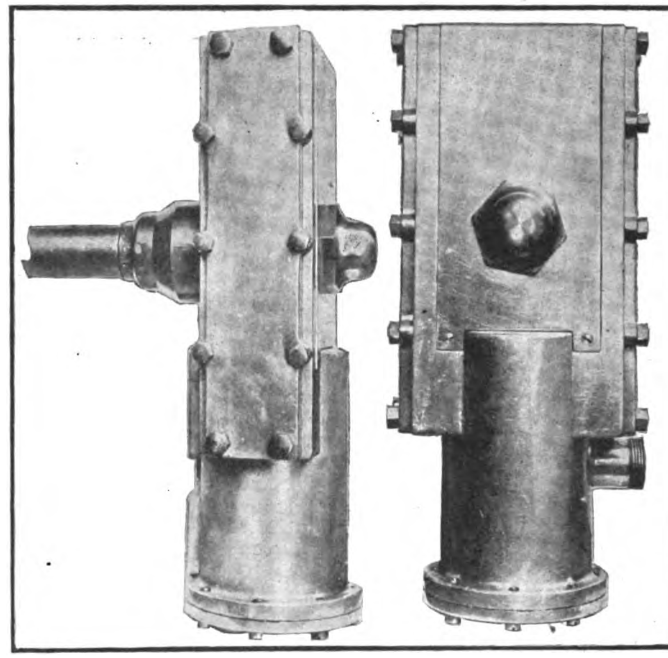


Fig. 4—Front and rear view of Compton air starter

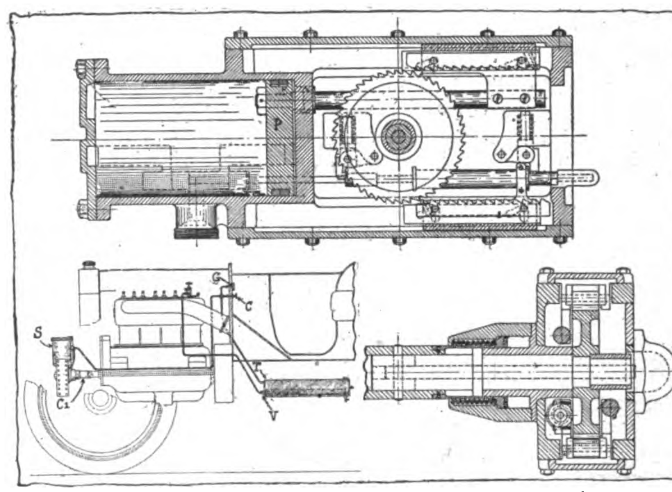


Fig. 5—Arrangement of starter units and part views

mitting the compressed air into the space where the chemical is carried, and to actuate the valve a rotatable handle is used, the latter being fitted to the top of the extinguisher, while the nozzle is provided in its lower end. The Electrene fire gun is furnished in any one of three sizes, the latter being 2 quarts, 1 quart and .5 quart respectively.

Laurent-Cherry Capstan Block

Capstan blocks designed for emergencies in which automobiles require to be hauled out of ditches, mudholes and so forth, are made by the Monitor Engineering Company, 1001 Chestnut street, Philadelphia, Pa. Every set consists of 50 feet of rope and of two blocks, one of which is constructed with a pawl-and-ratchet mechanism permitting of working it as a capstan. If a car is to be hauled out of a place which it cannot leave under its own power, the ordinary block is secured to a tree or other stationary object, while the block which contains the ratchet mechanism is hooked over the front axle of the car, the mechanism then being worked and the rope pulled in, whereby the car is brought out of its awkward position. The set takes very little space and may be carried in the toolbox, being a handy accessory which in time must prove of value to everyone who appreciates complete touring equipment.

Rubberset Tire Preserver

The Rubberset Company, Newark, N. J., manufactures a solution for coating outer casings with white paint, thereby improving their appearance. The paint particles are suspended in a solution containing some rubber-like substance which fills up small wounds in the tread and protects them from decay.

INTERNAL-Combustion Motor—In which the cylinder forms a pump and an explosion chamber.

This invention is illustrated in Fig. 1. Each working cylinder of the engine is shaped to form an explosion chamber, E, and a pump cylinder, P, within the same. A pump piston, Q, works in the cylinder, P; the latter is in communication with the inlet manifold, so that mixture may be taken into it and compressed into it, being transferred through a valve-controlled port in the piston Q into the explosion space E. There the mixture is burned and actuates a working piston, Q1, which bears on the crankshaft, and to which the end of the connecting rod of piston Q is secured. Piston Q1 has a pair of cylindrical walls spaced from one another so as to provide an oil passageway; the inner wall is formed with ducts, D, for conveying the oil to the exterior of the pump cylinder, oil being delivered to the ducts by way of an inclined flange, F.

No. 1,046,704—to Samuel Ybarra, St. Louis, Mo. Granted December 10, 1912; filed January 26, 1912.

Automobile Chassis Design—Including a flexible suspension.

This patent refers to a chassis, Fig. 2, in which the rear axle R is surrounded by a casing rigidly connected to one end of a reach, R1, the other end of which is yieldingly connected to the frame of the chassis. A power plant is adjustably supported by the front end of R1 and a transmission is in position between axle and power plant.

No. 1,046,681—to Morris S. Towson, Cleveland, O. Granted December 10, 1912; filed April 1, 1909.

Hydrocarbon-Fuel Carbureter—Being of the capillary vaporization type.

Fig. 3 shows the capillary carbureter referred to in this patent, in which vaporization of the gasoline is effected by the surface action of a wicklike substance through which the fuel passes. The carbureter casing is divided into an upper and lower compartment, U and L, respectively. The upper compartment is designed with a carbureting air inlet A and the lower compartment with a mixture outlet O. Fuel is supplied by way of the pipe S which leads into L, while air passes through A and U and thence through a passage into L. Fuel passes through the float-controlled valve V into the float-chamber F, whence it is fed through the material surrounding F to the surfaces of the capillary material filling L.

No. 1,046,653—to John Ruthven, Detroit, Mich. Granted December 10, 1912; filed January 25, 1912.

Tire Clincher-Ring Lock—Comprising a snap ring in combination with the rim, which holds the latter in place.

This patent refers to a clincher-carrying device, as shown in Fig. 5, which consists of a rim, R, carrying the tire and a removable clincher ring, C, slidably mounted on R and engaging one side of the tire. A snap-ring, S, is seated in the rim R and is adapted to restrain C from moving outwardly; a pin, P, movably mounted in the rim automatically locks behind the clincher ring when the latter is forced inward.

No. 1,046,855—to Peter Recconi, San Francisco, Cal. Granted December 10, 1912; filed October 21, 1911.

Force-Feed Lubricator—In which a horizontal lever actuates the pumping plunger.

The force-feed lubricator shown in Fig. 6 composes a reservoir which has a pump formed in one of its sides; a movable member, M, is adapted to reciprocate in the pump cylinder, being fixed to the end, E, of a lever, the other end E1 of which extends between guide-rods and is movable between the fixed fulcrum F and the adjusting-fulcrum screw A, so that the stroke of the plunger M may be varied. A cross-pin P on E1 coacts with guide-rods G and prevents casual displacement of the lever.

No. 1,046,563—to John F. Dake, Rochester, N. Y. Granted December 10, 1912; filed October 3, 1910.

Tire-Fastening Device—Including an expanding and a contracting ring for holding the tire tightly in place.

The tire-fastening device described in this patent works in combination with a rim, R, Fig. 4, and consists of an expansible clamping ring, E, which engages R at each side beneath the tire. A contractible ring, C, engages the outer sides of the tire between the rim and the ring E; the two pairs of rings mutually tend to draw the tire tightly upon the wheel, while a guard ring, G, holds it in place.

No. 1,046,629—to William Robert Morrison, Chicago, Ill. Granted December 10, 1912; filed April 17, 1911.

Motor Lubricating System—In which the flywheel casing serves as an oil passage between transmission and crankcase.

This patent refers to an oiling system in which both the crankcase and the transmission casing are formed in communication with the flywheel casing. This is done in such a manner that the overflow of oil from the crankcase as well as from the transmission passes into the flywheel casing and provision is made for the transfer of surplus transmission oil passing into the crankcase

No. 1,046,524—to Charles E. Wiffler, Detroit, Mich. Granted December 10, 1912; filed January 17, 1910.

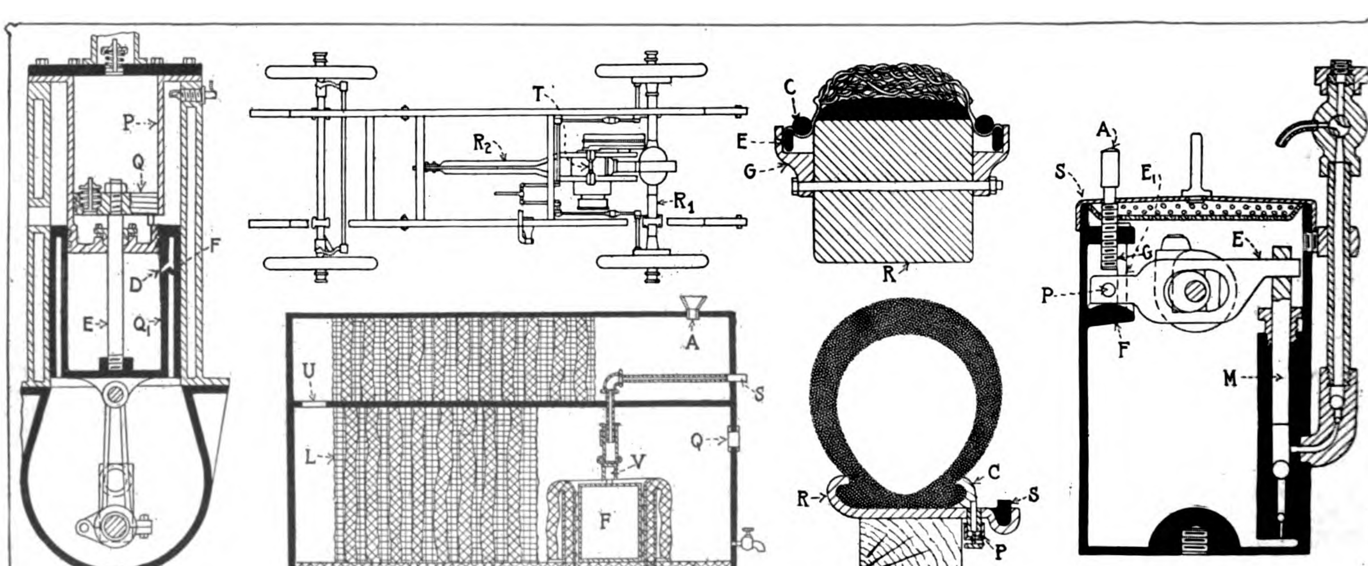


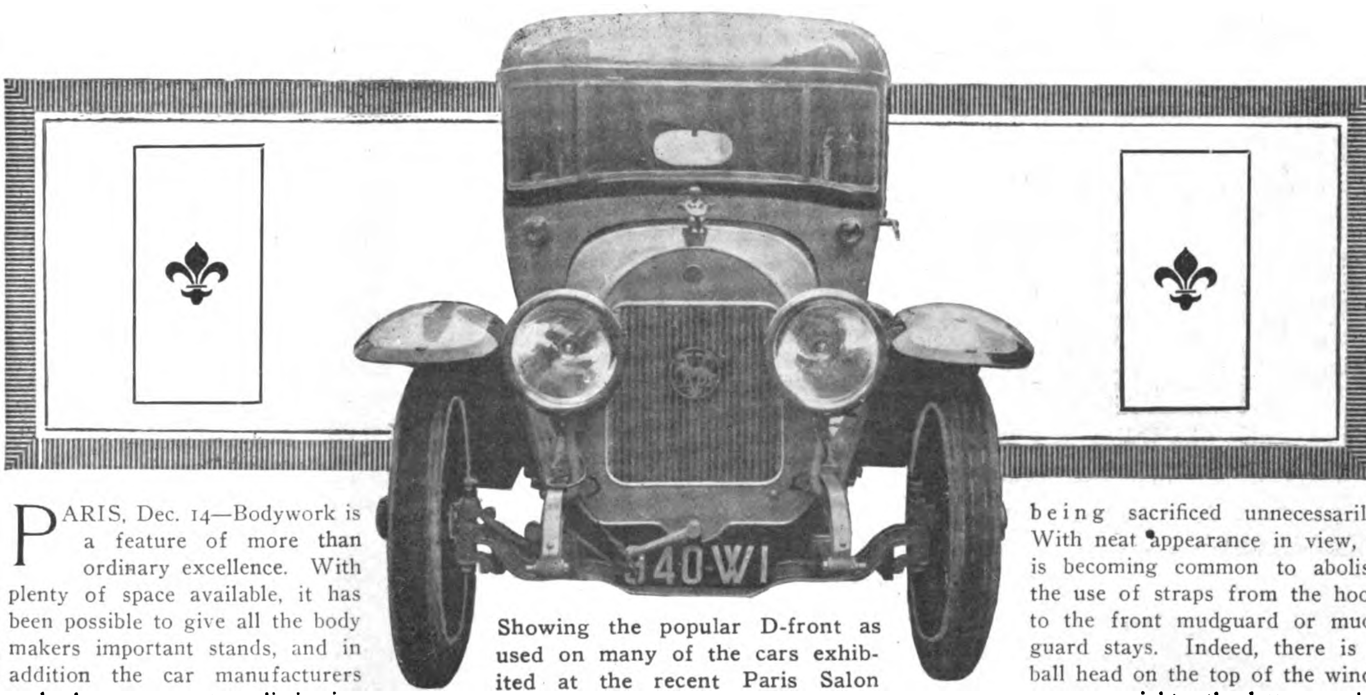
Fig. 1—Ybarra motor. Fig. 2—Towson chassis. Fig. 3—Ruthven carbureter. Fig. 4—Morrison tire-fastening device. Fig. 5—Recconi rim lock. Fig. 6—Dake lubricator

VOL. XXVII NEW YORK—THURSDAY, DECEMBER 26, 1912—CHICAGO NO. 26

The AUTOMOBILE

Bodies Big Feature at Paris Salon

Streamline Bodies Are All the Rage—Clean Outlines and Neat Appearance with Greater Comfort, Accessibility and Baggage-Carrying Capacity—Improved Disposition of Accessories

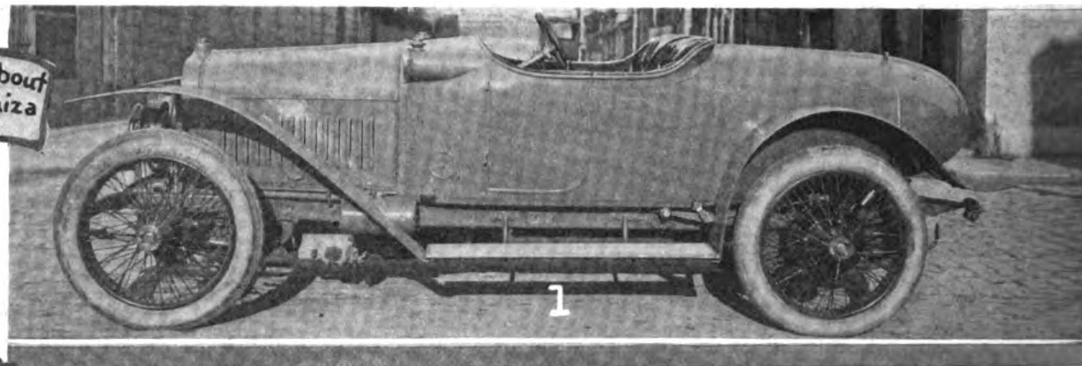


Showing the popular D-front as used on many of the cars exhibited at the recent Paris Salon

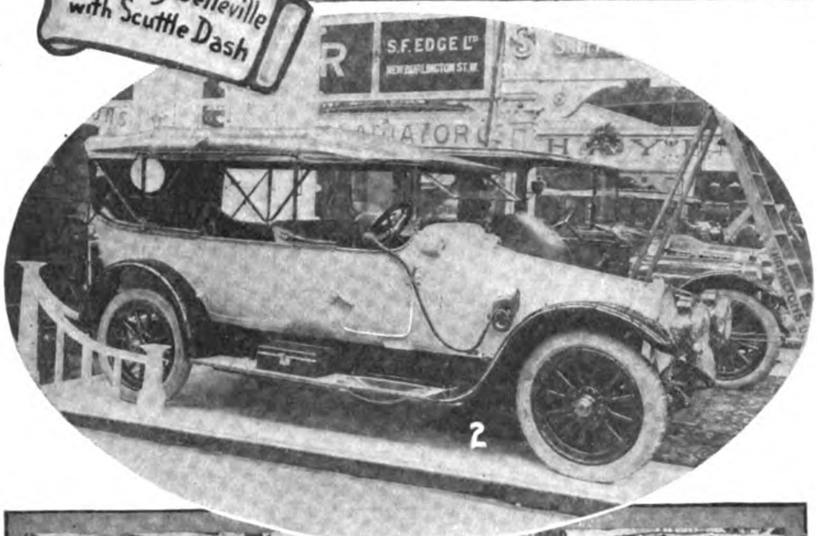
PARIS, Dec. 14—Bodywork is a feature of more than ordinary excellence. With plenty of space available, it has been possible to give all the body makers important stands, and in addition the car manufacturers each show one or two distinctive types of bodies, side by side with their chassis. This makes it possible for the Paris salon to be the finest display of body work in the world. Whatever the type, whether it be a little runabout or a heavy limousine, the main desire is to get unbroken lines so as to offer a perfectly boat-shaped streamline body. All added accessories are being eliminated as far as possible: levers are brought inside the body, lamps are inserted in the scuttle dash or merged into the front mudguards, the horn is made as inconspicuous as possible, tool boxes form a part of the running boards, and not a projection on them, and in no case is there a break at the dashboard, the line being unbroken from the radiator to the rounded-off rear panel. A couple of seasons ago the streamline designs were in the hands of speed maniacs who were willing to make great sacrifices of comfort and space in order to have clean, unbroken lines. There has been progress since then, and while every effort is being made to get unbroken lines, comfort, accessibility and luggage-carrying capacity is not being sacrificed unnecessarily. With neat appearance in view, it is becoming common to abolish the use of straps from the hood to the front mudguard or mudguard stays. Indeed, there is a ball head on the top of the windscreen uprights, the latter receiving a socket on the front bow of the hood and the two being locked together by a winged nut. It is just as effective as straps and considerably neater. On two-seaters there is the advantage that tops can be put up by this method without getting out of the car. There is a strong tendency, particularly on touring cars, to enamel all the metal work in the color scheme of the car instead of having it polished. In some cases this has been extended to the lamps, but this is not general.

In the accompanying illustrations of novel body types are included some constructions shown at Olympia which are of interest in connection with those exhibited at the salon.

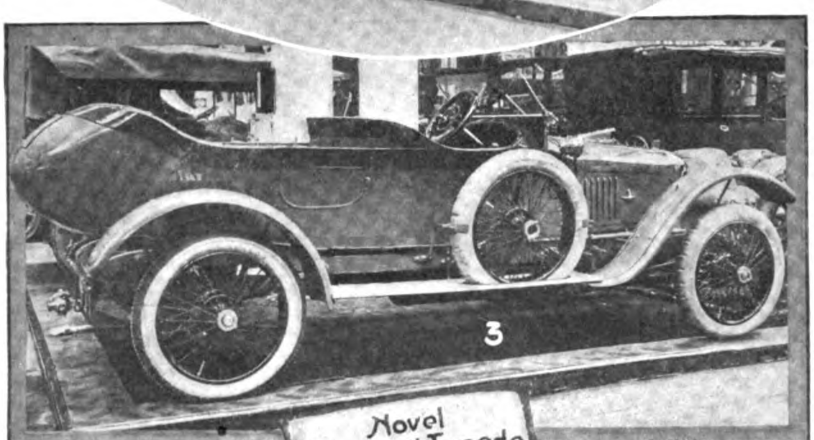
In a few cases an attempt has been made to avoid the abrupt break of the windscreen in order to harmonize with the stream lines of the body. On an open car this is really a difficult matter without making the screen a fixture. On a Martini car a very good effect was obtained by making the screen V-shaped, thus giving better protection to the occupants, offering less



Torpedo Runabout on Hispano-Suiza



Delaunay Belleville with Scuttle Dash



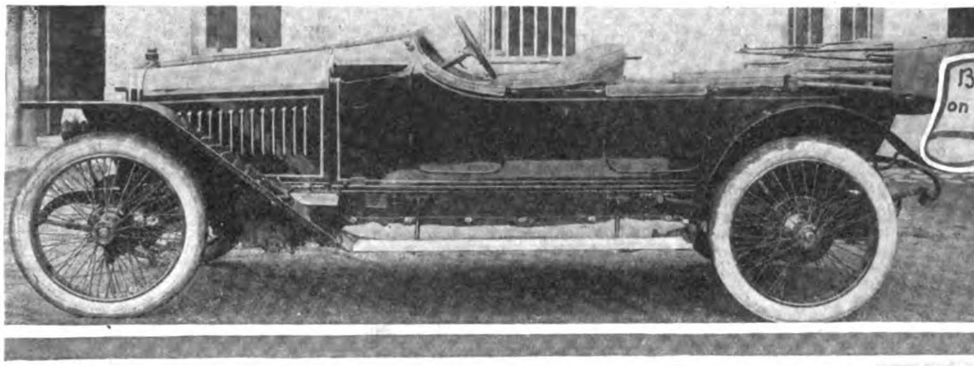
Novel Vauxhall Torpedo

resistance and making it possible to hinge the two portions of the screen in any desired position. Provision for baggage becomes a difficult problem when it is sought to retain stream lines, and there is also the problem of stowing away spare tires and wheels so as not to disturb the harmony of the car. On a D. S. P. L. there was a very neat arrangement of a circular locker at the rear of the car, the diameter of which was slightly less than that of the demountable rims. Thus two rims could be placed on the projecting locker, and as this compartment had a bulging door, the general effect was that of an egg-shaped torpedo. The circular locker in itself gave considerable space, but this was further increased by extending the storage space under the rear seats, with admission, of course, from the rear. There were several cases in which a large luggage compartment or tire compartment was built in the rear panel, this panel being hinged to give admission.

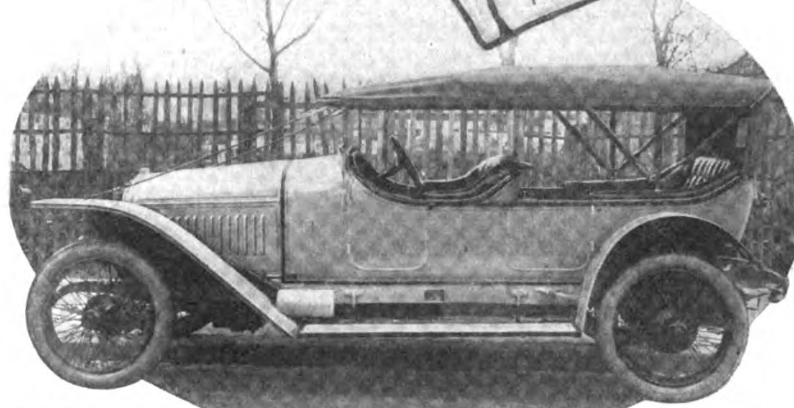
The two extremes of cars—open, full touring models or closed berlines or saloon cars—are in favor in France at the present time. All-weather types find comparatively little favor. The stream line D-fronted berline is a very strong feature. It is nearly always made with a dome roof, the sides rounded off into the back and the front, no dashboard, and generally two entrances on the left-hand side and one on the right-hand side. Alin & Liautard has made a specialty of this type of body and has some very attractive models on

Tub Lamp Under Hispano-Suiza Mud guard

Lorraine-Dietrich Torpedo Touring



Body by Keloch on Hispano-Suiza

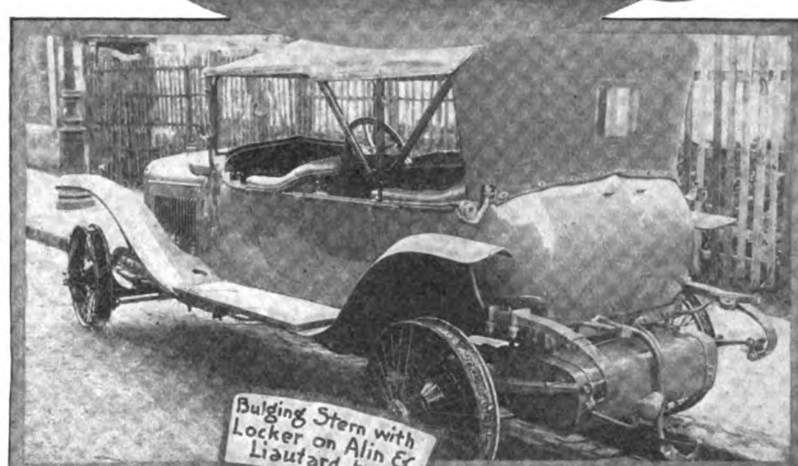


Torpedo by Alin & Liautard on Hispano-Suiza

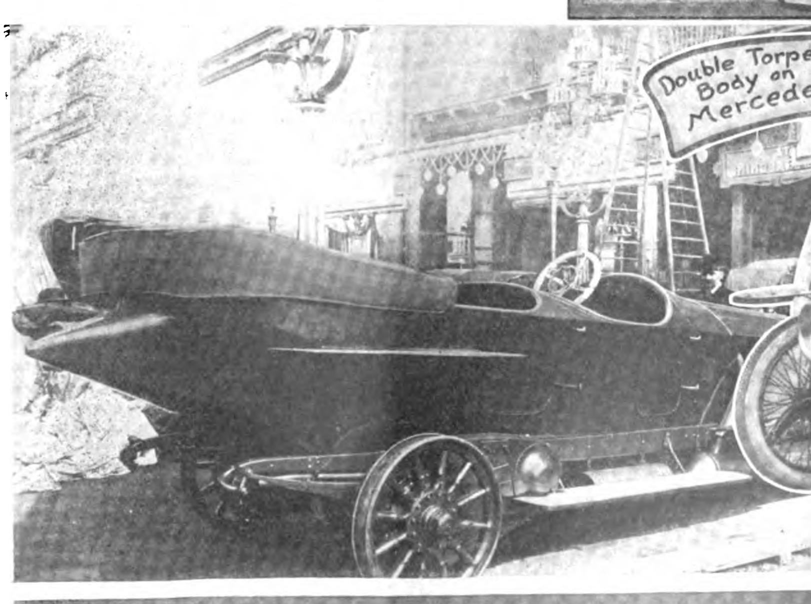
view. One of the most interesting is what is known as the "egg body" built on a Gregoire chassis. It is a saloon car with rounded roof, surmounted with a second roof, as on trolley cars, but with all the angles rounded off. The front of the body is D-shaped, being all glass, and the whole of the roof is of glass. The rear of the body is egg-shaped, but all the space at this portion of the car has been made use of for luggage and spares. Through a door at the rear fitted with hidden hinges a detachable wire wheel can be pushed into a special compartment under the rear seats. Below this is a locker of sufficient size for all the tools and spares necessary on a car, and above the tire cupboard is a larger compartment suitable for luggage. Although there are three doors, each with a pair of hinges and a lock, the work is so neatly done that it is only on close examination that the joints are noticed. In the two rear corners of the car, above the seats, are cabinet work cupboards for small articles. The gasoline tank is carried in the scuttle dash.

One of the novelties of the body department of the show is a new type of detachable set for which Lamplugh & Company, of Paris, have secured a patent. A shell body is built, lined with leather or other suitable material and merely left with a couple of low platforms in place of seats. The seats and the backs are made independently, the former being laid on a hinged frame so that they can be inclined as desired and are received on a central stud working on a worm gear by

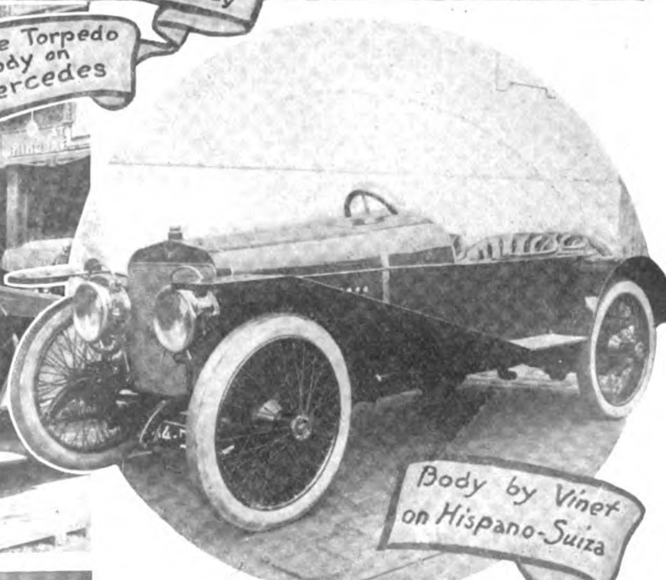
(*Continued on page 1331*)



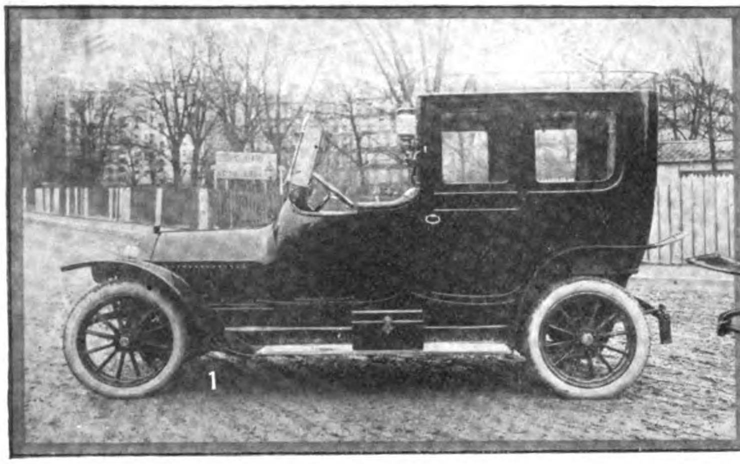
Bulging Stern with Locker on Alin & Liautard body

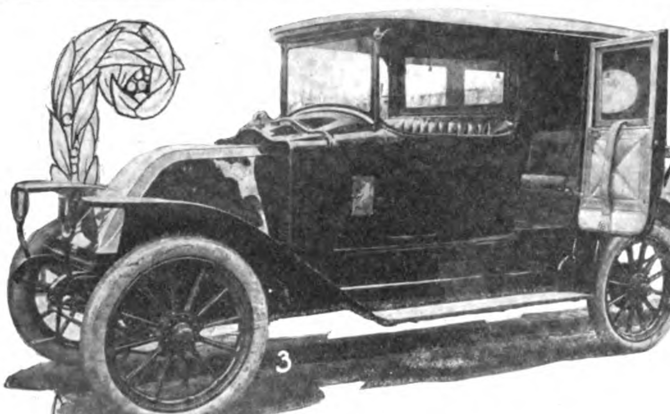


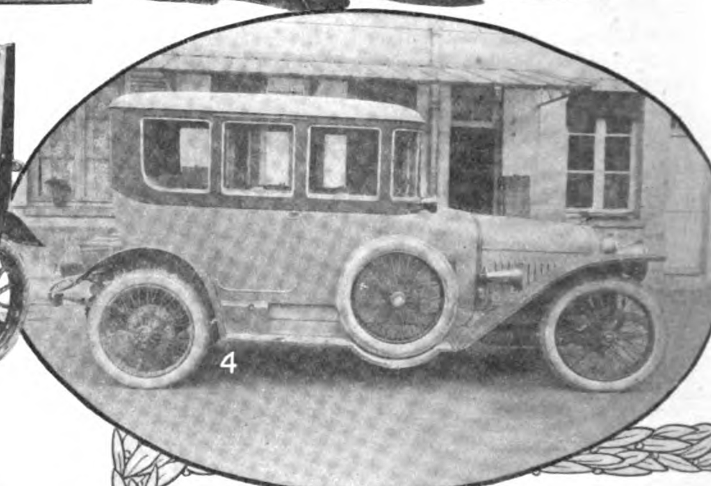
Double Torpedo Body on Mercedes

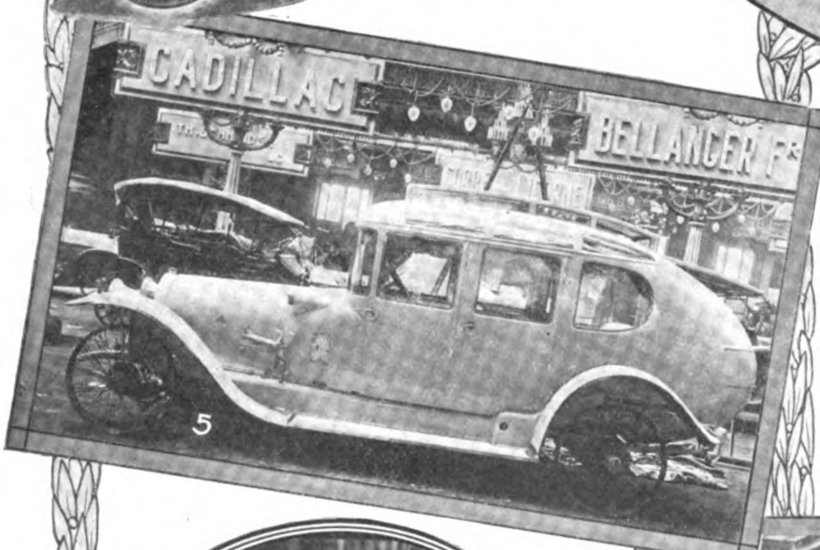


Body by Vinet on Hispano-Suiza



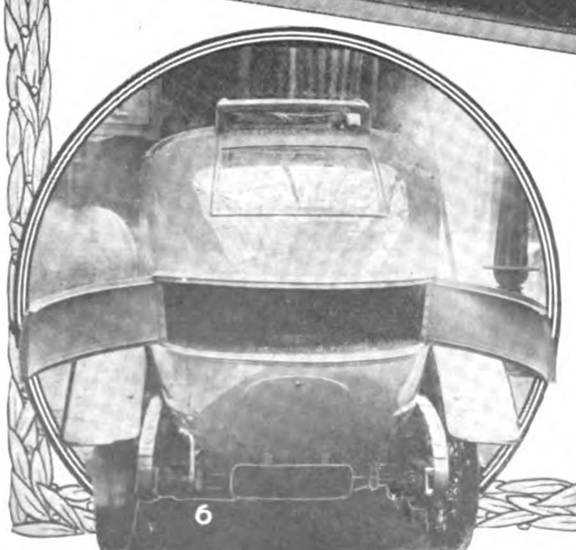


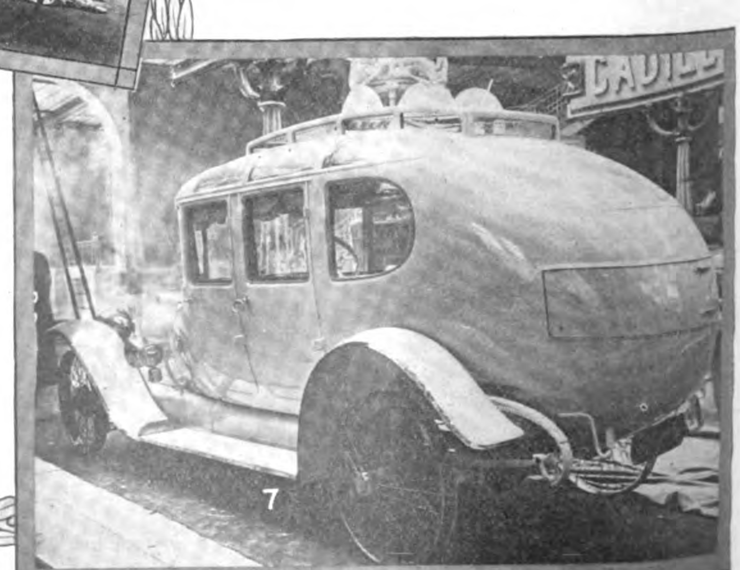


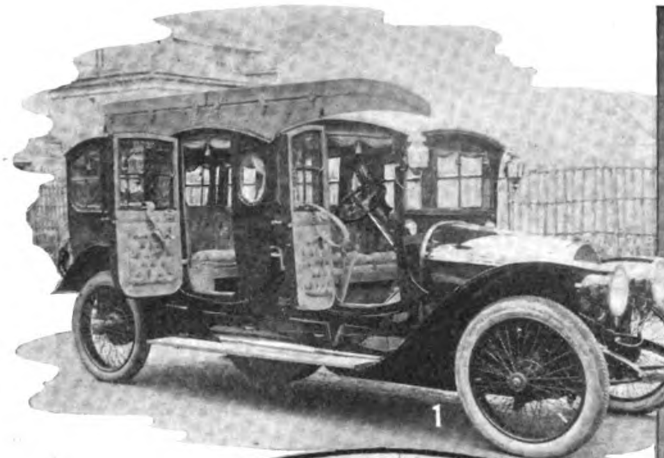


Novel Body Types at th

1—Single-compartment on Vinot chassis
2—Torpedo landaulet on 12-horsepower Benz
3—Charron limousine—note even height
4—Very graceful body on Hispano-Suiza
5—Side view of the Gregoire Egg body
6—Rear view of Egg—compartment open
7—Three-quarter view of the Gregoire Egg







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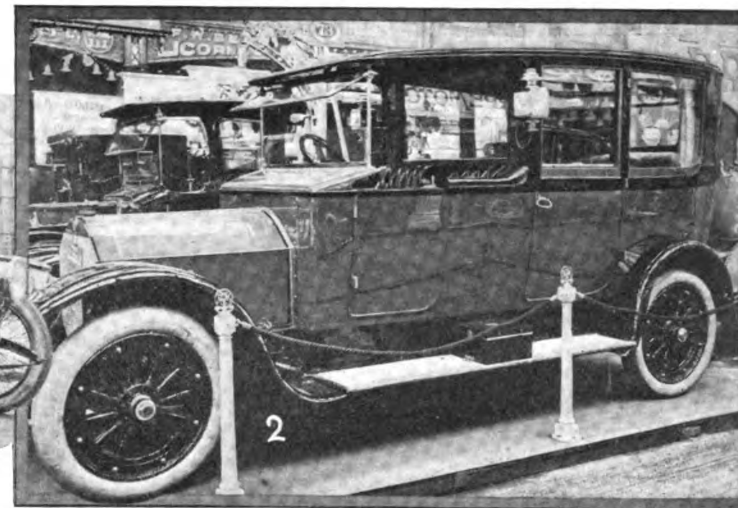

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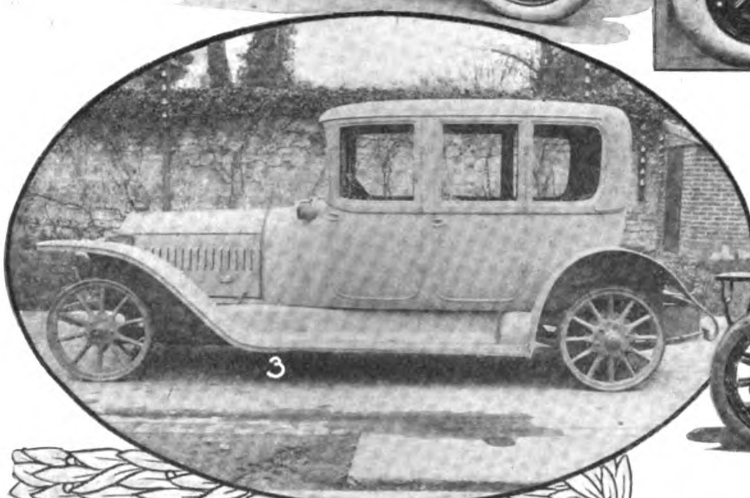

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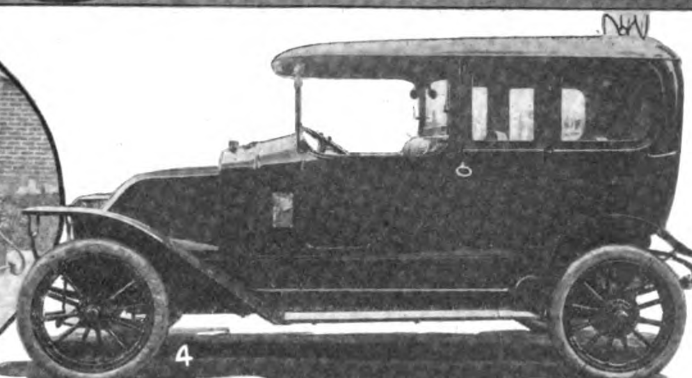

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Olympia and Paris Shows

1—Triple berline body shown at Paris Salon

2—Mercedes limousine as shown at Olympia

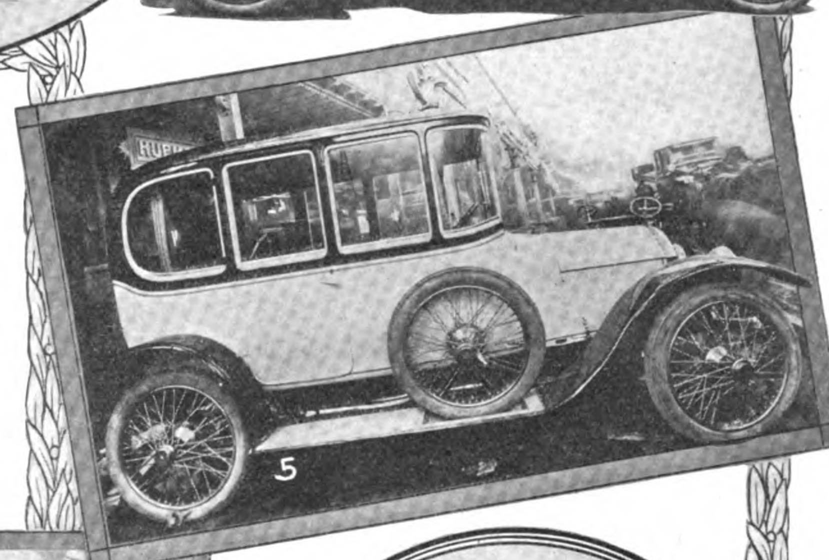
3—Dome roof berline on De Dion chassis

4—Charron limousine type with rounded back

5—Vermorel limousine with inside drive

6—Side view of distinctive streamline body

7—Showing clean outline of streamline berline



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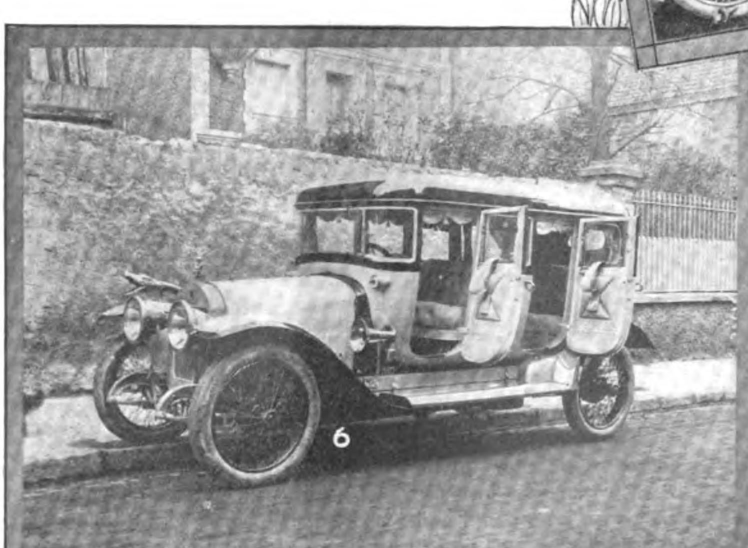

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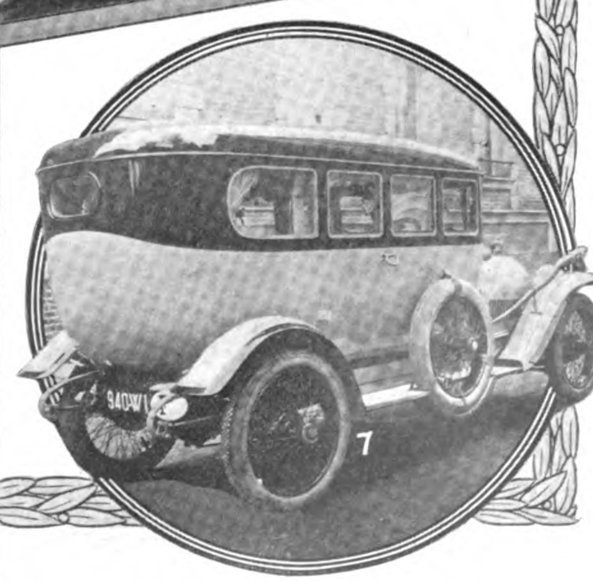

7

New York Bar Outlines New Patent Law

Responding to Queries of Taft's Commission on Economy and Efficiency, Gotham Association Frames Suggestions That Form Basis of Report Just Made to Congress—More Revenue and Less Wasted Time and Money Main Points

REPORTING to the President's Commission on Economy and Efficiency, the New York County Lawyers' Association has submitted an outline of patent reform legislation which has just been placed before Congress.

The New York report was one of a numerous series, and upon it and similar information the final draft was based.

In preparing the document the commission submitted a series of twenty-one questions covering the main points in present practice about which question had been raised. These questions and the answers of the New York lawyers are as follows:

1—Do you consider that abolishing one appeal in the Patent Office would be beneficial? Answer: Yes.

At present two appeals may be taken in the Patent Office before recourse is had to the courts.

2—If so, do you favor having one appeal from the primary examiner to the board of appeals, consisting of the highest officials in the office, such board to consist of five or six members, three to be a quorum? Answer: No.

3—If you think it advisable to continue the present system of two appeals within the office, and do not favor the board of five or six to hear appeals from the primary examiner, what procedure do you think best" Answer: It is recommended that the board shall consist of six properly qualified members to be appointed by the President, of whom three shall constitute a quorum.

Would Eliminate One Appeal in Patent Office

4—What changes, if any, do you think should be made in the procedure in interference cases?

Answer: That the present procedure in applications to dissolve for non-patentability, non-interference in fact, or imperativeness be altered so as to permit such questions to be brought up on due notice, at final hearing, with or without prior motion.

That Section 4906 of the U. S. Revised Statutes be amended to definitely authorize the assurance of subpoenas daces tecum in contested cases pending in the United States Patent Office.

That the Commissioner of Patents be given power for good cause shown to refer the issue of priority to a referee for report.

That there be but one hearing on the merits on the Patent Office and that by the proposed board.

5—Should interference cases be eliminated from the Patent Office by a change in the law, and the question settled in the courts after the patent issues?

Answer: No; for the reason, among others, that it would not be fair to the two patentees to have the terms of their patents running while they are held in interference. Nor is your committee prepared to recommend favorably the suggestion that the interferences be prepared in the Patent Office and transfrred to the courts for trials before patent issues—at least until the untried new equity rules have been fully tested and found wholly satisfactory.

6—Should the decision of the Patent Office on the question of priority of invention be made by law subject to review only on the appeal to the Court of Appeals of the District of Columbia? Answer: No.

7—Do you favor the bill pending in Congress which requires that an application for patent shall be prosecuted within six months after any action by the Patent Office, instead of within one year, as at present?

Answer: Yes; with discretionary power in the Commissioner of Patents to extend the time for a further period not exceeding six months on good cause shown.

8—Do you favor making the life of a patent 19 years from date of filing application? Answer: Yes; subject to the provisions of the Oldfield bill. These provisions add the time spent in interferences to the statutory term.

9—Do you favor a change in procedure so that the decision of the primary examiner to allow a patent to issue may be reviewed by the board of examiners in chief, or other board of appeals that may be created in the office, when such a review may be ordered by the Commissioner of Patents? Do you favor any plan for review? Answer: No.

10—What change, if any, in Patent Office procedure is needed to reduce the scope of patentability? Answer: None.

11—Do you favor the enactment of the bill now pending in Congress for the amendment of Section 4889 of the Revised Statutes, to require that there be filed with the application for patent, in addition to the drawing, two photographic copies of such drawing?

Answer: Yes; if two photo copies filed within 30 days after the filing of the application will be compliance with the requirements.

12—Do you favor the passage of the bill now pending in Congress to legalize the assurance of certificates of correction in patents? Answer: Yes.

13—State what change, if any, is advisable in reference to the appeal now allowed from the Patent Office to the Court of Appeals of the District of Columbia.

Answer: Eliminate the appeal in *ex parte* cases, retaining the same in interference proceedings. The construction which has been put on the Statutes by the Courts, requiring an applicant to appeal to the Court of Appeals, D. C., before he can file a bill in equity works a hardship. Moreover, the Court of Appeals, D. C., is not well qualified to decide a question of patentability on the Patent Office record of an *ex parte* case. By bill in equity that question could be speedily and intelligently tried under the new equity rules in a Federal court, upon evidence submitted. We therefore recommend an addition to the Act of March 3, 1897, to the effect, "Nothing herein is to be construed as limiting the right of an applicant to whom a patent has been refused by the Commissioner of Patents, to file bill in equity under Section 4915, without first taking an appeal to the Court of Appeals, D. C.

Strongly Urges Better Pay and Points Way

14—To what extent should the decision on such appeal operate as a final adjudication of patentability? Answer: To no extent.

15—Do you consider it necessary to the improvement of the efficiency of the Patent Office that the salaries paid to the higher officials and to the examining force be increased?

Answer: Yes; because the present salaries are inadequate to the services rendered and present-day living expenses.

16—Do you consider it necessary that the number of examiners be increased, particularly with reference to the work of reclassifying patents and digest of publications and the providing of every facility to simplify and make more accurate the search?

Answer: Yes; especially that the number of examiners be increased. Your committee has been advised by Assistant Commissioner Billings that the number of patent applications this year is now about 5000 more than last year. The number of examiners must be increased to keep pace with the increase of business.

17—What changes, if any, should be made in the official gazette and other publications; and wherein are the methods of handling publications, including copies of patents, subject to criticism?

Answer: That all claims of patents, instead of only the first five, be printed in the official gazette, and that there be a return to the former style of indexing both in the annual indexes and in the weekly numbers of the official gazette, except that such indexes shall omit citations to the volume and page of official gazettes and the volume and page of monthly bound numbers. Also, that the former practice be returned to charging 3 cents per copy where a sub-class is ordered.

18—Should the bills affecting the patent law on which hearings are held before the patent committees of Congress be published in the official gazette? Answer: Yes.

19—What changes, if any, do you think should be made in the application fee and the final fee?

Answer: Fix $20 as the filing fee and $15 as the final fee on applications other than design applications; provided the increased annual revenue thus provided, together with the annual surplus (in all about $225,000) be appropriated to the increase of salaries of the higher officials of the Patent Office. In 1911 there were over 32,000 more regular applications filed than issued. The increase of $5 in the filing fees on those cases would thus give a year's revenue increase of $160,000. In 1911 the surplus of income over expenses was $65,000. The total would thus be $225,000. The yearly excess of applications over patents for the past three years has been about 30,000. Your committee believes that the sum of $225,000 will suffice to provide increases of $1,000 each in the salaries of 60 of the leading officials in the Patent Office, and increases of $250 to $500 in the salaries of assistant examiners, and still leave $60,000 for five new examining divisions.

To the suggestion that the accumulated surplus of $7,000,000 be used for increase of salaries, your committee thinks a satisfactory answer is that given by Commissioner Moore in his annual report for 1911, namely, that such accumulated surplus should be applied to the purchase of a site for a new Patent Office Building and for its erection. A copy of that report of the Commissioner accompanies this report.

Further answering question 19, your committee is of opinion that the present system of design fees is often inequitable to the party who pays the large fee for a long term patent and later finds his application refused. We therefore recommend that in all design applications there be a fee of $10, payable on filing the application, with the option to the applicant of paying on the allowance of the application an additional fee of $5 for a seven-year term patent, or $20 for a fourteen-year term patent.

20—Where an assignment covers more than one patent, should there be an additional fee for each patent in addition to one? Answer: Yes.

Transposing Fees Will Produce $160,000 More

21—If the expenses of the patent office are not to exceed the revenues from fees and a larger annual appropriation than is now made is necessary to provide a sufficient number of examiners, to pay the examining force adequate salaries, and to make the office more efficient, would an increase of the application fee from $15 to $25, and reduction of the final fee from $20 to $15 be justified?

Answer: See answer to question 19.

22—What criticisms, if any, have you of fees of the office, other than the fee for filing an application for patent and the final fee?

Answer: See answers to questions 17 and 19.

23—What changes, if any, should be made in the laws or procedure of the Patent Office, with reference to trade marks, prints and labels?

Answer: No recommendation at this time.

24—While the subject is not covered by the resolution of Congress, the commission will receive such comment as you may wish to make upon the bill pending in Congress for the creation of a Court of Patent Appeals, to have the jurisdiction in patent cases now exercised by the Circuit Court of Appeals.

Answer: This committee has already passed a resolution urging the enactment of the bill referred to.

The recommendations contained in the above answer to the Commission's queries represents the opinion of 3000 lawyers practicing at the New York County bar, and are in line with those submitted from the bar associations of the whole country generally.

In effect the enactment of a law based upon such recommendations would save time in the Patent Office and money to applicants for patents, besides lending an additional element of certainty and security due to greater efficiency in the office itself.

One of the chief troubles experienced in the Patent Office in recent years has been the difficulty in retaining competent men as examiners. The salary of the office was so small that as soon as one gained skill he was taken away by larger salary and prospects.

The committee which framed the answers consists of the following prominent members of the patent bar: Samuel R. Betts, J. Edgar Bull, Park Benjamin, George E. Cruse, Samuel Owen Edmonds, Philip Farnsworth, Charles C. Gill, Livingston Gifford, Hubert Howson, Harry G. Kimball, Harry E. Knight, William H. Kenyon, Alfred W. Kiddle, William G. McKnight, Charles Neave, John C. Pennie, William A. Redding, John Jerome Rooney, James L. Steuart, A. Parker Smith, Alfred Wilkinson.

Short Receivership, Matheson Hope

W. C. Sheppard has been appointed receiver for the Matheson Automobile Company of Wilkes-Barre, Pa., in the United States District Court. Mr. Sheppard has been president of the corporation since the reorganization about a year ago. The nominal assets of the company are estimated at $1,000,000 and the liabilities are placed at $600,000.

It has been announced that the receivership is to be very brief, extending over a period of only about 3 weeks. It was friendly in its inception and was intended, according to the announcement, to stave off insistent creditors until the plans for refinancing the company are perfected.

The company made sharp retrenchments at the time of the reorganization, and has done a good business since. According to statements from the company, its basic condition is good and the legal steps resulted from a temporary lack of capital coming at the height of the non-productive season.

Nantucket's Motor Troubles

BOSTON, MASS., Dec. 21—Not until it has a town meeting at which all the islanders may vote will the troubles over motor vehicles on Nantucket, an island off the Massachusetts coast, be settled. The islanders succeeded in getting a law through the legislature a couple of years ago excluding motor cars, but recently the selectmen bought a motor fire wagon and it has been delivered. But the law does not make any exception in favor of fire wagons and some of the islanders who are in favor of automobiles say that if the selectmen allow the machine to be run they will have the firemen summoned into court for breaking the law. So the vehicle is somewhat of a white elephant at present. A special town meeting will be called to settle the matter, and it is expected that the legislature will be appealed to next January to straighten out the troubles some way or other.

Stewart-Warner Merger

Speedometer Manufacturers Sell Out To Virginia Corporation Capitalized at $11,000,000

Litigation of Patents Now Pending Said To Be Unimportant Because of Advance in Industry

CHICAGO, Dec. 23—*Special Telegram*—The Stewart-Warner Speedometer Company, a Virginia corporation of $11,000,000 capital, has just been formed and has purchased the plant and patents of the Stewart & Clark Manufacturing Company, Chicago, manufacturers of the Stewart speedometer, and also the plant and patents of the Warner Instrument Company, Beloit, Wis.

This new company has $1,000,000 preferred stock and $10,000,000 common stock.

Official announcement has been made that J. K. Stewart is to be president of the new corporation, but the remainder of the officers have not been selected. C. B. Smith will be general manager. The suit now pending in the United States District Court, Southern District of New York, has not been dismissed. Announcement has been made, however, on the part of Stewart & Clark, that the principle involved in the patent in question is not important to modern practice and the chances favor a dismissal because of the problematic value of a decision on a point not involved in present manufacture.

The physical properties of the Stewart and Warner companies will be continued as at present, that is, the Stewart & Clark Chicago plant and the Warner Beloit plant will continue manufacturing the same class of speedometers that they have in the past and marketing them under their respective names.

There will not be any change in the management of these plants or in the selling organizations connected with them.

This purchase of the two companies brings the holding of all speedometer patents of each company under a single control, and so the long drawn out litigation on the subject of magnetic speedometers between the two companies will be brought to a close.

The patent suit has been in the courts for many months.

The purchase of these two companies in the closing days of the year comes as a climax of a series of unions of this nature in the motor industry, the biggest previous one during the year being the Goodrich-Diamond deal.

Western Electric-Pittsfield Allied

CHICAGO, ILL., Dec. 21.—The reported rumors of an alliance between the Western Electric Company and the Pittsfield Spark Coil Company have been officially confirmed by both parties concerned.

Under the arrangement between the two companies the entire line of Pittsfield products, including magnetos, spark coils, spark plugs, timers and switches, are now to be marketed exclusively by the Western Electric Company, under the name of Western Electric-Pittsfield. For a while the Pittsfield Company will continue to sell some magnetos direct.

Multiwheel Drive Company Formed

WASHINGTON, D. C., Dec. 21.—The American Motor Traffic Company, incorporated under the laws of South Dakota, was formally organized in Washington, D. C., December 18. The directors of the company are E. S. Alvord, president Littlefield & Alvord Express Company, president; S. J. MacFarren, manager Engineering Searching Company, first vice-president and acting manager; W. J. Moore, president The Moore Company, second vice-president; A. L. Kley, of New York City, secretary; J. C. Muncaster, of Washington, and J. C. Menoher, of Pittsburgh.

The company will specialize in heavy duty commercial motor vehicles of the pivoted spindle, multiwheel drive and steer type, with flexible load suspension and balance, and also in liquid fuel combustion engines and vehicle accessories. Many other items of improvement in vehicle construction are controlled by the company under various patents granted to MacFarren, Thomas and others and further protected by special trade marks.

The company is empowered to operate, as well as manufacture, motor vehicles for all uses, and proposes to establish freight, express and passenger services in response to demand, through its exclusive state agencies or auxiliary companies which will be located with reference to convenient transportation and distribution of product.

Crude Oil Situation Is Acute

MILWAUKEE, WIS., Dec. 21—The crude oil situation in Milwaukee, where an aggregate of more than 15,000,000 gallons are used annually, has become critical, following the announcement of the Standard Oil Company that after January 1 no more crude product would be sold on account of the necessity of utilizing all of its crude supply to the production of the higher distillates, such as gasoline, benzine, naphtha and kerosene.

A second blow was struck late last week, when the independent oil companies, which agreed to continue to supply crude to Milwaukee users, issued a new price list, which increases the price from $2.50 to $3.50 per 100 gallons to $5.70 to $6.25 per 100 gallons. The advance is practically prohibitive, and with a supply greatly reduced it has become necessary for manufacturers to cast about for a substitute. As coke is about the only available substitute, it will be necessary for manufacturers to almost

Automobile Securities Quotations

The stock list made some good recoveries from the depression of the earlier part of December, during the past week. The tire stocks were all strong and higher, and nearly all of the automobile manufacturing issues showed some degree of strength. International was the exception, yielding moderately to the announcement of the new financing which involved the retirement of 55 per cent. of the common to form the basis of a bonus to the lenders of $1,500,000 to the company.

	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	180	200
Ajax-Grieb Rubber Co., pfd	..	..	96	100
Aluminum Castings Co., pfd	..	..	97	100
American Locomotive Co., Com	36	37	42¾	47
American Locomotive Co., pfd	105	106	106	106¾
Chalmers Motor Company	..	..	130	145
Consolidated Rubber Tire Co., com	5	12	13	14
Consolidated Rubber Tire Co., pfd	12	20	50	60
Firestone Tire & Rubber Co., com	178	185	310	320
Firestone Tire & Rubber Co., pfd	108	110	105	110
Garford Company, preferred	..	..	100	102
General Motors Company, com	34	35½	33	34
General Motors Company, pfd	77	..	76¾	77½
B. F. Goodrich Company, com	..	..	64	65
B. F. Goodrich Company, pfd	..	..	106	106½
Goodyear Tire & Rubber Co., com	330	335	412	420
Goodyear Tire & Rubber Co., pfd	104	106½	105½	106½
Hayes Manufacturing Company	..	..	..	90
International Motor Co., com	..	..	10	20
International Motor Co., pfd	..	..	40	60
Lozier Motor Company	..	..	..	38
Miller Rubber Company	..	..	160	170
Packard Motor Company, pfd	105	107	104	106
Peerless Motor Company	..	..	115	118
Pope Manufacturing Co., com	38	41	30	33
Pope Manufacturing Co., pfd	68	70	71	74
Reo Motor Truck Company	8	10	9	10
Reo Motor Car Company	23	25	20	21
Studebaker Company, com	..	..	36	37½
Studebaker Company, pfd	..	..	90	93
Swinehart Tire Company	..	..	100	105
Rubber Goods Mfg. Co., pfd	100	105	104	108
U. S. Motor Company, com	18	19	..	..
U. S. Motor Company, pfd	58	59	..	..
White Company, preferred	..	..	104	107
Willys-Overland Co., com	..	..	70	71
Willys-Overland Co., pfd	..	..	100	101

wholly rebuild their furnaces at vast expense, and the cost of manufacturing crucible steel will advance in a corresponding proportion.

The A. O. Smith Company, of Milwaukee, produces more than 60 per cent. of all the pressed steel motor car frames used in America The Smith concern uses nearly 1,000,000 gallons of crude oil per year The largest user of crude is The Falk Company, which is one of the largest manufacturers of kerosene gas engines in the world, and takes 2,000,000 gallons per year. The Allis-Chalmers Company and National Brake & Electric Company use 1,250,000 gallons and the Sivyer Steel Casting Company, a large producer of crucible steel, uses 750,000 gallons. The A. O. Smith Company has a contract for crude supply until April 1, 1913, but has already installed a gas producer plant and contemplates the use of electricity as the primary source of heating after April 1. The crucible steel industry is watching developments closely, but the rise in price seems unavoidable.

Grabowsky Creditors May Get Half

DETROIT, MICH., Dec. 23.—*Special Telegram*—Referee in Bankruptcy Lee Joslin has postponed the sale of the property of the Grabowsky Power Wagon Company, adjudicated bankrupt about a month ago, until Thursday. When sealed bids were opened at the office of the referee to-day only two offers were received. One bid was from the Joy Realty Company of Detroit, which bid $137,300 for real estate, machinery and equipment, which were appraised at about $188,600; the other offer was from Winternitz & Co., of Chicago, which offered to take the property with the exception of the real estate and sell at 121.2 per cent., guaranteeing to net $55,000. The total under the two bids would be less than $175,000 it is believed, and Referee Joslyn is confident at least $200,000 can be realized, which would give the creditors 50 cents on the dollar. This would be a fairly satisfactory showing.

Market Changes for the Week

FEW developments of interest occurred in this week's market of materials, so far as prices were concerned, despite the fact that the general tone of trading was firm, so that a few substances experienced appreciable advances in price. The most important feature in this respect was tin, which fluctuated over a range of 35 cents per 100 pounds during the week, but rose sharply the last two days and closed 15 cents higher than it had opened. Copper prices remained practically what they were last week, and no change in the price of steel has been recorded, whereas lead fell off slightly.

Petroleum and gasoline remained at their former quotations and there are no indications that future changes of price will be of a downward nature. The rest of the lubricants and oils have likewise remained at their old prices, except cottonseed oil, which rose from $6.15 to $6.37 a barrel during the week.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Week's Change
Antimony, per lb.	.09	.09	.09	.09	09	....
Beams & Channels, 100 lbs.	1.61	1.61	1.61	1.61	1.61	....
Bessemer Steel, Pittsburgh, ton	27.50	27.50	27.50	27.50	27.50	....
Copper, Elec., lb.	.17¼	.17½	.17½	.17⅗	.17⅗	+.00⅛
Copper, Lake, lb.	.17½	.17½	.17½	.17½	.17½	....
Cottonseed Oil., Dec., bbl.	6.15	6.25	6.27	6.28	6.27	+.12
Cyanide Potash, lb.	.19	.19	.19	.19	.19	....
Fish Oil, (Menhaden, Brown)	.33	.33	.33	.33	.33	....
Gasoline, Auto, 200 gals., @	.21	.21	.21	.21	.21	....
Lard Oil, prime	.96	.96	.96	.96	.96	....
Lead, 100 lbs.	4.30	4.30	4.30	4.30	4.25	—.05
Linseed Oil, prime	.46	.46	.46	.46	.46	....
Open-Hearth Steel, per ton	28.00	28.00	28.00	28.00	28.00	....
Petroleum, bbl., Kansas crude	.80	.80	.80	.80	.80	....
Petroleum, bbl., Pa. crude	2.00	2.00	2.00	2.00	2.00	....
Rapeseed Oil, refined	.69	.69	.69	.69	.69	....
Silk, raw, Italy	....	3.72	....	....	3.80	+.08
Silk, raw, Japan	....	4.35	....	....	4.35	....
Sulphuric Acid, 60 Beaumé	.90	.90	.90	.90	.90	....
Tin, per 100 lbs.	50.10	49.90	49.90	50.00	50.25	+.15
Tire Scrap	.09⅞	.09⅞	.09⅞	.09⅞	.09⅞	....

Stromberg Starts Suits

Begins Action to Adjudicate Ahara and Richard Carbureter Patents With Zenith as Defendant

Henderson Company is Moving Into Larger Factory and Announces Engagement of Production Manager

CHICAGO, Dec. 21—Suit was brought on December 12 by the Stromberg Motor Devices Company *vs.* Zenith Carburetor Company under two patents, one the Ahara patent granted in 1901, and the other a Richard patent granted in 1905.

The Ahara patent is one which has not attracted general public attention, although it appeared comparatively early in the carbureter art and has extremely broad claims upon a carbureter without any moving part. The inventor and patentee, Ahara, is an engineer of wide practical experience, and his invention was made in connection with actual development work, and has been commercially employed.

The Richard patent is directed toward a specific feature of construction, which, however, is employed by and is said to be necessary to any plain tube carbureter. It covers a U-shaped tube in certain relation to the gasoline supply, one end of the U-shaped tube extending into the mixing chamber, the other end being exposed to atmosphere, combined with other features which are found in all modern carbureters.

DETROIT, MICH., Dec. 23—*Special Telegram*—Notice of the filing of a suit has been given by the Stromberg Motor Devices Company, Chicago, against the Zenith Carburetor Company, Detroit, alleging infringement of the Ahara patent covering a carbureter without moving parts and Richards patent for U-shaped spray nozzle construction, the former dated 1901 and the latter 1905.

While not yet in the court, the case will be brought in the Federal Court here and will probably not come up for 6 months, as the courts are very lenient in patent cases of this nature.

V. R. Heftler, of the Zenith company, states that the suit will be fought and that there is no ground for action. The local attorneys for the Zenith company will be Wm. M. Swan, of the firm of Kenna, Lightner, Oxtoby & Oxtoby. Bigwell & Burnes, of Pittsburgh, who have handled patent litigation for the United States Steel Corporation, have also been secured by the Zenith company, which has not yet made any plans for its line of defence, as it is very difficult to determine the exact status of the matter until the taking of the first testimony, the bill of complaint having the usual vagueness.

Henderson Moving to Larger Factory

INDIANAPOLIS, Dec. 21.—The moving of the factory into the new addition has caused the Henderson Motor Car Company to add to its factory staff J. M. Smith in the capacity of factory production manager. Mr. Smith for several years was assistant superintendent in charge of production in a big Detroit factory. He comes to the Henderson from the Cole Motor Car Company, of Indianapolis, where he has been employed in the capacity of factory manager.

The Henderson factory will be closed down until January 1 while the different departments are acquiring additional space in the new factory building which will give the Indianapolis plant a floor space of 55,000 square feet. Before production is resumed an inventory will be taken and the first of the year an additional force will be added and the production will be doubled for January and February and trebled in the ensuing months of the 1913 season, according to announcement.

Connersville Seeks To Hold Lexington

Securities Company Offers 25 Per Cent. for Claims Against Embarrassed Concern Before Trying Reorganization

Imperial in Its New Factory Announces a Six-Cylinder Model—Gasoline Up at Milwaukee—Other News

CONNERSVILLE, IND., Dec. 21—In an attempt to continue the Lexington Motor Car Company as a going concern here, the Connersville Securities, a corporation composed of local capitalists, have made a proposal to the creditors of the manufacturing company to purchase the claims against the company and to refinance the project to a sound basis.

The proposition is for 25 per cent. in cash within 30 days after proper delivery. The new organization is still in shadowy form but will be developed as soon as the settlement of the claims is consummated.

The troubles of the company arose from the failure to secure new capital after entering into a contract to produce cars worth $1,500,000 a year. A meeting of the creditors was called and a committee appointed. The proposal of the securities company was the best received. Nominal assets are placed at $134,000 and liabilities at $140,000. Actual assets under forced sale would bring very much less according to the figures of the creditors' committee.

Imperial in New Plant to Build Six

JACKSON, MICH., Dec. 21—The Imperial Automobile Company now is located in its new plant, formerly the Buick factory, in the western part of the city. The building is the largest factory edifice in Jackson. A new model will be manufactured by the company in the new plant. This model will be a six-cylinder car, the only one to be made in any of the four automobile companies in Jackson. Motors and other parts of the car will be made in the new factory. The new plant and increased force will insure the prompt delivery of cars, no matter how great the demand.

The company began operations in Jackson September 1, 1908, with 25 workmen and an output of only 25 cars in the first season. Last season 300 men were employed. It is expected the force will be increased to 500 after the first of the year. Last season the company was compelled to forfeit the sale of 200 cars because of a lack of facilities.

Gray & Davis Not a G. E. Branch

Owing to the misinformation of a correspondent, THE AUTOMOBILE for December 19 contained a reference to "the Gray & Davis Company of Boston, a branch of the General Electric Company." William Gray, president of the company, states that his company is no branch of any concern.

Britons Seek Home Motor Fuel

LONDON, Dec. 10—An announcement has just been made that the Society of Motor Manufacturers and Traders has voted the sum of 2000 guineas towards research in connection with the production of a British produced fuel for motor engines, and very shortly will issue the terms and conditions under which it is proposed the prize shall be offered.

Generally speaking, the conditions will specify that the fuel must be home produced at a commercial price, be suitable for the existing motor engines, and manufactured or produced from materials available in this country.

It is considered by many people that benzol can be produced in sufficiently large quantities to compete with imported petrol. At present the production of benzol is comparatively small, and can at the present time be sold at about 1 shilling per gallon retail. The difficulty, of course, is that with benzol there is a ready market for certain manufacturing purposes, and if there were any great demand in connection with motor cars the price would immediately be raised.

Certain new processes for the production of benzol have lately been perfected, which will materially increase the production. However, the matter is to be most thoroughly investigated and both the Society of Motor Manufacturers and Traders and the Royal Automobile Club are combining with a view to obtaining the desired end, namely, the production of a home made fuel.

Free Course in Road Building

ST. LOUIS, MO., Dec. 21.—A 2 weeks course in road building will be given by the School of Engineering of the Missouri State University in February. A description of the work was a part of the report of State Highway Engineer Curtis Hill to the Missouri Association of County Judges which met in Columbia on December 10.

The course will be free to any one who desires to take it. Other than the lectures by university professors and practical road builders there will be demonstrations, tests and experiments in the engineering laboratories. If the course is well attended it may be lengthened and be made a part of the regular university work next year.

Gasoline Up Again in Milwaukee

MILWAUKEE, WIS., Dec. 21.—An advance of 1 cent in the prices of all grades of gasoline was made on December 20 to all Milwaukee garages by the oil supply companies. Garages are now paying 15 cents per gallon for 60 to 63 test; 17 cents for 65 to 68 test; 18½ cents for 70, and 19½ cents for 72 to 74 test, to which the garages add about 4 cents. A year ago gasoline was on the decline, ranging from 10½ for 58 to 60 test to 15 cents for the highest test, but with the approach of winter this year prices kept on advancing as during the summer.

In Wisconsin all gasoline, as well as other petroleum products, are inspected by the state department of illuminating oils.

Texas Census Shows 35,187 Cars

AUSTIN, TEX., Dec. 21.—In a statement just issued by the Texas Commercial Secretaries and Business Men's Association the results of the census taken by that organization of the automobiles in Texas are given. These are the first statistics that have ever been gathered on this subject in this state. The report follows:

"There are 35,187 automobiles in Texas and their total value in approximately $43,983,750. Compared with 1911, this is an increase of 5204, or 17.3 per cent., in number and a decrease of $1,016,250 in value. Ninety-five and one-half per cent., or 33,623, of the cars in the state are used for pleasure purposes, while 1564, or 4.5 per cent., are in commercial use. There are 105 different models in use in Texas and the price ranges from $400 to $10,000 each. The average price per car is $1250, compared with $1500 in 1911 and $2137 ten years ago."

Truck Club Elects and Plans for Show

At the annual meeting and election of officers of the Motor Truck Club of New York, D. C. Fenner was re-elected president; Emerson Brooks, vice-president; C. E. Stone, treasurer, and E. L. Howland,, secretary. A new board of managers also was chosen, consisting of E. W. Curtis, Jr., George H. Duck, Karl L. Frederick, J. W. Perry, A. W. Robinson, W. Oscar Shadbolt and Arthur J. Slade. The selections were unanimous, no opposition ticket being presented.

It was provided that in the future no member be chosen for the offices of president or vice-president for two succeeding terms and that the terms be limited to 1 year.

Extensive preparations are under way for an entertainment in the novel form of a breakfast, to be tendered a number of leading men in the industry, January 21, during the week of the motor truck show. The committee in charge plans to arrange for addresses by prominent officials of motor truck companies, and an attendance of more than 200 is declared to be assured for the occasion.

A report from the membership committee showed an increase of more than 100 per cent. within a year. Permanent quarters have been taken at 1845 Broadway, and a clerical force is maintained to handle the details of the work of the club.

The new Motor Truck Club Bulletin, the monthly publication of the organization, made its initial appearance among the members.

Lion Sale Brings Out Only Low Bid

DETROIT, MICH., Dec. 23.—(*Special Telegram.*)—As the highest bid for the property of the Lion Motor Car Company, of Adrian, Mich., was too low, Referee in Bankruptcy Lee Joslyn has postponed the sale to December 24. The property was appraised at $33,401.73 and the highest amount offered at the sale at Adrian was $7,000. Referee Joslyn thereupon postponed the sale. After the sale the creditors will elect a trustee.

Buffalo Electric Expands Service

BUFFALO, N. Y., Dec. 21.—The Buffalo Electric Vehicle Company has made an important addition to its facilities in Buffalo, having acquired the Buffalo Motor Vehicle Service Company. The latter company has a complete garage and service station and is closely affiliated with the Buffalo General Electric Company and the Rochester Railway & Light Company. The property acquired includes the garage and service station located on lands immediately adjoining the factory and service station of the Buffalo Electric Vehicle Company.

As a part of the same transaction in purchasing this company, the Empire State General Vehicle Company, of Rochester, closely affiliated with the Rochester Railway & Light Company, has taken the agency for both Buffalo Electric pleasure vehicles and commercial trucks for Rochester and vicinity.

Minnesota Plans Horsepower Tax

MINNEAPOLIS, MINN., Dec. 23—Plans are on foot to revise the Minnesota law governing the taxation of automobiles, substituting a horsepower tax for the present 3-year registration license fee and the personal property tax. It is estimated in this way a large sum can be raised for State road maintenance. The new law went into effect in 1911.

The automobile registration began in 1909 with 7000 licenses. The next year the registration was 12,000, and the third year 19,000. This year the total is 28,700, at $1.50 each. From 3300 chauffeurs $3 each has been realized, from 4700 motorcycles $1.50 each, from 250 dealers and manufacturers $10 each, a total of $70,000, of which $50,000 is net.

Delaware Motorists to Banquet

WILMINGTON, DEL., Dec. 20—The Delaware Automobile Association is planning for a monster State automobile demonstration in Wilmington on January 13, on which date the association will hold a banquet in the Hotel duPont, which is now being completed at a cost of $1,000,000.

Ford Surplus Now At High Record Figures

Balance Sheet Shows That Company Has $14,745,000 Over All Charges, of Which $6,400,000 Is Cash

Philadelphia Parts Company Reports Excellent Business and Fine Prospects for the Coming Year

DETROIT, MICH., Dec. 21—According to the balance sheet for the fiscal year to September 30, just issued by James Couzens, secretary and treasurer of the Ford Motor Company, the assets of the company at the end of the year amounted to $20,815,785.63, of which $6,400,100.66 represented cash on hand and in banks.

Other items included in the assets were: Michigan municipal tax exempt bonds at cost, $1,075,051.48; accounts receivable, $230,912.17; merchandise inventories at cost, $6,629,533.83; other investments, $7,772.04; prepaid expenses, $44,591.07; real estate, $820,636.97; buildings and building fixtures, $2,596,115.61; factory equipment, $371,110.90; office furniture and fixtures, $58,059.39; power plant, $301,166.13; machinery, $1,542,800.89; tools, $566,510,17; patterns, $66,884.06; machinery, tools and equipment at branches, $52,746.30; patents, $51,793.96.

Included in the liabilities were: Accounts payable, $2,261,026.63; accrued pay rolls, $149,166.45; accrued salaries, $12,327.45; accrued expenses, $178,766.10; contract rebates, $58,350; reserve for refunds to take care of reduction in price, $75,000; reserve for employees' bonus, $242,033.80; reserve for bad debts, $3,655.04; reserve for depreciation of fixed assets, $752,626.89; reserve for depreciation of patents, $51,793.96; reserve for fire insurance premiums, $11,900.40; reserve for unearned profits (branches), $284,043.34; capital stock, $2,000,000; surplus, $14,745,095.57; total, $20,815,785.63.

Evans Reports Good Year and Prospects

Merchant & Evans Company, with headquarters at Philadelphia and factories at Philadelphia, Chicago and Warwood has issued a review of its business for 1912 in which it is shown that its various automobile accessory departments have had a prosperous and busy year. The company makes clutches and other parts for automobiles in connection with a large business in outside lines. Powell Evans, president, states that the activity of the company has kept abreast of the rapid development of the industry. Prices and profits have been larger than in 1911. Collections have been excellent. All factory facilities of the company have been taxed to fullest capacity and night shifts were employed for a portion of the year. President Evans takes an optimistic view of the prospects for 1913. The factories are well booked into the second quarter of the year.

Will Sell Stock for Assessments

DETROIT, Dec. 21—The Advance Machine Company, formerly the Hale Motor & Machine Company, has given notice through its president, Peter M. Detzler, and its secretary, R. J. Brennan, that January 22, at the office of the secretary, 654 Franklin street, Detroit, at 10 a.m., enough stock of Carl I. Overton, John K. Teetzil, William W. Johnson, J. L. Allen and J. G. Bayerline will be sold at public auction to pay assessments levied upon the stocks held by these men, together with interest and cost of the sale. The amounts alleged to be due are: Overton, $375; Teetzil, $150; Johnson, $225; Allen, $300; Bayerline, $300.

Practical Method for Testing and Improving the Water-Cooling System of Any Car in All Its Features and Without the Use of Special Apparatus—Another French Window Slide Design—Praise for Cheapest Road Tar

ESTABLISHING a Cooling System by Experiment Combined with Calculation.—After determining the principal factors in the cooling system of a vehicle by calculation the manufacturer is sometimes disagreeably surprised to discover that the result differs from that which it had been the intention to realize. It is therefore of the highest importance, when a new model is being tested out, to devise practical means for controlling and correcting those features in the design of the motor and the vehicle which have to do with this matter. In order to make sure that the entire cooling system will always operate satisfactorily and yet not cool the motor so much as to reduce its efficiency more than necessary or be so large as to constitute an encumbrance, experiments must be conducted with the vehicle under the most unfavorable conditions which are likely to be encountered. Such conditions are realized when the vehicle climbs a long grade on the low gear with the motor developing its maximum power while the vehicle speed is the lowest possible. The grade must be long enough to establish a constant condition and the external temperature should be that of the hottest days of summer. In practice it is nearly impossible to realize this combination of circumstances just when it is wanted. Hills of the right length and grade are not usually available, and one which might be suitable for one model would probably not suit for another model of the same manufacture. The subject, on the other hand, is gaining in practical interest from the fact that harder work is now demanded of the motors than formerly and that truck motors especially are held down to minimum sizes with a view to fuel economy and lower first cost.

A method which has been used to great advantage by one firm and which permits the thorough testing of the cooling system of any vehicle on roads of any variety of grades and at any time of the year should therefore be of interest.

Let A, Fig. 1, be the vehicle to be tested. By means of a rope 15 to 20 meters long there is hitched to it a trailing vehicle B which is to act as a brake of a power varying according to the grade of the road, so as to serve to produce conditions equivalent to those met on a long hill of a certain and constant grade. Vehicle A is occupied by two men, the driver and an assistant; vehicle B by one man only. Vehicle A is equipped with a speed indicator, and its driver must know what speed in kilometers per hour corresponds to the maximum power output of the motor on low gear. It is the function of the two drivers to maintain their vehicles going at this speed while the motor runs at its highest power with the throttle open.

To this end the driver of vehicle B places his speed lever at low or second gear and, watching the signals given him from the driver of vehicle A, opens or closes the channels in his carbureter more or less, so as to create at all moments the brake resistance against the progress of vehicle A which is required for maintaining the uniform vehicle speed. In practice this method of braking by the motor [presumably with the gas and spark shut off] has been proved efficacious without it being necessary to resort to the mechanical brakes, provided only a road is chosen which has no strong downhill slopes.

Vehicle A is equipped with four thermometers. Thermometer No. 1 is placed on the body panel and gives the temperature of the atmosphere. No. 2 is placed under the hood in the current of heated air which is driven away from the motor and it measures the temperature of air which has passed through the radiator. Thermometer No. 3 is of the laboratory type and is placed in the current of water which is piped from the cylinders to the radiator, the arrangement being indicated in Fig. 3. Thermometer No. 4, also of the laboratory type, is placed in the water piped from the radiator to the cylinders.

During the road test the assistant on vehicle A takes the temperatures of all four thermometers every 15 minutes and tabulates them. If the vehicle is not equipped with a speed indicator the assistant may time the vehicle by means of a watch and a cyclometer or the kilometer stones at the roadside, but a speed indicator is preferable, as it enables the driver personally to gauge the speed of the vehicle more directly and accurately.

On returning to the factory, the discharge of the pump at maximum power output of the motor and with all resistances included is measured. For this purpose the rubber tube joint M at the entrance to the radiator is undone, and the water from the pipe is received in a graduated trough for a measured length of time while the required additional water is poured into the system through the reservoir of the radiator.

All the factors are now ascertained which are needed for determining how the cooling system will behave under circumstances which tax it most heavily.

[An exception may be noted for the case when the vehicle is travelling under otherwise most severe conditions and also with the wind coming from behind, or from the side, causing a certain amount of suction in front of the radiator and also perhaps interfering directly with the discharge of heated air at the rear of the motor. But these factors may be taken care of, perhaps, through the margin of safety which should be allowed in the system, anyway, to provide against the diminished convection and radiation of heat occurring in case of calcareous or other settlement in the radiator conduits. It will be noticed, by the way, that the computations in the following, by means of which shortcomings in the cooling system may be located in one feature or another of the whole motor or vehicle design, are applicable even if the preparatory testing is done with the vehicle at a standstill working against an adjustable hydraulic dynamometer, for example, rather than on the road and with the resistance regulated by means of a trailing vehicle.—Ed.]

THE FACTORS ENTERING IN THE EXPERIMENTS

The known factors are now:

Q, the discharge of the pump in liters per second;

1 (one), the specific heat of water;

D, the temperature centigrade shown by thermometer No. 3;

d, the temperature centigrade shown by thermometer No. 4;

T, the temperature centigrade shown by thermometer No. 2;

0.237, the specific heat of air at constant pressure;

t, the temperature centigrade shown by thermometer No. 1;

V, the speed in meters per second of vehicle A;

S, the total area of the air channels in the radiator of vehicle A;

L, the coefficient of contraction in the stream of air, which depends upon the conformation of the air channels in the radiator and has been determined as varying from 0.64 to 0.80. [This probably refers to cellular radiators. It is also commonly understood that the contraction of the stream depends not only upon the shape of the channels but also somewhat upon the velocity of the air current.—ED.]

g, the density of air under the pressure H and at the temperature t, which equals $1.293 \frac{H}{760} \times \frac{1}{1 + 0.00367 \times t}$ [see text books, under specific heat of gases];

x_1, the weight in kilograms of the air actually passing through the radiator; and

x_2, the weight of air which ought to pass through the radiator.

THE TWO PRINCIPAL EQUATIONS

The number of calories taken from the cooling water during one second is evidently absorbed completely in the air which passes; which fact can be written:

$$(1) \qquad Q \times 1 \times (D - d) = x_1 \times 0.237\ (T - t)$$

But the weight of air which ought to pass through the radiator is:

$$(2) \qquad x_2 = V \times S \times L \times g$$

$$= VS \times 0.64 \times 1.293 \frac{H}{760} \times \frac{1}{1 + 0.00367 \times t}$$

The first test is made without ventilating fan and is desginated as test O.

The second test is made with ventilating fan and is designated test P.

DEDUCTIONS MADE FROM THE DATA

Test O.—The radicle x_1 is determined from equation (1), and gives the weight of air which really passes through the radiator. Similarly, the value of x_2 is determined from equation (2) and gives the weight of air which ought to pass through the radiator.

If x_2 is found to be larger than x_1, the reason must be that the discharge-openings for the air current under the hood are insufficient; and they are consequently to be modified. It may be noted that this is a frequently occurring cause of inefficiency in the cooling system. The radiator is well calculated. The circulation functions normally. The ventilating fan works properly. And yet the motor steams. It is because the heated air has no sufficient exit and blocks the ventilation of the radiator. This point will bear watching.

Test P.—It is operated in the same manner as test O, and the same conclusion may be drawn from the data obtained, but the value for x_1 obtained from equation (1) under test P, compared to that found under test O, discloses the real effect of the fan at the vehicle speed V, which is the lowest at which full power can be developed and therefore the crucial one.

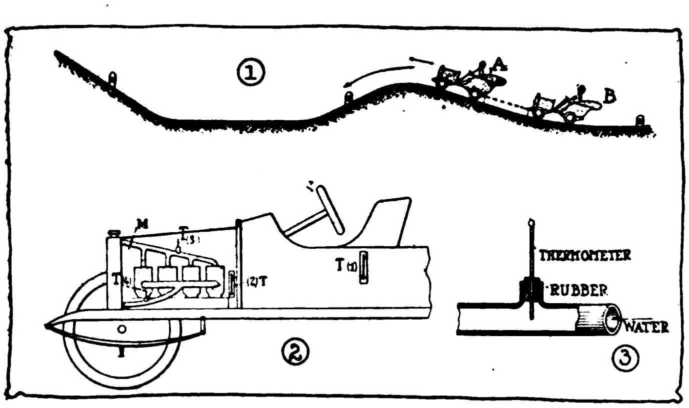

Fig. 1—General outline of method for improving the water-cooling system of a car. Fig. 2—Disposal of thermometers on car A. Fig. 3—Thermometers in the water circuit

The delivery of the pump has been measured; it should be from 65 to 80 liters per minute. [The author seems here to have in mind an individual instance which has not otherwise been specified in his article as it is printed. It can scarcely be supposed to be his contention that Q should not have a wider range of variation in motors of different types and sizes than from 1 1/12 to 1⅓ liter per second. Probably his specific reference to the tests which have come under his observation has been eliminated in the publication of his article.—ED.]

The difference between D and t makes it known whether the cooling will be sufficient for the hot days of summer. Suppose that the atmospheric temperature is 2 deg. C. and that of the water coming out of the motor is 84 deg. C.; then D minus t equals 82 deg. C. Now if the summer brings a temperature of 35 deg. C., it may be inferred that the water, when it comes out of the motor, will tend toward a temperature of 82 plus 35 degrees, which is 117 degrees; in other words, the water will be boiling away, and the cooling system which showed a temperature as high as 84 degrees for the water issuing from the cylinders during the colder weather should have been modified.

D minus t must not exceed 53 to 60 degrees if the efficiency of the cooling system shall be assured for all circumstances.

The value for $D - d$ is known and gives the more or less efficient utilization of the radiator. This value should, however, be as small as possible, since a low value for this factor means a hot radiator and the amount of heat absorbed by the air is proportionate to the difference in temperature of the radiator and of the air. To get good cooling with this factor small, circulation must be rapid. It is therefore reduced by suppressing resistances in the water circulation and by increasing the pump capacity.

The number of calories yielded up by the motor to the cooling water is expressed in the first member of equation (1). Designating this number as K, the number of calories disposed of per unit of radiator surface is obtained by dividing K by S.

After ascertaining that the air circulates satisfactorily and that its discharge at the rear of the hood is unimpeded, if it is still found that the radiator is inadequate—as may be recognized by finding that D minus t is larger than 53 to 60 deg. C.—a value for D which makes $(D - t)$ smaller than 53 to 60 deg. C. is substituted in equation (1); the corresponding new value for x_1 is now determined and is inserted for x_2 in equation (2). From this a new value for S is found. And from this new value for S it may be decided how the dimensions of the radiator should be changed. It must be observed, however, that the increased amount of air corresponding to the new value for x_1 will pass efficiently through the radiator and the rear exits, and also that the fan is established in unison with the new condition.

APPLYING THE METHOD TO A THERMO-SIPHON SYSTEM

In the case of a cooling system operating without a pump it is not possible to measure the amount of water Q which flows to the radiator per second. The proceeding must be different. The pan is removed as well as everything else which might impede the flow of air behind the radiator; if necessary even the dashboard. Under these conditions the amount of air which passes through the radiator is evidently identical with that which should pass through it, considering its design, and this amount x_1 may be determined from equation (2). And by inserting this value for x_1 in equation (1), Q may be determined from the latter. In this manner the method followed offers a means for ascertaining the water flow in a thermo-siphon system; something which it has not been found possible to do by pure experimentation. And the rest of the calculations needed for the examination and correcting of the system in each case presents no special difficulties.

DETAILS OF THE ROAD WORK

Some difficulty in applying the method might be feared to exist with regard to maintaining a constant speed by varying the braking effect of the trailer B. But in reality there is no such difficulty. The two drivers of A and B must evidently have a little practice in operating under the required conditions and must agree between them on a code of suitable signals. A speed indicator may also be placed on vehicle B, and its driver can then maintain a constant speed on his own hook. Speed variations of short duration have, for that matter, no appreciable influence on the final results.

The four thermometers should all be placed so that they may be read without stopping the vehicle, as it is quite necessary to have the test carried on without interruption, and while this calls for rather lively action on the part of the assistant upon whom it devolves to take the readings, there is no real difficulty since the vehicle is driven at relatively low speed.

Applied by one of the large French manufacturers this method has rendered it possible to find all weak spots in the cooling systems of different models and to improve them systematically. It calls for no complicated apparatus of any kind and gives very accurate data.—From *La Technique Automobile et Aérienne*. August 15.

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WINDOW-SLIDE Construction.—Special provisions for facilitating the raising and lowering of windows in the doors or body panels of automobiles continue to engage the attention of designers, showing that some difficulties are encountered at this point, probably by reason of the torsion which is communicated to the vehicle body from the chassis at high speeds. In THE AUTOMOBILE of last week the Hera window-lift was described and reference was also made to the Rawlence window-lift, both of which designs are intended principally for use with the new style of frameless window panes and also are meant to reduce physical effort by means of special mechanical movements and the use of compensating springs, the latter serving to regenerate a little power from the lowering of a window to help in the raising of it. Another and less ambitious design is shown in Fig. 4 and is patented to G. Kutzner of Paris. It is not intended by this construction to oust the ordinary lift-strap from service but merely to provide an arrangement which will operate reliably and uniformly under automobile conditions with the ordinary old style of framed windows, without sticking or rattling. Those interested will find the drawing almost self-explanatory. The sub-figures A, B, C and D represent the positions of the parts at successive stages of raising the window, while E represents a cross-section on the line AA. The door frame or body panel 1 is provided with a recess 2 at each side in which the whole mechanism is lodged when the window is down. Arms 3 slide on each side of the frame in a guide groove 4 in the upper portion of which a metallic piece 5 is secured. The two arms are formed with tenons 6 at their upper ends which slide in grooves 7 formed in the frame 8 of the window pane 9. Another pair of tenons formed as eccentric disks are secured to each arm, at about their middle, and, when reaching the sill, permit a lateral displacement of the window, so that its lower edge comes to rest at 11. The arms 3 also carry tenons 12 at their lower ends and these slide into guide 13 on the metallic pieces 5. The latter are equipped with rollers 14.

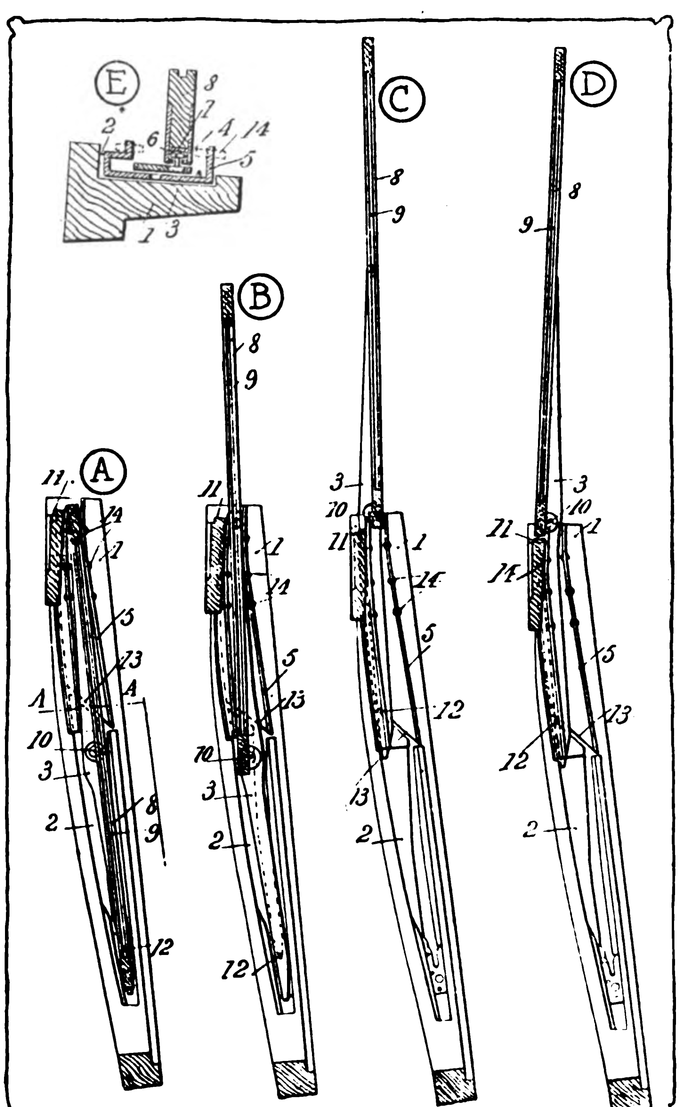

Fig. 4, A, B, C, D and E—Slide design for framed window panes

In the position B the eccentric tenons 10 reach the beginning of groove 7 and carry the arms 3 with them when following this groove until position C is reached. The lower half of frame 8 can then be moved laterally and can be pushed over the eccentric into its rest position. The eccentrics and the tenons 12 in engagement with the welge-guides 13 secure its firmness.—From *La Carosserie Française*, Nov. 15.

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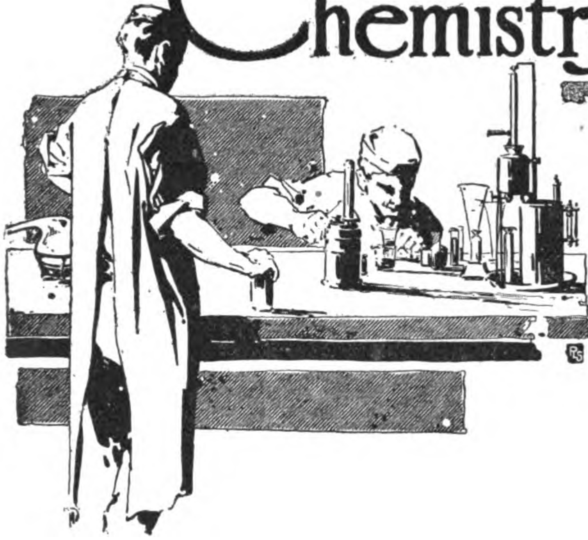
PLAIN Coal Tar for Roads.—The use of plain undistilled coal tar from the gas works for the tarring of roads has suffered a considerable setback, mostly by reason of the contentions made by certain investigators to the effect that all vegetation in the vicinity of roads treated with this material suffers heavily. It has also been claimed that fishes cannot live in the waters receiving the drain from such roads. As it is of importance for the improvements of roads to be able to use the cheapest product available, rather than the expensive tar preparations which have been adopted for the purpose in many French towns but which usually scare the taxpayer, H. F. Fischer of Stuttgart, Germany, has gathered data on the subject which it is the intention to lay before the Third International Road Congress to be held in 1913, so as to offset the unfavorable impressions with regard to the coal tar process which were received at the congress at Brussels.

From among the information collected, which has now been published in the Journal of Austrian Gas and Water Engineers, it is noted that the first charges relating to the alleged effects of coal tar, which were made by the French botanist, Dr. Marcel Mirande, with special reference to the sickening of the trees and shrubs in the Bois de Boulogne in Paris, have been refuted through the careful investigations of a Parisian engineer named Griffon. In Bordeaux a prominent street has for several years been treated with ordinary coal tar without a single tree suffering, and among them are silver poplars, maples, oaks, walnut trees and even the sensitive lindens. The macadamized roads at Montpelier have for a number of years been similarly treated, and it has been observed that the magnificent planetrees of this region are now thriving much better than before, owing to the comparative absence of dust under the present conditions. Prof. Saumier of Rouen has ascertained from replies to circulars sent to all departments of France that the ordinary coal tar nowhere is accused of damaging vegetation, except in Fontenay de Comte, where the trees surrounding a public plaza were destroyed. But

(*Continued on page* 1331.)

The Chemistry of Cylinder Oils



Professor Jones Answers Professor Gallup's Criticisms of His Articles On the Analysis of Cylinder Oils

NEW YORK CITY—Editor THE AUTOMOBILE—I have read with much interest the letter from David L. Gallup, assistant professor of gas engineering, Worcester Polytechnic Institute, published in THE AUTOMOBILE for December 12. In replying to his communication I will try to confine myself to the three items he mentions.

First—The effect of the flash point on the lubricating value of the oil. **Mr. Gallup states: "The chief argument in the article referred to seems to be that in order to be effective an oil should be of low flash and fire test, and for the specific reason that it burns up clean."** I have made no such statement, and if I had intended this to be what I meant I should have plainly said so. Neither do I think that what I have said will warrant any such deduction.

As for the questions he asks, following this statement, he says they are "ridiculous," with which I fully agree, and they therefore require no answer.

Professor Gallup states that "the best oil for lubrication is one which serves that purpose exclusively," etc.; and when he says that **"At present there is no oil known which will satisfy the last condition perfectly, and the only alternative is to use that which approaches its accomplishment most nearly."** I think he is quite right, **but he does not tell us anything about how to find that oil.**

The next statement he makes is not quite so good. Of course, it is needless to say that the output of these oils is controlled so that the distribution of a new oil requires a ready argument for its adoption, and that the easiest one seems to be that it burns up quickly. This is an absolute misrepresentation. The idea which he seems to put forward is that I am interested in bringing out a new oil. **I am not interested in any oil, I have no oil to introduce, nor am I interested in any way with any one who is selling oil.**

He then says that "another feature of a low-flash oil is that its price is usually lower," etc., and then still argues upon his one idea about burning the oil. Now no one is advising the use of an oil to be burned. We all know that if you burn your oil you will have to replace it. There is no argument in this. In the first part of my article I gave the analysis of an oil which might be considered as a fairly good oil for a cylinder oil. I do not say that it is the only oil to be used; I have shown others equally good, and for some conditions might even be better. But the analysis I gave was a very light oil with a low flash point, and this is what I understand Mr. Gallup condemns. Now as a matter of fact, this very oil is one to which automobile men have given high praise, and the only objection they had was the price, which is about 75 cents per gallon. If this is the cheap oil he is referring to, I would be glad to know what the high-priced ones are. There are higher priced oils. I have one now in my laboratory which sells at $1.00 per gallon. This oil has a flash point of 610 degrees Fahrenheit, and of course the viscosity of this oil is very high. Perhaps this is the oil Mr. Gallup would recommend.

On the fire point Mr. Gallup simply makes a statement which does not seem to have any bearing on anything I have said: Under 3: **"Speaking of the viscosity, he says, many oils show a marked decrease in this quality between 70 degrees Fahrenheit and 212 degrees Fahrenheit, and that this is more pronounced in the case of low-flash test oils than high."** I think that if he will stop to think he will see that this is quite wrong. **This may be his opinion, but it is not borne out by figures obtained.** Let us turn to table B, which appeared in THE AUTOMOBILE for November 21, and look at the first group under brand A. Here we have six oils, of different gravity, viscosity and flash points.

	Flash	Vis. 80	Vis. 212	Drop	Drop%
In No. 1 we have.......	384	3.2353	1.3214	1.9139	59
In No. 3 we have.......	422	6.1764	1.4285	4.7479	76
In No. 6 we have.......	532	58.2142	4.0357	54.1785	93
In M we have..........	325	1.7647	1.1428	0.6291	35

These figures seem to hold fairly well throughout the list. **These are facts, and not opinions, which I think show that Mr. Gallup's statement is not correct.**

He suggests further that if the test for viscosity be made at 212 or 250 degrees, an oil of high viscosity at this temperature should be given the selection. Now if one will look at the table B, of forty oils, it will be seen that there are only three oils with anything that might be called a high viscosity, and these are not considered as automobile cylinder oils, and as far as I know are not in general use for that purpose.

Again Mr. Gallup says, "an oil of low-flash test **must** possess a low viscosity at this temperature." Here again he is wrong. That it is generally the case I admit, but not always. We will take ———, an oil with which he ought to be acquainted. He will find the tests for this oil under brand B. This oil shows a flash of 428, and a viscosity of 1.2500. Now glance down the table to brand J No. 1, and you will find an oil with a flash of only 396, and a viscosity of 1.4285. Thus his statement is not correct.

There is no accident or error in these figures. These oils have been tested more than once, and from more than one source. It is characteristic of the oil in brand J.

Reverting to the flash point again, I notice that Mr. Gallup asks, "How long would the engine of a racing car stand up under the use of a low-flash oil?" He says the temperature of the cylinder under these conditions is so high that such an oil would be disintegrated before it had the chance to perform its function. Mr. Gallup has, so far as I understand, been claiming that this light oil would be burned up. Now **there is quite a difference between "burning" and "disintegrated,"** and in either case, to answer his question intelligently, it would be well to know about what the temperature of the cylinder is. Will he kindly let me know?—PROFESSOR W. JONES, Analytical and Consulting Chemist.

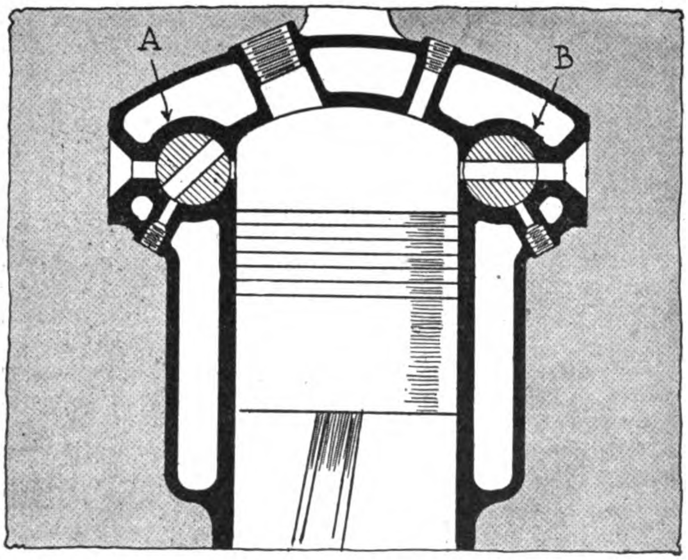


Fig. 8—Mead double rotary valve motor

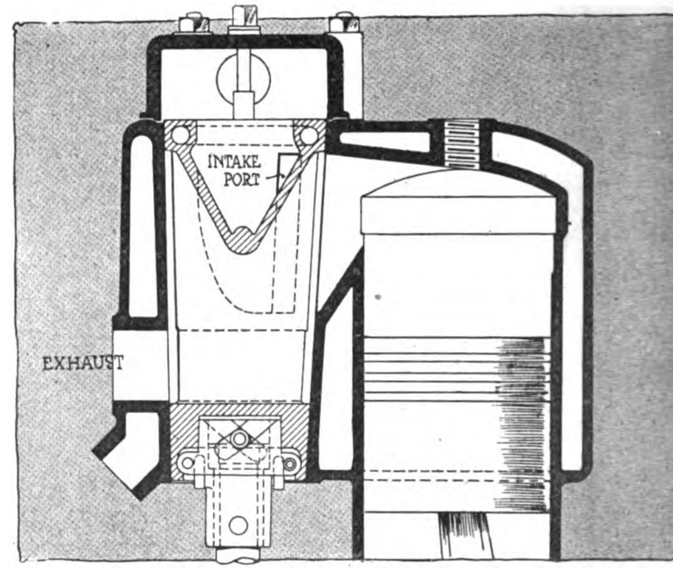


Fig. 9—Tapered rotary valve of Silent motor

Criticisms of Non-Poppet Valves To-Date

European Engineers Lead in New Constructions of Rotary and Slide Valves—Keeping the Valves at Low Temperature and Preserving Their True Shape Are Points Well Appreciated Abroad

Internal Cooling Is Not Absolutely Necessary and Properly Designed Valves Often Operate Well Without It—No Conclusion To Be Taken Yet As to Straight Cylindrical or Tapered Rotary Types

By Eugene P. Batzell Installment II

A COMPARISON between the new valve designs offered here and abroad indicates that Europe is closer to some ultimate successful arrangement of rotary or piston valve. Many of their new constructions prove that they have been originated by persons with experience in this field. At least it is evident that the concerns there have been carrying on much experimenting because their new constructions mostly are designed to avoid certain defects, which could not have been detected otherwise than by practical experiments.

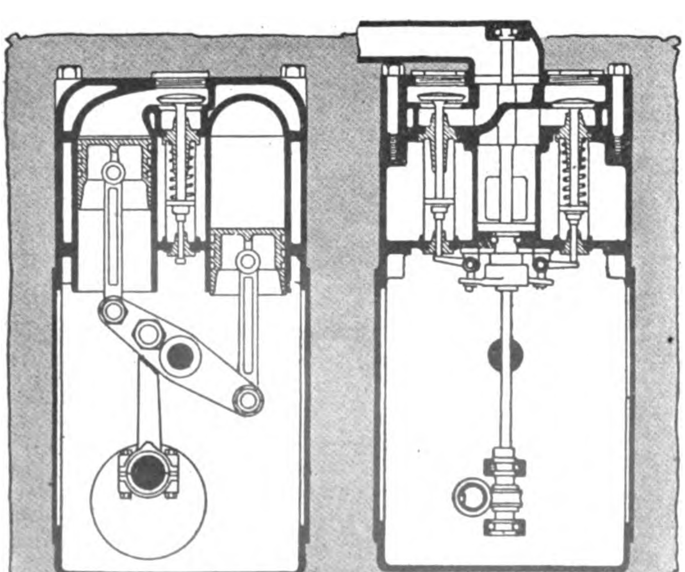


Fig. 10—Banner four-cylinder motor with central rotary valve

Keeping the valve at low temperature, without striving particularly after low bearing pressures or low circumferential speed; preserving the true shape of the valve by avoiding as much as possible the causes for its distortion, etc., are points well grasped and appreciated abroad. Accordingly the present state of matters is such that none of the American constructions offered has taken a firm enough hold in the trade to induce a single automobile manufacturer to adopt it for his product. On the other hand, constructions of European origin are not only in the hands of users abroad, but they even show a tendency to come on this market.

A question of interest is whether or not it should be feasible and practical to expect a rotary-valve system employing a barrel-type of valve to operate properly without some internal cooling. Internal cooling is not absolutely necessary, and constructions without it function well when properly designed. The leading representatives of motors with long cylindrical valves apparently neglected to work out their designs with due attention to the nature of the exterior valve cooling and the permanency of the shape of the bore wherein the valve operates; that and the sidewise spread of gases leave no other reasons which can be possibly given for the failures in this field. A close inspection of the conventional designs belonging into this group discloses certain interesting parts.

We have the liberty to indicate here merely one example with reference to the Mead construction, Fig. 8. In this motor the total explosion force acting against the cylinder top, extending practically from points A to B, is resisted by its flat cast-iron surface as wide as the valve ports, which are almost equal in length to the cylinder bore. The whole forms an arrangement subject to some deflection, as means for rigidity are omitted. This deflection would be greatest near the plane of the cylinder axis and passing through the middle of the ports. It will tend to lift the upper part of the valve housing from the valve surface, warping the rest of the bearing at the same time. This objection could be overcome by making a rigid top; it would be necessary, however, to consider the unequal expansion of a ribbed construction, which would be apt to show again some warping of the valve seat, though due to another reason. Shorter ports would help the matter considerably and the consequent decrease of their area could be compensated by making the valve of larger diameter, the latter alteration being quite practicable as there are comparatively well-functioning valves of diameters about equal to the cylinder bore. There is no reason to expect trouble in lubrication with the higher circumferential speed as long as the main harmful influences, heat and distortion, are eliminated. For this reason the particular construction, Fig. 8, and other similar ones should not be considered hopelessly impractical, but only insufficiently developed. It is difficult to see a reason for this lack of development since much promising work has been done with them.

No definite conclusion is to be taken as yet in regard to the advisability of straight cylindrical or tapered rotary valves. It was explained once that the cylindrical valve would be easier to fit to its seat with the specified amount of clearance by common manufacturing methods. Its running qualities could be impaired only when losing the original shape of its contact surface with the housing, which, by the way, has little chance to be caused through wear, the latter being negligible with proper care of the motor.

The tapered valve, on the other hand, was originated with the idea of regulating the bearing clearance and the wear, but it requires also more thorough means for its original good fitting to the shape of the seat; besides the wear which eventually might appear will be mostly concentrated in the surface of the valve seat opposite to the opening into the cylinder. Any wear on the valve proper is distributed over a larger surface passing opposite to the cylinder opening during the time of greatest pressure therein, thus both the valve and the seat when worn will assume an oblong irregular shape of section through their contact surfaces which no regulation by axial motion of the tapered valve could eliminate. **The aim of the tapered valve fails not only because the wear is negligible, but also because it cannot be taken care of properly by axial adjustment of the valve;** nevertheless some tapered valves are worth mentioning on account of special features, though nothing can be said at the present as to their practical value.

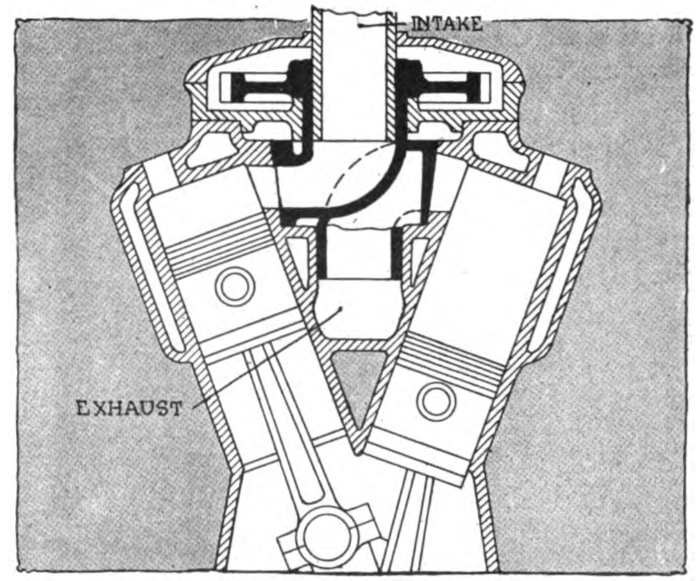


Fig. 11—Batzell tapered valve design for V motor

Fig. 9 shows the Silent-valve system, possessing an original driving method, which tends to free the valve from its seat as soon as any reason for tight running or sticking becomes noticeable. In theory the drive is simple and positive, but it is not free from practical defects, though the makers state that a relative motion of a fraction of a degree between the valve and its driving shaft is sufficient to lift the valve from its seat. This might be true only when the driving pin and cam surface are fitted close to each other. Some play between them would start in time and would be followed by change of timing in the individual cylinders. Should the amount of wear in the drive be great with a corresponding change of the timing, irregular motor running would result. The same can be expected due to untimely leaks from the cylinder, as could occur when the valve is somewhat listed from its seat during compression or explosion, when the chance of tight running is at its maximum. However, this valve looks operative notwithstanding that it has an irregular shape and expression, and that it is heated on a large surface by the exhaust gases.

The problem of satisfactorily driving the rotary valves, and the aim to eliminate all unnecessary complication in this

(*Continued on page 1327.*)

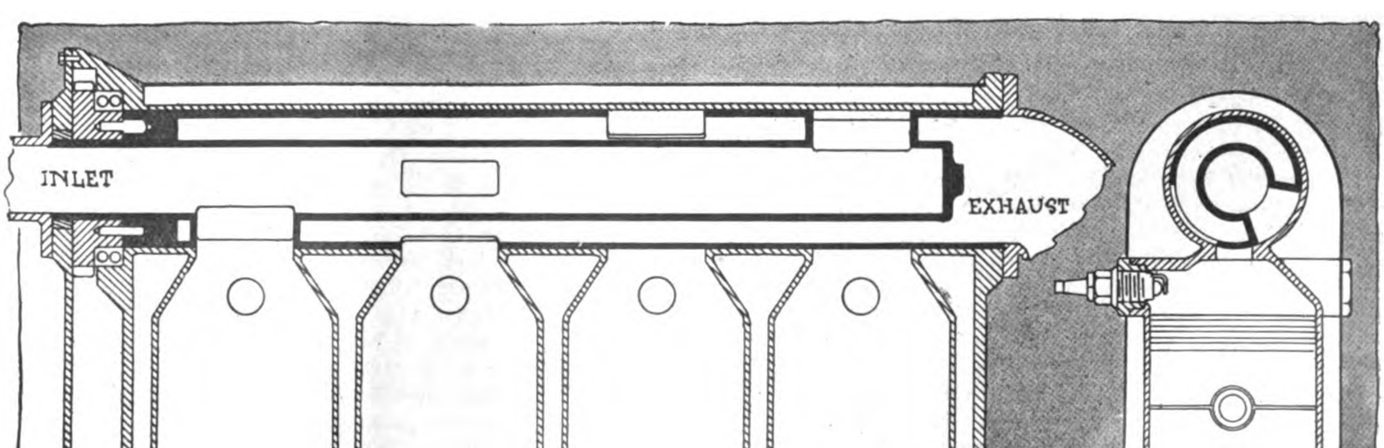


Fig. 12—Type of rotary valve which is subject to overheating with consequent tightening within the valve seat

Part IV Carburetion

by Robert W. A. Brewer

Subject Digest

Dugald Clerk discovered in 1907 that it was necessary to find out what was going on inside the cylinder in order to judge the performance of a carbureter, and in that year he read a paper calling attention to the value of exhaust gas analysis.

Exhaust gas analysis alone cannot truly determine how the carbureter is functioning at all motor speeds. It is extremely difficult in the first place to secure fairly average samples of gas on account of misfiring possibilities. This causes unburnt gas to mingle with the sample.

It was noticed in tests that when the CO_2 was allowed to increase to 11.6 that the load on the brake rapidly fell off and that the thermal efficiency was dropping rapidly.

Within considerably wide limits the richer mixture maintains the maximum horsepower at a constant value while the thermal efficiency drops off.

The most economical point to run is when the CO_2 is 13.5 per cent. by volume the O .2 per cent. and the CO is .7 per cent. to O. At this time the thermal efficiency was 26 per cent.

IN 1907 Dr. Dugald Clerk, who is probably the greatest authority on the internal combustion engine, read an important paper before the British Institution of Automobile Engineers on the principles of carburetion as determined by exhaust gas analyses.

He was thus the first to draw public attention to the importance of this method of determining what was taking place in the cylinders of an internal combustion engine. Previous to that time the Royal Automobile Club had been conducting some tests on motor cars, but did not previously make it clearly understood that exhaust gas analyses were going to be made. It was at that time generally thought that the emission of smoke only was to be judged upon. As a result of the findings of the committee it was a great surprise to the majority of automobile manufacturers to find how imperfect was their carburetion and there was a considerable outcry at the time. The modern conditions of high-speed motors make it extremely difficult to design a carbureter which will function throughout the prevailing ranges of load and speed, and by means of exhaust gas analysis are we able to determine what is taking place under various working conditions.

It must not be considered that by exhaust gas analysis alone can the true determination be made, and it is extremely difficult to obtain, in the first place, fair average samples of exhaust gases on account of the possibilities of misfiring, when charges are liable to escape and thus mingle with the sample of gases to be analyzed. This mingling gives a false impression, of course, as to what is actually taking place with regard to the products of combustion and any analyses must be considered only with considerable caution unless very great care is taken in sampling.

Dr. Dugald Clerk, himself, subsequent to the Royal Automobile Club experiments, made some experiments on an 18-horsepower car fitted with a four-cylinder engine. The gases were analyzed by Horatio Ballantyne, to whom reference will be made later on.

In this case exhaust samples were taken as follows:

1—The car standing on the level with the engine running as slowly as possible.

2—The car still standing on the level and the engine running at about 600 revolutions per minute.

3—The car running on the level at about 18 miles per hour, the throttle being one-half open.

4—The car climbing a hill, the engine running at 1,000 revolutions per minute and throttle from three-quarters to fully open.

A brief summary of the results obtained showed how erratic may be the products of combustion with ordinary working conditions. It will be noticed that these results are bound to differ from the laboratory tests where special care is taken to prevent anything occurring which might prejudice the results obtained.

As a result of these tests and subsequent experiments, Dr. Dugald Clerk is of opinion that **the erratic behavior is due to the lack of homogeneity in the mixture and this opinion is borne out by the writer, who has conducted a large number of experiments on exhaust gas with four-cycle and two-cycle motors,** and in his investigations has found the erratic behavior such as has been evident with Dr. Dugald Clerk's car.

Professor B. Hopkinson, Cambridge University, about the same time made a number of experiments upon this subject, and his results were embodied in a paper read before the British Association in 1907. These experiments were made on a four-cylinder Daimler engine, with cylinders 3.56-inch bore by 5.11-inch stroke, and the engine was run under full load at a constant speed at 750 revolutions per minute; but the Hopkinson tests are particularly interesting in this respect: They show that the percentage of CO_2 mounts from 10.9 to 13.5 per cent by volume as the horsepower of the engine increases to its maximum, and at the same time the thermal efficiency of the engine increases up to that point.

Above that point and onward as the percentage of CO_2 falls from 13.5 to 9.6, the brake load curve is practically flat, and is at its peak. During this period it is interesting to note that the percentage of CO_2 varies from 0.2 to 0, and the percentage of CO which was previously 0 quantity increased from 0.7 to 6.25.

As the percentage of CO_2 was allowed to increase up to 11.6 the brake load rapidly fell off, the whole of this time the thermal efficiency of the engine was dropping rapidly.

It will be seen that within considerably wide limits a rich mixture of fuel maintains the maximum horsepower at a practically constant value, whilst the thermal efficiency drops off, and that the most economical point to run is when CO_2 is 13.5 per cent. by volume, the O_2 is 0.2 per cent, the CO is 0.7 per cent. to O. At this time the thermal efficiency of the engine was 0.26 or 26 per cent.

Now when we come to compare these figures with those obtained by Dr. Watson in his paper on Thermal and Combustion Efficiency, we find that the most efficient all-round mixture **was obtained when the ratio of air to fuel by weight was from 15 or 16 to 1. At this time the thermal efficiency showed 0.249 or practically 25 per cent., and the**

mean effective pressure in the cylinder varied from 81 pounds per square inch to 84 pounds per square inch.

As the mixture's strength was weakened and the ratio of air to fuel by weight mounted to 18.7 to 1, the thermal efficiency dropped to 0.230 and the mean effective pressure to 65.4 pounds per square inch.

On a further weakening of the mixture until the ratio was 19.4 to 1, the mean effective pressure dropped further to 55.4 pounds per square inch and the thermal efficiency to 0.196.

Now, when we look to the other end of the scale and strengthen up the mixture we find that in Dr. Watson's tests as the ratio of air to fuel increased to 12.3 to 1 the mean effective pressure increased slightly up to 85.7 pounds per square inch, with a dropping thermal efficiency to 0.208, and as the mixture strength further increased to 11.7 to 1 the mean effective pressure dropped slightly to 85.6 pounds per square inch and the thermal efficiency dropped to 0.173.

Coming nearer home it is interesting to compare these figures with those obtained by Herbert Chase at the laboratory of the Automobile Club of America, and these figures are embodied in his paper read before the Society of Automobile Engineers at the summer meeting, 1912, and were at the time criticized by the writer. Mr. Chase's figures clearly show that he never reached the maximum thermal efficiency obtainable in an engine of this type, as the weakest mixture which it appears he used was 14.2 to 1, of air to fuel by weight, and at this proportion he obtained some of his best results, in which the CO_2 stood at 11.0 per cent., the CO at 2.4 per cent., and the O_2 at 0. These figures show that there was insufficient oxygen present to totally consume the CO to CO_2, and throughout the whole range of tests there appears to be the presence of CO in the exhaust gas analysis, which, of course, can be eliminated by a more satisfactory carburetion.

Mr. Chase's figures, being almost entirely of a mechanical nature, apart from a physical one, give the thermal efficiency rated on the boiler horsepower and the thermal efficiency at this mixture is 17.8 per cent. An elementary calculation will convert this to bring it into line with the thermal efficiencies previously given which are, of course, worked out on the indicated horsepower.

Throughout the whole of Mr. Chase's figures we find that the same somewhat erratic behavior is evident, to which reference has already been made. For instance, comparing his tests 25 to 27; in the former we find the ratio of air to fuel by weight 10.6 to 1 and the percentage of CO was 7.8, then in No. 26, where an increase of air supply is shown to 12.5 to 1, the CO dropped to 5.5 per cent., but with a further reduction of air supply to 11.9 to 1 there is also a reduction of CO which is contrary to what one would expect, and, furthermore, with this reduced air supply we find a trace of O_2 in the exhaust gas analysis.

These results can only be accounted for by a lack of homogeneity in the mixture, and are contrary to all expectations. It is evident, therefore, that too much reliance cannot be placed upon exhaust gas analysis alone, but this system of testing is very useful in conjunction with other observations.

The writer has found the exhaust gas analysis very useful in connection with the development of two-cycle motors, as when a carbureter is known to give certain results with a four-cycle engine, and is placed upon a two-cycle engine, the exhaust gas analysis gives some indication as to the amount of unburnt charge passing down the exhaust pipe and the excess of air necessary to give the best results.

Detecting Water in Petroleum Products

From Technical Paper 25, issued by Bureau of Mines, Department of the Interior, by Irving C. Allen and Walter A. Jacobs

WATER in a lubricating oil sometimes forms emulsions which tend to lower the durability of the oil and render it less efficient as a lubricant. In fuel oils the unfavorable effect of water is even greater. When burned in an internal-combustion engine it will be even more unsatisfactory. A drop of water may prevent ignition of the fuel.

Methods employed for the determination of water in petroleum and its product may be classified as follows:

1. Ascertaining the loss of weight by heating.
2. Diluting with a solvent and separating by gravity.
3. Diluting with a solvent and separating with a centrifuge.
4. Treating with calcium carbide.
5. Treating with sodium.
6. Use of a color-comparator tube.
7. Treating with normal acids.
8. Electrical treatment.
9. Distilling with a non-miscible liquid.
10. Directly distilling off the water

Method 1 is approximate and applicable to heavy oils and greases only.

Method 2 is approximate and applicable to thin oils. A diluent is to be avoided.

Method 3 is like 2 but more rapid, and somewhat more accurate.

Method 4 is convenient, and with petroleums, accurate to approximately 3 per cent. of the water percentage.

Method 5 is convenient and accurate.

Methods 6 and 7 are approximate only.

Method 8 is successful in breaking up an emulsion on a commercial scale or in reducing the water content of an oil to such a condition that it can be successfully treated in some other manner.

Method 9 is accurate to approximately 0.033 gram of water per 100 c. c. of benzene and oil in the distillate.

Method 10 is convenient, and can be used simultaneously with a distillation. It is accurate to about 0.003 gram of water in the distillate if the water is cooled to about 2 degrees C. Methods 5 and 10 may be described:

Treating with Sodium

Graefe estimates the water content of an oil by agitating with finely cut metallic sodium. This process may be carried out as follows: For each gram of water in the sample of oil, about 2 grams of finely cut sodium is used in the same apparatus and in exactly the same manner as described in method 4. The reaction will be as follows:

$$Na_2 + 2H_2O = 2NaOH + H_2$$

or 1 gram of water will generate 2-36 gram of hydrogen.

One thousand cubic centimeters of hydrogen weigh 0.09004 gram at 0 degrees Centigrade and 760 millimeters pressure, or 1 gram of hydrogen has a volume of 11,106.17 cubic centimeters. One gram of water generates 2-36 × 11,106.17 cubic centimeters, or 617.0095 cubic centimeters of hydrogen; or 1 cubic centimeter of hydrogen represents 0.00162 gram of water in the sample used.

Distilling Off the Water Directly

Bell, Senger, and Allen distill the sample directly, and measure or weigh the quantity of water that settles in the distillate. The water content may be accurately and conveniently determined during the course of an ordinary distillation in the following manner: Two hundred grams of the sample is weighed into a .25-liter-distilling flask and the distillation carried out in the ordinary manner at the rate of one drop of distillate per second. The distillation can be performed most accurately in an electric still. At temperatures between 90 degrees and 150 degrees Centigrade, the water distills over, and can be removed from the receivers by means of a micropipette and weighed. Usually a few drops of water adhere to the condenser, and fail to run into the receivers; in this event a small pellet of absorbent cotton, moistened with water, squeezed as dry as possible, and weighed, is fastened to a wire and run up into the condenser to remove these last traces of water. The amount of the increased weight of the cotton pellet, reckoned as water, is added to the weight of the water in the receivers.

Definition of Mechanical Fits—Caring for Storage Batteries in Winter—Use of Tire Preservers—Poor Compression Causes Power Loss—Where Carbon Forms—Easing a Cone Clutch—Trouble With Wheel Bearing

Mechanical Fits of Many Kinds

EDITOR THE AUTOMOBILE:—How many fits are there used in mechanics? I have heard of driving fits, sucking fits and loose fits, and also other kinds of fits. I would like to know if there is any definite meaning attached to these terms.

New York City. CHARLES P. RUPPERTS.

—According to accepted practice there are four general classifications of fits, namely, force fits, driving fits, push fits and running fits. Running fits are divided into three sections known as easy fits, close fits and fine fits. Force fits are used in places where the parts are never intended to be taken apart again, such as where rear axle housings are formed of tubes pressed together under hydraulic pressure. Driving fits are used in parts where close adherence is a necessity, and where the parts are to be disassembled by the use of an ordinary hammer. Examples of this type of fit are found at flywheels, gearwheels, ball bearing inner races and generally devices which are fastened by tapered keys. Push fits are used in such places where the parts do not have relative motions in actual work, but which have sufficient freedom to be assembled by hand. This is true of bolts, slip joints, ball-bearing outer races, etc. Running fits are used in places where parts have relative motion. They are subdivided as stated above, and are used as follows: Easy fits: where great freedom of running is required and where lubrication is not copious. This is true of valve guides, control connections, clutch shafts, etc. Close fits: used in all high-speed work, and found in ordinary bearings. Fine fits; used in all parts where the stresses are of an alternating or vibratory nature, and where great accuracy is required. Lubrication should be copious to these parts.

Winter Care of Storage Battery

Editor THE AUTOMOBILE:—We do not put our cars out of commission here in South Carolina during the winter as the bad weather does not last many weeks at a time. It has only been necessary for the car owner to drain the radiator when he comes in, in expectation of a cold night, but now we have the storage battery to protect. Will you give us information through THE AUTOMOBILE how to do this?

2. Does it take more horsepower to pull a car when the chains are on?

Inman, S. C. G. C. F.

—When the car is standing in the garage there is no danger of the solution freezing when the battery is fully charged unless the temperature gets as low as 20 degrees below zero. When not fully charged, however, the danger is great, as it may freeze a few degrees below freezing point if nearly discharged. If the car is not to be used in winter, keep the battery fully charged at all times. In running the car, the battery should be protected so that the wind cannot blow against it.

2. It requires a slightly increased horsepower, although the increase is so slight as not to be noticeable. It may be made apparent by trying to push the car with the chains on.

Use of Tire Preservers

Editor THE AUTOMOBILE:—Will you please tell me if the various compounds for preserving tires really rejuvenates the rubber, as some of these makers claim, or merely act in the same way as paint?

New York City. J. E. S.

—So-called tire rejuvenators are no doubt of great value as far as appearance goes and also are of some use in forming a protecting film over the rubber at such points where it is not rubbed off by contact with the ground or other points, but are useless as far as actually rejuvenating the rubber is concerned. When rubber is once rotten, worn out or otherwise decayed it is impossible to bring it back to its former stage. It may, however, be mixed to a certain percentage of pure rubber and fair results obtained, although this practice does not give nearly the results as compared with pure rubber.

Motor Losing Power Rapidly

Editor THE AUTOMOBILE:—Lately my motor has failed to deliver the power which it formerly possessed. I cannot climb hills or make the same speed on slight inclines as I formerly could. What do you think would be the cause of this? The ignition is good, and the motor never misfires.

Beloit, Wis. T. A. C.

—One of the chief causes of the loss of power is poor compression. Another great cause is that the mixture is either too lean or too rich or very often bearings are so tight that the increased friction will cause a considerable loss of power. Outside the motor a slipping clutch or dragging brake will cause a falling off in the pulling capacity of the motor. Low compression means absence of an explosive mixture in the cylinder. It may be determined by turning over the motor by hand and noting if the resistance to turning is light or heavy or if it is the same in all cylinders. Sometimes a motor will lose compression after it has been started, and in this case it will begin to misfire and finally stop altogether, or else run very slowly. Low compression may be due to a leak in the combustion chamber through the various joints which lead to it, such as the threads around the spark-plug or valve cap through the bushings surrounding the valve stems owing to a sticking valve, pitted valve, weak spring on the exhaust valve, loose or open compression cup, leaky piston, defective gasket in the cylinder head or other cylinder connections, a broken valve or valve stem, a scored cylinder wall, or a bady adjusted valve which is held off the seat when the motor is at rest or cold. Leaks through the different joints may be detected by the application of a little soapy water or oil to the suspected points. If there is any leakage it will be indicated by the formation of bubbles. A leaky piston can be detected by a sharp hiss within the cylinder, while a broken ring will give the same indication. Occasionally the openings of the circumferences of the piston rings get into line and allow the gases to escape. This can be found out only by removing the piston and is easily remedied by turning the rings so that the openings in their circumferences are staggered. Sometimes a valve will not be able to close because a piece of carbon has become lodged on the seat or when the valve is broken or cracked a leak will be caused. Carbon also very often works its way into the piston rings and causes them to stick so tightly that they are bent out of shape and spoil the cylinders. Scored cylinders are caused by a variety of things, the principal one being insufficient lubrication. The cure is in having the cylinders rebored. A slipping clutch is a great absorber of power and is often very deceptive, causing the owner to believe that it is the motor which is at fault instead of the clutch. A slipping clutch may be cured, if it is a cone by the application of gasoline to the leather, a treatment of neat's-foot oil, or an increase of tension on the clutch spring. If it is a multiple-disk clutch a thorough cleaning with kerosene will generally restore it to its former condition. Dragging brakes absorb power and cause the motor to overcome a large amount of resistance which is unnecessary. Dragging brakes may be detected by jacking up the rear wheel and revolving it, noting the resistance. It may be cured by changing the adjustment on the brakes so as to remove friction.

Trouble with Front Wheel Bearing

Editor THE AUTOMOBILE:—I am using a Hupmobile 20-horsepower runabout and while running slowly the other day heard a clicking and grinding noise from the front wheel on the right side. On examination I found that the hub cap on that wheel was all splintered to pieces, and when removed fell apart. I also found that the part upon which the hub cap screwed was also cracked and this was what caused the breaking of the hub cap. On trying the front wheel I found that there was a great amount of play. As I was in a hurry at the time I simply screwed the cone up tightly against the balls taking up the play, but I had not gone but a short distance when I heard a sound and looking down found that all the balls had dropped out and that the ball race was ground to pieces. I was forced to go home on the damaged wheel, and had to travel a distance of about 50 miles and found that the spindle had been sawed through by one edge of the ball race, and it cost me $14 to repair the damage. Would you tell me what could have been the cause of the trouble and whether it was something I could have guarded against by taking due precautions?

New Rochelle, N. Y. M. M.

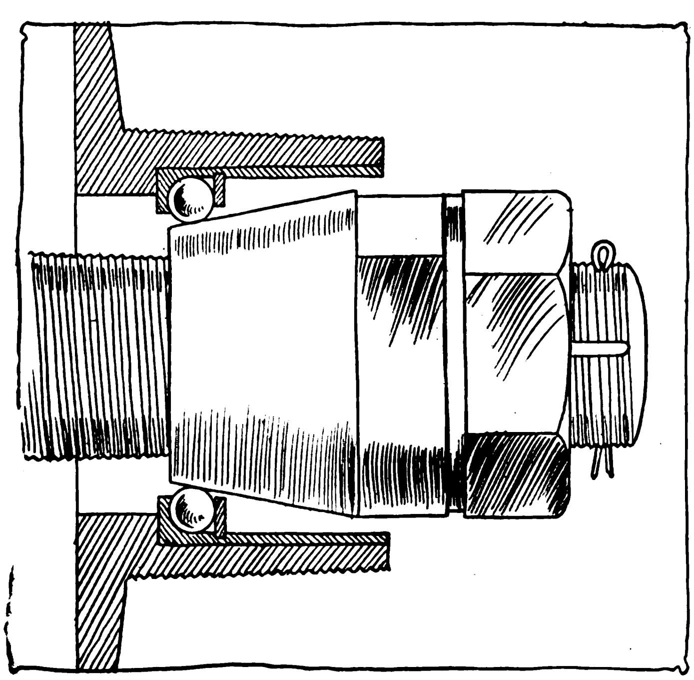


Fig. 1—Relative arrangement of parts in an ordinary cup and cone bearing such as used in small runabouts for the front wheel outer bearing. Bearings of this type require occasional adjustment

—The trouble was that you did not keep an eye on the front wheels in order to take up the play when it became excessive. As shown in Fig. 1, the cone enters the circle formed by the ring and ball bearing and the balls run between the race and the cone. After a time it becomes necessary to take up the play in this type of bearing. If this is not done the wheel is allowed to slope upwards, and carrying the raceway with it furnishes an irregular surface for the balls to run upon. The result is that the raceway is worn and also the cones, thereby giving a rough surface which will wear the balls as well as the bearing surfaces. The relationship of the parts under these circumstances is shown in Fig. 2, and this condition becomes worse and worse until finally the raceway bears on the spindle and begins to cut through it. The way to guard against this is by taking up on tht cone whenever the play becomes excessive.

Points Where Carbon Deposits

Editor THE AUTOMOBILE:—Is it necessary in going over a car that is giving satisfaction to remove carbon from the cylinders when there has been no indication up to the time that the car is to be put away that there is any carbon trouble? Time is no object, but I do not wish to enter upon a task which will be of no use after I have finished it. What are the usual points of carbon deposit, what is it due to, and what damage can its presence cause?

Elizabeth, N. J. CARBON.

—Carbon trouble is one of the recurring annoyances of automobile motors which has never been entirely removed. The heat of combustion is so high that even the best of oils leave some deposit. This may be so small that it is not noticeable after an entire season's use, but, on the other hand, it might be so great that the motor refuses to function as it should. When going over the car during the winter, it would be best to thoroughly clean the cylinders of all traces of carbon. Referring to Fig. 5, the usual point of carbon deposits will be noted. On the piston head a formation will also occur which takes the shape of a cone. This cone is gradually built up higher and higher as the deposits go on until finally it accumulates to such an extent that the apex of the cone has removed for some little distance from the metal of the piston. When it reaches this condition it becomes incandescent, and the point starts to glow. The result is that the highly compressed gases are exploded before the piston reaches its upper dead center, and the effect is the same as if the

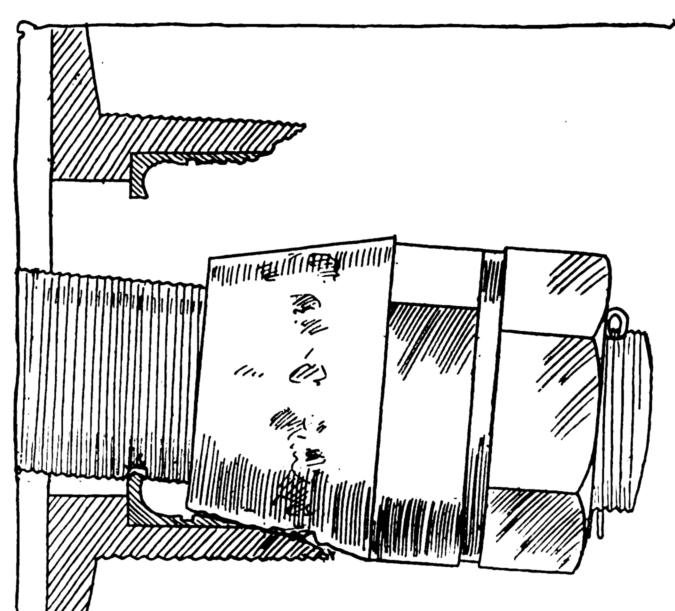


Fig. 2—Condition bearing may reach if not adjusted. Balls have dropped out and wheel is rusting on hub ball race cutting into wheel spindle. This condition actually occurred on a car brought to the attention of The Automobile recently

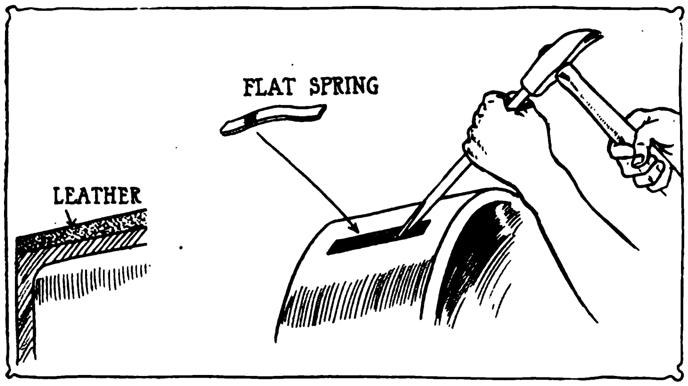


Fig. 3—Showing how clutch may be repaired for flat springs beneath leather

spark had been advanced too far. A knock of considerable force is heard and the mystified driver is often inclined to believe that there is a loose bearing somewhere in the motor. The same applies to the carbon deposits which form on other exposed points in the combustion space. Another point where carbon deposits are apt to gather and cause considerable trouble is on the electrodes of the spark-plug. This cuts off the spark and results in the cylinder being a load instead of a function of the propulsive effort of the motor. When the carbon deposit gathers on the valve seat it prevents the valve from closing, and hence cuts down the compression in the cylinder to which the valve belongs and deprives it of nearly all its power.

Use of Carbon Remover

Editor THE AUTOMOBILE:—I have recently purchased a can of carbon remover upon which there were no directions as to how to use it. The can has been lying around the garage for several days, and now when I want to use it I find that even the label giving the directions and the name has been destroyed. It is a liquid substance about the consistency in color of maple syrup with a very strong pungent odor. Would you tell me how these carbon removers are generally used, and if they are safe?

Denvel, Col. L. P. MOORE.

—In general it may be stated that the patent removers on the market are very good. They are strong solvents, and do not hurt the metal of the cylinder in any way. On the other hand, however, there are some which are not as good as they should be, and it would be well before using something which you know nothing about to secure another can of carbon remover of some well-known make. The 75 cents extra or thereabouts is not worth the risk which you would be under when using a fluid with the nature of which you are unacquainted. In general, these carbon removers are used as follows: The spark-plugs are removed and the remover poured into the cylinders so that about a half pint will be distributed between four cylinders. It is left standing a few hours and then blown out by turning over the motor with the relief cocks open. After this the motor is started and run until it stops smoking at which time the carbon is supposed to be out of the cylinder.

Adjusting the Marathon Clutch

Editor THE AUTOMOBILE:—I have a 1912 model M-40 Marathon and wish to adjust the clutch, which is dragging. Will THE AUTOMOBILE kindly explain how this should be done, showing the working parts of the clutch? Might add that I have given it a thorough cleaning with coal oil and gasoline, but it still drags.

Neche, N. D. A SUBSCRIBER.

—The Marathon clutch is of a multiple-disk type and is housed within the same casing as the gearset. It consists of twelve saw-steel plates running in oil and is supported by two bearings. Three strings are provided on the clutch and adjustment may be made through the handhole on the gearset housing. The clutch was depicted on page 1278 of THE AUTOMOBILE for December 19. The nuts at the head of each spring controlling the tension may be reached through the large cover plate over the gearset housing. By backing these nuts the tension on the springs will be decreased sufficiently to prevent the clutch from dragging if this is the cause. Should the plates not be clean a treatment of kerosene should remedy the trouble.

Pennsylvania Parts Wanted

Editor THE AUTOMOBILE:—Do you know of any available parts for a model B 27 Pennsylvania car, manufactured by the Pennsylvania Auto Motors Company, Bryn Mawr, Pa., now bankrupt and out of business? Also advise me if possible by whom the rear system and universal joint in this car were manufactured.

Mansfield, O. H. W. LUDWIG.

—Parts of this car can probably be secured from the Auto Parts Company, Detroit, Mich.

Easing Leather Cone Clutch

Editor THE AUTOMOBILE:—I am using a car which is fitted with a leather cone clutch. Unlike most clutches of this kind the one I have is very harsh. It is impossible to start the car off without a jerk, and no matter how I try I have great difficulty in getting under way without discomfort to the passengers. I have soaked the leather with castor and neat's-foot oils, but this does not afford any great relief. I am thinking of putting in cork inserts or some type of spring, and would like to know which you would recommend.

Birmingham, Ala. J. G. H.

—The methods which you suggest are both good, but that in which springs are used is a little simpler to apply than the other. Fig. 3 shows how this may be done. The metal beneath the leather is grooved for a distance a little greater and the thickness of the metal of which the spring is composed. The spring is shaped as shown in the illustration, and is placed in a groove which is of such length that the spring may be flattened within

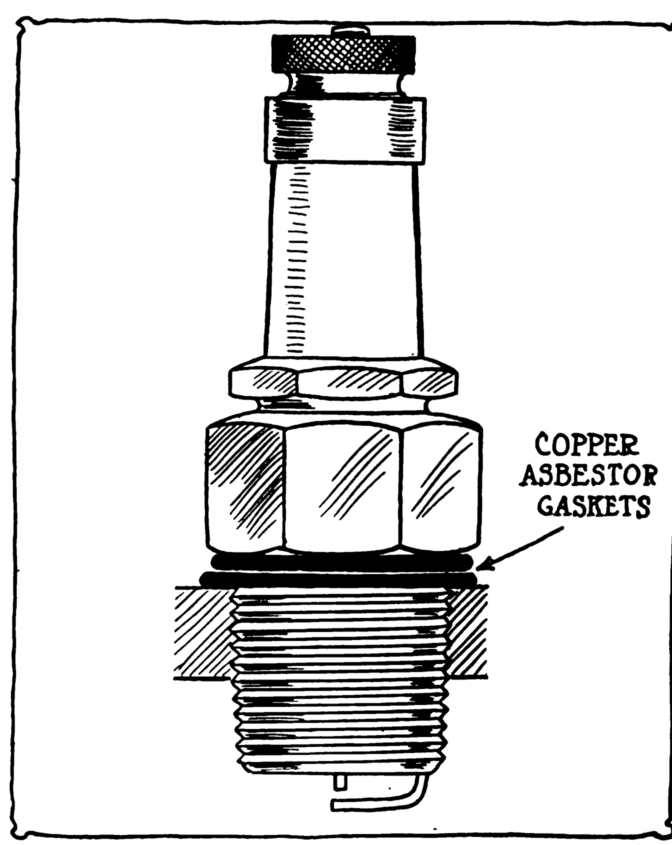


Fig. 4—Use of two copper asbestos gaskets will prevent leaks at plug

it without making a groove or a lump in the leather when the latter is placed over it, and the clutch is engaged. This cure should help your troubles and do away with the harsh engagement of the clutch. There is a possibility that the tension on the spring is too strong or that the motor misfires at low speeds, making it necessary to speed up to such an extent that the car starts off with a jerk.

Two Magnetos as Stock Equipment

Editor THE AUTOMOBILE:—Kindly advise me if any company ever made stock cars with two magnetos as regular equipment, and, if so, what company?

Lincoln, Neb. LLOYD JORDAN.

—Although two magnetos have often been put on racing cars they have never been given as standard equipment. It would be a waste of money and space to so equip a car as it would be perfectly possible to secure two-point ignition from a single magneto which had been designed for that purpose. A magneto so seldom goes wrong that the batteries which are used for starting purposes are sufficient protection against an emergency.

Advantages of Fixed Spark

Editor THE AUTOMOBILE:—I see that on some of the cheaper cars fixed spark is used. I am driving a small runabout which has a variable spark and would like to know why the fixed spark is adopted on some of these cars. I do not see how it can be economical at all speeds. Would you please tell me through THE AUTOMOBILE what are the advantages.

Huntington, L. I. G. C. TYLER.

—The fixed spark is only an advantage in so far as its cheapness and simplicity are concerned. For economy it is greatly surpassed by either the automatic advance or the variable spark. There is one point at every engine speed at which the spark should occur to secure the greatest economy. This is at the greatest possible advance. Every fraction of the stroke that the spark is delayed after this means so much falling off in efficiency, and a greater increase of unburned products in the exhaust. The spark should always be advanced as far as it can be without closing a notch due to too early ignition. It is, of course, impossible to secure this condition at any but one speed with a fixed spark. For the variable spark this can be secured at any speed when under the control of an experienced driver. The only reason the fixed-spark magneto is used is that, although the utmost economy cannot be secured with it, the results are uniformly good and it is cheap without introducing any added complications. Automatic advance is equally simple so far as the driver is concerned and gives a much greater economy than the average driver obtains with a variable spark.

Use Correct Size Carbureter

Editor THE AUTOMOBILE:—Please let me know what size model L Schebler carbureter will give the most power, that is, the correct size for a single-cylinder automobile engine, bore 5 inches, 6-inch stroke, four-cycle; average speed about 400 revolutions per minute to 600 revolutions per minute. After getting the correct size Schebler carbureter, would any other make of carbureter be correct in using same size for the same engine?

Dawson, Minn. G. O. HELVIG.

—A 1.5-inch carbureter would be the best to use on your motor. Carbureters run about the same size, so that any other 1.-5-inch size carbureter would suit your motor. A good formula for determining the correct size carbureter to use on any motor is:

$$\text{Size in inches} = \sqrt{\frac{D^2 \times S \times R}{C}}$$

In this formula D is the diameter of the cylinder in inches, S the stroke, R the revolutions per minute, and C a constant which is equal to 50,000 for automobile motors of the four-cycle type. This formula is approximate and may be used irrespective of

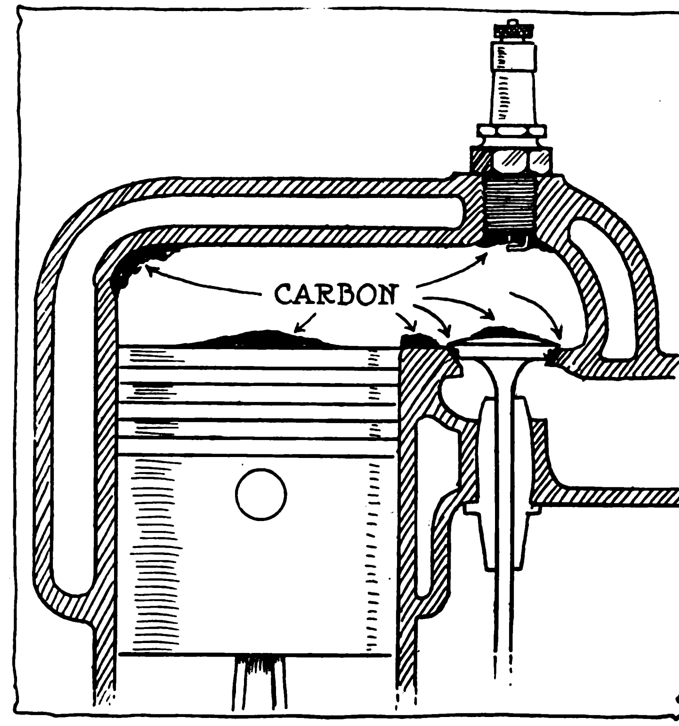


Fig. 5—Showing points in cylinder where carbon deposits are apt to gather

the number of cylinders on the motor. This is true for the reason that even in motors of six cylinders the suction strokes do not noticeably overlap each other.

Suggests Garageman's Commandments

Editor THE AUTOMOBILE:—I am sending a set of commandments for the garageman for publication in THE AUTOMOBILE. I have been in the automobile business for a number of years and believe there is more truth than poetry in these commandments:

1.—Thou shalt not talk of any other garageman before me.

2.—Thou shalt not expect the garageman to keep his place open till the cock crows in the rosy morn, so that thy machine will be safe from storm and thieves without giving him a piece of money.

3.—Thou shalt not expect the garageman to perform miracles with thy machine when thou didst fail to put oil in the engine since last summer.

4—Thou shalt not tinker with the carbureter or magneto of thine automobile lest thy days of pleasure on earth be few.

5.—Thou shalt not take thy machine to the blacksmith for repairs for verily I say unto you the blacksmith straightway sends for the garageman to make the needed repairs, and thy bill is increased two-fold.

6.—Thou shalt not, when thou wouldst buy an automobile, go like a thief in the night to cities afar off in order that thou mayest save a few small pieces of silver, for surely the publican of the city will see thee coming.

7.—Thou shalt not if thou be a banker who loans other people's money at high rates of interest, take an agency, in order that thyself and thy wife's brother may get a machine at cost, lest likewise thy depositors take a notion to loan their own money, and thou wilt have more job than a rabbit.

8.—Thou shalt not after the garageman has risen from his bed at 2 a. m to repair thy broken-down machine which thou didst buy because it was cheap, deny and refuse to pay thy bill because there is a place where the worm dieth not and the fire is not quenched.

9.—Thou shalt not get wroth and curse the tire maker in thy wrath because thy tire blew up when thou kept only 40 pounds of air in thy tires when thou shouldst have had 80 pounds.

10—Thou shalt not tell the garageman that thou did not change the adjustments of the machine which thou didst buy of him, in order that thou mayest get him to work for thee for nothing, lest he smite thee in his just wrath.

11.—Thou shalt not covet the garageman's job, nor his bookkeeper, nor his stenographer, for verily his days are long and full of trouble, nor shalt thou covet his gasoline, nor his oil, nor his transmission grease, nor the labor of his mechanics, unless thou dost intend to pay for it.

Kewanee, Ill. GARAGEMAN.

Uses Two Copper Gaskets

Editor THE AUTOMOBILE:—I find that in order to stop a leak from around the sides of the spark-plug I am compelled to use two copper asbestos gaskets. These are placed as shown in the accompanying sketch, Fig. 4. This tip may be of use to some who hear a hissing sound from their cylinders.

Cornwall, N. Y. EDWARD BRONSVELD.

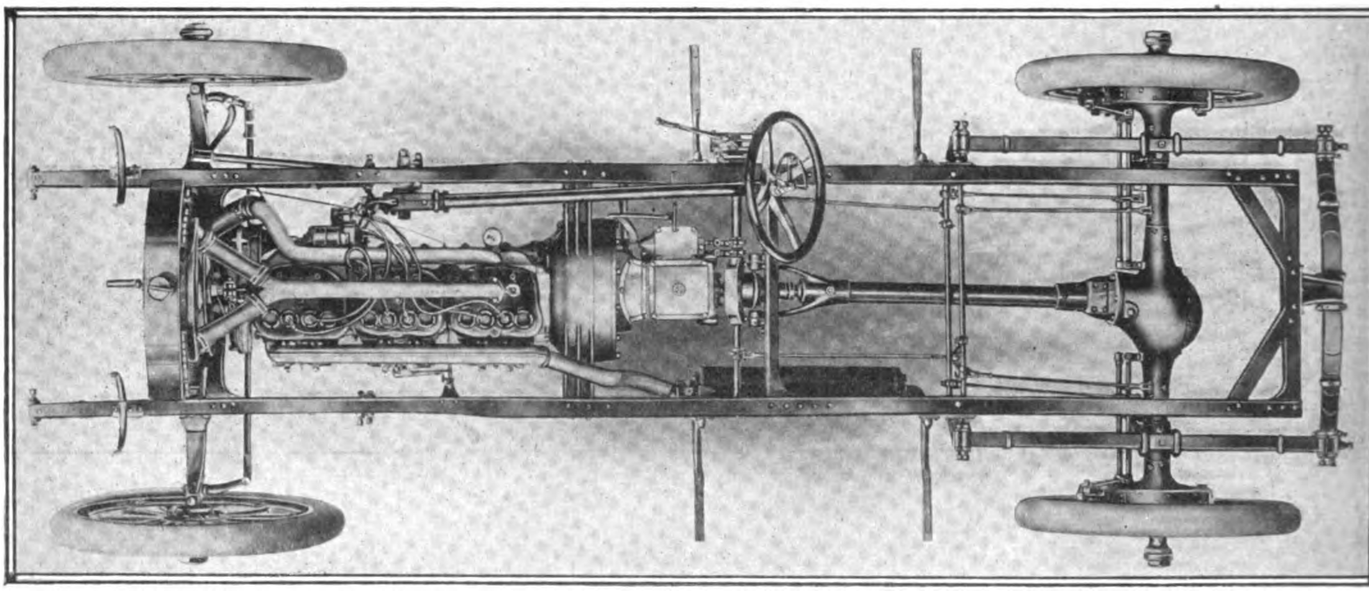


Fig. 1—Plan view of Havers 6-44 chassis, showing Y-shaped water outlet manifold and unit power plant

Havers Adds a Big Six

Continues 6-44 with Minor Changes—New 6-55 Has Larger Motor, Longer Wheelbase and Larger Body

North East Electric Lighting, Starting and Ignition System and Full Equipment Features of New Model

THE Havers Motor Car Company, Port Huron, Mich., will manufacture two chassis types and four body designs for the 1913 season. Previously only a single six-cylinder chassis has been marketed, on which a touring car and a roadster body were fitted. This is the model 6-44, which has been continued; the new model—also a six-cylinder machine—has a larger motor and is known as model 6-55. It is made with either a five-passenger touring car body or with a special speedster body.

A few refinements of detail have been made in the chassis of the 6-44. The new model is similar in general specifications to this earlier type, but, in addition to having increased horsepower, its wheelbase is longer, the touring car body is larger than that of the 44, and the equipment is complete. The latter item includes the North East combination electric lighting, starting and ignition system.

The unit power plant idea is embodied in the Havers designs. The smaller motor has a bore of 3.75 inches and a stroke of 5 inches, giving a rated horsepower of 33.75 S. A. E., while with dimensions of 4 by 5 inches, bore and stroke, respectively, the larger motor has a rating of 38.4 horsepower, S. A. E. formula. With this long stroke the motors are plainly underrated by the latter, and the factory ratings are set at 44 and 55 horsepower, respectively, as indicated by the model designations. The stroke-bore ratios are 1.33 and 1.25.

The cylinders are cast in pairs and are of L-head design, the valve stems and springs being completely inclosed by aluminum cover plates, as shown in Fig. 1. Valves are on the left side and have a diameter of 1 13-16 inches. The intake ports of each pair of cylinders have a common opening into the manifold, while there is an individual passage from each exhaust port to the exhaust manifold connection. This will be evident from an inspection of the motor illustrations.

The pistons are exceedingly long and are provided with oil grooves below the piston pins and bosses, which, together with

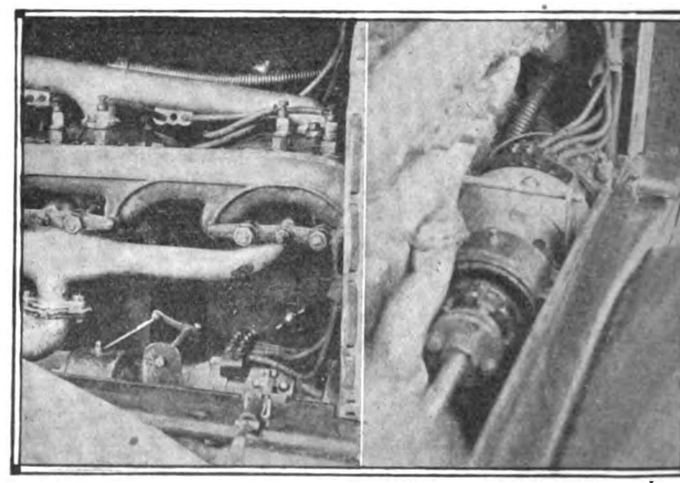


Fig. 2—Two views of the installation of the North East electric lighting, starting and igniting dynamo on the Havers 6-55

the relief holes, distribute the oil to the cylinder walls and aid in the escape of surplus lubricant. Each piston has three compression rings of eccentric design and with butt joints. The connecting-rods are drop forgings of liberal dimensions. They are provided with adjustable, die-cast, nickel-bronze split bushings at their lower ends, which are shimmed in place.

The crankshaft has four bearings, which are fastened to the upper half of the crankcase as in average practice. For the larger motor the bearing lengths are 4 inches for the rear, 3 inches for the two center and 3.5 inches for the front bearing. The lower connecting-rod bearings have a length of 2 5-8 inches. The flywheel bolts to a flange which is integral with the crankshaft. Like the crankshaft, the camshaft has four bearings, which are of ample size. The cams are forged integrally with the shaft. Timing gears are of the helically cut type and of steel.

The lubrication of these motors is accomplished through the use of a combined force-feed and splash system. The oil is forced by a gear pump from the reservoir, which is cast integral with the lower half of the crankcase, through a distributing channel in the upper half of the crankcase to the main bearings and to the gears. Grooves carry the excess oil from these points to the oil troughs, where it is dipped up and splashed to all parts of the motor by the connecting-rod ends. There is an individual trough under each connecting-rod. The oil eventually finds its way back to the reservoir, from which, after being strained, it is again conveyed to the main bearings and gears.

The cooling is by the thermo-syphon system, no circulating water pump being employed. There are two connections from the water outlet manifold at the top of the cylinders to the radiator, forming a Y, as may be seen in the plan view of the chassis, Fig. 1. The radiator is of the cellular type. The water jacket space around the cylinders is .75 inch thick. Cooling is aided by the ordinary type of fan between motor and radiator, driven from the magneto shaft by a belt. There is an adjustment for tightening the fan belt. Water enters the cylinder jackets at the right side of the power plant.

The two models differ in the type of ignition used, model 6-55 making use of a combined starting, lighting and ignition system which is the product of the North East Electric Company, Rochester, N. Y., while the 6-44 utilizes the Bosch dual system, an acetylene starter being fitted as part of the regular equipment. The magneto, which is carried on a bracket integral with the upper half of the crankcase, is gear-driven from the crankshaft through a magneto shaft in the usual way.

The generator-motor of the 6-55 is carried on the opposite side from that of the magneto on the smaller engine, as will be evident from Fig. 2, which shows the generator-motor on the intake side and at the rear so as to be close to the flywheel, to which it is geared. In connection with the system a storage battery is used, as well as starting and lock switches. The storage battery performs the usual function of furnishing starting current, driving the motor-generator as a motor and revolving the crankshaft. The battery, which is the recipient of all energy generated in excess of that needed for lighting and ignition, also furnishes current for lighting the lamps when the engine is running at a speed too low to cause sufficient energy to be generated by the motor-generator and when the car is not running. The generator has no governor or other device to regulate its speed, an automatic gear arrangement providing the proper gear ratio between motor and generator at all engine speeds.

The carbureter is of Stromberg make and is located at the center of the left side of the power plant. The fuel is carried in a 20-gallon tank under the seats, feeding by gravity.

The power from the motor is transferred to the transmission gearset through a multiple steel-disk clutch, alternate plates of which are lined with Raybestos. The gearbox bolts directly to the flywheel housing, as in accepted unit power plant design. Cover plates permit of free access to all the gearset mechanism. The transmission has three speeds forward and reverse and is of the selective type. The main driveshaft and the countershaft are carried on annular ball bearings. Gears are of chrome-vanadium steel, heat-treated and case hardened. They have wide faces and are of ample diameter.

Power is conveyed to the rear axle by a nickel steel driveshaft having a diameter of 1.5 inches. It is inclosed in a torque tube, which has two arms at its front end fastening to a cross-member of the frame, as shown in Fig. 1. The rear end of the tube bolts to the rear axle housing. One universal joint is found just back of the gearbox, where is also located a slip joint on the transmission shaft. The driving strain is carried through radius rods, while torsional strain is taken by the frame through the agency of a large yoke on the third member.

The rear axle is of the floating type, by which construction the weight of the car is borne by the axle housing, the driveshafts having only the function of turning the rear wheels. The differential gears are made accessible through a plate at the back of the housing. Brakes are of large size, the surface brakes contracting externally, while the emergency brakes expand within the drums. Both sets are equipped with equalizers, as shown in Fig. 1.

The front axle is of the drop-forged I-beam type, the yokes being similarly manufactured. The frame is of the so-called double-drop design, constructed of pressed steel of heavy channel section. Fig. 6 shows the first drop to be about opposite the flywheel, while the second is at the rear axle, as may be seen in Fig. 3. The front width of the frame is 30 inches, while it is 31.5 inches in the rear.

Springs are semi-elliptic in front and have a length of 40 inches. They are 2 inches in width. The rear spring suspension is of the platform type, that is, there are two half-elliptic side springs and a cross-spring in the rear, as will be seen from the

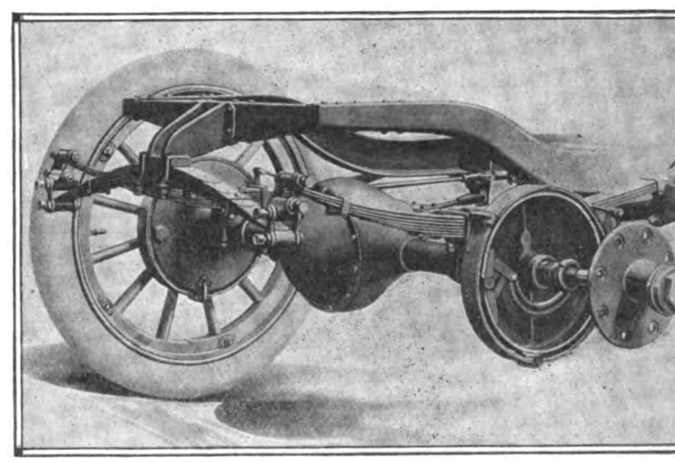


Fig. 3—View of the rear construction of the Havers, showing platform spring suspension and rear axle design

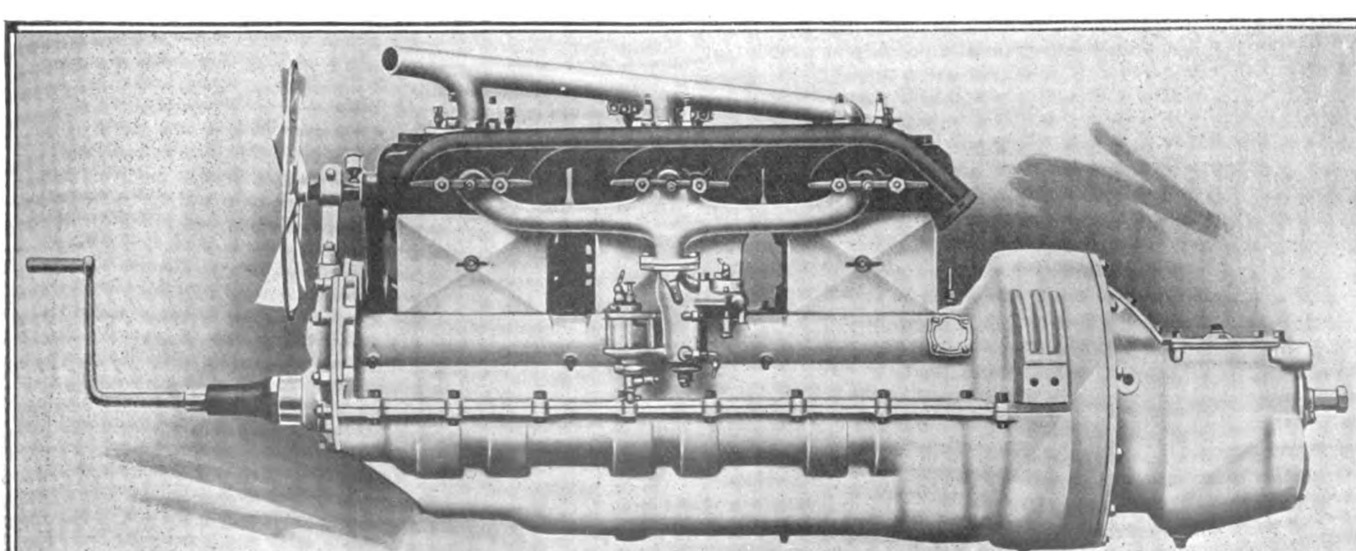


Fig. 4—Side elevation of unit power plant of the Havers 6-44, intake side. Note cover plates inclosing valves

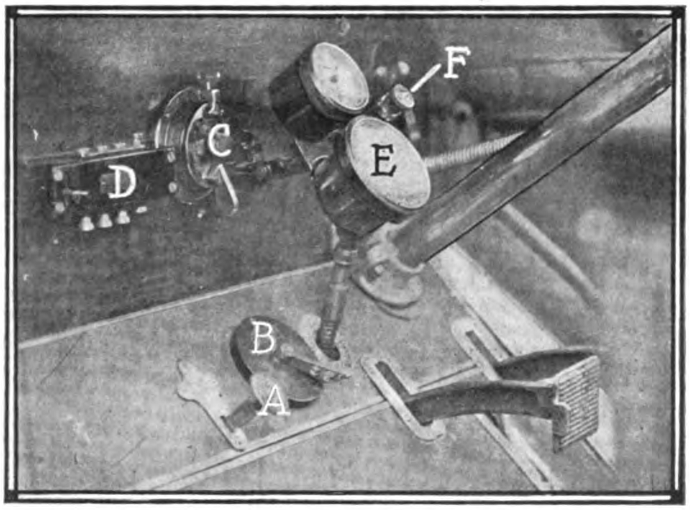


Fig. 5—Havers dash for 1913, showing control features

plan view of the chassis, Fig. 1. With this construction the rear of the frame is really suspended at three points, which is claimed to be as much of an advantage as the three-point suspension of the power plant, in that inequalities of the road surface are taken care of without straining the springs or frame in any way. The rear side springs are outside the frame, but shackle to it only at the front ends, their rear ends fastening to the ends of the inverted rear cross-spring, which is rigidly secured at its center to the rear cross-member of the frame. These rear springs have dimensions of 36 by 2 inches.

The wheels are of the wood artillery type, with large hubs and heavy spokes, of which there are twelve both front and rear. These wheels take either Baker or Firestone demountable and detachable rims, the make being optional with the purchaser. Tires are 36 by 4 inches all around. The wheelbase of the 6-55 models is 128 inches, while that of the earlier type is 122 inches. The tread is standard.

The control is on the right, the gear-shift and emergency brake levers being at the driver's right, but inside the car body. The steering gear construction is of the worm and gear type, making possible the simple adjustment for wear. The steering gear is irreversible. The steering column is of nickel and has a diameter of 1.75 inch. The control is standard in all its features, consisting of brake and clutch pedals, accelerator and H-gate gear-shift.

There are four body designs, as already brought out. These consist of the two touring car types, one for each chassis, and two roadsters. The bodies are designed along the lines of present-day automobile fashion. All door hinges are concealed, as well as the handles. On the 6-55 model provision is made for the carrying of the spare tires in the rear. The metal dash of cow type is also typical of the latest in body design.

The arrangement of the various control devices on the dash is shown in Fig. 5. The muffler cut out is seen at A, while the accelerator, which is of peculiar form, appears at B. Instead of being pressed down to admit more gas to the cylinders, this eccelerator lever is moved in a horizontal plane around its center as an axis in much the same manner as the throttle lever on the steering wheel is moved, the only difference being that when the accelerator arm is released it returns to its original position just as any other type does. The lock ignition switch is shown at C, the sight-feed of the oiling system at D, the speedometer at E, and its pilot lamp at F. The aim has been to make all the dash apparatus as accessible as possible to the driver.

The Knickerbocker speedster, so-called, is worthy of more than passing mention, in that it is a new effort for the Havers company, which believes that there is a demand for a machine of this type, built along attractive and racy lines. The car is shown in Fig. 6. The gasoline and oil tank is carried back of the seat, which has a comfortable angle. Back of the tank is the trunk for supplies of clothing, and the spare tires are mounted in the rear.

The equipment of the 6-55 models consists of Gray & Davis black and nickel lamps, mohair top with patent inside curtains, ventilating windshield, horn (placed under the hood), foot rail, coat rail, extra rim, tire irons, speedometer and gradometer, together with a full complement of tools. On the earlier 6-44 the equipment is standard, although ignition is not in combination with lighting and starting, as already mentioned. This combined electric starting, lighting and ignition feature is optional with the purchaser, however, at an additional cost.

Harking Back a Decade

FROM *The Automobile and Motor Review*, December 27, 1902: The fifth annual automobile salon, which opened December 10 at the Grand Palais in Paris, is by far the most complete exhibition of the motor vehicle ever seen. President Loubet opened the show. There are sixteen sections included in the exhibition, nine of which have some connection with the automobile. As this account was mailed the next day, your correspondent declares that it will be impossible in this issue to give the American reader any comprehensive idea of the show.

W. K. Vanderbilt, Jr., has entered for the Paris-Madrid race. David W. Bishop is also expected to enter.

In the official report of the late A. C. A. run to Boston and return, it is shown that the contesting cars suffered penalizations for 100 stops. Of these twenty-six were caused by faulty ignition; eleven due to mishaps to the cooling systems and ten each the result of tire and valve troubles. Accidents caused five penalized stops. Among the steam cars 75 per cent. of the stops that brought penalties were due to troubles in the water and gasoline systems.

A good formula for determining the horsepower of a gasoline engine is as follows: Square the diameter of the cylinder in inches; multiply by the length of the stroke in inches; multiply by the number of cylinders; multiply by the number of revolutions of the crankshaft per minute and divide by the constant 18,000.

The Panhard cars of the future will be equipped with Krebs carbureters. This carbureter consists of three parts: First, the air inlet, communicating with the mixing chamber; spray nipple connecting with the float chamber; second, a cylinder and piston, the latter actuated by the centrifugal governor and third, an extra air inlet equipped with cylinder and piston. The advantages claimed for this type of mechanically actuated carbureter is that it consumes less gasoline and is far more certain of producing satisfactory explosions.

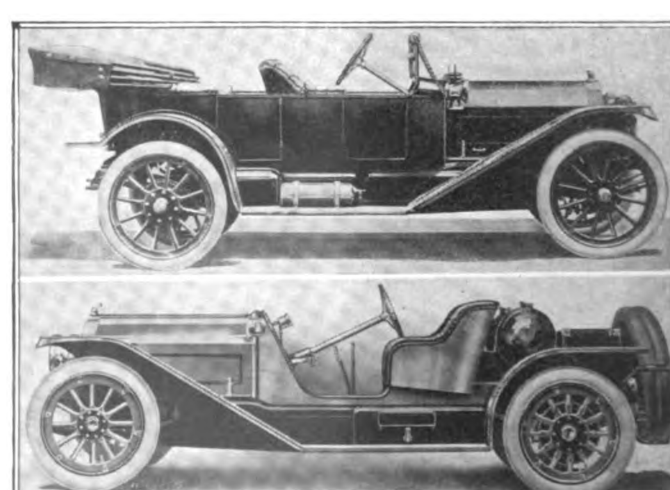


Fig. 6—Upper—Side view of the Havers 6-44 touring car for 1913
Lower—Knickerbocker speedster on 6-55 chassis

High Turbine Supplants Flywheel and Muffler

THE High exhaust motor is designed for the purpose of eliminating the muffler, and of utilizing the exhaust gas in mechanical devices which replace the flywheel, but still perform its functions. By so doing more torque and increased power is claimed besides absolutely preventing all exhaust detonation, without increased back pressure in the cylinder. The device, it is said, can be manufactured as cheaply as the flywheel and muffler which it replaces and it can be designed to be applied to any constant rotation heat motor.

The claims of power and torque are based on the impulse reaction turbine principle, and the claim of silence is based on the ability of the device to break up the fluctuations in the exhausting gas besides expanding it, so that the issuing gas will have a constant and low pressure. The action of the motor is as follows:

The exhaust from the cylinders is led through a gracefully-diverging manifold, Fig. 1, to a position in the motor casing where it will impinge in a pocket, Fig. 2, in the periphery of the rotor rim. The initial velocity of the exhausting gas of approximately a mile a minute is greatly increased by divergence of the manifold so that the gas has considerable momentum when it strikes the rotor pocket. This impulse on the rotor is delivered at a time when the torque curve of the exhausting cylinder is negative. The gas is held by the pocket only during a few degrees of the rotor's revolution when a by-pass in the wall of the case is uncovered into which the gas reacts and expands. This by-pass shoots the gas to the preceding pocket—this pocket uncovers a second duct which shoots the gas against fan blade spokes, which after the impulse shot is past, continue to such gas until the next exhaust shot gives them impulse.

The gas, after passing over the fan blade spokes, is further expanded in a chamber under the cover plate and from here the gas discharges through receding diverging nozzles cast in the front face of the rotor rim into an annular exhaust receiver from whence Exit. The starting-crank is fitted in the cover plate—the disengaging spring making it gas-tight when not in use. The flywheel bearing, which is the only point of friction, is protected from hot gas by having the case overhang the hub and the blade spokes keep the hot gas from that point.

Criticisms of Non-Poppet Valves To-Date

(*Continued from page* 1317)

drive as well as in the whole of the motor construction, have induced many designers to use one valve as a gas distributor for a number of cylinders, that is, a valve with a single set of passages alternately serving the different cylinders. Among the representatives of this class are the Itala, Figs. 2 and 3, and the Silent valve, Fig. 9. In both of these cases a single valve is provided for each pair of adjoining cylinders.

It may be proper to mention in this connection the Banner engine, Fig. 10, with all cylinder axes parallel; and also my arrangement, roughly represented in Fig. 11, and intended for V-shaped engines. Many other similar schemes could be evolved. Their merit would be simplification.

There is one group of rotary valves for which very little success can be expected and which deserve much scepticism based even on the scarce experimental data of today. These are the valves openly exposed to much heat either by serving as exhaust gas carriers for a large part of their length, or, still worse, forming a part of the explosion chamber. The valves could be used partly for exhaust gas passages only when they have cooled outside shell, which comes in touch with the bearing surfaces of the valve-inclosing space. If the valve has no cooled shell but the hot gases come in direct contact with the exterior valve walls these will attain high temperatures differing widely from the mean temperature of the water-cooled valve seat. The expansions of the valve and its seat cannot be uniform and proportional with respect to each other, thus resulting in a variation of the valve clearance with the state of the motor action. This criticism is applicable to valves of the type shown in Fig. 12. There may possibly be some justification for this arrangement of outer exhaust passages and inner inlet space if the motor was intended for fuels needing forced evaporation before entering the cylinder, but scarcely otherwise. In any case the design does not look satisfactory from the point of valve functioning, the valve either leaking when cold or sticking when the motor is hot. The valve, Fig. 12, could be quite practical, at least it has more chance to be so if the method of carrying of the gases were reversed, that is, having the inlet gases outside and the exhaust gases passing through the internal passage.

(*To be Continued*)

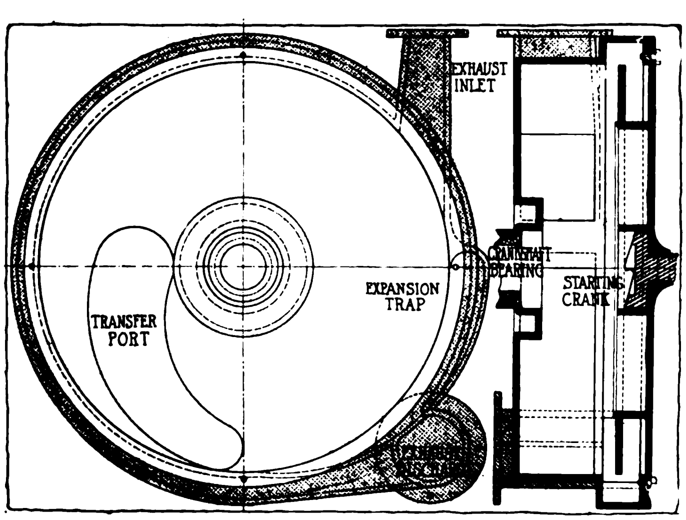


Fig. 1—Side elevation and cross-section of High motor

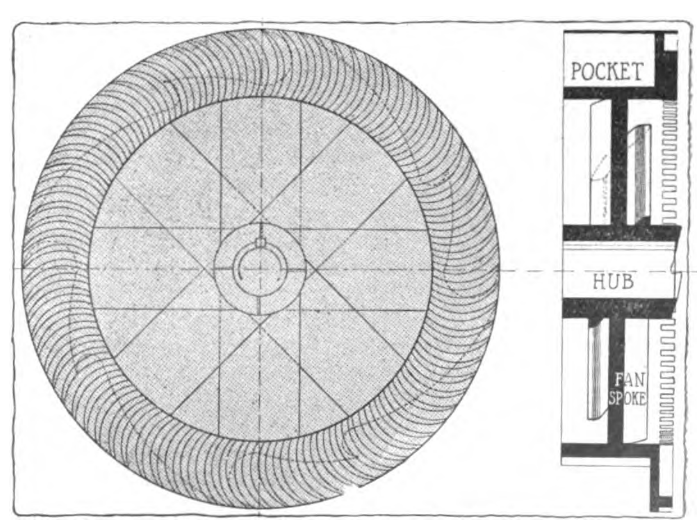


Fig. 2—High turbine wheel and constructional section

New Stanweld Rims

Made in Seven Types, Four Being Quick Detachable and Demountable—Others Are Detachable Only

Stock Used Is Hot-Rolled Steel Electrically Welded—Rims Made to Stand Side Load of 2 Tons

THE latest type of rim to enter the field comes from Cleveland, O., from the rim plant of the Standard Welding Company, pioneer in rim making. This concern has been engaged in the making of automobile and bicycle rims for some 14 years, hence its product has necessarily reached a high degree of perfection.

During the first few years of its existence the Standard Welding Company occupied a space of about 30,000 square feet and employed in the neighborhood of 100 men. Since that time it has gradually expanded until at the present time the factory has a floor area of about 8 acres and furnishes employment for about 2,000. The plant operates the year round for 24 hours a day, welding, shaping and other rim-making operations being carried on as in the daytime.

The new products have supplanted all other types in the plant and they are known under the trade name of Stanweld. They come in seven types, four of which are quick detachable and demountable, while the other three are detachable only, the demountable feature being omitted.

The demountable types are the most interesting. Figs. 7 and 8 serve to show their construction. Both of these, which are identified as Nos. 40 and 41, are the same with the exception that the former is a universal type, while No. 41 is intended for straight-side tires. Both rings A and B are removable in the case of No. 40, as Fig. 7 indicates. The dotted lines show how a straight-side tire ring may be placed on the base C instead of the clincher rings, if desired, making this type universal. In addition to the two types of demountable shown there is the rim which is designed for use with clincher tires only, in which case the tire supporting ring is a part of the base. It is the same as the straight-side rim, Fig. 8, except that the rings are concave instead of convex, as at RB.

In all three the demounting features are the same, so that we will confine ourselves to an explanation of that shown in Fig. 7. Referring to this figure, it will be noted that the rim consists of four principal parts, the rim base C, the adjusting ring D, the felloe band F and the locking device or clamp L. The adjusting ring D is the most noteworthy feature of the whole design, for its construction removes all excessive strains from the clamp bolts because such pressure can reach them only indirectly. The beveled portions of the adjusting ring D, which are in contact with the mating bevels of the rim base C, tend to force the latter toward the inner side of the wheel. This movement is resisted by the flange F_1 which is an integral part of the inner side of the felloe band F. The bevel construction also has a tendency to force ring D out, but any such movement is checked by the clamp L and also in large part by the friction between the flat surfaces of F and D. Thus it is evident that there is very little pressure exerted upon the clamp.

The design of ring D and the mating bevels of the rim base C prevent any lateral or side motion of the latter because it is held fast by the very wedge nature of the construction. The absence of such side motion is a big factor in tire economy. Another feature of the construction which is evident to the reader is that radial vibration which the rim may undergo in travel can in no way be transmitted to the clamp L, as it can receive only lateral force.

There are six of these clamps L for each wheel. These are of rotary type and operate on bolts N extending through the wheel felloe S, as shown in Figs. 1 and 2. The bolt heads M have the peculiar form shown and they support the felloe band F on the inside of the wheel. These bolt heads M are drilled for the screws T, which prevent the bolts from turning when the clamp nuts are being operated.

The clamp has a universal movement on the driving nut V so that, in loosening the latter by turning to the left with the special socket wrench furnished, the clamp is also turned in this direction and its lip L_1 then clears the ring D, allowing the latter to release its wedging action and permitting the rim to be removed. Tightening on the nut, or turning to the right, swings the clamp into vertical position, engaging the adjusting ring. Thus the clamp is automatically put in locking position or removed from engagement with the rim, depending on which way

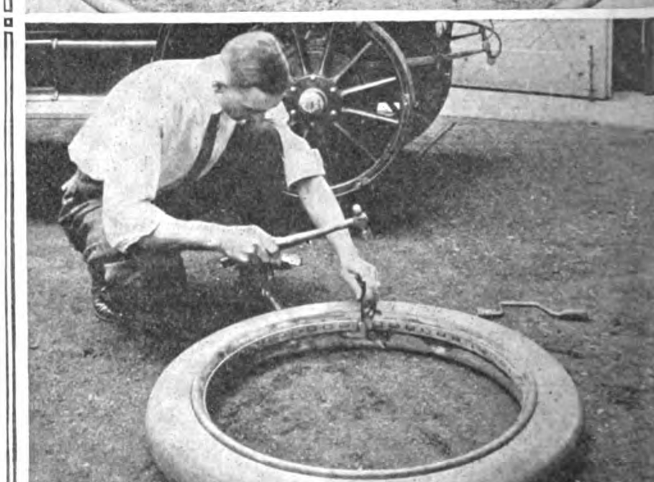


Fig. 1—Wedges removed and rim being lifted from wheel
Fig. 2—Showing construction. Both sections are locked
Fig. 3—Unlocking swinging latch holding locking ring ends

the nut is turned. The clamp and nut are held together by means of the friction spring FS, Fig. 7, which passes around a collar integral with the clamp nut V, and the ends of which fit in a groove in the lower part of the clamp. Unless undue resistance is brought to bear this spring is tight enough to cause the clamp to turn with the nut, but when the former has turned to the side until it meets a projection of the clamp washer W, Fig. 7, the frictional hold of the spring is overcome and the nut turns free of the clamp, tightening or loosening as the case may be. The construction of the clamp may be understood from A, Fig. 7, which shows clearly the spring S_1 and the manner in which it passes around the nut collar or projection C_1. The clamp A_1 is also clearly seen.

Another distinctive feature of these new rims is the method of removing of the side ring for the replacement of a tube or casing. Fig. 9 shows the construction when locked and when

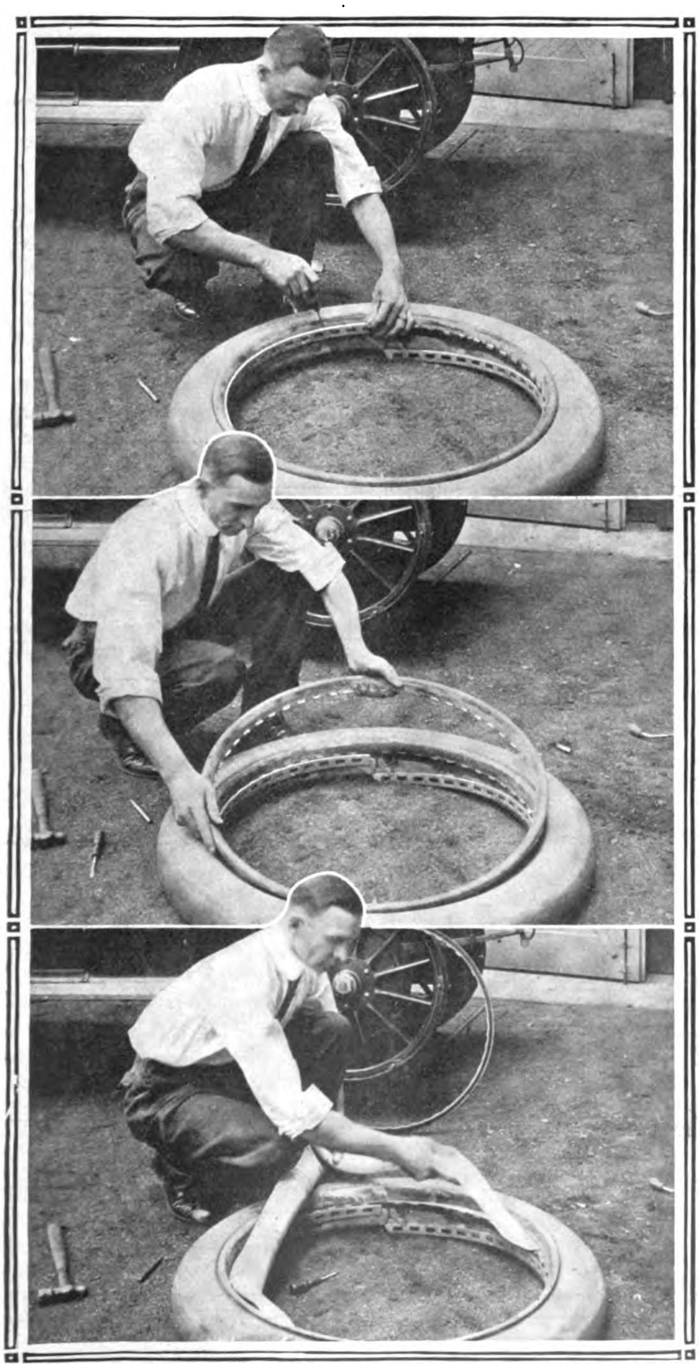


Fig. 4—One locking ring removed. Other being loosened
Fig. 5—Narrow section of the rim base being removed
Fig. 6—Showing the process of removing the inner tube

unlocked. On either end of the split ring B there is a lug Y, which is slotted, and which passes through a hole in the rim base C. These lugs lock by means of a cam O, which is turned by the integral lever X. When in the locked position the cam sides fit into the slots in the lugs, preventing them from being removed. The lever is held locked by means of a latch, consisting of a small button or projection on the end of the lever which fits into a recess or groove in the under side of the rim.

To remove the ring a screw-driver is all that is needed. This is inserted between the rim and the lever, and the ball catch on the end of the latter is pried from its seat in the rim socket. The lever is then turned outward, causing the cam to clear the slots in the lugs, and allowing these to be pried upward through the slots or holes in the rim base. In doing this the screw-driver is placed in the notch P, which is formed in the base of the ring for that purpose.

Figs. 12, 13 and 14 show the sections of the detachable types which are not demountable. These are designated as Nos. 50, 51 and 52, respectively. No. 50 is a universal type, that is, it may be used for either clincher or straight-side tires depending on which type of side rings are used. The other two are designed for either type, but are not interchangeable, the inside ring being a part of the rim base, as shown. With all three the outer ring is split and locks the same way as do the demountable types, by the use of the cam-locking device just described.

Another type of rim is made by this company, which is known as No. 30, and it differs considerably from the other designs already mentioned. This is a circumferentially-split ring, and intended for cars which require a rim of very light weight. The series of photographs of this rim serve to show how this No. 30 is constructed, and at the same time bring out its manner of operation, which is seen to be very simple. The demounting device consists of six clamps or wedges which operate on bolts extending through the felloe and holding the inner ring on the inner side of the wheel.

The detaching of the tire with this type of rim is accomplished through the taking apart of the two halves of the rim, of which the tire bead holding rings are integral parts. The rim is seen to be really two circumferentially-split half rings, each half being provided with lugs which extend inward and which correspond with similar lugs on the other half. Slots in the spring rings, which are of semi-circular form and which are riveted to the wider half of the rim, fit around these pairs of lugs when the two halves of the rim are locked together, thus tightly binding them into a complete rim. The free ends of the slotted spring rings which hold the lugs together are locked by means of a swinging latch which in turn is secured in place by a form of cam arrangement. These parts are pivoted to the wider half of the rim, and therefore there are no loose parts.

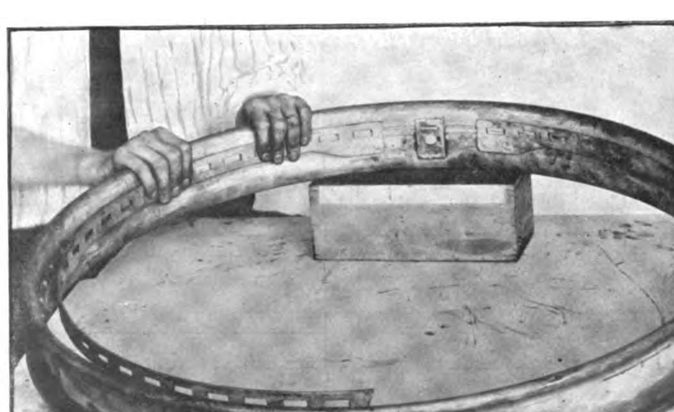


Fig. 11—Locking ring sections of Stanweld No. 30. Slots in rings being fitted over lugs

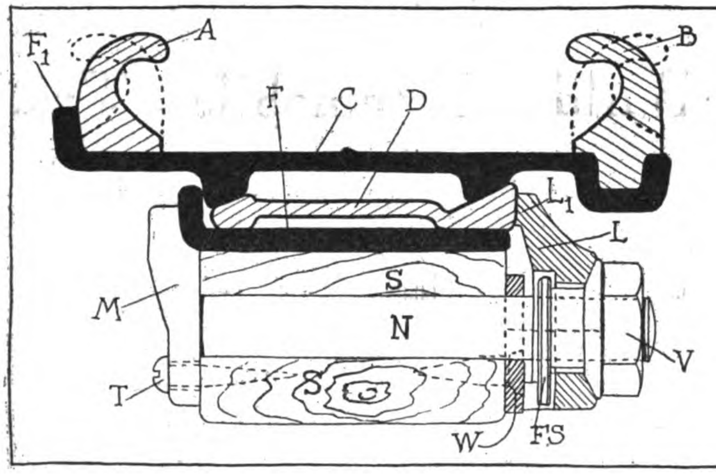


Fig. 7—Stanweld universal quick detachable demountable rim.

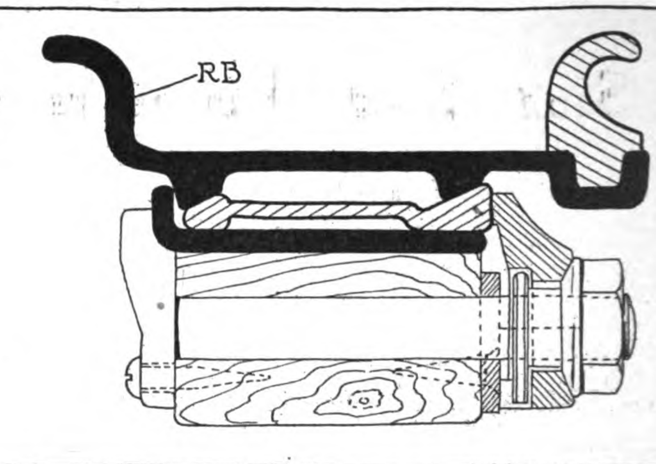


Fig. 8—Quick detachable demountable rim for straight-side tires

The cam-locking device and the means of unlocking it are shown in Figs. 1 to 6, showing steps in the operation of this rim.

As most of our readers are not familiar with rim-making, it may be well to add that all welded portions are so constructed electrically, the stock being hot-rolled, open hearth steel. The composition of this material is as follows:

Carbon	1.2 to 2.0 per cent.
Phosphorus	Not to exceed 0.5 per cent.
Sulphur	Not to exceed 0.5 per cent.
Manganese	0.65 per cent.

The material is also subjected to a number of physical tests. The tempered stock is required to bend down upon itself cold without fracture at the bend. The following physical characteristics are exacted:

Elastic limit	Not less than 50 per cent.
Elongation in 8 inches	Not below 25 per cent.
Reduction in area	Not below 50 per cent.
Tensile strength	Not under 63,000 pounds per square inch.

The majority of the smaller attachments to the rim are drop forgings, only one or two being constructed from malleable iron castings.

The representative of THE AUTOMOBILE, on a recent visit to the factory of the Standard Welding Company, had the various parts of one of the concern's latest types of rims weighed, in order to gain some idea of just how much the rims added to the total weight of the car. A No. 40 rim, size 36 by 4 inches, was used, with results as follows:

Felloe band	7 pounds
Adjusting ring	5 pounds
Rim base	16 pounds
Endless side ring	5.5 pounds
Detachable side ring	6.5 pounds
Six clamping devices	2 pounds
Total	42 pounds

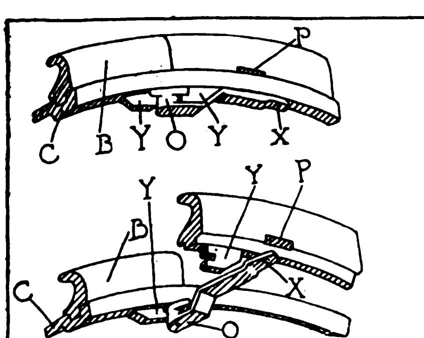
Thus a set of five rims, four in use and one spare, add the small amount of 210 pounds to the car's total weight. It must be said in justice to the other rims of the Standwell make that the one weighed was the heaviest of the company's manufacture, since it involves both the demountable and the universal features, as already explained.

A test of this No. 40 rim was made by the Department of Applied Mechanics and Hydraulics of the Case School of Applied Science at Cleveland recently, with results as follows:

Load applied, pounds	Adjusting ring, lateral deflection, inches	Rim, lateral deflection, inches
000	.330	.025
500	.330	.026
1,000	.330	.025
1,500	.330	.025
2,000	.330	.025
2,500	.330	.025
3,000	.330	.025
3,500	.330	.025
4,000	.330	.025
4,500	.330	.025
5,000	.330	.025
6,000	.331	.025
7,000	.332	.025
8,000	.332	.025
9,000	.332	.025
10,000	.334	.025

This shows that the rim is not disturbed by a side load of 10,000 pounds, while the adjusting ring is bent laterally not to exceed .004 inch under loads of 10,000 pounds, which shows that a properly constructed automobile rim of today is by no means a weak part of the car.

Owing to the care given by the rim makers to their products, tire replacement is no longer the burden which it was in the past, but the new devices must be understood for their simplicity to become apparent.



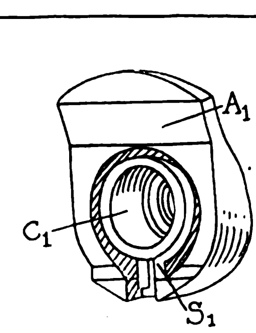


Fig. 9—Showing the construction of the ring when locked and unlocked. Fig. 10—End view of clamp

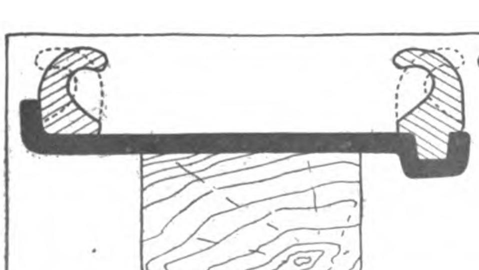


Fig. 12—No. 50 Q.D. rim.

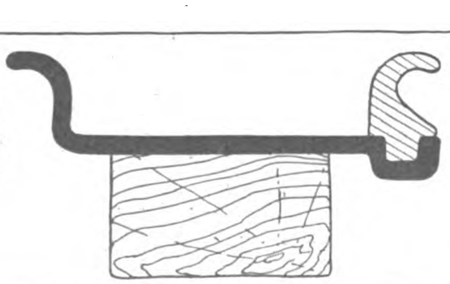


Fig. 13—No. 51 Q.D. type for straight-side tires.

Fig. 14—Q.D. for clincher tires

Sing Sing Prisoners Build Automobile Truck

Can Be Unloaded in 1.5 Minutes—Has a Steel Body with a Capacity of 8 Cubic Yards—Is Very Simple in Construction, Employing a Worm and Gear—First Time Used on Dumping Body

STREET-Cleaning Commissioner Edwards, New York City, has solved the problem of the cartage of that city's refuse. In 1910 the commissioner and the superintendent of industries at Sing Sing prison took up the question of motorizing the department, and for over 2 years the men have been working on a machine which they built by hand and which was recently seen on the streets of New York.

The truck is constructed of steel, has a body with a mean capacity of 5 cubic yards water measure, but when fully loaded carries 8 cubic yards, and is so constructed that the top of the sides is of a reasonable height, permitting easy loading. It has a cover of a new design which is dustproof and which will confine odors during transportation. This cover is easy to operate, is in sections, having a number of doors, only one of which can be opened at one time, and which will not interfere with the loading. The doors operate easily. This cover really does prevent dust being blown about in the loading operation, which is the great nuisance attending the use of open or partly open carts.

Worm-and-Sector Dumping Device

The body of the truck is dumped by a peculiar mechanism, which permits it to be completely and speedily emptied because it raises the body to a perpendicular position. This raising mechanism is composed of a worm-and-sector gear, here used for the first time in connection with a dump cart. This device is not only effective, but it is the safest possible, because it has a safety device locking the body while being raised, so that there can be no injury by the fall of the body, and is so arranged as to stop when in exactly the right position for dumping, be held perpendicular for the dumping and then be lowered.

This makes the operation of dumping completely automatic and independent of the driver, which meets the requirements usually made for such a device of being foolproof. It is a stanch machine, simple in construction and with little danger of getting out of order, even in inexpert hands.

Not only is the motor truck a time saver, but it is expected to net the department about $2,400 per day, which is a substantial item to be considered in department work. The cost of a cart per day is $4.65, and the estimated cost of trucks would be $20, so that there is an apparent saving of approximately $8 per day for each of these vehicles, and when it is remembered that the department operates about 1,800 carts, it can be readily seen that such a conveyance is needed.

The accompanying illustrations show the truck before unloading and after. The splendid adaptability for dock purposes is apparent, and its quick service in unloading in 1.5 minutes renders it a highly important acquisition to that department.

Bodies Big Feature at Paris Salon

(*Continued from page* 1303)

means of which the stud just mentioned, together with the seat, can be moved backwards and forwards, thus giving adjustable depth. The back is also separate and is really a cushion built on a suitable frame, the frame having attached to it a couple of flat-blade springs so curved that they pass under their seat and have their extremities received in notches in the platform. By means of a roller brough up against the back of the blade springs the back can be inclined to any degree, and the seat passing underneath the back, its depth can also be varied within wide limits. By making the upholstery entirely independent of the body, shocks transmitted to this latter are not received by the passengers.

Digest of Leading Foreign Journals

(*Continued from page* 1314)

in this instance the tar had been spread in close proximity to the trees, interfering with watering and nutrition—the same blunder which accounts for any damage done in the Bois de Boulogne.

Replies to circulars sent out in Germany also acquit the coal tar. The officials in charge, such as Inspector Lipps of Rhenish Prussia and Von Steglitz of Schwenke assert that properly done the tarring is harmless. Inspector Engelhardt of Danzig has observed that at most a few plants with especially sensitive epidermes are somewhat injured. The chief engineer at Alexandria, Egypt, has found from extensive experimentation that the vegetation in his country does not suffer at all from the use of ordinary coal tar on the roads, and he gives a detailed account of the tests he has made.—From *Zeitschrift des Mitteleuropaischen Motorwagen Vereins,* Nov. 30.

Convict-built truck with body in normal position—doors closed. Note drive-chain

Showing the dumping body raised to perpendicular as it deposits its load

Painting the Steel Body

Sheet Steel Surface Presents Poor Foothold for Both Oil and Pigment—Has Little Absorption

IN connection with painting the sheet steel automobile body it has been demonstrated that **the steel's capacity for absorption is comparatively small when compared with that of wood.** The same quantity of linseed oil used for a primer to be applied to wood would be altogether excessive for a steel surface primer. It would, in fact, if used upon the metal surface—and in this particular matter we may also include the aluminum surface—result in the formation of a paint skin, tough and leathery on the surface and soft underneath.

It is very plain, therefore, that if the same quantity of thinning medium is to be used in a given amount of metal primer as would be used for the wood primer of like amount such medium should consist of **a minor part of raw linseed oil and a major part of some other medium** and a portion of this thinning medium will naturally consist of turpentine. The remaining portion may be finishing varnish. As a matter of fact, finishing varnish has been used for the purpose; and by some very able workmen has been recommended as one of the most dependable primers for metal. The writer has used it in a clear state, unfortified by pigment, for galvanized iron surfaces—one of the most difficult surfaces to make paint adhere to, by the way—and the results have been invariably satisfactory. **The steel surface to a greater extent than any other offers an inadequate foothold for raw linseed oil** as there are no pores for the oil to penetrate. In many of the ready-to-use steel primers finishing varnish is largely used and with such primers no fault is being found.

In about every way conceivable it has been proved that the fewer coats applied to the steel surface, consistent with the measure of protection required, the greater service and durability secured. The best paint or pigment to put next the steel is one that offers the maximum inhibition of corrosion on the steel. Moisture, acids, gases and even oxygen orginate and promote corrosion. **For continuous corrosion moisture must be present.** When the steel is pickled there is a free acid set loose which not only creates corrosion but serves to promote it.

However, paints for steel surfaces should have other desirable qualities beyond those which give it power for the inhibition of corrosion. Wearing properties, capacity to stand up under the hard and varied service to which the motor car surface is daily exposed, must be in addition to this power of preventing corrosion. Moisture, more than any other agency, develops and accelerates corrosion and **to prevent moisture is therefore all important.** Raw linseed oil, soya bean oil, and similar oils now acclaimed the supreme oils, are not fully capable of excluding moisture wholly. These oils are all too porous; and it is only when varnish is added in positive quantity that the non-porous surface condition is obtained. In connection with the use of varnish for the metal surface, an overdose of the varnish will render the surface glossy, a condition not at all desirable in a coating of material to be further coated upon. Naturally, **this question of porosity depends to no small degree upon the fineness of the pigment.**

In respect to the best pigments for use upon the metal surface there are divers views. The famous Atlantic City steel panel test has recently shown for American Vermilion a rating of 10 as compared to four lead and zinc compounds with a rating of 9. All these panel exposure tests are not absolute in their findings, especially when brought into the carriage and automobile shop. They have their value, however, in determining certain merits possessed by the materials, and to this extent they may prove of real worth to the vehicle painter in his pursuit of the pigments best adapted to his especial needs.

After all has been said and done in connection with steel surface primers and paints we still have as an uppermost theme the preparation of the metal for the reception of the coating.

When possible, sand blast the metal. This, it has been demonstrated past all dispute, is the most economical and the most direct way, and leaves nothing upon the surface, or within the crystals thereof, detrimental to the paint applied. Lacking the apparatus necessary for this work, **there remains one method: hand emerying.** Also, if available, there are rotating grinders and emery wheels. Hand emerying is, to be sure, a crude method as compared to the use of the emery wheel or the rotating grinder, but it is one immediately within the reach of all. **Another method, and one considerably used by manufacturing concerns, is the so-called pickling process.** This is done with either sulphuric or hydrochloric acid, both of which, however, penetrate into the minute intercrystalar crevices of the metal. The sulphuric acid is a non-volatile medium and hydroscopic—that is, it does not dissipate into the air, but does absorb moisture to a large extent—and unless washed from the surface completely it develops corrosion in the metal under the paint, which corrosion continues until ultimately the entire surface is involved and the paint structure finally splotches and shatters beyond any remedy short of complete removal of the pigment. **The only sure way of removing sulphuric acid traces consists in washing with a stream of hot water applied under considerable pressure.**

In comparison to the sulphuric acid, the hydrochloric acid, as a pickling agent has the advantage of readily volatilizing, even at a low temperature, and it does not absorb moisture to the extent that the sulphuric acid does. That is to say, it is not hydroscopic. **Its action if left upon the steel is nevertheless similar to that of sulphuric acid,** and it is therefore necessary in using it to wash it very thoroughly from the metal. In the use of either of the two acids it is a good practice as a final process in the work to use lime water with which to neutralize the acid traces.

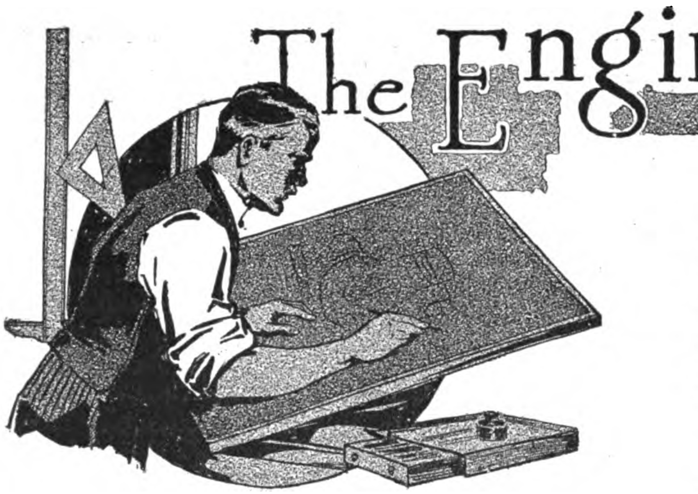
The grinding or machine emerying is a slow proceeding under which the sheets of steel, or the steel surface in whole, are easily bent or buckled.

Hand emerying is a still slower method and it is recommended to the automobile painter only as an emergency practice. The question may arise in the mind of the reader why the elimination of the sulphuric acid traces may not be accomplished by consigning the surface to a baking oven, and in reply it may be stated that **the acid does not volatilize below a temperature of 350 to 450 degrees Fahrenheit,** while the ordinary baking temperature is from 200 to 300 degrees Fahrenheit.

In the earlier days of the steel painting industry it was customary to coat the surface with a sufficient foundation of priming and surfacing pigment to develop under the rubbing process a surface both smooth and level. This rubbing was done with water and artificial pumice stone or rubbing brick. Thus, in rubbing off the high places to the level of the lower ones more or less of the metal was sometimes laid bare and under this exposure to the water moisture attacked the metal with the result that corrosion speedily became an uncontrollable surface disease.

By the present practice, however, all this trouble may be corrected. **Instead of using water in connection with the rubbing brick for leveling down and making the surface smooth, raw linseed oil is substituted as the medium in which to moisten the stone.**

The Engineers' Forum



Four-Speed Gearbox As a Saver of Fuel

H. Ward Leonard Also Says High Engine Speed Necessary with Three-Speed Gearbox Is Hard on Motor

Lighter Transmission Mechanism, Higher Economy and Greater Durability Results of Smaller Motor

THE increasing cost of gasoline is forcing automobile engineers to use gearboxes employing four forward speeds instead of three. There is no question whatever that a saving of gasoline is effected where four speeds are available instead of only three, and this fact has been repeatedly demonstrated, both theoretically and practically, by European and American engineers.

When four speeds are employed it was formerly the universal practice to have the direct drive on the fourth speed but in recent years the most advanced engineers have been gradually learning to appreciate that the employment of a direct drive on the third speed with a geared-up fourth speed gives a most useful result in the case of an average car under ordinary conditions of use.

Many engineers still think that three speeds are practically as good as four speeds, and also think that if four speeds are to be used the direct fourth is as good as, or better than, the direct third, with indirect fourth, but this is often due to a lack of appreciation of four-speed gear-box with the direct third speed.

To consider the questions involved, it is first necessary to consider the characteristics of a modern gasoline engine.

The power curve of a modern four-cylinder gasoline engine of average size rises until it reaches about 1,500 revolutions per minute when it will be producing its maximum power. Then the power curve begins to droop and soon rapidly falls to an insignificant figure.

When a gasoline engine is driven on merely friction load at its maximum possible speed the power which it is able to deliver is practically zero. But at this maximum speed the engine is being subjected to terrific internal strains and the difficulties of lubrication become a most serious matter. The difficulties of lubrication are perhaps most pronounced in the case of the cylinder walls and a great many of the best modern cars are equipped with automatic devices for greatly increasing the flow of the oil at the highest engine speeds.

Evidently the best engineering results could be obtained if the engine were never driven at speeds greater than that needed to produce the maximum power. Suppose the maximum power is produced at 1,500 revolutions per minute. At this speed lubrication is simple and there are no abnormally destructive effects due to the reciprocating parts. Suppose the gear ratio is such that the car can be driven on the direct drive at 36 miles per hour with the engine going at 1,500 revolutions per minute. The direct drive is then available for all customary touring speeds without racing the engine.

But in practically all cases the owner of the car will occasionally drive the car on a level road or slight down grade at the highest possible speed. He may succeed in forcing the engine to go up to 2,100 revolutions per minute, and drive the car at 50 miles per hour. **But in so doing he is likely to do more harm to his motor in a few minutes than would be the case in years of use at speeds not exceeding 1,500 revolutions per minute,** which is the speed we have assumed to represent the maximum power.

If the car operator has a fourth geared-up speed giving him a gear ratio which enables him to utilize his maximum power at 1,500 revolutions per minute, he can readily drive the same car at a much higher speed than 50 miles per hour while running his engine at a speed which makes extraordinary lubrication systems unnecessary, and he also avoids subjecting the engine and car to the destructive effects due to excessive engine speeds. And the engine being well balanced at 1,500 revolutions per minute, the entire car runs more smoothly and holds the road better.

Every engineer will admit that if the car is to be driven at 50 miles per hour it is better to do so by means of an engine running at 1,500 revolutions per minute rather than by the same engine at 2,100 revolutions per minute provided that the direct drive is available in both cases for ordinary grades and speeds.

With the three-speedbox and direct on third speed the tendency is to higher and higher engine power because this single third speed must be able to mount considerable grades and yet drive the car at the highest speed.

The employment of the four-speed gearbox with the third speed direct **tends to more moderate engine power which leads to a lighter weight for all the transmission mechanism, higher economy and greater durability.**

The great importance of preventing the operator from running his engine at excessive speeds is clearly indicated in the fact that the best modern motor trucks have their engines equipped with a governor which prevents the operator from racing his engine at these destructive highest possible engine speeds. In the case of trucks efficiency and durability determine the design far more than has been the case in the design of pleasure cars until recently. But the users of motor cars are rapidly being educated so that efficiency and durability will soon be given more consideration than heretofore, and the stunt hill climber which uses 50 per cent. more gasoline than necessary and lasts but a fraction of the time it should last is rapidly falling out of favor, and will eventually be replaced by the car of maximum efficiency and minimum depreciation of the same maximum speed. It is, therefore not surprising to note the gradual increase of the four-speed gearbox having the third direct, and it seems likely that the maximum speed governor which has proven of such value in the truck field will soon be applied in the pleasure car field, as a simple means of preventing these excessive engine speeds.—H. WARD LEONARD.—Ward Leonard Electric Company.

The AUTOMOBILE

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Increasing Efficiency

THE pendulum is swinging more than ever to production in the American factory. Production is largely responsible for the difference in the success of many companies of to-day. Frequently the best engineering product does not prove the best investment. In a word, it is not the greatest money maker. Production to-day means a thorough knowledge of the art of industrial management as understood and developed during the lost decade. The success of any great factory lies largely in the ability of its executives, and an executive cannot be a competent executive without a complete knowledge of the principles underlying this art. If the executive is not competent the factory fails to obtain its merited position.

One of the basic principles of industrial management consists in the transference of skill from the executive to those under him. If the executive has not this ability of transferring skill he has not a right to the position he holds. He may hold such a position for a time; his company may imagine he is a success in this capacity, but without this ability of transfering skill he will prove a failure when the real test arises. The results of an executive consist in what he is able to get his subordinates to do rather than what he is able to do with his own hand. Ability to obtain results from subordinates presupposes a very general knowledge of the work by the executive. In other words, the executive, to be competent, must be thoroughly familiar with all the methods and practices that the subordinate must use. It is this knowledge that has helped put the executive in his present position.

Not a few of our factory executives are found sadly wanting when weighed in the balance in this respect. So many of them are entirely inadequate, so far as their knowledge of detail is concerned; and many of them are equally inadequate when it comes to the transference of their skill to those under them. They are lacking in a knowledge of the science of psychology, which is a prime requisite with an executive if he is to be successful in transferring his knowledge to those under him.

In the transference of skill from an executive to those under him the threefold aspect of this work must be kept in view, namely, the executive must first make a systematic use of the experience he has previously gained in this work and impart this to his subordinates; second, he must, in a word, be a student of motion study in its various aspects so as to control effort in order that the minimum expenditure of effort will produce the maximum results; and third, he must increase the value of his subordinates by welfare work in which his personality to an extent is imparted to those under him. When he has assumed this attitude towards those beneath him, then and only then may he hope to attain the results that the trend of the times makes it necessary to obtain if his company or factory is to stand in the forefront.

During the last few months there has been pronounced activity in the automobile industry with the aim of creating, or invigorating the efficiency of the various departments in the industry. Sales managers have realized that the efficiency of the dealers throughout the country must be increased; advertising managers have realized that the efficiency of the advertising campaigns in their various sections of the country must be developed; and factory superintendents and production managers have been working overtime to get greater results from the same force of men, working the same number of hours per day and the same number of days per week.

There is to-day in many factories a deplorable lack of knowledge of industrial management. During the past year not a few concerns have been precipitated in legal entanglements and other factories have been discontinued. In nearly every case it has not been a question of poor car design, poor materials, or poor body style, but always a question of conducting the affairs of the company. One company has not been able to produce, and another company has not been able to sell the product. In either case it has been a lack of knowledge of the basic principles of industrial management. There has been much grasping at everything that might ward off the inevitable hour. But these have not been along proper lines.

For 1913 manufacturers must study and operate more than ever along the principles of industrial management. The motor industry as an industry demands it, and those concerns that are going to live and grow must build upon this art. They must use it in engineering, they must use in production, they must use it in advertising and they must use it in selling. The company which had not been operating in conformity with such a system cannot make the transition in a week, a month, or a year. It takes years to get the various subordinates into the habit stage, which is one of the prime essentials of such a system.

Teaching Value of Safety to School Children

American Museum of Safety Starts Educative Campaign in New York Schools to Prevent Accidents in Traffic Such as Those That Were Noted During The Past Year as Result of Carelessness and Recklessness on Streets

DURING the first 11 months of 1912 ninety-three children under the age of 16 years were killed in vehicular traffic accidents in New York City in which automobiles figured. Several of these fatalities were due to unavoidable mishaps; a few to careless driving, but by far the greater number are chargeable to carelessness, recklessness and negligence of the unfortunates themselves. It has been estimated that twelve of the fatal accidents were caused by roller-skating; the game of tag cost seven juvenile lives; careless riding of velocipedes, pushmobiles and bicycles on the streets by children resulted in eleven fatalities, while reckless acts of children, such as covering their heads while playing in the streets, either in games where a blindfold is used or otherwise, have resulted in serious accidents on numerous occasions.

Various solutions of this problem have been suggested in the past, but when they simmered down they took the form of restrictive legislation against the automobile driver rather than anything that would go to the foundation of the matter. Most of the accidents in New York occur when the automobile involved is traveling well within the legal limit and in conformance with the local ordinances, thus demonstrating the worthlessness of the law as a protector of life in many cases each year.

The situation presented is not how to hamper automobile operation more than at present. It is to educate the public to a true valuation of the dangers of traffic. A child learns from its mother than a hot stove will burn its hands if they come in contact with the stove. Consequently little hands are generally burned no more than once, but the child is allowed to gain its experience of traffic dangers by personal observation. As one accident may mean death, the value of experience is not very high.

In order to protect life and limb in street traffic, as well as the wider field presented by the great industries of the country, the American Museum of Safety was incorporated and maintains offices in New York. The museum is now placing its resources at the disposal of the New York public schools in an effort to check the slaughter of children by working at the foundation of the problem by educating the children to the dangers of the streets.

The method to be used is largely founded upon suggestion. Safety talks are conducted in the various schools under sanction of the Board of Education. These talks outline the terrible dangers that attend playing foolish tricks to torment and tease drivers. The favorite game of Never-Touched-Me is frequently fatal. In this game the player tries to see how close he can come to a fatality without actually suffering one. It has no rules and consequently is a nightmare to the drivers of automobiles, as they can never know what to expect from the player.

The game is played in a thousand different ways, one of the most spectacular of which is to lie down flat on the pavement and allow the automobile to pass along without touching the player. Of course, no child ever intends to take such a chance, but it has been done as many automobile drivers will attest.

Roller-skating in the streets is a fruitful source of trouble. The skaters rarely watch corners even when alone and when they are playing in groups the sudden apearance of an automobile is often unnoticed until the car is right among the children.

Pushmobiles on the streets are an unmitigated nuisance, dangerous to the operator and a source of apprehension to the automobilist.

Hitching on behind automobiles and motor trucks invites disaster. The old-fashioned game of tag, baseball in the streets, hockey, shinny and blindman's buff all are dangerous and all have taken toll of life.

The American Museum of Safety has already presented its safety talks to 10,000 New York school children and the work has only been in progress since December 10. It is planned to continue the work until the whole field is covered.

Aside from the addresses that are made the lecturers distribute leaflets and pamphlets to the children calling attention to the dangers of modern traffic in New York. The idea is to couple a real significance with the term safety. It is pointed out that death is the end of things earthly, and that death lurks in the traffic. That the loss of a limb means a handicap that can only be overcome in very unusual instances in these days of competition. That in either event, the best game of tag or hockey, or the finest kind of roller-skating is not sufficiently large as a consideration for lost life or limb. In other words, while all roller-skaters on the streets are not killed by automobiles and all tag-players are not knocked down by automobiles, the percentage is sufficiently large to make plausible the conclusion that the games themselves are not worth the risk.

Due diligence in the operation of automobiles is only a casual factor in the situation. Only a short time ago a case was reported where a boy ran into the side of the rear wheel of an automobile while playing tag, falling forward so that his arm was run over. The car was proceeding at less than 6 miles an hour at the time and in absolute control.

In the newspapers, cases are reported daily where children have darted directly in front of automobiles and horse-drawn vehicles as well, with varying results. On account of the controlling facilities of the automobile the drivers are frequently able to stop short when there is even the shortest period of warning. Of course, where the child dashes around the end of a street car and runs into an automobile accident is certain.

The conclusion is that where an unfortunate is run over by an automobile the speed of the automobile is immaterial. The main question is to avoid running over the child.

Wanted!—A Car and a Truck

The American Museum of Safety, an organization committed to the preservation of life and limb, with offices at 29 West Thirty-ninth street, New York, initiated a series of Safety Talks December 10, sanctioned by the New York Board of Education, the lectures being delivered to school children. The museum wishes to continue the work and for the purpose requires a four-passenger automobile and a 1,000-pound delivery wagon from now until the end of the school year. The organization requests the loan of such vehicles from the automobile industry as a measure of co-operation in its undertaking. The intent of the work is to educate the children to the dangers of traffic. The museum promises due credit to the lenders of the cars.

New Bodies at Salon Prime Show Feature

Several Unique Designs To Be On Display When Importers Open Astor Doors to Motoring Public

Two-Passenger Landaulet and Four-Seated Limousine in Luxurious Styles Will Attract Attention

CHANGED body styles will be the most palpable difference noted by visitors to the annual automobile Salon conducted in the Grand Ball Room of the Astor, which opens January 2.

At least two entirely new types of bodies will be introduced by the Salon. These are a four-seated limousine of the enclosed drive type, which is becoming very popular abroad, and a two-passenger landaulet, which is readily converted into a runabout by folding down the sides and top. The former is entirely enclosed and there is no division between the front and rear seats. Many of these bodies are fitted with four arm chairs for seats. Some of the new two-passenger landaulets have a third seat for the chauffeur which, however, is not enclosable. This third seat is on the same level as the front seat, so that the chauffeur does not sit above the passengers and driver, as in the old types of three-seated runabouts.

European body fashions for the coming year decree the six-seated car for limousines, landaulets and touring models. By making the rear seat no wider than the others this makes an absolutely straight line body possible, and the tendency toward straight lines has been more pronounced each year. This has another advantage in the case of limousines and landaulets, as the side windows can be dropped all the way down, because the body is entirely inside the rear wheels. With the old style body the windows could only be dropped half way. The six-passenger body of this type is another step toward popularizing the enclosed car for touring purposes by eliminating the bulging back of the three-passenger-on-the-rear-seat type of body this goes a long way toward improving the appearance of limousines and landaulets.

Another new tendency which the Salon will disclose is that of building enclosed bodies very low. This is not accomplished by mounting the bodies lower, for this would be hardly possible, but by providing considerably less head room. It is said that this has resulted in small hats for ladies which are the new fashion, although it is quite possible that the body designers have taken advantage of the new fashion in ladies hats to design a body far more graceful than the old type, with its ample head room. The flat roof for enclosed bodies has given way to the curved roof, so that its lines conform in harmony with the general design.

The interior decorations of the limousines to be exhibited at the Salon will prove a revelation to the average motorist. The upholstery, furnishings and inlaid woodwork of some of these limousines represent an expenditure of several thousand dollars.

Rival Show Announced for Quakers

PHILADELPHIA, PA., Dec. 21—With the question of where it is to be held definitely decided, the show committee of the Philadelphia Trade Association is actively at work completing arrangements for allotting space and other preliminary details incidental to the opening of the twelfth annual automobile show January 18 at the mammoth garage of the Automobile Club of Philadelphia. Space will be drawn for next Thursday.

With 90,000 square feet of floor space at the disposal of the committee this year in one building, as against 60,000 in two buildings last year, there will be no need to curtail allotments nor limit the number of exhibits, as formerly. Many companies that would otherwise have exhibited last year were forced to conduct private displays in their various buildings, owing to the fact that adequate display room could not be obtained in either of the two armory buildings where the show was held. Naturally, they will be in the fold this year, and as the Automobile Trade Association comprises an active ownership of 60 dealers, representing 90 different makes of cars, in addition to an associate membership of 20 accessories dealers, all or most of whom will exhibit, the show will be the largest and most representative of the industry ever held here.

The exhibition committee of the Philadelphia Automobile Trade Association consists of Louis C. Block, Ford Motor Company, chairman; W. P. Herbert, Lozier; H. M. Coale, Autocar; F. W. Eveland, Stevens-Duryea; A. E. Hughes, Pierce-Arrow, and H. Warren Terry, assisting secretary.

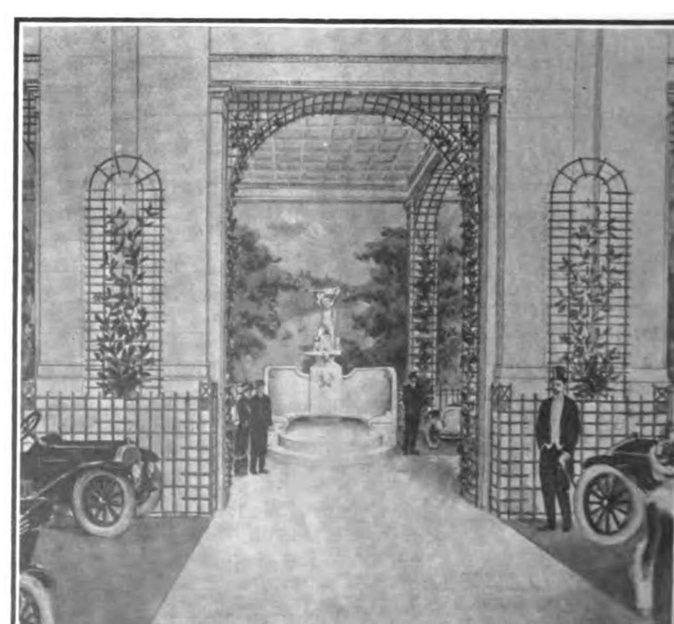
Quite a flurry has been stirred in local automobile circles by an announcement that J. H. Beck, a former secretary of the Philadelphia Automobile Trade Association, will conduct an independent show in the First Regiment Armory in opposition to the big show. This show will also open on January 18, under the auspices of the Philadelphia Automobile Board of Trade, Ltd., a recently organized body, but in no way connected with the Philadelphia Automobile Trade Association.

Hoosiers to Come East in Style

INDIANAPOLIS, Dec. 21.—Indiana automobile manufacturers are going in a body to the New York show and have arranged for a special train over the Pennsylvania Lines, which duplicates the equipment of the Pennsylvania Limited and other famous trains. Nine steel cars will carry them from the Hoosier Capitol.

The train will leave Indianapolis Thursday, January 9, 2 days before the show opens, and will reach New York City at 4:15 p. m. Friday afternoon. This schedule was arranged so that the manufacturers and their guests can make a feature of the dinner on Thursday evening and ride through the mountains and the beautiful main line suburbs of eastern Pennsylvania by daylight.

Soon after the train was announced the committee, composed of W. D. Edenburn and F. E. Wilson, of the Henderson Motor Car Company, and W. McK. White, of the Marion Motor Car Company, had received 112 reservations for space from people all over the Hoosier state.



Roman exedra to be seen at Grand Central Palace

Show Decoration Will Strike Harmonic Note

New York Automobile Display to Be Housed Amid Settings That Will Bring Out Beauties of Cars

French Grand Prix To Be Run Over 19-Mile Course North of Paris Near Amiens Having Triangular Shape

A GOOD idea of what the interior of Madison Square Garden and Grand Central Palace will look like when they have been converted to the purposes of the Thirteenth National Automobile Show, which is to be held in both buildings for 2 weeks, beginning January 11, has finally been made clear by the issuance of some colored photographs which are now being displayed in store windows in large cities throughout the country. A number of decorative features are entirely new and different from any ever before seen at an automobile show.

The general effect in both buildings is more imposing and impressive than in previous years, and there is very little theatrical or artificial treatment in the decorative schemes. The past 6 months the show committee, which consists of Col. George Pope, chairman; Alfred Reeves, and Merle L. Downs, secretary, have been putting forth strong efforts in their work of preparing an adequate setting not only for the cars, but for the accessories, and the schemes that have been hit upon are unusual. A Crystal Palace is what the show committee terms the decorative effect of the Garden, while the Grand Central Palace will be known as The Palace of Versailles. The treatment of the Grand Central Palace will be along the lines of the old palace of Louis XIV., with fountains, Corinthian pillars, vistas, etc.

The exhibition spaces on the main floor of both the Palace and Garden will be carpeted with a specially woven fabric of light green, to lend something toward the effect of the cars being on the turf. More than 12,000 square yards of carpeting will be used.

Entering the arena at the Garden exhibition the visitors will be confronted by a Roman seat and fountain. The fountain is opposite the center of the seat, which is of a low abutment of gray stone and has a trough-like basin containing gold fish and natural pond lilies, from which varied colored lights will radiate.

In the Garden a wide balustrade will extend along the outer edge of the elevated platform, while the walls at the back will be covered with an imported cartridge paper of golden hue. In the general view there will be three balconies in the rear and in the front of the Garden and but one on either side.

French Race On 19-Mile Course

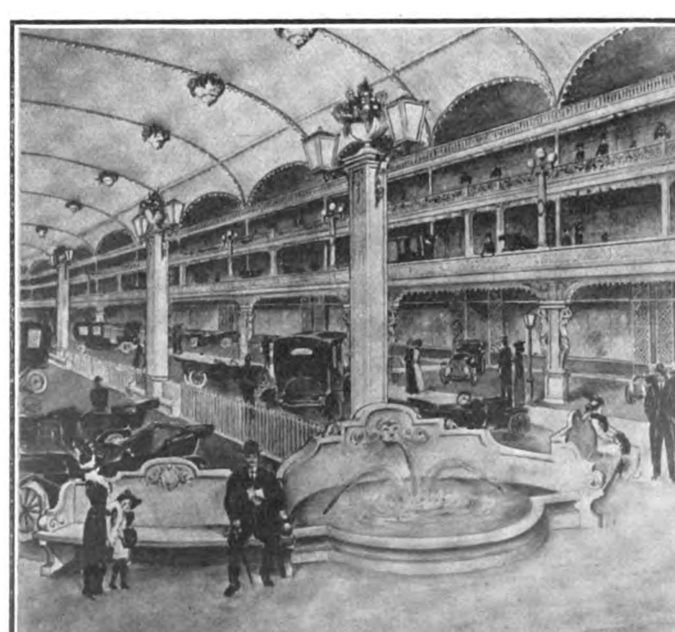
PARIS, Dec. 14—Next year's French Grand Prix race will be run on a 19-mile course, 2 miles to the east of the town of Amiens and 80 miles north of Paris. An official announcement regarding this course will be made next week, but from reliable inside information it is possible to definitely announce that the Amiens course will meet with the entire approval of the racing board of the French club.

Amiens, a flourishing town of more than 90,000 inhabitants, a large proportion of which are interested in the cloth and woolen trade, is on the main railroad line from Paris to Calais, with a railroad station on the main line within a couple of hundred yards of the point where the grandstands will be erected. It is within 80 minutes of Paris by rail, 3½ hours of London, and within easy reach of the Belgian frontier. The town can provide all the accommodation necessary for a big crowd of spectators.

Roughly, the course is triangular in shape, the first leg being a dead straight line 8 miles in length, of an undulating nature and with only one small village on it. This is an ideal speedway, being one on which the cars can be run with wide open throttle from beginning to end. A sharp turn to the right takes the cars on the second leg of the course, nearly 3 miles in length, all of it being straight and level with the exception of the last few hundred yards, which are on a slight downgrade into the village of Moreuil. The third leg measures a little more than 8 miles of a very wide and slightly winding national highway, which twice passes under the main railroad line from Paris to Calais. There are rather difficult S turns under the bridges. During the last half mile the road is parallel with the first leg of the course, the distance between them being so slight that the whole of the land between the two roads has been secured by the racing board and will be used for grandstands and pits. Spectators within this space will therefore see the cars approaching on the national highway, watch them go round the bend, and see them disappear on the fastest portion of the course. It is proposed, instead of taking the cars right down to the fork, to build a special cross-country road uniting the two parallel portions of the course. This will make it possible to provide an easier bend and one which, on being banked, can be taken at speed, thus adding to the spectacular nature of the race. Grandstands will doubtless be erected both inside and outside the bend.

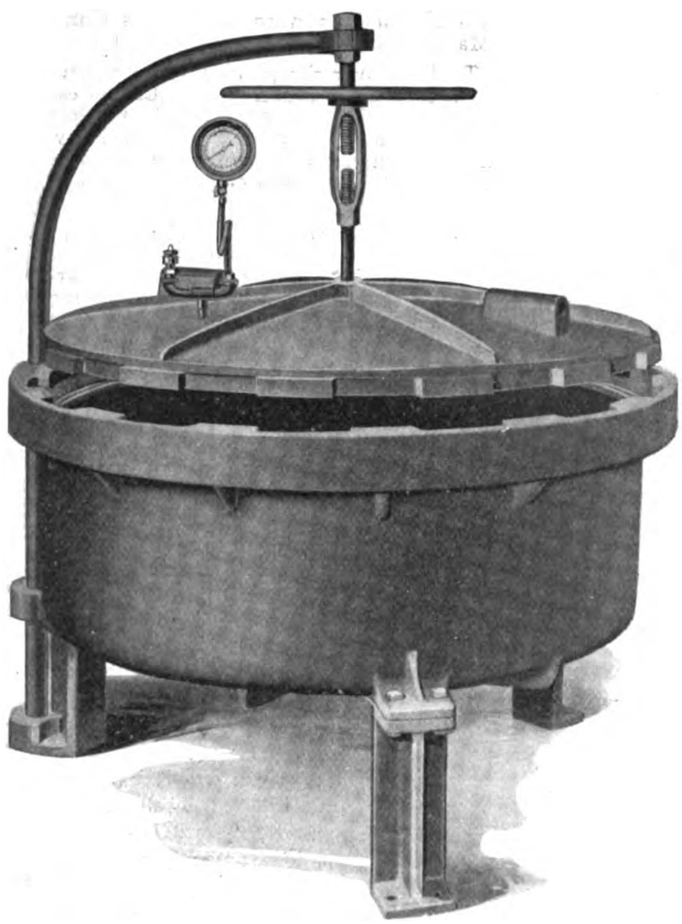
At the present time there are 16 cars for the French Grand Prix race. These are three Sunbeam, three Peugeot, two Delage, one Mathis, three Itala, one Opel and three Schneiders, the nations represented being England, France, Germany and Italy. Final entries close at the end of the year, by which time it is expected that there will be 35 to 40 cars on the list. It is understood that Mercedes will enter a full team, and it is most probable that Fiat and Benz will come in at the last moment. Other firms having the matter under consideration are Motobloc, Piccard-Pictet, Alcyon, Lorraine-Dietrich and Mors. It is quite possible that most of these firms will wait until the last possible moment before putting in their entries, for there is an intention on the part of some of them to bluff rivals out. It is practically certain that the French Grand Prix will be held during the last week of June or the first few days of July.

The 3-liter race, originally fixed for Sunday, June 29, will be postponed until the middle of September in order to give manufacturers an opportunity of taking part in both races and to avoid clashing.



Decorative scheme to be used at Madison Square Garden

Factory Miscellany



Quick opening tire kettle made by the Williams Foundry & Machine Company, Akron, O., for use in the steam curing process. It has the good feature of having no nuts or bolts to tighten when the cover is in place

AFTER the tires are wrapped they are handled in what looks like a prodigious soup kettle. This kettle is for the steam process and therefore must be capable of resisting the pressure of the steam used in the curing of the tire. The kettle shown above is not the largest size made, but is the type used in all but the largest plants. It measures 43.5 inches inside diameter and has a capacity of four tires which are all handled at the same time. The tires which can be taken care of are anything from a 42-inch size down. The curing space is 16 inches in depth above the grating in the bottom of the kettle. The shipping weight of the kettle is 2,100 pounds. It is made of open hearth steel and is tested with 200 pounds hydraulic and 75 pounds steam pressure. It can be opened and closed rapidly by turning the wheel which manipulates a differential screw and nut, lifting the cover. A boltless head is used, not one nut having to be tightened when the cover is put in place. When the tire is cured the steam inlet valve is shut off and the steam in the kettle blown out. The crane lifting the lid can be swung to one side out of the way.

SWINEHART's **New Buildings**—New buildings have doubled the capacity of the Swinehart Tire and Rubber Company, Akron, O. The mill room has been enlarged and the tire building department has had its capacity doubled. A one-story addition, 100 feet by 20 feet, has been built for a chemical laboratory. The plant occupies a three-acre plot and comprises six buildings, the main ones being of three and four stories.

Mayer Building—The Mayer Carbureter Company, Buffalo, N. Y., contemplates erection of a Detroit, Mich., factory.

Tire Plant in Oklahoma—A plant for the manufacture of leather tires for automobiles is to be established at Oklahoma City, Okla., by Don O. Nation.

Sandusky Plant Enlarges—The Sandusky Automobile Parts Company, Sandusky, O., maker of automobile trucks and accessories, is planning the enlargement of its plant.

Corcoran Brothers Build—The Corcoran Brothers Company, Cincinnati, O., manufacturers of automobile and carriage lamps, will soon begin work on a four-story factory addition.

Plans for Addition—The National Motor Vehicle Company, Indianapolis, Ind., has submitted plans for an addition to its factory. The addition will be a three-story brick structure 83 feet by 97 feet.

Parish Starts Work—Another large company has started work in Detroit, Mich., the Parish Manufacturing Company, which has already made shipments. The company will employ over 1,000 men.

Rushing Truck Factory Work—The foundation for the new motor truck factory to manufacture the Traves machine in Ravenna, O., is practically completed, and all endeavors are being directed at present toward completing the plant.

Adds Four-Story Addition—D. Israel, New York City, general metal worker, will build a four-story addition. One floor will be used for manufacturing oil tanks, copper and tin measures and funnels, and the remaining floors for show room.

Buffalo Plant Moves—The Buffalo Top & Trimming Company, Buffalo, N. Y., manufacturer of automobile bodies, tops and accessories, will remove its plant from 108 The Terrace to 121-234 West Chippewa street, where it is fitting up a new factory.

Baker to Expand Plant—Building plans and operations are under way at the Baker Motor Vehicle Company, Cleveland, O., which will increase the size of the factory by about 30 per cent. Most of the new buildings will be occupied by the truck department.

Garford Asks for Bids—The Garford Company, Elyria, O., has asked for bids on the erection of an addition to the automobile plant. One building will be 57 feet by 280 feet, structural steel, saw-tooth roof and the stock room and shop offices will be 45 feet by 45 feet, four stories.

Perfecto Radiator Moves—The Perfecto Radiator Company, Chicago, Ill., manufacturing automobile radiators and specialties, has moved to Racine, Wis., and is occupying a moderate sized plant. Twenty workmen are employed at present, and this number will be increased as more room is obtained.

Rutenber Purchases Factory—The Rutenber Motor Company, of Marion and Logansport, Ind., has purchased a factory at Chatham, Ont., in which to manufacture motors for the Canadian trade. W. Bowen, of the Bowen Manufacturing Company, of Auburn, N. Y., has been placed in charge of the Canadian plant.

Goodyear Doubles Capacity—About March 1, the Goodyear Tire & Rubber Company, Akron, O., will have a capacity of 8,000 tires a day. This will be made possible by three new buildings which have been acquired and are being fitted up for use. With these the capacity of the plant will be just double what it was a year ago.

Michigan Buggy Adding—The Michigan Buggy Company, Kalamazoo, Mich., is erecting an addition, 50 feet by 180 feet, three stories, to its plant, which will be devoted exclusively to its automobile manufacturing department, and its buggy factory will be extended into the building made vacant by the removal of the automobile department.

Brazil May Get Plant—The Brazil, Ind., Factory Promoting club has received a proposition from a large automobile plant which is seeking a new location. The managers of the plant say the company has $80,000 invested in the business at its present location and that if local men will guarantee $75,000 additional capital that it will remove there.

Budd Company Building—The E. G. Budd Manufacturing Company, Philadelphia, Pa., is having plans prepared for a three-story factory building, 75 feet by 500 feet, to be erected at Tioga and C streets. The Budd company manufactures steel automobile bodies and general pressed steel work for the construction of which the new building will be used.

Shows, Conventions, Etc.

Jan. 2-10..........New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11..........Cleveland, O., Annual Automobile Show.
Jan. 4-11..........Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-18.........Milwaukee, Wis., Annual Show, Auditorium, Milwaukee Automobile Dealers'. Association.
Jan. 11-25.........New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 18-25.........Philadelphia, Pa., Annual Automobile Show.
Jan. 21-26.........Toledo, O., Annual Show, Exposition Building, Toledo Automobile Shows Company.
Jan. 25-Feb. 1.....Montreal, Que., Montreal Automobile and Truck Show, R. M. Jaffray, Manager.
Jan. 25-Feb. 1......Providence, R. I., Annual Show, State Armory, Rhode Island Automobile Dealers' Association, Inc.
Jan. 27-Feb. 1.....Philadelphia, Pa., Truck Show.
Jan. 27-Feb. 1.....Buffalo, N. Y., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1..... Rochester, N. Y., Annual Show, Exposition Park, Dealers' Association.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Jan. 27-Feb. 13....Troy, N. Y., Annual Show, State Armory, Troy Automobile Club.
Feb. 1-8...........Chicago, Ill., Annual Automobile Show, Coliseum and 7th Regiment Armory.
Feb. 3-8...........Washington, D. C., Annual Show.
Feb. 8-15..........Hartford, Conn., Annual Show, State Armory, Hartford Automobile Dealers' Association.
Feb. 10-15.........Chicago, Ill., Truck Show.
Feb. 10-15.........Minneapolis, Minn., Annual Automobile Show.
Feb. 10-15.........Ottawa, Ont., Ottawa Motor Show, Howick Hall, Louis Blumenstein.
Feb. 15-22.........Albany, N. Y., Annual Show, State Armory, Dealers' Association.
Feb. 15-22.........Newark, N. J., Annual Automobile Show, First Regiment Armory, New Jersey Automobile Exhibition Company.
Feb. 16-23.........Richmond, Va., Annual Show.
Feb. 17-22.........Kansas City, Kan., Annual Automobile Show.
Feb. 18-21.........Grand Forks, N. D., Annual Show, Auditorium, Dealers' Association.
Feb. 18-22.........Baltimore, Md., Annual Show, B. A. D. A.
Feb. 19-22.........Bloomington, Ill., Annual Show, Coliseum, McLean County Automobile Club.
Feb. 19-22.........Geneva, N. Y., Automobile Show, Armory, Louis Blumenstein.
Feb. 19-27.........Topeka, Kan., Annual Show.
Feb. 20-22.........Canadaigua, N. Y., Automobile Show, Louis Blumenstein.
Feb. 22-Mar. 1.....Brooklyn, N. Y., Annual Show, 23rd Regiment Armory.
Feb. 24-27.........Kansas City, Mo., Truck Show.
Feb. 24-Mar. 1.....St. Louis, Mo., Annual Show.
Feb. 24-Mar. 1.....Memphis, Tenn., Annual Show.
Feb. 24-Mar. 1.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1.....Paterson, N. J., Annual Show, Paterson Automobile Trade Association.
Feb. 26-Mar. 1.....Fort Dodge, Ia., Annual Show.
Feb. 26-Mar. 1.....Glen Falls, N. Y., Automobile Show, Louis Blumenstein, Manager.
March 3-8..........Pittsburgh, Pa., Annual Automobile Show.
March 3-18.........Des Moines, Ia., Annual Show, Pleasure Car Section, Coliseum, Dealers' Association.
March 5-8..........Tiffin, O., Annual Show, Tiffin *Daily Advertiser*.
March 8-15.........Boston, Mass., Annual Automobile Show.
March 12-15........Ogdensburg, N. Y., Automobile Show, Louis Blumenstein, Manager.
March 18...........Syracuse, N. Y., Annual Show, Syracuse A. A.
March 19-26........Boston, Mass., Annual Truck Show.
March 20-24........New Orleans, La., Annual Show, N. O. A. D. A.
March 24-29........Indianapolis, Ind., Annual Automobile Show.
Jan. 6.............New York City, Meeting Motor Dealers' Contest Association.
Jan. 14............New York, Beefsteak Dinner, Big Village Motor Boosters.
Jan. 15............New York City, Banquet, Waldorf-Astoria, Motor and Accessory Manufacturers.
Jan. 16............New York City, Meeting, Hotel McAlpin, Society of Automobile Engineers.
Jan. 17............New York City, Banquet, Hotel McAlpin, Society of Automobile Engineers.

Race Meets, Runs, Hill Climbs, Etc.

May 30............Indianapolis, Ind., 500-Mile Race, Speedway.

Foreign

Jan. 11-22..........Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.
March ....France, Sealed Bonnet 3000-Mile Run.
March 31..........Montevidio, Uruguay, International Competition of Agricultural Motor Vehicles.
April ....Barcelona, Spain, International Exhibition.

White Plant Expanding—The White Company, Cleveland, O., will add to its factory space on February 1 a one-story sawtooth building, 160 feet by 240 feet, and will be completed at the north end of the plant. It will be used for chassis testing and body fitting and allow for just that much manufacturing expansion in other departments. A high iron fence now surrounds the factory buildings.

Detroit Workers Strike—Because members of the Carriage, Wagon & Automobile Workers' Union desire a shop committee, and the employers, professing to see in this demand a move to establish the closed shop and have refused the men's request, about 1,000 union men have gone on strike in Detroit, Mich. Five plants of the American Auto Trimmings Company and the Briggs Manufacturing Company are affected.

Gilbert in Detroit—To look over the plans for the 14 factory buildings to be added to the Morgan & Wright tire establishment, Detroit, Mich., J. M. Gilbert, general manager of the United States Tire Company, was in Detroit recently. When the additions are completed Detroit will have the largest tire plant in the world. The plant will employ more than 5,000 men and will bring 3,000 additional workers to the city.

Michelin in Wisconsin—The Michelin Tire Company of New Jersey, is the latest tire company to establish a direct factory branch in Wisconsin. The corporation has filed articles and a statement to do business in Wisconsin, giving its capital stock as $3,000,000 and the Wisconsin interest at $25,000. The location of the new branch, which will be in Milwaukee, has not been announced, but definite arrangements will be completed by January 1, the date of the opening.

Mt. Clemens Factory—Three parties, representing an automobile concern, appeared recently before the industrial committee of the Business Men's Association, Mt. Clemens, Mich., and submitted a proposition to locate automobile shops in that city. The representations made seem to be very favorable and the committee is investigating the proposition and the men behind it. The committee will meet again to consider the matter further.

Employees Share Stock Dividend—Notice has been given to the shareholders of the Baker Motor Vehicle Company, Cleveland, O., of a stock dividend of $200,000, of which half will go to the shareholders and half to employees. This is said to be the first case on record where shareholders and employees have been treated with absolute equality in the distribution of a stock dividend. At last reports, the company had an authorized capitalization of $1,000,000, of which $500,000 was outstanding.

Piggins Wants to Move—The Piggins Motor Truck Company of Racine, Wis., manufacturing Piggins commercial vehicles and for many years engaged in the manufacture of motors for pleasure and commercial cars and parts, is considering several good propositions from commercial clubs and business men's organizations throughout the central west to move from Racine. Unless local capital makes inducements, it is believed likely that the Piggins company will entertain invitations from other cities. Nothing definite will be done before the first of the new year, however.

Stockroom of the Standard Welding Company, Cleveland, O., showing the method of storing the rims in stock

Farewell dinner given to Alfred Reeves by the sales organization of the United States Motor Company at Paul Rector's, New York City

CHALMERS Celebrates Ginger Night—Gathering together salesmen, traveling men, district managers and officers in 300 cities throughout the United States, the Chalmers Motor Company, Detroit, Mich., celebrated Ginger Night. At 7:30 o'clock or earlier in all these places simultaneous meetings of the Chalmers dealers and their organizations were held. At the same time a banquet and meeting of heads of departments and other officials of the factory organization was held in Detroit. Throughout the evening the central meeting in Detroit was in telegraphic touch with the other Ginger meetings throughout the country.

Grant Manager Grinnell—S. J. Grant has been appointed Detroit, Mich., branch manager for the Grinnell Electric Car Company.

Classifies Careless Drivers—A Chicago, Ill., judge has classified careless drivers of automobiles and motorcycles as users of deadly weapons.

Jordan Hoffecker Manager—Walter I. Jordan has become Detroit, Mich., manager for the Hoffecker Speedometer Company, Boston, Mass.

McDuffee Western Sales Manager—J. H. McDuffee has been appointed western sales manager by the F. B. Stearns Company, Cleveland, O.

Racine Company's Office—The Racine Brass & Iron Company, of Racine, Wis., has broken ground for a new office building and is making improvements in its works.

Schacht in Baltimore—The Schacht Motor Car Company, Cincinnati, O., will open a factory branch on January 1 in Baltimore, Md., which will be in charge of I. R. Smith.

Haybell Resigns—E. A. Haybell, who has been traveling out of the Washington, D. C., branch for the Studebaker Corporation, South Bend, Ind., has resigned his position.

Ready Resigns—W. J. Ready, superintendent of the Lozier Motor Company, Detroit, Mich., has resigned to become manager of the Star Motor Company of Ann Arbor, Mich.

Trucks Distribute Mail—Motor trucks are to be employed this year by the Minneapolis, Minn., post office to distribute extra Christmas package mail instead of horses and wagons.

Schacht Opens Factory Branch—The Schacht Motor Car Company, Cincinnati, O., recently opened a factory branch at 1700 Broadway, New York City, with a service station at 536 West 49th street.

Kemmerer's New Quarters—The E. A. Kemmerer Automobile Company, of Janesville, Wis., has just taken occupancy of its new garage building, erected at a cost of $35,000 and covering nearly a half block at 206-208-212 East Milwaukee street. The building affords 37,500 square feet of space and 300 cars may be stored in it. It is one of the largest garages in Wisconsin.

Richmond Automobile Doings—The Chesterfield Motor Car Company, Richmond, Va., is in new quarters on West Broad street, while the home of the Foster Motor Car Company has been remodeled.

Building for N. Y. Trade—A twelve-story fireproof building for the automobile trade will soon be completed on West Fifty-fourth street at a cost of about $400,000 and will occupy a space of 57 feet by 100.5 feet.

Philadelphia Firm Moves—The Baker-Bell Motor Company, Philadelphia, Pa., distributor of the Baker-Bell commerce delivery truck, will on January 1 take possession of its new quarters at 665 North Broad street.

Kline Car for Police—The Kline Motor Car Corporation, Richmond, Va., recently delivered to the police department of that city a model 4-40 touring car, which will be used to bring to justice joy riders and speed violators.

Crum Oshkosh President—Dr. J. A. Crum was re-elected president of the Oshkosh Automobile Dealers' Association of Oshkosh, Wis., at the annual meeting recently; F. S. Hoaglin was elected vice-president; A. H. Thom, secretary, and W. F. Scoular treasurer.

Condemn Indiana Road System—The present Indiana road building and road maintenance system was condemned and a radically new system proposed, at the meeting of the Indiana Better Roads convention held at the German House in Indianapolis, Ind., recently.

Clubs Form Alliance—The Antigo, Wis., Automobile Club and the Commercial Club of Antigo have formed an alliance to boost the good roads movement and to raise funds for improvement of highways until the county government can make permanent improvements with state aid.

Ellsworth Completes Garage—The Ellsworth Auto & Repair Company, of Ellsworth, Wis., has completed the construction of its new garage building, but will continue its old garage until next spring, using the new building for dead storage. The equipment will not be added until spring.

Milwaukee Factory Branch Established—The report that the United States Tire Company would on January 1 establish a direct factory branch at Milwaukee, Wis., to supersede the state agency held by the Goodyear Rubber Company, 382-386 East Water street, Milwaukee, has been confirmed. On January 1 the U. S. Company will establish a branch at 454-456 Milwaukee street.

Ryan Manager—W. A. Ryan has been appointed manager of the Ford Motor Company's Detroit, Mich., retail store.

Doyle Resigns—Thomas Doyle has resigned as manager of the Detroit, Mich., branch of the Ford Motor Company.

Chattanooga's Mail Car—An automobile mail wagon has been assured the Chattanooga, Tenn., post office by the department in Washington.

Open Baltimore Quarters—Quarters have been opened in Baltimore, Md., at 308 North Holliday street by the Rhollo Tirefiller Company, which is in charge of C. B. Berry and W. N. Glass.

Armstrong Resigns—Charles A. Armstrong, assistant salesmanager of the Mitchell-Lewis Motor Car Company, Racine, Wis., has resigned effective January 1. A successor has not yet been chosen.

Storing Cars for Spring—The A. A. Atwood Automobile Agency, Toledo, O., is storing over a hundred Overland cars in the warehouse of the D. & C. Steamship Company, at the foot of Madison avenue for spring delivery.

Taylor with Rutenber—Ceil Taylor, formerly engineer for the Chalmers, Hudson and Studebaker companies, is now consulting engineer for the Rutenber Motor company with factories at Logansport and Marion, Ind., and in Canada.

Franklin's Conference—A conference of the Franklin automobile dealers in New York State was held on December 20 at the Franklin factory, Syracuse, N. Y., with D. F. Garber, New York State district sales manager, presiding.

Urban Sales Manager—To succeed F. E. Moskovics, whose resignation takes effect March 1, 1913, Fred J. Urban, special representative of the Remy Electric company in Chicago, Ill., and Detroit, Mich., will become general sales manager.

Denver Club Active—Building a country home at some especially attractive suburban location and improving many miles of Colorado roads are among the activities contemplated by the Denver Motor Club, Denver Colo., for the coming year.

Flegel's Gauge—Harrison D. Flegel, of Racine, Wis., is about to market a new type of gauge for measuring the depth of liquids in tanks. Mr. Flegel has been granted letters patent on the device and is establishing a workshop for its manufacture.

Booths of the Cadillac and R. C. H. Corporation at the Paris Show

Theft a Penitentiary Offense—A victory in the Ohio fight to make the theft of an automobile a penitentiary offense was won December 20 when three indictments, charging grand larceny, were returned against a trio of young men for driving away the car of Mason B. McLaughlin, sales manager for the White Company, Cleveland.

Lewis Honored—Captain William Mitchell Lewis, president of the Mitchell-Lewis Motor Company, Racine, Wis., was made the recipient of the highest honor in the gift of the Milwaukee Press Club at the annual Festival of the Sacred Cat recently, by being dubbed the fourth knight of Bohemia, a degree of recognition of friendship.

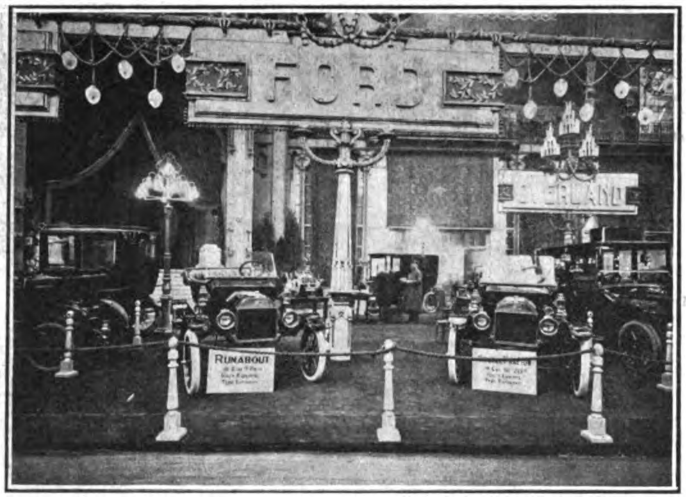
New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Adair, Ia.	Marathon	S. B. Gwin.
Alma, W. Va.	Jackson	R. Ankrom.
Amarillo, Tex.	Marathon	W. T. Pyland.
Auburn, N. Y.	Lozier	Stillwell Auto Co.
Austin, Tex.	Marathon	Louis P. Meyer.
Baltimore, Md.	Mitchell	D. C. Walker Auto Co.
Bartlesville, Okla.	Moon	Cherokee Motor Car Co.
Batavia, N. Y.	Marathon	R. B. Brown.
Bayonne, N. J.	Marathon	Livingston Motor Car Co.
Beaver Falls, Pa.	Cole	Seanor & Williams Co.
Berlin, Ont.	Cole	Aaron Bricker.
Boston, Mass.	Ames	C. B. Johnson Co.
Boston, Mass.	Pullman	C. B. Johnson Co.
Boston, Mass.	Nyberg	Nyberg Auto Co.
Boston, Mass.	S. G. V.	I. W. Bowman.
Brockton, Mass.	Cole	L. E. Reynolds.
Brooklyn, N. Y.	Jackson	The Central Garage.
Charlevoix, Mich.	Cole	J. A. Vought.
Chicago, Ill.	Buick	Hippe Motor Car Co
Chilton, Wis.	Overland	Hippe Motor Car Co.
Chilton, Wis.	Marathon	S. M. Stone.
Chilton, Wis.	Rambler	Hippe Motor Car Co.
Clark, Mo.	Moon	Clark Auto Co.
Columbia, Tenn.	Cole	Columbia Motor & Implement Co.
Columbus, O.	Empire	S. W. Schott & Co.
Columbus, O.	Franklin	Barr Motorcycle Co.
Connellsville, Pa.	Cole.	The Connellsville Garage.
David City, Nebr.	Cole	Doty Motor Co.
Des Moines, Ia.	Studebaker	Des Moines Motor Co.
Dwight, Ill.	Kissel Kar	Short's Garage.
Early, Ia.	Marathon	Rosenhaner & Eckerman.
Fargo, N. Dak.	Kissel Kar	Ball Auto Co.
Findlay, O.	Ford	Philip Oelberg.
Fort Wayne, Ind.	Kissel Kar	H. G. Raymond.
Franklin, Pa.	Kline	E. Blakeley.
Harrisburg, Ill.	Moon	Chas. V. Parker.
Hazelton, Pa.	Cole	Adam Eidam.
Henderson, Tex.	Franklin	Henderson Crow Co.
Horicon, Wis.	Velie	Hornlein Bros.
Iron River, Mich.	Kissel Kar	Bishop & Chero.
Jersey City, N. J.	Jackson	Emil Moch.
Manchester, N. H.	Marathon	H. M. Lamphrey.
Manhattan, Kans.	Kissel Kar	Chas. H. Lantz.
Medicine Hat, Al.	Kissel Kar	Dominion Motor Machine Co.
Milwaukee, Wis.	Chalmers	Smith-Hoppe Auto Co.
Milwaukee, Wis.	Pullman	E. B. Leverenz.
Muskegon, Mich.	Cole	W. P. Marshall.
New Canaan, Conn.	Jackson	B. H. Keller.
New York City	Marathon	Apperson Motor Car Co.
Oakland, Cal.	Kissel Kar	C. C. Eichelberger.
Patchogue, N. Y.	Jackson	Patchogue Garage Co.
Phoenix, Ariz.	Marathon	McCondra & Hoeye.
Pittsburg, Pa.	Kissel Kar	Alpine Motor Co.
Plattsburg, N. Y.	Marathon	F. J. Dragoon.
Port Kent, N. Y.	Marathon	E. J. Dague.
Pueblo, Colo.	Federal	Ideal Motor Car Co.
Quebec, Canada	Cole	Frank Campbell.
Reading, Pa.	Lozier	D. B. Hoffer & Sons.
Richmond, Va.	Lozier	Lozier Motor Sales Corp.
Rochester, Vt.	Cole	F. J. Robinson.
Salem, Ore.	Cole	Chamberlin Bros.
Sandusky, O.	Moon	J. F. Singler.
San Francisco, Cal.	Moon	Dillon-Goodwin Co.
San Marcos, Tex.	Marathon	Ernest Hohenberg.
Saskatoon, Sask., Can.	Cole	Robert McIntosh.
Scranton, Pa.	Jackson	Central Automobile Co.
Sheboygan, Wis.	Mitchell	E. & H. Motor Co.
Sheboygan, Wis.	Regal	E. & H. Motor Co.
Sherbrooke, Que.	Kissel Kar	J. D. McKee.
Southport, Conn.	Lozier	Burkley's Auto Station.
Spokane, Wash.	Franklin	Spokane Auto Truck Co.
St. Johnsbury, Vt.	Kissel Kar	Percival & Silsby.
St. Louis, Mo.	Pathfinder	New York Motor Car Co.
St. Louis, Mo.	Winton Six	Von Arx Bros. Auto Co.
St. Louis, Mo.	Wilcox	F. A. Nolan.
Strong City, Kans.	Cole	Jacob Hinden.
Sunbury, Pa.	Kline	W. H. Weaver.
Syracuse, N. Y.	Kline	Bradley J. Lane.
Taft, Cal.	Kissel Kar	Jack L. Maddox.
Tampa, Fla.	Cole	West Coast Auto Co.
Taylor, Tex.	Moon	Prewitt Auto Co.
Toledo, Ohio	Imperial	Cornelius-Hohly Auto Co.
Topeka, Kans.	Cole	Vesper & Evans.
Traverse City, Mich.	Cole	Wm. Goode.
Vassar, Mich.	Franklin	Miller Auto Co.
Victoria, B. C., Canada	Cole	Moore & Pauline.
Washington, D. C.	Reo	Barnard Motor Car Co.
Washington, D. C.	White	White Automobile Co.
Waterloo, Ia.	Lozier	Miller Motor Car Co.
Winnipeg, Man.	Little	Canadian Motors Co.

COMMERCIAL VEHICLES

Place	Car	Agent
Columbus, O.	Federal	Coates Motor Co.
Houston, Tex.	Federal	Hawkins-Halff Co.
Kansas City, Mo.	Federal	Dailey & Warriner.
Lexington, Ky.	Federal	Blue Grass Auto Co.
Louisville, Ky.	Federal	Cumberland Motor Co.
New York City	Adams	I. Sekine Co.
Rochester, N. Y.	Federal	J. Cunningham.
Sheboygan, Wis.	Chase	E. & H. Motor Co.
Syracuse, N. Y.	Federal	A. J. Jackson.
Toledo, O.	Federal	H. B. & W. H. Wilkinson.
Weldon, Ia.	Marathon	Horney Bros.
White Rock, S. Dak.	Kissel Kar	Rydell & Hokenson.
Williamsport, Pa.	Cole	F. L. Sheffer.
Winfield, Ia.	Moon	Nesbitt Auto & Supply Co.
Youngstown, O.	Federal	Youngstown Carriage Co.



The Ford had a big exhibit at the recent Paris Salon

Will Operate Bus Line—A Cincinnati, O., builder will operate a bus service between Reading, O., and Avondale, where car service is not available.

Buxton & Childs Move—Buxton & Childs, the Moon agents ni Los Angeles, Cal., will soon move into their new building, situated at Pico and Olive streets.

Wilson with Studebaker—O. S. Wilson has been assigned to the east and south as district representative of the Studebaker sales department, South Bend, Ind.

Enders General Superintendent—H. J. Enders has been made general superintendent of The Oakes Company, manufacturers of automobile parts, at Indianapolis, Ind.

Indianapolis Race Arrangements—Arrangements for the third annual 500-mile race are now being made by the management of the Indianapolis Motor Speedway, Indianapolis, Ind.

Marion in Binghamton—The American-Marion Sales Company of New York City has closed contract with Lewis & Niblette of Binghamton, N. Y., for the sale of Marion automobiles.

New Seattle Firm—A new firm has been added to Seattle's Automobile row, Seattle, Wash., namely, the Autoparts Supply Company at 702 East Pike street. E. L. Hawkes is president and manager.

Syracuse Club Reinstated—The New York State Automobile Association held its annual meeting at Utica, N. Y., recently, and practically reinstated the Automobile Club of Syracuse, Syracuse, N. Y., to membership.

Establish Milwaukee Branch—The American Tire & Rubber Company, of Akron, O., has established a branch at Milwaukee, Wis., under the management of Albert Wiesskopt. The headquarters are at 252-254 Fifth street.

Maritime Show February 8—The first automobile show to be held in the Maritime Provinces, Can., will be held in the drill hall, St. John, N. B., Feb. 8 to 15, under the auspices of the New Brunswick Automobile Association.

Arthur with Croxton—B. D. Arthur, formerly western sales manager for the Ohio Motor Car Company of Cincinnati, O., has been made vice-president and general sales manager of the Croxton Motor Car Company of Washington, Pa.

Ohio Registration Statistics—In 1911 there were a bare 3,000 cars in Hamilton County, O. According to the 1912 report of the registrar of state there are now 4,027, 228 of which are electrics. These figures are based on a September report.

Deupree Resigns—H. G. Deupree, for two years assistant sales and advertising manager of the Remy Electric Company of Anderson, Ind., has resigned to become vice-president and active executive of a large real estate company in Indianapolis, Ind.

Schacht Lowest Bidder—The Schacht Motor Car Company of Cincinnati, O., was the lowest bidder to furnish the city of Springfield, O., with three motor-drawn hose wagons, equipped with chemicals. The bid underwent a Springfield concern by $350.

Chilton's Garage—The city of Chilton, Wis., now has its first complete garage, salesroom and repair shop, the Hippe Motor Car Company having completed a 2-story building, 50 feet by 80 feet in size, in which general automobile work will be carried on.

New Winnipeg Club Quarters—New country headquarters have been secured by the Winnipeg Automobile Club, Winnipeg, Man., in the old historic Lower Fort Garry, built by the Hudson Bay Company as a trading post on the banks of the Red River in 1832.

Howard Goodyear President—G. T. Howard has been appointed manager of the Washington, D. C., branch of the Goodyear Tire & Rubber Company, succeeding F. W. Powers, who has been promoted to the managership of the Goodyear branch in Philadelphia, Pa.

New Orleans Adds Ambulance—After 31 months' service without a single breakdown the automobile ambulance in the service of the charity hospital at New Orleans, La., has so proven its worth that another motor ambulance is to be added in the near future.

Richards Resigns—George H. Richards, secretary-treasurer of the Veerac Motor Company, Minneapolis, Minn., has re-

Automobile Incorporations

AUTOMOBILES AND PARTS

Appleton, Wis.—Appleton Motor Car Co.; capital $15,000, to deal in new and second-hand cars, and do a general accessory garage repair and storage business. Incorporators: J. A. Schmit, J. A. Kronser and John McCann.

Brooklyn, N. Y.—Bedford Auto Renting & Repair Company, Inc.; capital $10,000. Incorporators: Geo. J. Murphy, Jos. H. Bernstein and August E. Fuchs.

Brooklyn, N. Y.—Brooklyn Auto Livery Company, Inc.; capital $20,000. Incorporators: Lewis W. Boynton, Dodge B. Hicks & Chas. M. Fuller.

Buffalo, N. Y.—Buffalo Automobile Sales Corporation; capital $15,000. Incorporators: Wm. J. Harris, Wm. U. Heverly and Maud McDonald.

Buffalo, N. Y.—Marvel Motor Car Company; capital $25,000. Incorporators: Myron B. Franklin, Geo. B. Klein and Herman Kleinhans.

Buffalo, N. Y.—Glide Sales Company; capital $10,000; to deal in automobiles, aeroplanes, tricycles, etc. Incorporators: J. Francis Lynch, Louis P. Fuhrmann, Edward T. Danahy, Chas. Ensminger, Andrew Spiess, Wm. Speidel and Geo. C. Zuefle.

Chicago, Ill.—A. W. Greiner Auto Sales Company; capital, $25,000; to manufacture automobiles and accessories. Incorporators: A. W. Greiner, M. Feinberg and C. E. Becker.

Cincinnati, O.—Ideal Lamp Company; capital $5,000; to deal in automobiles. Incorporators: V. E. Shields, Henry Faultless, W. C. Klein, R. S. Oppenheimer, E. F. Peters.

Columbus, O.—Johnson Sales Company; capital $10,000; to carry on a general automobile business. Incorporators: W. J. Bennett, J. U. Pelton, A. D. Yeise, M. M. Johnston, J. M. Bennett.

Cleveland, O.—Sixth City Machine Company; capital $10,000; to sell, manufacture and deal in automobiles. Incorporators: R. C. Skeel, C. M. Ringle, C. F. Bruggmeiner, E. M. Becker, A. F. Goldenbogen.

Cleveland, O.—Oldsmobile Company; capital $50,000; to manufacture automobiles and electrical devices. Incorporators: P. D. Metzger, C. H. Davis, J. J. Schmidt, C. L. Lampus, C. O. Nelson.

Cleveland, O.—Republic Electric Company; capital $10,000; to manufacture and deal in electrical machinery and motors of all kinds. Incorporators: Louis Griesser, O. S. Mann, G. Solomon Peskind, Edna May Marte, G. E. Mann.

Cleveland, O.—Rutzen Power Company; capital $100,000; to control the patents of the Rutzen motor and to manufacture said motor. Incorporators: D. W. Corbin, F. J. Peck, D. H. Tilden, A. M. Snyder, N. I. Young.

Clevevland, O.—R. M. Allen Motor Sales Company; capital $10,000; to deal in automobiles and motor trucks. Incorporators: Blanche M. Allen, R. M. Allen, H. W. Wiebush, T. B. Logan, H. C. Kagy.

Detroit, Mich.—The Superior Motor Company; capital $100,000; to manufacture gasoline engines. Incorporators: Henry Fraser, Walter C. Schneider and Gaylord C. Brimmer.

Detroit, Mich.—Cragg Motor Mfg. Company; capital $4,000; to manufacture motors and accessories.

Mansfield, O.—Brucker Motor Car Company; capital $5,000; to deal in automobiles. Incorporators: D. D. Brucker, W. F. Voegle, Lewis Brucker, A. E. Courtney, J. M. Ottinger.

Minneapolis, Minn.—Michaelson Motor Company; capital $200,000; to deal in automobiles. Incorporators: W. E. Michaelson, A. E. Peterson.

Morgantown, W. Va.—Chaplin Dille Motor Car Co.; capital $25,000; to deal in motor cars, trucks, etc. Incorporators: B. M. Chaplin, James E. Dille, Minnie Chaplin, M. C. Wildman, Opal Hoard Dille.

New York City.—Collier Rotary Valve Company, Inc.; motor engines, parts, etc.; capital $100,000. Incorporators: John N. Blair, Harry D. Johnson and Arthur B. King.

New York City.—S. & M. Company, Inc.; capital $10,000; automobile business. Incorporators: Edward E. Strobel, Walter C. Martin, Richard W. Freedman.

New York City.—George J. Stier, Inc.; capital $5,000; building wagons, trucks and automobiles. Incorporators: Geo. J. Stier, John Reed, Matilda A. Stier.

New York City.—Vaughan Car Company, Inc.; capital $1,000,000; automobile business. Incorporators: Raymond C. Thompson, Julius Kahn and Paul T. Kammerer.

New York City.—Buyer's-Seller's Automobile Company; capital $5,000. Incorporators: Isaac J. Cohn, Jay H. Preston, Max Gross and Sam A. Fried.

New York City.—American Commercial Truck, Inc.; capital $10,000; to manufacture auto trucks, machinery, etc. Incorporators: Raymond C. Thompson, Julius Kahan, Edward C. O. Thomas.

Racine, Wis.—Perfex Radiator Company; capital $15,000; to manufacture automobile radiators. Incorporators: J. P. Wolf, A. B. Modine, F. M. Opitz.

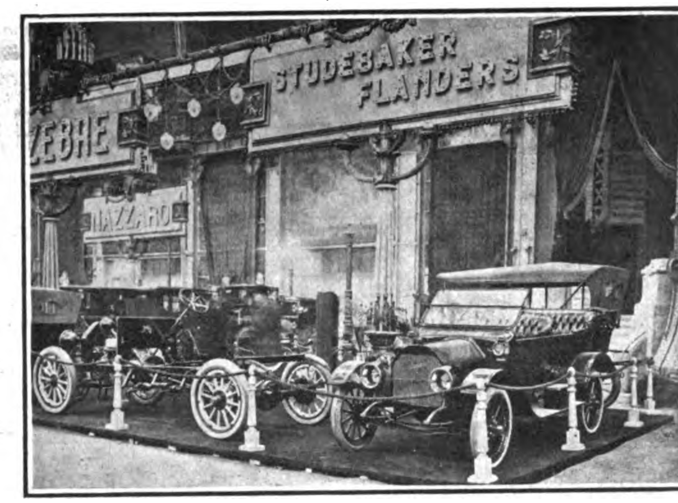
signed to become secretary of the Minnesota Bankers' Association, with headquarters in Minneapolis, Minn. He will continue stockholder and director.

Toepp Resigns—To become salesman for the Detroit Mantel and Tile Company, Detroit, Mich., with which he formerly was connected, P. H. Toepp, who has been connected with the retail sales force of the Abbott-Detroit line at Detroit, has resigned his position.

Bowman with Abbott—To succeed F. P. Steinhauer, who has become general sales manager of the Colby Motor Company, at Mason City, Ia., R. S. Bowman has resigned to accept the district sales managership of the Abbott-Detroit line, covering Iowa, Nebraska and western Illinois.

Detroit Men Combine—W. H. VanDusen and Joseph Warren have formed a business combination to be known as the VanDusen-Warren Sales Company. The new concern will have offices in the Ford building, Detroit, Mich., and will act as agents for manufacturers of accessories.

Toronto Show February 20—It is announced that the annual Toronto, Can., Automobile Show will be held at the Exhibition, in the Government and Transportation Building, from February 20 to March 1, under the management of E. M. Wilcox, who has managed past automobile shows in Toronto and Montreal.



Studebaker and Flanders show space at the Paris Show

Physician Loses Wager.—A physician arrested for driving his automobile at more than 40 miles an hour offered in Minneapolis, Minn., to pay an automobile city detective $100 if he could make the car go that fast. The detective won, refused the money and the physician turned it over to a charity. The fine was $20.

Mowe Resigns—J. H. Mowe, manager of the Detroit, Mich., branch of the Firestone Tire and Rubber Company, has tendered his resignation, to take effect January 1. While Mr. Mowe has other plans for the future he will make no announcement of them at the present time. Mr. Mowe will be succeeded by Howard A. Coffin.

Electrics for Pastors—Two churches in Minneapolis, Minn., have adopted the electric car to assist the pastor in making parish calls. The Church of the Redeemer bought a Columbus electric as part of the equipment of the church. The women of Westminster Church presented a Rauch & Lang car to the pastor for his own use.

Princeton's Bus Service—Motor bus service has been installed at Princeton, Ind., by the Stevens Automobile Company of that city. Princeton is one of the most prosperous communities in southern Indiana, but has never had street car service. The busses are making trips over regular routes, each bus passing the public square. The fare is $ .05 to any part of the city.

New Minneapolis Rule—The fire department chief, Minneapolis, Minn., has ordered large red lights placed on automobile fire auxiliary wagons to insure clearing of the street when a run is made. One big light will be placed in front of the machine, one at the rear and one on either side. By a system of signals the apparatus will indicate to the traffic policemen where a turn will be made.

Report Shows Profit—The report of the St. Paul, Minn., Automobile Club's new White Bear Lake club house for the season showed a profit in its first year. Previous years from the club on Lake St. Croix there was a shortage. At the annual meeting in January provision is expected to buy the land on which the lease expires. The property is 32 acres with 9 cottages. The club will erect a new house.

Automobile Replaces Stage—An old stage coach that ran for more than 30 years on the New Albany and Vincinnes pike between New Albany and Hardinsburg, Ind., has been displaced by a motor bus operated by Rhodes Brothers of New Albany. The new bus makes one round trip a day between the two points and thus far has had a profitable business in carrying passengers, baggage and freight.

Surveying Minnesota Roads—Four crews are surveying in the northern part of Minnesota highways to be built under the new Ellwell law. One party is working on the projected International Falls-Twin City road, another on the Duluth-Winnipeg road, and third is at work on the Duluth-Moorhead road and the fourth on the Bemidji-Beaudette road. A concrete road is projected from Minneapolis to Hopkins on the Minnetonka highway. The Winona Automobile Association is planning to widen to 20 feet the Winona-Minnesota city road and surfacing with gravel. This stretch is 2 miles.

Automobile Incorporations

SOMERVILLE, MASS.—Caverly Automobile Company; capital $5,000. Incorporators: Irvin C. Caverly, Wm. A. Thibodeau, Edna C. Caverly.

TOLEDO, O.—Willys-Overland Company of Toledo; capital $25,000,000; to manufacture automobiles. Incorporators: Walter Stewart, Isaac Kinsey, R. R. Scott, A. H. Smith, G. W. Bennett.

TRENTON, N. J.—Lord Baltimore Motor Car Company; capital $100,000; general automobile business. Incorporators: J. Lentz, Jr., H. C. Nicholas, J. L. Conrad.

GARAGES AND ACCESSORIES

CLARKSDALE, MISS.—Montroy Ignition Starter Co.; capital $10,000. Incorporators: J. M. Montroy, C. L. Montroy, E. M. Fant and E. Fant.

CLEVELAND, O.—Victor Brass Manufacturing Company; capital $25,000; to manufacture brass articles of all kinds, including automobile parts and to operate a machine shop. Incorporators: M. T. Mahon, A. M. Fiebach, T. B. Pelton, F. M. Pelton.

CLEVELAND, O.—Presco Manufacturing Company; capital $15,000; to manufacture lamps and automobile specialties of all kinds. Incorporators: H. G. Smith, J. C. Hipp, T. J. Smith, Tony Lanness, Daniel Pfahl.

DETROIT, MICH.—Armitage Leather Company; capital $35,000; to produce leather for use in automobiles. Incorporators: W. S. Gurd, E. S. Barbour, R. B. Gillespie, Edwin Armitage.

DETROIT, MICH.—Detroit Autoheater Company; capital $3,000; to manufacture automobile heaters and other accessories.

HARRISONBURG, VA.—Harrisonburg Garage; capital $25,000. Incorporators: John H. Garber, J. J. Hawse.

INDIANAPOLIS, IND.—The New Miller Carbureter Company; capital $200,000; to manufacture carbureters and other automobile accessories, gas and gasoline motors, etc.

MINNEAPOLIS, MINN.—Northwestern Tire Company; capital $50,000; to deal in accessories. Incorporators: F. J. Kerner, A. A. Kerner, J. C. Roney.

NEW YORK CITY.—Rolaff Oil Carbureter Company; capital $25,000. Incorporators: Richard W. Olfsky, Joseph W. Stone, Wm. G. Van Vleck.

NEW YORK CITY.—United Rubber & Supply Company; capital $200,000; tire fillings. Incorporators: Herman Mayer, Thomas H. Royce, Charles L. Brookheim.

NEW YORK CITY.—Favary Tire Company, Inc.; capital $300,000. Incorporators: Ethelbert Favary, William P. Richardson and M. W. Brashears.

NEW YORK CITY.—United Rubberine Supply Company; capital $200,000; to deal in tire filling, rubber, etc., etc. Incorporators: H. Mayer, T. H. Royce, C. L. Brookheim.

NEW YORK CITY.—New York Macandaruba Tire Filler Company, Inc.; capital $25,000; to deal in a composition used for filling tires. Incorporators: Moses Haas, Nathaniel Levy and Geo. A. Weingetz.

NORFOLK, VA.—Michigan Motor Branch of Virginia; capital $10,000. Incorporators: John T. Buchanan, R. H. Baker, Archie M. Bopp.

PATCHOGUE, N. Y.—Patchogue Garage Company, Inc.; capital $1,500. Incorporators: Julian A. Udall, Jr., Harry J. Lawrence and Julian A. Udall.

PITMAN, N. J.—Campbell's Auto Express; capital $25,000; to do a general express and delivery business. Incorporators: R. Worthington, N. Koelle, C. A. Wolverton.

PORT CHESTER, N. Y.—Nelsons Garage, Inc.; capital $1,000. Incorporators: Fritz Nelson, Martins Nelson and John Colantonio.

RICHMOND, VA.—Harrisonburg Garage, Inc.; maximum capital $25,000, minimum $10,000. Incorporators: J. N. Garber, J. J. Hawse, H. L. Furr.

TOLEDO, O.—Toledo Auto Shows Company; capital $10,000; to conduct automobile shows and exhibits. Incorporators: F. L. Mulholland, A. A. Atwood, H. W. Blevins, J. W. Banting, G. R. Ford, Stanley Roberts.

WESTON, W. VA.—Ahnear Oil & Gas Company; capital $10,000; oil and gas. Incorporators: W. H. Ahnear, Lewis Bennett, H. M. Bennett, C. A. O'Hara and J. S. Vandervort.

YOAKUM, TEX.—Yoakum Machine Shop & Garage; capital $10,000. Incorporators: W. L. Orth, L. A. Orth and M. S. Orth.

YONKERS, N. Y.—Colonial Taxi Service Company; capital $3,000. Incorporators: Alfred L. Barmore, Ernest S. Miller and John L. Barmore.

YOUNGSTOWN, O.—Youngstown Automobile Show Company; capital $1,000. Incorporator: W. P. Williamson.

CHANGES OF CAPITAL AND NAME

CLINTONVILLE, WIS.—Four Wheel Drive Automobile Company; capital increased from $110,000 to $250,000.

CLEVELAND, O.—Galion Motor Truck Company; capital increased from $300,000 to $1,000,000.

RICHMOND, VA.—Stewart-Warner Speedometer Corporation; capital increased from $3,000 to $11,000,000. Incorporators: Robert Oehmig, James E. Hauronic, H. S. Perrigo, B. Flippen.

Overman Resilient Grooved Automobile Tire; Fowler Exhaust Siren; Ferromatic Automobile Tire; E. G. Bumper for Cadillac Cars; Thermic Driver's Gloves; Detroit Car Heater; J-M Keystone Radiator Shield

Overman Pure Rubber Tire

IN ORDER to overcome the shortcomings of the pneumatic tire, the Overman Tire Company, 250 West Fifty-fourth street, New York City, has constructed the Overman cushion tire, illustrated in Fig. 1. This tire is made of rubber throughout, but the latter is vulcanized only to such an extent as to still be able to absorb all the shocks encountered in traveling without the use of an inner tube. As the cross-sectional photographic view shows, the use of an inflatable tube would be impossible with an Overman tire, as rubber fills practically all the space which ordinarily is taken by casing and inner tube. This rubber forms the resilient element proper, contrary to pneumatic practice, where the rubber only serves as container and protector for the inner tube. The shape of the cross-section is rather suggestive of solid tire practice, but there are several important points, besides the high resiliency, in which this tire differs from so-called solid tires. The tread is formed as a meandering band, continuing all over the outside annulus of the tire, and the grooves formed between the windings of this relief-shaped tread afford spaces into which the rubber may expand when compressing under load. A small continuous air space of approximately triangular section is formed inside of the tire which also permits of compression of the rubber into it. A thin strip of fabric runs along this triangular space and the tire base as well as the flanges which are formed on both sides of the same. Through these flanges the tire is bolted to the wheel felloe to prevent its creeping on the metal rim and its deterioration thereby.

Ferromatic Automobile Tires

Another substitute for pneumatic tires has been devised by the Ferromatic Tire & Manufacturing Company, Kansas City, Mo. This product is called the Ferromatic automobile tire and consists of two concentric, pressed-steel rings which are arranged around the rim of the wheel and between which two helical vanadium springs are in place, which form the resilient element of the tire. In order to produce increased ease of riding the outer ring is covered with a tread of rubber vulcanized onto the steel ring and resembling the tread of a pneumatic to a fair degree. All told the appearance of the tire is a good deal like that of an ordinary outfit.

A long life is claimed for this product and this is a fair expectation due to the almost entire absence of materials which deteriorate quickly.

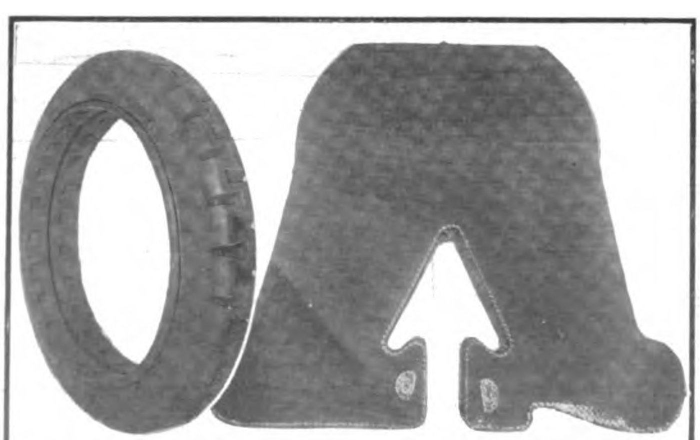


Fig. 1—Overman resilient rubber tire

Novel Spring-Leaf Lubricator

Under the name of spring-leaf lubricator a simple device is offered to the automobiling public, which is a double-wedge screw clamp consisting of a round shaft having fastened to either of its sides a solid foot and arm between which is placed a sliding jaw. The jaw has a projection making a wedge foot with a projection on the foot. By means of a cross rod, a screw which is ball jointed to the sliding jaw and threaded to the solid arm, is turned toward or away from the opposing foot. To lubricate the spring leaves, the tool is spanned across the latter. The points of the wedge teeth are inserted between two teeth and the screw is turned up until the leaves are well separated, a little oil, grease or graphite is placed in the crack and the tool removed. The tool may also be used as a temporary clamp in case of a broken leaf. This device is manufactured by the Spring Leaf Lubricator Company, Ann Arbor, Mich.

Fowler Exhaust Siren Horn

The Fowler Lamp & Manufacturing Company, Chicago, Ill., has brought out an exhaust operated automobile signal which while differing in some respects from so-called siren horns operates on a similar principle. The horn consists substantially of a tube which attaches to the exhaust pipe of the motor, being attached between the latter and the muffler. When a butterfly valve arranged at one end of the pipe is moved by the control mechanism located on the dashboard, the pipe affording access of the exhaust gases to the muffler being closed and the gases directed into the signal tube. The latter contains a fanwheel of the propeller type which is rotated by the inrushing gases and by its motion breaks them up, imparting to them a rapid whirling movement which strikes, at rapid intervals, the other end of the tube which is covered with a perforated metal sheet. The forced passage of the gases and their intermittent flow produce a sound which is rather melodious, resembling that of a siren a great deal and being rather well adapted for use as an automobile warning signal.

Winona Radialite Device

A practical headlight-turning device has been brought out by the Winona Carriage Company, Winona, Minn. This device consists of a pair of forked lamp carriers held in tubular supports which are clamped on to the front end of the chassis frame and contain the central member, which is developed into a fork further up. One of the lamp forks has its central member connected to the steering cross rod by means of a reach rod, while both forks are connected to each other. The whole system works out as follows, the reach rod being arranged at the right of the car: If the car wheels are turned to the right, the reach rod is pulled back, thereby turning both forks so that their lights face in the same direction as the wheels. If the latter are turned to the left, the reach rod is pushed forward and turns the lights in the opposite direction.

Bremer-Wilson Starter for Fords

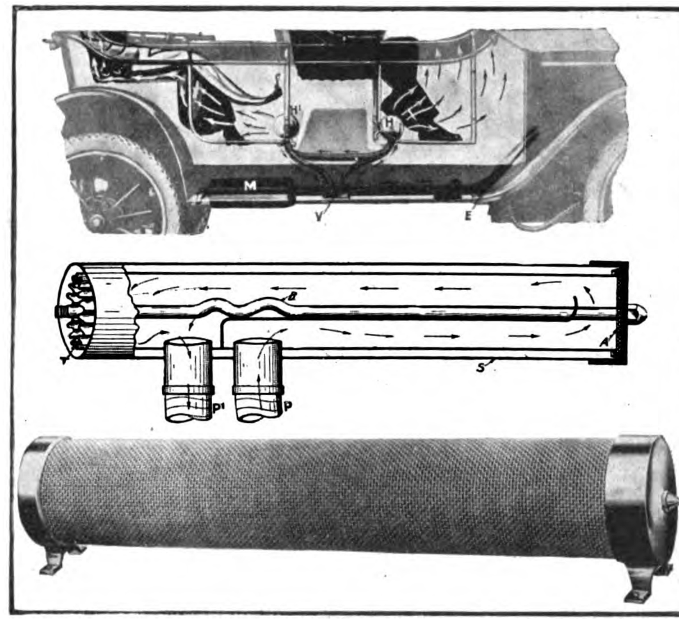
The Triplex starter for Ford cars has been placed on the market by the Bremer-Wilson Manufacturing Company, 1256 Michigan boulevard, Chicago, Ill. This starter consists of a small clutch capable of engaging the crankshaft directly in front of the dashboard if a handle is pulled by the driver. A tension spring disengages the clutch after starting.

Clamp-On Bumper for Cadillacs

The E. G. bumper specially designed to fit Cadillac cars, although it is applicable to other cars as well, is shown in Fig. 2 The bumper may be obtained with a tubular or square bar, but the method of attachment characterizing it is the same in all cases. The bar is held in the ring ends of two connector bars, each formed of a pair of telescoping tubes, the other ends of which are rigidly secured to the front end of the chassis frame and which contain the shock-absorbing springs. The clamping members which attach to the frame end are seen in Fig. 2, consisting of an approximately T-shaped stamping having on one side a downturned flange which fits over the upper leg of the channel of the frame. This flange is tapped with two screw-threaded holes, in each of which works a small screw the tightening of which secures the T-member to the frame. By loosening the screws and moving the whole mechanism along the chassis member, the position of the bumper may be changed to suit the wish of the owner, making the whole device flexible and adaptable enough, permitting of clearing the starting crank while yet affording an arrangement which protects the front of the car in case of collisions. This bumper which is furnished in black throughout, or with black fittings and brass or nickel-plated bumper bar, is made by the Emil Grossman Company, 250 West Fifty-fourth street, New York City.

The Detroit Automobile Heater

The Detroit Auto Heater Company, Detroit, Mich., manufactures the new heater, Figs. 3, 4 and 5. The same consists of a two-way valve which directs the exhaust either directly to the muffler or leads it through the heater and of the heater proper. The latter consists in turn of a corrugated, gastight pipe T through which the exhaust gas flows and which is surrounded by another pipe, an air space being formed between both. The exhaust enters through P and leaves through P1, and the whole device is inclosed in a screen which is equipped with feet, permitting of keeping the apparatus standing on the running board. The air which passes through the space between exhaust and outer pipe then flows into a manifold and to the front and rear compartment of the car, to increase the comfort of driver and passengers.



Figs. 3-5—Detroit automobile heater and parts

Electrically Warmed Driver's Gloves

One of the many new accessories which the present winter has called forth is the outfit shown in Fig. 6, the electrically warmed glove made by Carron & Company, Inc., 1784 Broadway, New York City. This invention which after being tested for a long time is now ready for the market consists of a pair of brass plates which are mounted on the steering-wheel rim and are connected to the poles of a 6-volt battery. The gloves are equipped with two button contacts which, when pressed against the two brass plates, permit a current to flow through a wire resistance laid through the glove so as to be in contact with the back and palm of the hand and to surround the fingers; the effect is that if the wire is heated, the hand and its every part is warmed to any desired degree, the heat being regulated by means of a rheostat mounted on the spoke of the steering wheel. There is a rheostat for every glove, the two of which are independent of one another, so that one hand may be warmed and the other not, or both to varying degrees. The wire resistance consists of a very great number of hair wires wound with silk so as to form a cable; so that many wires may break and yet the working of the glove remains undisturbed. On the other hand, the wires are very strong and tough, so that breakage is not a frequent occurrence and need not be considered. Of course, the plates may be attached at any portion of the steering wheel rim and their position may be changed to suit the driver's requirements. As Fig. 6 shows, the appearance of the gloves is not different from an ordinary good type of glove and there is no difference between the use of this glove and any other. Furthermore, if it is desired to stop the warming of a hand or both, it is merely necessary to interrupt the contact between one of the glove buttons and the brass plate which it touches. This shows the simplicity and usefulness of this new accessory.

The current consumption is small, being approximately .70 ampere, so that about 10 watt are needed to keep the driver's hands warmed. It might not be needless to add that cold hands in winter are not only the source of a more general discomfort, but frequently the cause of dangerous situations, as control is made very difficult if the hands are not in normal condition.

Johns-Manville Radiator Cover

Another radiator cover is out. The H. W. Johns-Manville Company, New York City, is the maker of it and has named it the J-M Keystone radiator shield. The latter consists of a thick layer of thoroughly cleansed cattle hair, neatly quilted between two layers of waterproof imitation leather. The edges of this waterproof covering are folded over and securely stitched together along all four edges of the cover, while the entire surface of the same is quilted through and through só that it will permanently retain its heat-insulating qualities. The center of the shield is arranged as a flap folding toward the top, being capable of closing by means of two snap-hooks so as to cover the entire front of the radiator when the car is not running. The shield does not absorb water, oil or grease and can be easily cleaned when soiled. It will not scorch or burn and is neat in appearance. Attachment of the shield is by rawhide straps and rings which fasten to bottom and sides of the radiator, while an adjustable straphanger is provided for fastening over the filler cap. A round spring wire is securely fastened at the top edge and inside the covering of the Keystone shield to hold it in shape.

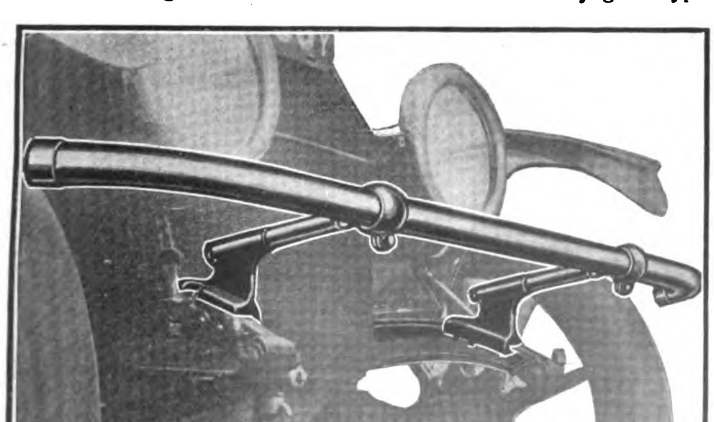


Fig. 2—E. G. clamp-on bumper for Cadillacs

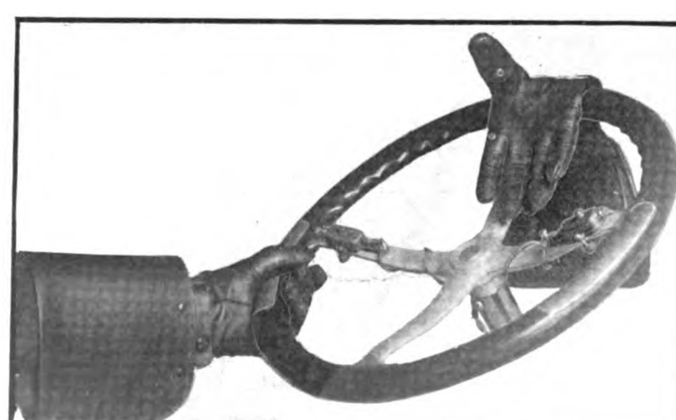


Fig. 6—Electrically heated driver's gloves

INTERNAL Combustion Motor—In which a separate piston is employed to compress air in the crankcase for subsequent use in the combustion chamber.

The two-cycle motor described in this patent and illustrated in Fig. 1 is distinguished by the use of a piston working in a cylindrical extension of the crankcase which is located adjacent to the working cylinder. The piston P1 is fixed to a connecting rod pivoted at the center of a walking beam W, one end of which is attached to the crankcase wall and the other to a special connecting rod C1 carried by the piston and being independent of the ordinary connecting rod which works on the crankshaft. The working piston and the air compressing piston P1 work in parallel, that is to say they both move up or down at the same time due to the walking beam arrangement. When the main piston is on the explosion stroke it moves P1 down whereby air is compressed in the crankcase in addition to the action of the working piston and is forced through to transfer passage T to the inlet port which opens when the piston reaches the bottom of its stroke; at the same time the dead gases are expelled through the exhaust port E. After the inlet port has been closed by the piston the suction caused in the crankcase by the upward movement of the pistons opens the valve A in the side of the crankcase and air enters through it, whereupon the cycle is repeated as described above. Fuel is injected by way of a sleeve valve F in the head of the cylinder so that a rich mixture is obtained in the proximity of the spark plug S. This fuel injector valve is operated by the armature A1 of a coil C which is energized periodically by a current timed in the ignition distributer of the motor.

No. 1,046,491—to Alfred Randolph, Salem, O. Granted December 10, 1912; filed August 24, 1910.

Automobile Tire Mail—Comprising a mantel of chain links embedded in the fabric of a tire to prevent skidding of the same.

The subject matter of this patent is seen in Fig. 2 and consists of means for connecting the links of the chain embedded in a tire in such a manner as illustrated. As Fig. 2 shows the chain system extends all the way across the tire down to the beads on both sides. The device is constructed in the following manner: The links of strands longitudinal of the tire are crossed by transverse strands; the links are of single sheet-metal stampings and each link of the longitudinal strands is inclosed on one leg by the half of the superimposed transverse chain link. These chains are vulcanized on the tire and while they reinforce the casing they do in no way interfere with the flexibility thereof.

No. 1,046,451 to Joseph B. Duhring, Chestnut Hill, Pa. Granted December 10, 1912; filed December 15, 1911.

Piston-Valve Construction—A small piston works in an auxiliary cylinder in the head of the working cylinder of an internal combustion motor.

Fig. 3 shows the subject matter of this patent, namely, a piston valve which controls the exhaust port of an internal-combustion gasoline motor. This piston V works in a small cylindrical extension formed on top of the working cylinder. The piston is controlled by the pressure in the cylinder on one hand and the tension of the spring S connected to the auxiliary cylinder and the crank C which carries the small connecting rod operating the piston rod V. Normally the spring holds the piston V in a position off dead center; if the pressure in the cylinder exceeds the tension of the spring the latter is compressed, the piston is moved outwardly while in case of reversed conditions the piston moves inwardly thereby controling the exhaust port of the cylinder.

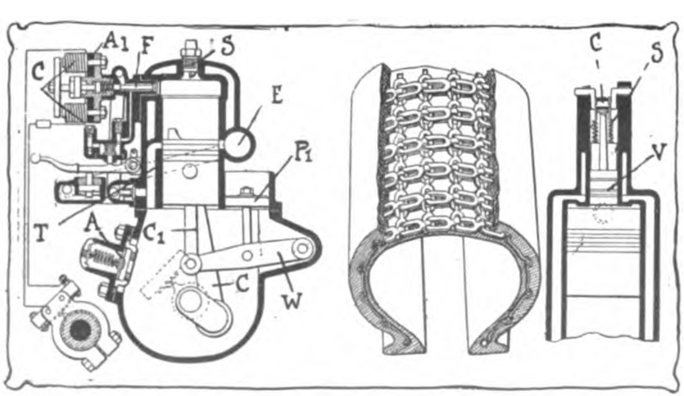


Fig. 1—Randolph two-cycle motor. Fig. 2—Duhring tire mail. Fig. 3—Butsch piston-valve

No. 1,046,965—to Alphonse Butsch, St. Lucia, British West Indies. Granted December 10, 1912, filed October 1, 1909.

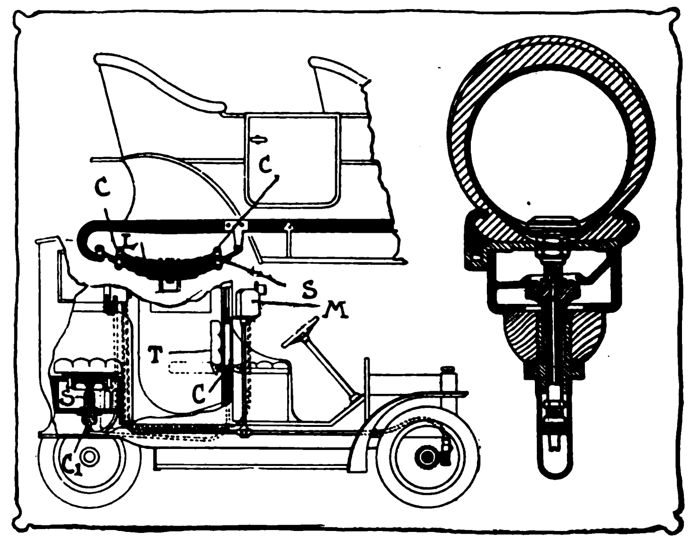


Fig. 4—Kaunitz rebound-check spring. Fig. 5—Kuhn-Netter taxicab control. Fig. 6—Booth tire valve

Rebound Check Spring—Comprising a semi-elliptical construction which is mounted inside the arch of the main elliptic spring.

This patent refers to an anti-rebound spring L which consists of a short leaf spring mounted on the inner side of the master leaf of the regular suspension springs of a car. The spring L is secured to the regular spring S by shackles fastened to clips which go over the main spring. It is easily seen that normal action of the spring S is not restricted but that a recoil which tends to increase the arch of the spring S is counteracted by the initial tension of the spring L.

No. 1,044,661—to Nils W. Kaunitz, Hoquiam, Wash. Granted November 19, 1912, filed December 9, 1911.

Automatic Taxicab Control—To record number of passengers in a car.

This invention is illustrated in Fig 5 and consists in the use of a clutch C which connects the auxiliary seat T of a taxicab to the taximeter mechanism in such a manner that if the seat T is tilted down for the use of a third passenger the clutch is thrown in and a record is made on the taximeter. A similar clutch arrangement is used by the main seats, clutches C1 being engaged if the seats are pressed down by the weights of passengers.

No. 1,046,808—To Max Kuhn and Raphael Netter, New York City. Granted December 19, 1912; filed August, 26, 1911.

Tire Valve Connection—Consisting in a valve piece fitted into the rim which forms a continuation of the tire valve proper.

This invention is illustrated in Fig. 6 being a supplement to the valve of the inner tube which fits into it and forms a complete valve ready for inflation purposes when the tire is on the wheel. The construction shown in the illustration is such that the use of such a valve greatly facilitates the replacing of a tire on a demountable rim.

No. 1,044,435—To William N. Booth, Cleveland, O. Granted November 12, 1912; filed June 2, 1911.

The AUTOMOBILE

VOL. XXVII
NO. 26

NEW YORK, DECEMBER 26, 1912

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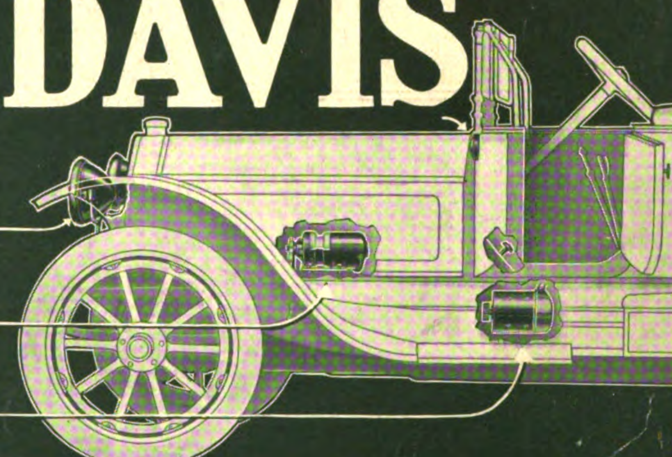

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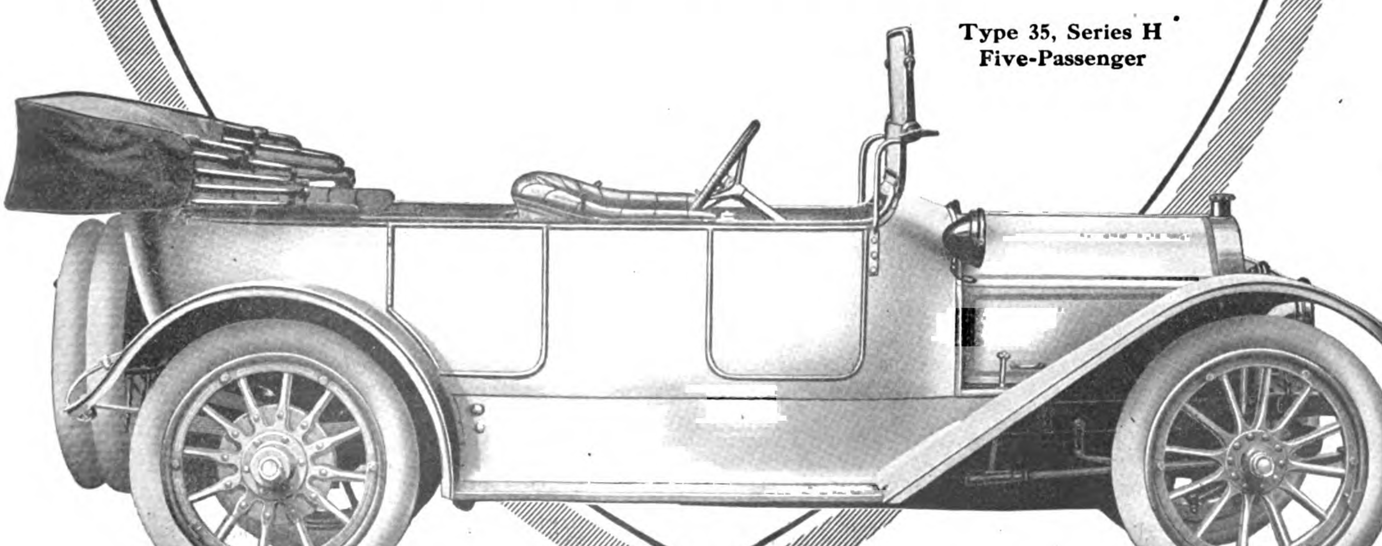

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4—Cyl. Beaver Motor, 4½" Bore	75.00
4—Cyl. Unit Power Plant, Disk Clutch Electric Trans. 30 H. P.	150.00
New Mohair Tops, for Buick 10, Flanders 20, Ford, N. S. & R.	13.00
Pressed Steel Frames—10 sizes	3.00 up
34" x 3½"—36" x 3½" Wheels O. D. Clincher Rims, 10 & 12-1-½" Spokes, Set 4	10.00

Before buying see our list.

AUTO PARTS CO.,
513 to 531 Jackson Blvd., Chicago.

LIMOUSINE AND LANDAULET BODIES
at reduced prices.

High grade make and latest styles, will fit any standard chassis. We do mounting, painting and turn out complete jobs, at a saving of 30 per cent.

Pacific Motor Car Exchange Co.,
229 W. 54th St., New York.

LIMOUSINE AND LANDAULET BODIES for sale, fit any make car, bargains; bodies mounted and painted. High-class auto painting. Prices reasonable. Bradhurst Auto Co., 653 St. Nicholas Ave., N. Y.

LIMOUSINE BODIES, UP-TO-DATE; CAN be bought very reasonable. New York Auto Body Co., 508 West 58th St.

MAKE YOUR OLD CAR LIKE NEW AT extremely low cost—everything at ¼ to ½ of original cost. New Bodies, Touring, Runabout, Racing, $75 to $200; worth from $400 to $600. Magnetos, $22.50; regularly $75 to $125. Windshields (brass), $9.50; were $40. Electric Horns, $7.50; formerly $35. Metal Tool Boxes, $2.50; were $10. Road Vulcanizers, $2.50; regularly $8.50. New Motors, 15 horsepower, $95; regular price, $250. 20 H.P., $125 regular $400. No matter what you may require in parts or the automobile complete. Write us and save from 25% to 75%.

TIMES SQUARE AUTOMOBILE CO.
Largest dealers in the world in automobiles and job accessories.

New York..............1710-1718 Broadway
Chicago...........1210-1212 Michigan Ave.

MANUFACTURER AND REPAIRER OF copper and galvanized tanks, drip trays, mud guards, hoods, sprocket covers and metal aprons. Radiator repairing a specialty. D. Israel, 300 West 48th Street, New York City.

MAXWELL.

Push Rod Adjusters. $1.50 for complete set delivered. Money Back Guarantee. Auto Parts Co., Providence, R. I.

MORA REPAIR PARTS—
We have purchased the repair business of the Mora Cars, including all stock on hand, drawings, patterns, jigs, office records and the right to receive the mail of the Company.

Owners of Mora Cars will save considerable time by placing their orders for parts directly with us. We have in stock repair parts for all models. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

PACIFIC TREADS GUARANTEED 5000 miles against puncture or blowout. Fits all kinds of rim, avoids discomfiture of changing tires on road in bad weather. Pacific Leather Works, Oakland, Cal. Chas. M. Moody, Eastern Distributor, 1995 Broadway, N. Y.

PEERLESS EXTRA FINE BLACK BAKing Japan—Bakes either to a high gloss finish, egg-shell gloss or dull finish on lamps, radiators and fenders. Will not crack, chip or peel. Ask your garage and supply dealer.
The Columbus Varnish Co., Columbus, O

RADIATORS.

Our radiator list is complete and are offering all new radiators at prices that would save you from 25–50%.

Ford Model "T" radiators	$18.00
Ford Model N-R-&-S radiators	23.00
Buick Model "10" radiators	26.50
Hupmobile radiators	25.00
Flanders "20"	27.50
Buick "16" and "17"	32.50
Everitt "30" radiators	20.00
F. A. L. radiators	18.00

Write for those not mentioned.

AUTOPARTS MFG. CO.,

Detroit, Mich.

REPAINT YOUR CAR YOURSELF. WITH our materials and full instructions you can repaint your car as well as a regular painter and save from $25 to $50, depending on its size. Previous experience unnecessary. Latest colors. Write to-day for full information and color cards. We also make Liquid, Gun Metal, the National Brass Enamel, $1 a can, express prepaid. The only article of proven merit for lamps, radiators, etc. No polishing. Arsenal Varnish Co., Motor Car Dept., Rock Island, Ill.

RIMS AND RIM PARTS. SOMETHING worth while. Send for our rim parts circular, free on request. Kastner Tire & Rim Co., 2112 Michigan Ave., Chicago, Ill.

SAMSON LEATHER TREAD TIRES

have been used for the past ten years and have proved a success. Made from only the best French Chromo Leather (Deer Hide), rivetted with hard steel rivets and vulcanized on tire by Samson Patent Process, the leather going down to the bead, absolutely insures against punctures, blowouts and skidding. The additional cost of Samsonizing pays for itself in prolonging to double and treble the life of the tire, makes riding safe and easy without loss of time and trouble wasted on so called non-skid devices. H. Phillips Rubber Works, 1931 Broadway, New York; 'Phone 9066 Col.

SCHEBLER CARBURETOR.
J. C. NICHOLS,
Direct Factory Distributors.
1673 B'way, at 52d St., New York City.
Tel. 6161 Col.
Our new model L Carburetor with three speed adjustments, at half price by returning your old model Carburetor.

STEEL BALLS, HIGH GRADE, PER hundred: 5/16", 30c; 3/8", 40c; 7/16", 80c; 1/2", 95c; 9/16", $1.15; 5/8", $1.55; 11/16", $1.95; 3/4", $2.10; 13/16", $3.50; 7/8", $4.50; 15/16", $4.90. Fenders painted dark blue, $10.00 set of 4. Selective-type 4-speed shifting levers, complete with emergency brake lever, $8.00. New 1¼" Kingston carburetors, floating ball type, $3.50; same slightly used, $2.50. 1" Kingston carburetors, same, new, $3.00. Other bargains. Automobile Appliance Co., 1712 Michigan Ave., Chicago, Ill.

PEERLESS AUTO TOP DRESSING—A waterproof dressing for leaking mohair and duck tops and curtains. Makes old and faded tops look like new. Ask your garage and supply dealer for it.
The Columbus Varnish Co., Columbus, O.

THE LARGEST IN THE WORLD
Auto Supply and Repair House.
We carry in stock parts to build cars from a buggy to a three-ton truck.

Some of Our Bargains Below.

Four-cylinder motors, new and guaranteed	$100.00
Selective sliding gear transmission, new	34.00
I-beams for axles, machined	4.00
Artillery type wood wheels, all sizes, each	2.00
Pressed steel frames, nearly all sizes, each	8.00
Brass hood radiators, second hand, guaranteed not to leak	10.00
All-brass windshield, complete, packed one in a box	7.50
Gasoline tanks	1.00
Mufflers	1.50
Barnes steering gears	10.00

AUTO PARTS CO.,
513-15-17-19-21-23-25-27-29-31 W. Jackson Blvd., Chicago.

Parts and Accessories

WANTED

I AM ALWAYS IN THE MARKET FOR pneumatic tires of all kinds, regardless of quantity. If you have a price that is interesting write me. J. G. Whinham, Buffalo, N. Y.

WANTED—SECOND-HAND CHARGING equipment for Electric Garage, either as a whole or from one to ten panels, ten to thirty stations. Henry B. Hall, 1420 U St., N. W., Washington, D. C.

WANTED—SECOND-HAND OR NEW Rear Axle with Brake Drums, Bevel Gear Drive, geared no higher than 3½ to one (lower preferred) for thirty-five horse-power engine: Timken Axle preferred. Must be a bargain for cash. J. J. Williams & Son, Montpelier, Vermont.

Rebuilding and Repairing

AUTO CASINGS RETREADED AS FOL-lows: 30x3, $6; 30x3½, $7; 32x3½, $7.75; 34x4, $12; workmanship, material and price right; a trial will convince. Jungkind & Vogler, 158 Chambers St., N. Y. City. Repairing tires since 1896.

AUTOMOBILE CYLINDERS REGROUND, new pistons and rings fitted. Garage air compressors. Cast Iron Brazing Co., Manchester, N. H.

BROKEN PARTS WELDED EXPERTLY and guaranteed. Why risk sending your broken cylinders and crankcases to inexperienced and irresponsible welders when you can get expert workmanship, prompt service and fair prices from an old and responsible firm? Write us for estimates and look up our references. What good is a guarantee unless the firm behind it is reputable and responsible? We refer to Dun, Bradstreet or any Waterbury Bank.
Waterbury Welding Company,
Waterbury, Conn.

BROKEN CRANKSHAFTS, CRANKCASES, cylinders, flywheels, gearteeth, pistons perfectly welded and machined, ready to replace. Scored cylinders made new. Atlas Welding Works, Rahway, N. J.

CYLINDER GRINDING, $10.00 PER HOLE. Complete with new pistons and rings. Merritt, 311 W. 59th St., New York City.

CYLINDERS REBORED, PISTONS AND rings fitted, $7.00 to $12.00 per cylinder; gear cutting in nickel steel, rawhide, brass, fibre, etc.; crankshafts, connecting rods, gear sets; axles, crankcases, reproduced like original—send broken or worn parts to go by. The shop of quality. McCadden Machine Works, St. Cloud, Minn.

CYLINDERS REBORED, NEW PISTON and rings, $8.00 to $15.00, according to size and number; makes compression like new. The Evarts Machine Co., Hicks St., Hartford, Conn.

CYLINDERS REGROUND
and fitted with new pistons and rings for $15 per cylinder. We make parts and cut gears of all kinds. Send us your old parts and we will repair or duplicate them in record time. Cracked cylinders, gear cases, etc., welded and made good as new. Aluminum, bronze and brass castings of every description. The Adapt Machinery Co., 1626 Wabash Ave., Chicago, Ill.

NEW RADIATORS — RADIATORS RE-built and repaired. Send us your blue prints and we will give you estimates. Address Box 141, care The Automobile.

SCORED CYLINDERS REPAIRED.
No enlargement of bore—no need for new pistons and rings. Send piston with cylinder. Absolutely reliable method. References, testimonials, and full details on request. Waterbury Welding Co., Waterbury, Conn.

SCORED CYLINDERS REPAIRED, $4 UP
(Wrist Pin)
Bore absolutely undisturbed. Machined, ready to assemble. Discount to dealers. Returned in 24 hours. Send piston and express prepaid. Cracked Cylinders, no matter how bad, returned like new. Aluminum Welding with the art of past masters.

"SCHAAP FLAME" WELDING SYSTEM,
344-8 Cumberland St., Brooklyn, N. Y.
Thirty-five years of experience.

WELDING.
Cast Iron, Aluminum and all metals.
National Welding Mfg. Co., Inc.,
523 Jackson Blvd., Chicago, Ill.

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A FIRST-CLASS SALESMAN TO TAKE an interest in one of the best equipped garages in Iowa. Town of 25,000. A good paying repair business already established. Give references and experience. Address "Hawkeye," care The Automobile.

WANTED — STRICTLY HIGH - GRADE Salesman—one who is now visiting automobile trade or owners. Good money made on a very attractive proposition. Sturdy Mfg. Co., 2637 Michigan Ave., Chicago.

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CHAUFFEUR—EXPERT MECHANIC AND driver—ex-chauffeur of Presidents of Mexico—wants employment with private family; repairs and drives any car; sober, reliable and the very best of references; 30 years. Speaks English, French and Spanish. E. Fourmans, Van Ness Ave., 1319, San Francisco, Cal.

CRUDE RUBBER EXPERT — A CRUDE rubber man with seven years' experience in inspecting rubber would like a position as rubber buyer for a tire company, or to give expert advice on crude rubber purchases. Address Box 43, The Automobile.

GENERAL MANAGER AUTOMOBILE branch house desires to make change; can show record; 8 successful and profitable years with house I am now with. Address Box 102, care The Automobile.

EXPERT DESIGNER ON MAGNETO work and ignition apparatus in engineering department of a large company of high standing. Exceptional opportunity for right man. State qualifications and remuneration desired. Address Box 144, care The Automobile.

MECHANICAL ENGINEER, WITH three successful cars at 1913 shows, New York and Chicago, expert in up-to-date design and economical construction of commercial and pleasure cars, open for engagement after January 15th. Address Box 51, care The Automobile.

YOUNG MAN, WELL EDUCATED, 27 years of age, will pay a good commission to party getting him a position with automobile company, with prospects of becoming a salesman. J. A. Marshall, 645 46th St., Brooklyn, N. Y.

For Sale or Exchange

WANTED—TO EXCHANGE MY 160 acre improved farm, with crop, in northwestern Oklahoma, for five-passenger touring car. Carl Grau, Taylor, Tex.

Motorcycles

FOR SALE — SEVERAL GOOD, FIRST-class motorcycles cheap. Wolke Cycle Co., Louisville, Ky.

PARTS AND ACCESSORY MAKERS— The Motorcycle field is well worth your attention. 105,000 new machines in 1912. Leading medium, "Motorcycle Illustrated." 51 Chambers St., New York. Paid Circulation over 11,600.

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AUTOMOBILE AND MOTORCYCLE Tours—350 trips over the best roads in every State. 56 large pages of maps and road directions. 25c. postpaid. Motor Tours, 51 Chambers St., New York.

"FORD MODEL T REFERENCE BOOK" gives cause and cure of all the ails of Model T simply and concise. Gives the latest kinks. Full of pointers. Written especially for it. Elaborate cross index enables you to discover any trouble at once. Write for descriptive circular or sent postpaid, $1.00. Ford Reference Book Co., 57 West 125th St. New York.

GAS ENGINE TROUBLES AND IN-stallation. Cloth, $1.00; Flexible Leather, $1.50. Automobile Troubles and How to Remedy Them. Cloth, $1.00; Leather, $1.50. Eight other practical and reliable mechanical books. Send for circular.
Chas. C. Thompson Co.,
1126 S. Wabash Ave., Chicago.

HOW TO RUN AN AUTO—WITH A copy of Audel's Answers on Automobiles, $1.50, you can know all about Carburetors, Ignition, Timing, Engine Troubles, Overhauling and Driving. A complete course in 500 pages, with 375 diagrams, highly endorsed by men who know, $1.50 postpaid to any address. Money back if not pleased. Send postal for free circular.
THEO AUDEL CO., Publishers,
72 Fifth Ave., New York City.

NOTICE OF ANNUAL MEETING.

The annual meeting of the stockholders of the Automobile Trade Directory, for the purpose of electing Directors and Inspectors of Election, and transacting such other business as may properly come before such meeting, will be held on the 15th day of January, 1913, at eleven o'clock in the forenoon, at the office of the company, 239 West 39th Street, New York City.

E. M. COREY,
Secretary.

Dated December 26, 1912.

NOTICE OF ANNUAL MEETING.

The annual meeting of the stockholders of the Commercial Vehicle, Inc., for the purpose of electing Directors and Inspectors of Election, and transacting such other business as may properly come before such meeting, will be held on the 15th day of January, 1913, at ten o'clock in the forenoon, at the office of the company, 239 West 39th Street, New York City.

E. M. COREY,
Secretary.

Dated December 26, 1912.

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ALL IN ONE

No.05

DURING THE YEAR 1912

More Cars Have Been Equipped With

TRADE MARK
Raybestos
REG. U.S. PAT. OFF.

"THE ORIGINAL AND BEST ASBESTOS BRAKE LINING"

Than Ever Before in the History of the Industry

Manufacturers, dealers and owners now realize that this is *the* lining which made the automobile safe. That is why it is demanded by all motorists who insist upon safeguarding their lives against accident. RAYBESTOS *stops* car without effort and in time to avoid danger.

Be Sure to See the Royal Equipment Co. Exhibit at the Show

Examine RAYBESTOS. See for yourself why it is better than any other lining—note the material, the close, compact weave, the strong, sturdy toughness—the special treating and all the things that make it the best.

DUPLEX BRAKE—the brake that stops the car instantly, whether it is going forward or backward, will also be on exhibition.

If You've Had Brake Troubles

write us or call at the show. We'll be mighty glad to give any assistance. We are brake experts, build brakes to order, make enormous quantities of brakes each year and are in a position to help you to make *your* car safe.

The Royal Equipment Co.

420 Housatonic Ave., Bridgeport, Conn.

We Also Make Raymond Brakes and Gyrex, the Mixer

✤ the oil that lubricates most ✤

Mobiloil

A GRADE *for* EACH TYPE *of* MOTOR

IF OIL SAVES POWER IT FOLLOWS THAT ONE OIL SAVES MORE POWER THAN ANOTHER

VACUUM OIL COMPANY
ROCHESTER, U. S. A.

PRESSED STEEL

FRAMES

FOR TRUCKS AND PLEASURE CARS

A. O. SMITH COMPANY
MILWAUKEE

SAVE YOUR TIRES

Examine your tires carefully and notice the thousands of little breaks, some no bigger than a pin prick. These are the beginning of decay. If you want your money's worth out of those tires stop the decay now. You can do it by applying Preserv-O Tire Paint. It fills every little break and covers the whole tire surface with a coating of pure white waterproof rubber. It dries quickly, cannot hurt the tire, and lasts longer than any other tire paint. Let us ship you a can express prepaid. Money back if you ask it. Send 50 cents (or a $1 bill for two cans) today. Made and guaranteed by the Tire-Doh people.

ATLAS AUTO SUPPLY CO., 75 E. ADAMS ST., CHICAGO, ILL.

How to Repair an Inner Tube in 15 Minutes

Directions: Place tube between plates of the **Imperial Vulcanizer** (see cut); tighten thumbscrews; put a little gasoline in pronged receptacle; ignite. A permanent repair in 15 minutes.

You can do this yourself at home or on the road—anywhere. The Imperial Vulcanizer saves time, saves money, is easy to operate, and pays for itself in a short time.

NICKEL PLATED **PRICE $3.50** Patent Pending

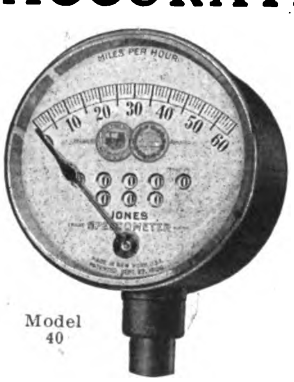
Complete with enough rubber for 40 punctures. At your dealer's or sent by express.

Guaranteed to Satisfy or Money Refunded

McGRAW TIRE & RUBBER CO., Dept. D, **East Palestine, O.**

ACCURATE—ALWAYS

JONES SPEEDOMETER



Model 40

Mechanically geared to the truth. Constructed on the principle of Centrifugal Force.

THE JONES SPEEDOMETER

Main Office: Bush Terminal, New York

Chicago, Boston, Philadelphia, San Francisco, Buffalo, Los Angeles, Portland, Seattle, Detroit

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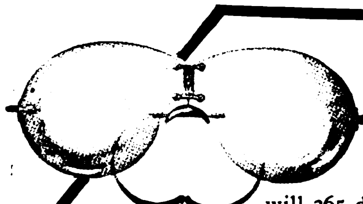

FOR THE MOTORIST'S CHRISTMAS—

Give him something useful, something that will remind him of your good-will 365 days in the year—a pair of

Coptic Motor Goggles

They provide perfect comfort and relief from the injurious ultra-violet rays, the blinding snow glare, sun, dust and storm. Furnished in all styles, shapes and colors at all prices. Also with corrections. To be had at all dealers or from us direct. Send for new catalogue.

CHICAGO OPTICAL COMPANY
1934-36 W. North Avenue, Chicago, Ill.
Dealers Wanted Everywhere

Weed Chains

Absolutely Prevent Skidding

Necessary on Rear Wheels
Advisable on Front Wheels

For your own safety—for the safety of the public, fully equip your car with Weed Chains

AT ALL DEALERS

Weed Chain Tire Grip Co.
28 Moore St. New York

For the convenience of customers desiring immediate delivery, stocks of Shelby Seamless Steel Tubing are kept in many large cities; the location of stock nearest to any specified point will be given on request.

NATIONAL TUBE COMPANY, General Sales Offices: Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES: Atlanta, Boston, Chicago, Denver, New Orleans, New York, Philadelphia, Pittsburgh, St. Louis, St. Paul, Salt Lake City. Pacific Coast Representatives—U. S. Steel Products Co., San Francisco, Seattle, Portland, Los Angeles. Export Representatives: U. S. Steel Products Co., New York City.

ELEKTRA ASBESTOS FRICTION

For BRAKES and CLUTCHES

Over 1,000,000 feet of material produced by our PATENTED PROCESS in daily use.

High coefficient of friction gives greatest factor of safety in operation of all brakes and clutches and OUR PATENTED PROCESS produces the only HIGH-FRICTION facing. THIS MATERIAL gives better satisfaction and wears longer than any other facing and is especially adapted for manufacturer's use; our BAND linings, as well as RINGS and CONES for CLUTCHES being formed ACCURATELY to shape and size.

F. L. Horton Manufacturing Co.
36 Whittier St., Boston, Mass.

STANWELD RIMS

Made by the pioneers and masters of the craft. Mechanically perfect and built of the finest material procurable, they give the utmost in service and efficiency.

A type and size for every car and any tire

THE STANDARD WELDING CO.
CLEVELAND, OHIO
New York Chicago Detroit

Where's Your "Six" for 1913?

Every progressive manufacturer announces a "Six" for 1913. The supremacy of the "Six" is established. It has come to stay. Sooner or later you have *got* to add a "Six" to *your* line. Competition will force you to it. Why not *now?* Your 1913 "Six" at from $1600 to $2000 will prove a self-seller if equipped with a

Beaver "Six" Unit Power Plant

With cylinders 3¾ x 5 inches this motor has the much desired long stroke and just the right power—40-45 H.P. Valves are extra large and the enclosed valve action is noiseless. Transmission unit enclosed with motor has plate clutch and 3-speed forward selective sliding gear-set. Write for catalog of motors and prices.

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2800 First Avenue :: MILWAUKEE, WIS.

Four Cylinder KELLOGG Air Pump

Has been adopted as part of the regular equipment by leading manufacturers for their 1913 cars, because they realize that good accessories help the sale of their cars.

The Kellogg Tire Pump inflates the largest tires to any desired pressure in the shortest space of time, and relieves you of all unnecessary labor.

Your dealer knows the merits of the Kellogg and will be glad to put one on your car.

For more complete information, send name of car and address.

Kellogg Mfg. Co., 108 Circle St., Rochester, N.Y.

Chicago	New York	San Francisco
1108 Michigan Ave.	1733 Broadway	444 Market St.

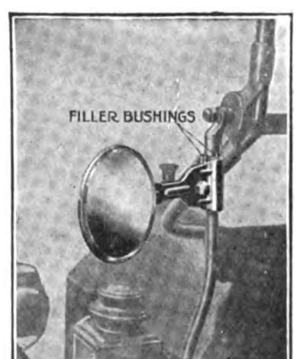
Braender Tires

are cheapest on mileage

They are strictly high-grade—built to outlast all others—and they do it.
Guaranteed 4000 miles
Send for price list and full particulars
Agents Wanted

BRAENDER RUBBER & TIRE CO.
Main Office and Factory
RUTHERFORD, N. J.
Salesrooms—1987 Broadway, N. Y. 1211 Bedford Ave., Brooklyn, N. Y.

THE HIND VIEW AUTO REFLECTOR

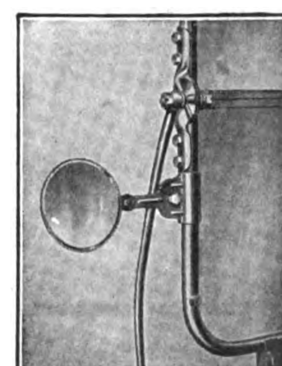


Patent Applied For

Prices $2.50 and upwards

Style A with Bushings

Style A



THE KALES-HASKEL CO., Detroit, Mich.

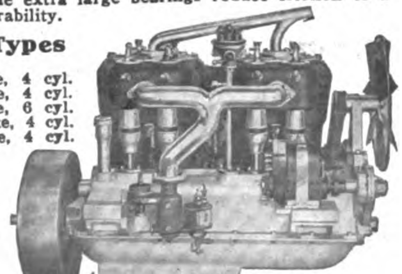
Wisconsin The Consistent Motors

The crank shaft is of large diameter—a self-contained oiling system supplied by a gear pump through the hollow crank shaft provides perfect oiling. The extra large bearings reduce friction to a minimum and increase durability.

All 4 Cycle—in 5 Types

3¾ in. bore, 5 in. stroke, 4 cyl.
4¼ in. bore, 5 in. stroke, 4 cyl.
4¼ in. bore, 5 in. stroke, 6 cyl.
4¾ in. bore, 5½ in. stroke, 4 cyl.
5¾ in. bore, 7 in. stroke, 4 cyl.

Wisconsin Motor Mfg. Co.
Milwaukee, Wis.
Dept. 28



Rushmore Electric Car Lighting

SMALLEST DYNAMO—largest output. Headlights up to 30 c.p. supplied without daylight charging.
No delicate regulating mechanism. Simplest—most reliable—cheapest.
Full technical description on request.
No. 1 dynamo, diameter 5½ inches, length 8 inches.
RUSHMORE DYNAMO WORKS Plainfield, N. J.

The Searchlight Gas Co.

1016 KARPEN BUILDING

CHICAGO, ILL.

Stronger than ever, legally, financially and in the esteem of the trade. Watch us grow.

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Dallas, Texas.
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Camden, N. J.
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AJAX TIRES

DOLLAR FOR DOLLAR SERVICE

DEALERS:—The marvelous efficiency and endurance of Ajax Tires assures permanent customers. We have an interesting proposition for established, responsible dealers.

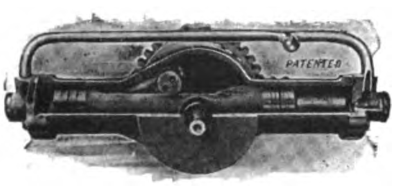
AJAX-GRIEB RUBBER COMPANY

General Offices, 1796 Broadway, N. Y. Factories, Trenton, N. J.
Branches in Principal Cities.

O. B. GEAR DRIVEN AIR COMPRESSOR

This compressor runs equally well placed in any position

Why are other compressors discarded in favor of the O. B.? There is a reason. Examine the sectional cut and you will readily see why this compressor will last a lifetime, needs no attention, compress air way above usual requirements, has very few moving parts, and is constructed on right principles, which are covered by patents. We use piston rings and bevel seated valves (notice piston rings in one end and piston ring grooves in the other). Can you find all these features in other compressors?



Patented August 30, 1910. Other Patents Pending

UNIVERSAL MANUFACTURING CO.
308-10-12 Ninth Street South MINNEAPOLIS, MINN.

The WOODSTOCK

You Can Walk from There to Anywhere

The Hotel of Comfort

43rd St. Just East of Broadway, New York

Our new addition is ready for occupancy. We now have 360 rooms with 265 baths. Write us for descriptive folder with typical floor plan and rate card. Wire for reservation at our expense.

Rates from $2.50 to $4.00 per day

W. H. VALIQUETTE
MANAGER

Also THE BERWICK, Rutland, Vermont

The **Kimball Steel Protector** makes **Blow Outs, Punctures** and **Rim Cuts** impossible. A few sections will hold any old blowout. **Tires are as flexible as ever.** Send for detailed information.

KIMBALL TIRE CASE CO., 171 Broadway, Council Bluffs, Iowa

NEWTONE Motor Horns

"Newtone" Trade Mark guarantees not only satisfactory service, but a certain refinement in appearance and quality of warning note found in no other horn.

Torpedo Type
Price $20

Automobile Supply Mfg. Co.

220 Taaffe Place, BROOKLYN, N. Y.

70% MORE TIRE MILES
WIRE McCUE WHEELS

Save Tires—Save Fuel—Save Car. Make cars easier riding and easier driving. Stronger than any other practical wheel.

THE McCUE CO. BUFFALO, N. Y.

Long Radiators

THE LATEST DEVELOPMENT IN

High Grade Radiators

THE LONG MANUFACTURING CO.
Detroit, Mich.

Hold Your Breath

Get Our 1913 Agency Proposition
It's All Velvet for You—Write Us this Minute
W. H. McINTYRE CO.
AUBURN
IND.
CATALOGUE
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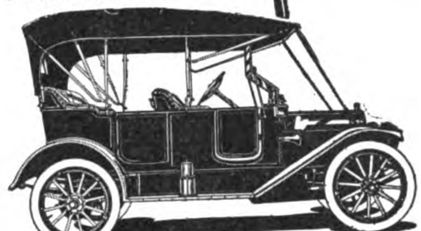


Reo The Fifth

Final and crowning achievement of the R. E. Olds, pioneer designer of Autos. A standard size 30 to 35 horsepower, four-cylinder car of modern refinements, priced for the present at only $1095.

R. M. OWEN & CO., General Sales Agents
REO MOTOR CAR CO., Lansing, Mich.

Studebaker

Three new models—the "25"—"35"—and "Six"—each the greatest automobile value ever offered at its price. Studebaker values are a sensation and Studebaker Dealers are justified in believing that this will be their biggest year.

THE STUDEBAKER CORPORATION
Detroit, Mich.

I Want You to HEAR This Musical Auto Horn

Patented
Jan. 23, '12.
Aug. 20, '12

I know there isn't *anybody* who can *describe* the chime-like signal of the Aermore Horn to you. So I want you to *hear* it—

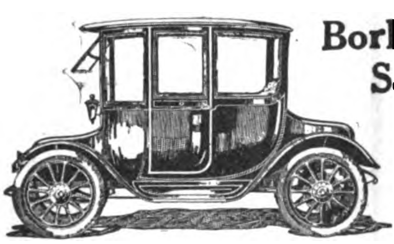
The AERMORE Exhaust Horn
—the horn harmonious

I want you to write me and I'll tell you where and how you can hear the singing, organ-like tones of the Aermore. Just drop me a postal.

G. V. P. Lansing, President.

AERMORE MANUFACTURING COMPANY
Dept. 5568. 1536 Michigan Blvd. CHICAGO, U. S. A.

Borland Electrics Satisfy Owner and Agent



The Borland 1913 Regular Coupe —$2900

The absolutely perfect construction of the Borland eliminates the necessity for repairs due to defective material or workmanship, pleases the owner and insures the dealer the greatest final profit on each sale. Besides model illustrated we make: Brougham, $2500; Roadster, $2550; Coupe, $2700, either front or rear drive; 1500-pound delivery truck, open body, $2100; 1500-pound truck, closed body, $2250; Limousine, $5500.

Write for agency terms at once

THE BORLAND-GRANNIS COMPANY
2634 Michigan Avenue CHICAGO

Baker Electrics

Pleasure Cars Trucks

Each carries the strongest and most significant guarantee ever placed upon a car of any make or type — the guarantee of Baker design, Baker material, Baker construction, Baker workmanship, Baker reputation.

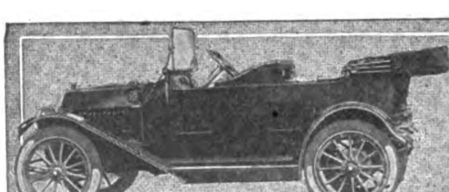
Communications from Open Territory Solicited

THE BAKER MOTOR-VEHICLE COMPANY - - Cleveland, O.

Cartercar

Climbs a 50% grade—any number of speeds—friction transmission. Five models. Write.

CARTERCAR COMPANY, PONTIAC, MICH.



"OLYMPIC"
$1500
4 cylinders
"MAJESTIC"
$1975
4 cylinders
"SULTANIC"
$2650
6 cylinders

JACKSON AUTOMOBILE CO
1208 EAST MAIN STREET, JACKSON, MICHIGAN.

Jackson

NO HILL TOO STEEP
NO SAND TOO DEEP

OAKLAND

"The Car With a Conscience"

Write for 1913 Catalog

FOUR AND SIX CYLINDER MODELS
$1,000 to $3,000

OAKLAND MOTOR CO.

100 OAKLAND BLVD., PONTIAC, MICH.

Hupmobile

Hupmobile "32" Touring Car, Fully Equipped, $975, F.O.B., Detroit
Long-Stroke motor 3¼ x 5½ inches; Enclosed valves; Three bearing crank shaft; Unit power plant; Multiple disc clutch; Three speeds forward; Sliding Gears; Full floating axle; center control; Zenith carburetor; Bosch Magneto; 106 inch wheelbase, 32 x 3½" tires; Quick detachable rims; Mohair top with envelope; Jiffy curtains; Windshield; rear shock absorber; Prest-O-Lite tank; Gas headlights; oil side and tail lamps; tools; horn; Trimmings, black and enamel; Standard color, black.
Magneto and Camshaft driven by silent Coventry chain.

Hupmobile "32" Roadster, Fully Equipped, $975, F.O.B., Detroit
Chassis and specifications same as Touring Car. Large turtle back dust proof compartment for extra accessories, tires and baggage.

Hupmobile "32" Delivery, Fully Equipped, $950, F.O.B., Detroit
Chassis same as Touring Car; Enclosed Panel Body; 2 Cushioned Lazy-back seats; Carrying capacity 800 lbs.; Chassis and body painted black, high-class finish; 2 Piece Windshield; Prest-o-Lite tank; Gas Headlights; Oil side and tail lamps; Quick Detachable Rims; Tools; horn; Trimmings, black and nickel

HUPP MOTOR CAR COMPANY, 1252 MILWAUKEE AVE. DETROIT, MICH.

Motor Car Manufacturers Since 1893

HAYNES

1912

Occupying the newest and most modern automobile manufacturing plant in America.

HAYNES AUTOMOBILE COMPANY

Dept. T-7 KOKOMO, IND.

Warren

MOTOR CARS

Warren flexibility, strength and speed, and durability never fail to inspire Warren owners with the firm conviction that the Warren is the "best medium priced car built"

"12-30" Roadster - - $1175
"12-30" Demi-Tonneau - 1250

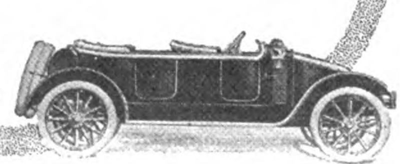
Including Top and Automatic Windshield.
Self-Starter $50 extra.

"12-30-K" Touring Car - $1300 "12-35" Roadster . $1415
"12-35" Touring Car - $1500 "12-40" Touring Car $1700
Including Self-Starter, Automatic Windshield, Silk Mohair Top, etc.

Warren Motor Car Co., 391 Holden Ave., Detroit, Mich.

Croxton

Croxton cars incorporate all of the features for which the buyer looks in the new season models. Write for catalog and agency details.



THE CROXTON MOTOR CAR CO.
WASHINGTON PA.

S. R. O.

Leading and Oldest European

Ball Bearing

Mea

MAGNETO

Write for particulars and list of users

MARBURG BROS., Inc.
Sole Importers

DETROIT 1786 Broadway, NEW YORK CHICAGO

Buffalo Electric

Direct Drive—Single Reduction
Foot Control
Irreversible Worm Steer
Long Mileage Batteries
Buffalo Service

Model 29 Roadster, . . $2,600
Model 30 Coupe, ... 3,200
Model 30-B Coupé, . . . 3,300

The Buffalo Electric Vehicle Company
Buffalo, New York

MARMON

"The Easiest Riding Car In The World"

The Marmon "32"
32-40 h.p., 120-inch wheelbase, dependable electric starting and lighting system, left-hand drive, center control, nickel trimmings, with newest body types to meet every requirement and corresponding equipment—
$2,850 to $4,100

The Marmon "Six"
48-80 h.p., 145-inch wheelbase, dependable electric starting and lighting system, left-hand drive, center control, nickel trimmings, with body types to meet every requirement and corresponding equipment—
$5,000 to $6,350

Detailed Information on Request

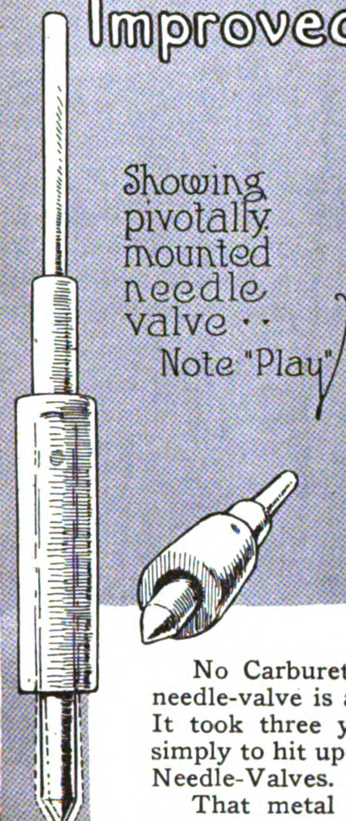
NORDYKE & MARMON CO.

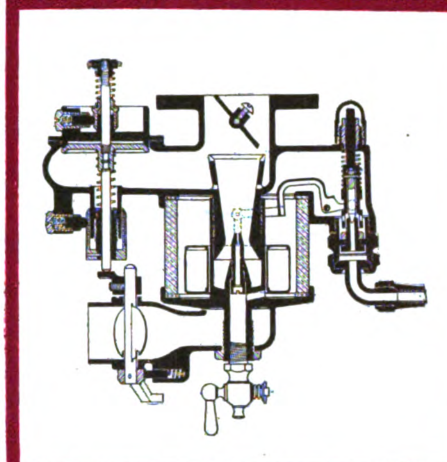
INDIANAPOLIS Established 1851 INDIANA

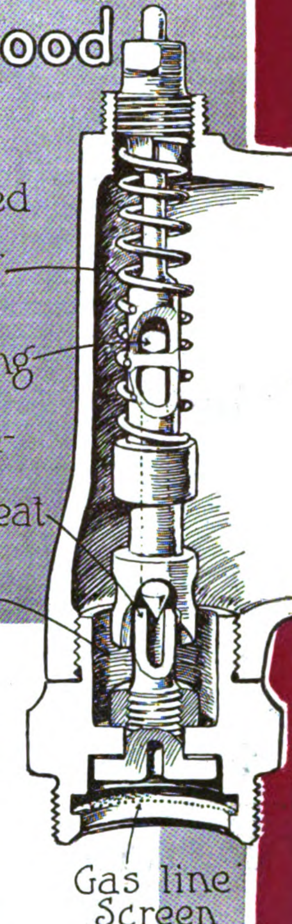
Sixty Years of Successful Manufacturing

WHY STROMBERG

Improved Carburetors Won't Flood




SECTIONAL VIEW OF MODEL B



No Carburetor is more efficient than its needle-valve. A "sick" needle-valve is at the root of as much flooding as a "dropsical" float. It took three years' experimenting in STROMBERG laboratories, simply to hit upon a metal from which to manufacture STROMBERG Needle-Valves.

That metal had to withstand all vegetable acids—it must not rust nor corrode. That metal had to be as hard as a diamond—it must take a polish as smooth as glass—in long periods of service must not "blunt" nor wear—under the severest vibrations must not "groove" nor vary in points of contact. Such are qualities of STROMBERG Needle-Valve metal.

STROMBERG *Improved* Carburetors won't flood because their needle-valves are self-cleaning, self-aligning, adjustable. Why? Because they are pivotally mounted. They are self-cleaning because they have plenty of "play" (see illustration), resulting in any possible obstruction being "joggled" out of the aperture.

Being pivotally mounted, the valve has got to align. Were it possible for the valve-seat to wear, the needle-valve must adjust itself to conform to the contour of that seat—it has got to come central.

But the valve-seat won't wear. Why? Because it is made of the longest-lived valve-seat metal obtainable—exclusively manufactured from a formula determined in our own laboratories. A limit to its endurance has yet to be discovered.

STROMBERG *Improved* Carburetors won't flood because of the gas-line screen (see diagram). No foreign substances in the gasoline can "get to" the needle-valve and obstruct it unless they can worm through this fine-mesh screen. STROMBERG was the first carburetor to use a screen of this kind in the gas line.

Should foreign particles, by any possibility, get by this outer safe-guard in the Model B carburetor, they are sloughed off by the self-cleaning valve and deposited in the catch basin (see diagram) where they become harmless.

STROMBERG *Improved* Carburetors won't flood because each individual part is as delicately attuned to the whole, as the components of the most sensitive scientific instrument. The spring (see diagram) is made of specially imported steel wire, and is given a separate tension test on every carburetor assembled.

These are but a few "reasons why" it is mechanically impossible for STROMBERG *Improved* Carburetors to flood. More will appear next week.

"Reason Why" Talk 1-A

STROMBERG MOTOR DEVICES COMPANY
100 EAST 25TH STREET CHICAGO, ILLINOIS

Herreshoff

"The Thoroughbred"

Roadster, $950
Touring Car, $1150
Six-Cylinder Touring Car, $1700

Live wire dealers write or wire for unalloted territory

Herreshoff Motor Co., Detroit, Mich.

Speedwell Motor Cars

New Series "F" 4 cylinders, 4 and 5 passenger models, **$2700.**

New Series "G" 6 cylinders, 4 and 5 passenger models, **$2850.**

All models electrically lighted and fully equipped.

Speedwell Motor Car Company
ESSEX AVENUE DAYTON, O.

Stearns

THE ULTIMATE CAR
(KNIGHT TYPE MOTOR)

The first American Car to adopt the Silent Knight Motor—the Engine used by Daimler, Mercedes, Panhard and Minerva.

THE F. B. STEARNS CO.
CLEVELAND, OHIO
Branches and Dealers in 125 Cities.

MOLINE WINS AGAIN!

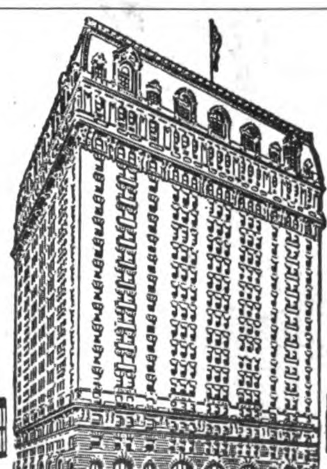
For the third time in the history of the Annual Reliability Run of the Chicago Motor Club, the Moline entries carried off the honors—Won Team Trophy 1910; tied for touring, won Roadster Trophy 1911; won Roadster Trophy and Team Trophy 1912. Proof sufficient of the power and efficiency of the

Dreadneught Meline M-40

Now fully equipped: 5-passenger touring car or 2-passenger roadster model—Ward-Leonard Electric Self-Starter and Electric Lighting System—Top, Windshield and Speedometer—full 40 H. P.—Moline Long Stroke Motor, Unit, Power Plant, 3-point suspension—only $1,950. Attractive open territory for live dealers. Write for information catalog.

MOLINE AUTOMOBILE COMPANY
105 Keokuk Street East Moline, Illinois

Dreadnought Moline



Hotel La Salle

CHICAGO'S FINEST HOTEL

ERNEST J. STEVENS, Vice-Pres. and Mgr.

Located in the heart of the city, within easy reach of all railway terminals

RATES

ONE PERSON	Room with detached bath	$2 to $3 per day
	Room with private bath	$3 to $5 per day
TWO PERSONS	Room with detached bath	$3 to $5 per day
	Room with private bath	$5 to $8 per day

TWO CONNECTING ROOMS WITH BATH

Two persons	$5 to $ 8 per day
Four persons	$8 to $15 per day
SUITES	$10 to $35 per day

LA SALLE AT MADISON STREET, CHICAGO

Is There a PAIGE Dealer In Your Territory?

If not, write or wire us today and "get the jump" on your competitors.
The Paige "36" at $1275 and the Paige "25" at $950 are the leaders in the popular price field.
You want them, if you can get them.

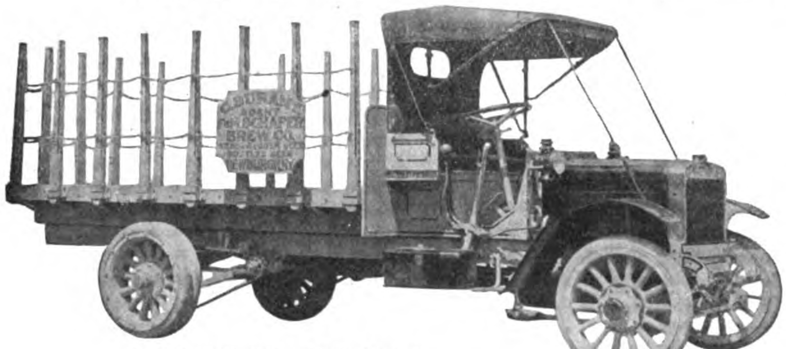
PAIGE-DETROIT MOTOR CAR CO.
304 Twenty-First Street, DETROIT, MICHIGAN

All Roads are Level to

Moyer

DESIGNED & BUILT BY
H. A. MOYER Syracuse, N.Y.
Send for catalogue

ATTERBURY TRUCKS



Model "D" Three-Ton Truck

We make a truck to meet the requirement of every branch of modern business, and every vehicle bears the stamp of Atterbury uniformity and is supported by the security of the Atterbury guaranty.

Our delivery wagon, one, two and three-ton trucks, have occupied a leading position in the commercial vehicle world ever since their appearance on the market, eight years ago.

One distinctive feature of the Atterbury construction is our strut and radius rod, specially designed to swivel on the rear axle, with double universal action.

Write for their complete catalogue "G."

ATTERBURY MOTOR CAR COMPANY
ELMWOOD AND HERTEL AVENUES
BUFFALO, NEW YORK

NEITHER RAIN, MUD NOR DUST CAN HARM

your luggage when it is carried in the new rain-proof, water-proof

KAMLEE AUTO TRUNK

"Made by trunk-makers who are motorists"

Embodies every desirable feature—strength, lightness, durability, beauty. It adds to rather than detracts from the appearance of any car.

Consider these exclusive Kamlee features before you buy an auto trunk, then you'll surely select a Kamlee: patent drop front—no lifting of lid—patent interlocking edge makes it air-tight, dust-proof, rain-proof; no straps to bother with in opening; fitted with standard suit-cases permitting removal of one party's luggage without disturbing others.

Ask Your Dealer or write us for price and descriptive circular. If your dealer can't supply you, **we'll gladly ship** you a Kamlee on approval.

The Kamlee Co.
236 Broadway **Milwaukee, Wis.**

Look for The Red and Gold Diamond In Lower Right Hand Corner

The Easiest Way

to figure on the mileage of motor-driven vehicles and keep track of gasoline or battery consumption, tire, lubrication and depreciation costs—also any promiscuous "joy-riding"—is to install a VEEDER HUBODOMETER.

Neat, durable and compact it can be easily attached. Price complete **$25.00**

At your dealers', direct from our factory or at the following agencies:

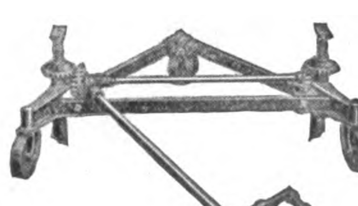
T. H. Cranston & Co., 56 E. Randolph Street, Chicago, Ill.

Bernard I. Bill, 543 Golden Gate Avenue, San Francisco, Cal.

The Veeder Manufacturing Company
C. H. VEEDER, President D. J. POST, Treasurer
H. W. LESTER, Secretary
HARTFORD, CONN.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings.

Store Your Cars on WEAVER AUTO TWIN-JACKS



WE MEAN YOU—no matter whether you own a public garage and store a hundred cars, or a private garage with one car.

The public garage can store from 30 to 50 per cent more cars by placing them in close formation with Weaver Auto Twin-Jacks. Every inch of floor space can be utilized.—**The repair shop** needs them even more than ever during the busy "overhauling" season.

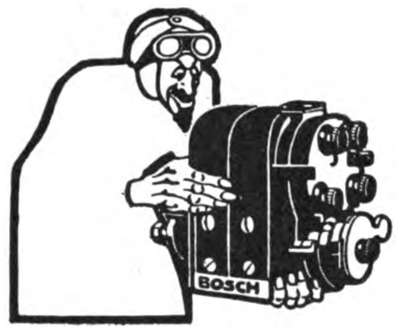
MR. PRIVATE CAR OWNER—don't waste money buying individual tire rests this winter—buy Weaver Auto Twin-Jacks. They comprise a TURN TABLE, TRANSPORT and LIFTING-JACK, as well as a tire-rest.

TWO FOR $20.00 at your dealers or direct from

WEAVER MFG. CO., SPRINGFIELD, ILL.

AS A TURN TABLE

AS A TRANSPORT



BOSCH

Magneto and Plugs

COMPARATIVE tests of every nature have proven the contention of the exacting man that "Bosch" has no equal—not only from a viewpoint of efficiency, but mainly in regard to reliability and longevity.

Be Satisfied **Specify Bosch**

BOSCH MAGNETO COMPANY
223-225 West 46th Street - - New York

The

Reacto

$10.00

A vibrating electric horn with a tone which is loud, sustained and penetrating, but not abruptly harsh—Operates on 6 volts.

No delicate parts—Adjustment permanent. Dust and waterproof—Easy to keep clean.

Send for Bulletin "158 A."

The Holtzer-Cabot Electric Company
Chicago, Ill. Brookline, Mass.

Holtzer-Cabot

American Made for American Trade

Quality Plus—

NEW DEPARTURE

Ball Bearings

No ball bearing is so carefully made, so closely gauged, so persistently inspected and so insistently standardized.

Write for catalog describing three types

The New Departure Mfg. Co.
BRISTOL, CONN.

Sale of All the Properties of

United States Motor Company
Alden-Sampson Manufacturing Company
Brush Runabout Company
Columbia Motor Car Company
Dayton Motor Car Company
Maxwell-Briscoe Motor Company

Pursuant to decree of the United States District Court for the Southern District of New York, the properties of the above companies will be offered for sale in Room 47 of the Post Office Building, Borough of Manhattan, City of New York, on

January 8th, 1913

Sealed bids will be received by receivers at their office, Broadway & 61st Street, Manhattan, N. Y., up to 10 A. M. January 8, 1913. Bids will be announced January 8, 1913, at 11 A. M. in Room 47, P. O. Building, Manhattan, N. Y. Thereupon bidders, qualifying pursuant to terms of decree of sale, may bid further until 3 P. M. of that day if and as may be permitted by the Court. For copies of decree of sale giving terms, conditions and particulars as to bids and sale and for all further information reference may be made to the undersigned. Bidders should inspect the decree of sale.

W. E. S. STRONG
ROBERTS WALKER } Receivers.
Broadway & 61st Street, Borough of Manhattan,
New York City.

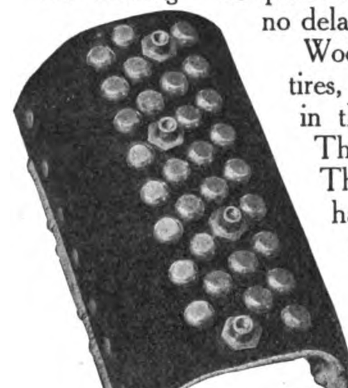
ROSENBERG & LEVIS,
Solicitors for Complainant,
170 Broadway, Borough of Manhattan,
New York City.

DON'T SKID!

—but save the cost of chains by using the modern non-skids for snow and ice

Double Grip *Woodworth Treads*

No bother putting on and off—they stay on all the time.
No banging of loose links.
No chafing—no punctures—no frost-bitten fingers—no delays.



Section of Double Grip Woodworth Treads showing special high rivets.

Woodworth Treads *protect* the tires, and save more than their cost in the added mileage they give. They cost *nothing* in the end. The Double Grip Woodworths have a special series of high rivets giving perfect traction in snow and ice. Put them on *now*, while your tires are still good!

Leather Tire Goods Company
NIAGARA FALLS, N. Y.
New York Store, 1608 Broadway
Good Agents Wanted for Unoccupied Territory

Guaranteed 5000 Miles Without Puncture

Whether Your Tires Are New or Old

If your tires are tread-worn or rut-worn, don't throw them away or you'll throw away $50 to $200. *Durable Treads* will make your tires wear 10,000 miles instead of 5,000.

OUR WRITTEN GUARANTEE

With *Durable Treads* we will give you a written legal Guarantee for 5000 miles without puncture. This is binding whether your tires are new or old, tread-worn, rim-cut or rut-worn.

Durable Treads are the only protectors built to actually protect your tires against rim-cuts, rut-wear and side-blow-outs.

NO MORE PUNCTURES

Your tire expense this winter will be tremendous. Frozen rough roads will puncture and ruin your unprotected tires.

But if you will protect them with *Durable Treads* you can travel over the worst roads—there'll be no punctures, road-delays, skidding or tire expenses.

And each season you will not need to pay $50 to $200 for a new set of tires. *Durable Treads* will capacitate your old ones for 5000 miles more without puncture.

Durable Treads

COST HALF OF TIRES

A set of tires cost $50 to $200. But *Durable Treads* cost less than half these amounts. Hence, isn't it economy to *protect* your tires? And isn't it more economical to buy *Durable Treads* at *half* the cost of tires?

SPECIAL DISCOUNT

If *Durable Treads* are not already represented in your territory, we will make shipments direct to you from factory and allow you our *full dealer's discount* on your initial order and make you an exceptional dealers' proposition.

TEST AT OUR EXPENSE

We want you to know just what *Durable Treads* are before you invest a cent or promise to buy. So we will ship you a pair or full set with your permission, for inspection. *We will pay all express charges.* This examination will cost you nothing. We want you to send the coupon below for conclusive proof. If you live *East* of the Mississippi, address *Chicago; West*, address *Denver*.

SEND COUPON FOR PROOF

Colorado Tire & Leather Company,
1214 Majestic Bldg., Chicago.
1026 Broadway, Denver, Colo.

Dear Sirs:—Please send me proof about *Durable Treads* without obligation or expense to me.

Name ....
Street Address ....
City .... State ....
My Tire Size is ....

Colorado Tire & Rubber Co. 1214 Majestic Building, Chicago
1026 Broadway, Denver, Colorado
522 W. 34th St., New York City, N.Y.

Last call for the Show Issues

FORTY thousand motor owners and motor dealers are waiting for the big Show numbers of THE AUTOMOBILE and MOTOR AGE.

The show issues are part of the show itself—a compact digest of everything the industry has produced in the past year.

These forty thousand intelligent and motor-wise readers will be unusually *interested* in the Show issues.

They will *absorb* them from cover to cover.

They will *keep* them and refer to them as they would to a directory.

Model B Speedometer with Grade Indicator . . . **$50**

Model B-1 Speedometer with Grade Indicator and Clock **$85**

Out of 158 Car Makers who have selected the magnetic type of speedometer for equipment on their cars, 134 have selected the Stewart Speedometer.

The Selection of the Stewart Speedometer by this great majority of car makers signifies only one thing—***that the Stewart Speedometer is an instrument of superior merit.*** Think what this means! The Stewart Speedometer is the almost unanimous selection of car makers—***men who are especially competent to judge of the merit of a speedometer***—inventors, designers and manufacturers of fine mechanism themselves. Even if you didn't know that the Stewart Speedometer is a magnificent instrument—strong, lasting, accurte, beautiful—you could safely rely upon the judgment of 134 car makers out of 158.

Therefore, if you desire permanent satisfaction insist on getting the New 1913 Stewart Speedometer with Grade Indicator when buying a car. The chances are that the car of your choice will bear the Stewart Speedometer as standard equipment ***because over eighty per cent of the total output***—ALL MAKES—for 1913 will bear the Stewart Speedometer as standard or special equipment. ***Even if the car you select is not so equipped you can get the Stewart Speedometer if you insist.*** The maker or dealer will gladly and quickly put one on—all you will have to do is to say: "I want the New 1913 Stewart Speedometer with Grade Indicator on my car."

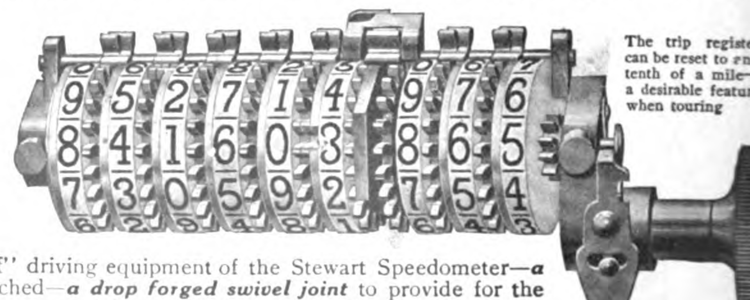
And you can rest assured that you will be right because you will have the trained judgment of one hundred and thirty-four car makers to back you in your choice.

The Grade Indicator

(At Top of Speedometer Dial)

The Grade Indicator is an accurate instrument operated automatically by gravity. Made strong and dependable, it is as unfailing as the power which operates it. It tells the exact truth about grades. It shows the various degrees of grades from zero up to thirty—the big, easily read numbers being carried on a revolving cylinder which presents the proper figure at the opening of the speedometer dial.

A Real Automobile Odometer. This Big, Sturdy Distance Recorder is Combined with the Stewart Speedometer



The trip register can be reset to any tenth of a mile—a desirable feature when touring

Note its big, honest figures—its sturdy frame—and strong brass cylinders—***that means real "instrument" construction.*** Note that ti is an expensively made ***automobile*** odometer—not a cheap ***bicycle*** odometer. Every turn of the front wheel is registered because its brass cylinders are revolved by a ***direct drive mechanism***. It cannot lie because it contains no springs to break or weaken—no pawls to slip or fail. Hard bronze gears—solid brass cylinders—direct drive mechanism—positive action—service everlasting.

Don't forget the strong, unbreakable, "trouble-proof" driving equipment of the Stewart Speedometer—***a flexible shaft*** that will outlast the car to which it is attached—***a drop forged swivel joint*** to provide for the movement of the front wheel in turning corners (others use a cast joint)—***noiseless front wheel gears.***

You can get the New 1913 Stewart Speedometer with Grade Indicator on any make of car if you insist.

SEND FOR CATALOG

Stewart & Clark Manufacturing Company

1930 Diversey Boulevard, Chicago

BRANCHES—Detroit Chicago San Francisco New York Boston Cleveland Philadelphia Kansas City Los Angeles Minneapolis Indianapolis London Paris

The Grade Indicator cannot be obtained with any other make of speedometer. It is combined only with the Stewart.

$985 *Completely Equipped*

Overland

$985 *Completely Equipped*

High-priced feature No. 9

Every Overland motor is thoroughly "worn-in" on the block under a belt for 48 hours; it is then tested on the block under its own power for 48 hours.

Not content with these tests, we require that each chassis be tried out on country roads—carrying a test body weighed with 800 pounds of sand bags.

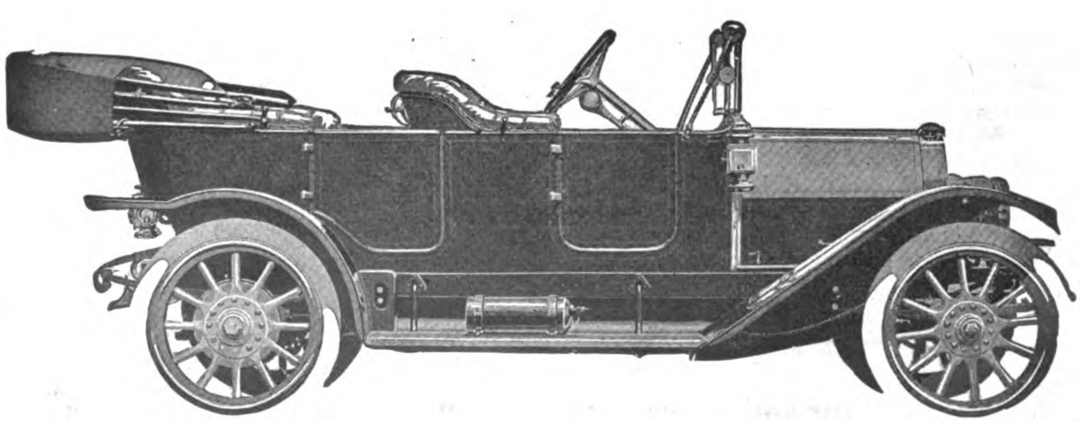
Finally, each completed car is subjected to a trying 5-mile drive by an expert driver.

When you buy an Overland you are buying guaranteed performance.

In the Model 69T this high priced inspection and supervision costs but $985.

Write today for details. Please address Dept. 38.

The Willys-Overland Company
Toledo, Ohio



Prest-O-Starter

Starts your engine (old or new) quickly and easily in coldest weather

For Four Cylinders $20

For Six Cylinders $25

$1.50 extra for two-way valve necessary when the same Prest-O-Lite is used for both starting and lighting.

Here's a starter that adds practically no weight to your car, is perfectly simple and is as durable as the engine itself. Easily applied to any engine, old or new, very economical in the use of gas, and requires no expert repairing.

How Prest-O-Starter Works

The principle of starting a motor with Prest-O-Starter is the same as "starting on compression." A measure of acetylene, at low pressure, is pumped from your Prest-O-Lite into the cylinders.

Touch your spark—your engine starts.

Unlike "gasoline priming," it is not affected by heat or cold. It is certain.

In cool weather, by opening a valve on the dash, you can feed gas at low pressure into the intake manifold. This allows your engine to run on acetylene until it is warm enough to run on gasoline.

If the Prest-O-Starter did no more than prime your engine in this way during cold weather, this convenience would be well worth the price.

But Prest-O-Starter is more than a primer. When installed properly, it will start your engine, summer or winter, almost invariably without recourse to the crank.

Make Sure Your Starter is Installed CORRECTLY—Look it Over

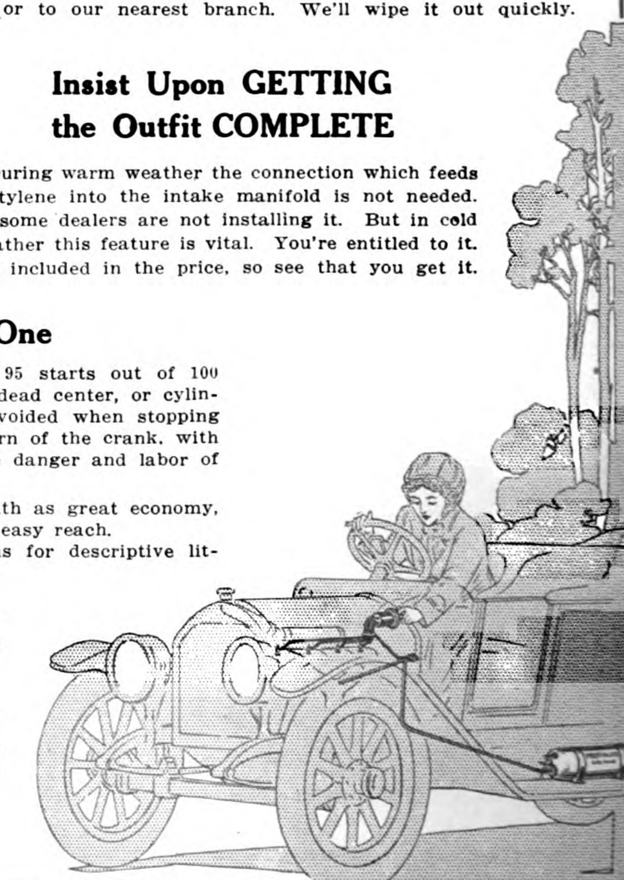
The Prest-O-Starter is easy to install correctly. In fact, it's so very easy to install that some good factories and garages install it with utter carelesslless, overlooking the one or two simple features vital to success in operation. Fortunately this is an easy matter for the car owner to correct, even if he isn't a mechanic.

Our literature tells you exactly how the Prest-O-Starter is installed, and how to adjust it. Anyone can give it the slight attention it may need or quickly tell a dealer where the trouble lies.

Every Prest-O-Starter is sold with the assurance of satisfactory service. The entire Prest-O-Lite Organization is back of every one. If you have any trouble, report it to us or to our nearest branch. We'll wipe it out quickly.

Insist Upon GETTING the Outfit COMPLETE

During warm weather the connection which feeds acetylene into the intake manifold is not needed. So some dealers are not installing it. But in cold weather this feature is vital. You're entitled to it. It's included in the price, so see that you get it.



Now—More than Ever—You Need One

Your Prest-O-Starter, properly installed, will average better than 95 starts out of 100 attempts. The few failures are caused by your motor stopping on dead center, or cylinders filled with burnt gas. Both of these conditions can be easily avoided when stopping your motor. But should either or both happen, an eighth or quarter turn of the crank, with the switch at neutral, will remedy the trouble at once, with all of the danger and labor of cranking eliminated.

Rest assured that no other starter can give you as high efficiency with as great economy, durability and freedom from mechanical trouble. The price is within easy reach.

Get in touch with any of our branches—or your dealer—or write us for descriptive literature.

The Prest-O-Lite Co. 234 E. South St. Indianapolis, Ind.

Canadian General Office and Factory, Merritton, Ont.

BRANCHES:

Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Indianapolis, Jacksonville, Kansas City, Los Angeles, Memphis, Tenn.; Milwaukee, Minneapolis, New Orleans, New York, Omaha, Philadelphia, Pittsburg, Portland, Ore.; Providence, St. Louis, St. Paul, Minn.; San Antonio, San Francisco, Seattle, Syracuse, Merritton, Ont.; Toronto, Ont.; Winnipeg, Manitoba.

Exchange Agencies Everywhere

?
WHICH

FOR EVERY CAR OWNER the question gets right down to this alternative: *damage* or a *Conover Safe-Guard.*

EITHER is inevitable.

COLLISION you *cannot* avoid. If you don't run into something, some other car or wagon backs into you. It is merely a matter of time for *every* car. Fenders, lamps, radiator, wheels, axle—any or all will be smashed to some extent. If badly, you can collect insurance; but you lose the use of your car while repairs are being made. If slightly damaged, you cannot collect a dollar.

The CONOVER
"The Dependable Safe-Guard"

PROTECTION you *can* have. And this for the original price of *one* Conover. Made on a new principle; backed by a new guarantee. Its broad, flat surface, sturdy semi-elliptic steel springs, with four contact points, were made to take blows. If dented, you can hammer back the protection surface. If broken, you can have a new Conover *free*, any time within two years.

WHICH alternative? Which is the economical, satisfactory sensible one?

Best quality of steel heavily enameled in black, royal blue, French gray or maroon; bar 2 inches wide. **$15.00**
(Any other color of enamel $5.00 extra)

Best quality of steel, brass or nickel plated; bar 2 in. wide - - - **$17.50**

Solid bronze, finished in either brass or nickel; bar 2 in. or 2⅜ in. wide **$25.00**

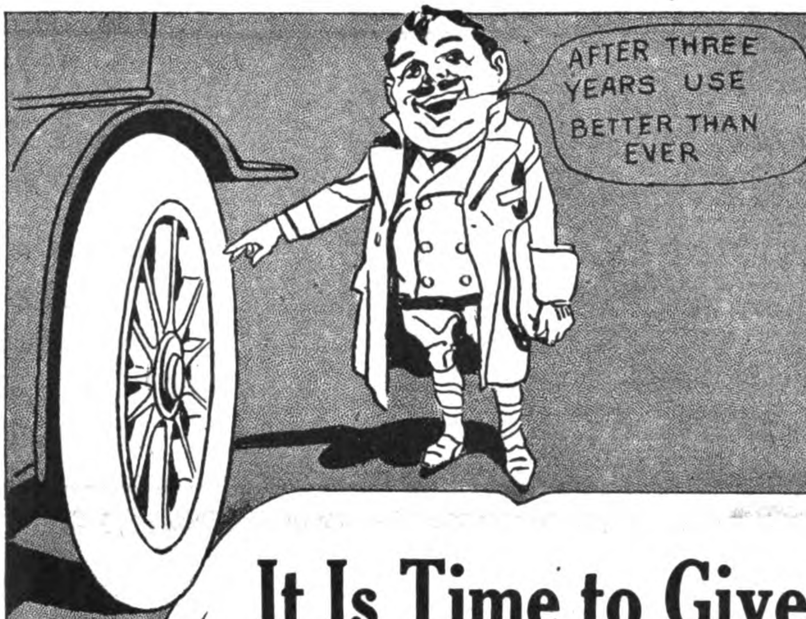
Shipped, express paid, anywhere in the United States, on thirty day's trial, upon receipt of the regular price. When ordering, give name and model of car. Specify size and finish desired.

An attractive booklet will be sent free upon request.

LOVELL-McCONNELL MFG. COMPANY
Sellers — Newark, N. J.

NEW JERSEY TUBE COMPANY
Makers — Newark, N. J.

CONOVER
"The Dependable Safe-Guard"



IF YOU ARE IN DOUBT AFTER TRYING IT, WE WILL NOT ONLY GIVE YOU YOUR MONEY BACK, BUT WILL GIVE YOU A NEW SET OF TUBES.

It Is Time to Give Up Tire Changing

Airease absolutely does away with roadside Tire Repairs!

Motoring to-day would be the great national pleasure if it were not for that ever-present bug-bear—TIRE TROUBLE. The most disagreeable part of motoring is completely eliminated by the use of a tire filler that makes tires as resilient as air, yet as unpuncturable as solid tires.

Reflect on some of your past experiences: changing casings in the boiling sun, pumping tires under torrid heat, changing tires at night or in the rain, or going home on the rim—ALL of these are relegated to the region of the old "one-lung" and two-cylinder opposed motors.

WISE MEN MARVEL today at the fact that the old-time bicycle tire, with its troublesome compressed air, could have developed into the automobile tire. Thousands of attempts have been made at spring wheels and airless tires, and not a few tire fillers have been marketed. But it remains for Airease to produce a lasting, unchangeable material, not affected by heat or moisture, or cold or drought, that will be as resilient as air and an indestructible element in itself.

Nearly every car owner has said unprintable things about his tires, while dealers and garage men have been besieged with requests for a cheaper and satisfactory substitute for the tire filled with air.

After many years of investigation by a famous chemist, and three years' experimentation and use on many cars, that substitute for air has been developed not only to a marketable state, but to an almost perfect one. In fact, Airease fills all the requirements of the perfect tire filler.

The AIREASERS demonstrating the joys of care-free motoring

CAN IT BE THAT THERE IS A MAN IN THE WORLD who would insist on using compressed air in his tires if he were sure that a perfect tire filler could be quickly put in them which would give all the resiliency of air and last for many years?

A PORTRAIT OF THE INVENTOR

All-Year-Around Service

TO GET full value from your motor car you should select one which is suitable for all - the - year - round service.

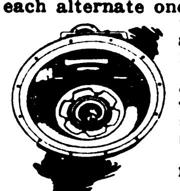
Abbott-Detroit automobiles are.

In the first place, they are driven by powerful Continental motors which have sufficient reserve power to meet all emergencies.

Each unit conveying the power from the flywheel to the wheels is an equally efficient mechanical device. Practically no power is lost.

THE CLUTCH

The clutch which is of dry, multiple disc type is composed of 17 steel discs, each alternate one faced with a combination of copper wire mesh and asbestos which will not burn.



Interior of Fly-wheel Case Showing Multiple Disc Clutch.

When this clutch is operated, there is a total absence of all gripping, jarring and jumping, the motor taking hold gradually but firmly.

Owing to the large amount of friction surface, this clutch is most efficient and may be slipped without harm or excessive wear.

Those who have driven cars, through heavy mud and winter snows, know how valuable is this ability.

Another thing, in the cone clutch, the revolving part attached to the transmission is so large and heavy that the inertia of such a mass of metal tends to keep the clutch in motion and renders it almost impossible to shift the gears readily; without producing that clashing and rasping noise so disagreeable to the occupant of the car and others nearby.

Transmission and Clutch Unit with Inspection Covers off.

In the multiple disc clutch, however, this inertia is reduced to a minimum and the gears may be shifted while the speed of the car is being reduced or accelerated, without the attendant disagreeable and deteriorating effects.

It wears very little and seldom requires adjustment.

Abbott-Detroit advertising for 1913 is being printed in serial form. This is the sixth of the series. The seventh will appear in Saturday Evening Post January 18, 1913, Collier's Weekly January 11, Life January 9, Literary Digest January 4. Copies of previous advertisements sent on request.

THE TRANSMISSION

The transmission, which is of the three-speed forward and reverse sliding gear type, is situated just behind the clutch and its case is bolted direct to the engine crank case, so that the whole power plant forms one unit.

The main shaft and countershaft gears, the faces of which are 1 inch in width, ¼ of an inch wider than those usually used in other cars of this class, are made of 3½ per cent. nickel steel, very accurately machined, ground and mounted upon Timken roller bearings.

The transmission and clutch case is oil and dust-proof and the gears and shafts run in a specially prepared lubricating compound.

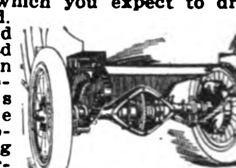
If desired, the interior of the transmission case may be easily inspected, by the removal of the top cover plate.

The Abbot-Detroit transmission is one of the most compact and efficient change speed gears that has ever been placed in a motor car.

It has been built for severe service and for that reason will be found to be particularly adapted for hard winter use, when, on account of the changing character of the road it is necessary to shift gears often.

OTHER DETAILS

Some other things should be mentioned as important for your consideration when buying a car which you expect to drive the year round.



Rear Axle with Cover removed from Bevel Gear case. Note also Underslung ¾ Elliptic Scroll Springs.

There should be ample road clearance, an absence of projecting parts below the frame, a protected steering gear, wide flaring fenders, snugly fitted to the body so that no water or slush can get through, provision for entirely enclosing all moving parts including brakes, well-finished and upholstered bodies, close fitting wind shields and tops equipped with Jiffy Curtains, well fitted doors of clean cut design, free from places in which mud and slush can collect.

Abbott-Detroit cars are admirably suited to give all-the-year-round service.

Remember—Electric Self-Starter
Electric Lighting
Standard Equipment
on all Models

"The demand of the day is that an organization shall be judged by its product and not by what is claimed for itself."

This is our slogan. Apply it when inspecting the 1913 Abbott-Detroit Cars.

Models and Prices

34-40	Fore-door Roadster, 116-inch wheel base	$1700
34-40	5-Passenger, Fore-Door Touring Car, 116-inch wheel base	$1700
44-50	5-Passenger, Fore-Door Demi-Tonneau, 121-inch wheel base	$1975
44-50	7-Passenger, Fore-Door Touring Car, 121-inch wheel base	$2000
44-50	Battleship Roadster, 121-inch wheel base	$2150
44-50	7-Passenger, Fore-Door Limousine, 121-inch wheel base	$[illegible]050

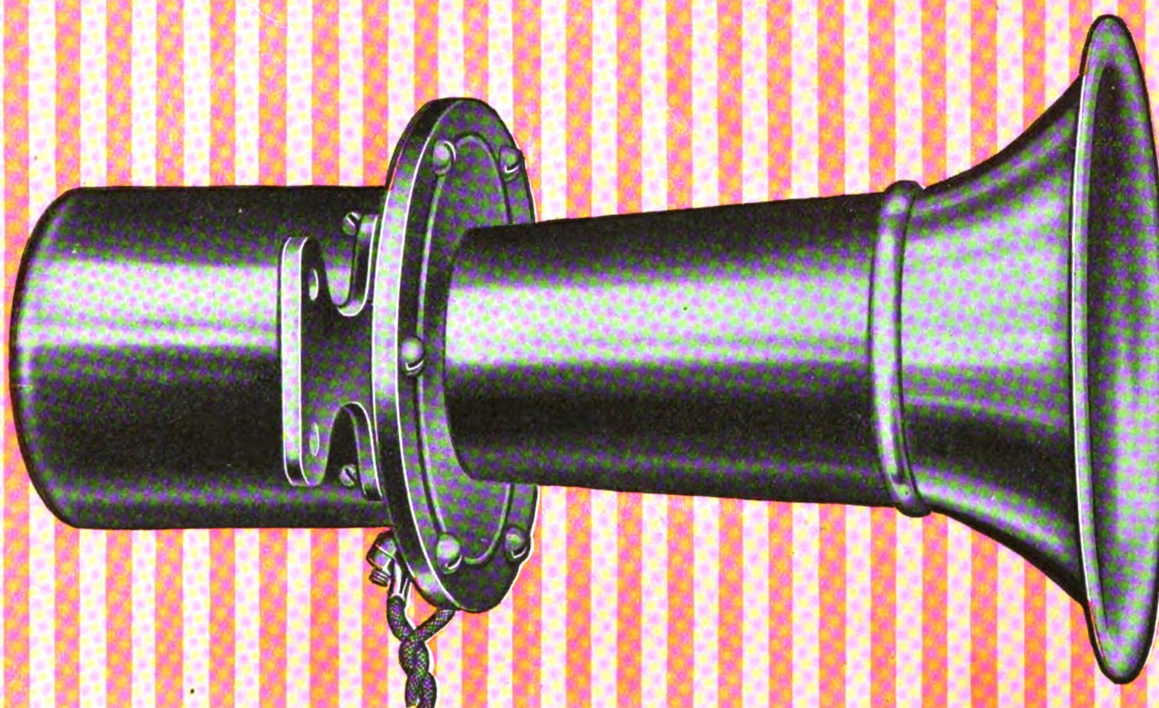
Abbott-Detroit

Built for Permanence and Guaranteed for Life

Advanced Catalog on request

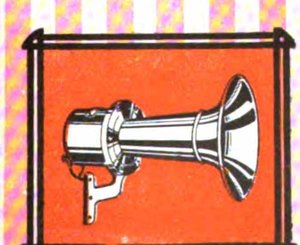
Abbott Motor Co.
604 Waterloo Street
DETROIT, MICH.

The KLAXET
Twelve Dollars



The Klaxet is slightly smaller than the Klaxonet; operating on exactly the same principle. It possesses the true Klaxon warning note: loud, abrupt, danger-expressing; and it is sold under the regular Klaxon guarantee.

Finished in brass, nickel, black enamel, gun metal, black enamel and brass (as shown above), black enamel and nickel. Each instrument is supplied with push-button matching the finish of the instrument itself, and ten feet of double insulated wire.

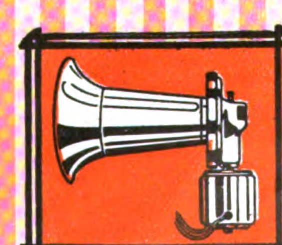


KLAXONET

Lovell-McConnell Mfg. Company Newark, N.J., U.S.A.

KLAXON

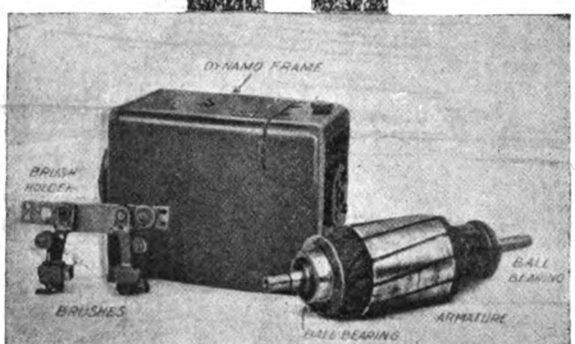
"The Public Safety Signal"



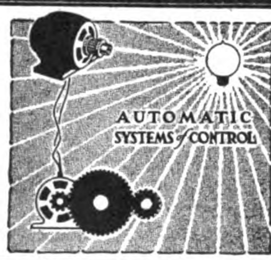
KLAXON

The Ward Leonard System for Lighting and Starting

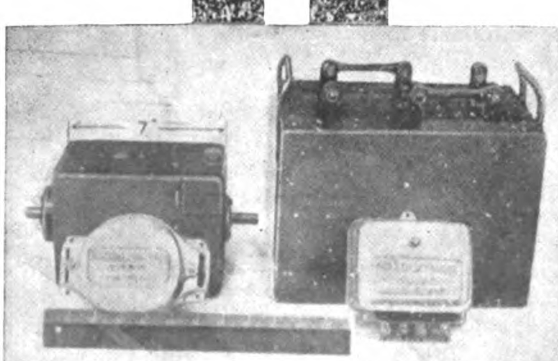
Every Trial a Triumph



· WARD LEONARD ·



· Lighting - Starting ·



Every trial of a Ward Leonard System means triumph for its designers and satisfaction for its users.

Every user—every dealer—every manufacturer realizes the need of an efficient lighting and starting system.

But each one of them wants the ultimate system, and the ultimate system will be that one which is theoretically, scientifically and practically correct.

There must be no complications, no unnecessary parts, nothing to get out of order.

The system that will answer these requirements is the Ward Leonard System.

Time and exhaustive experiments through twenty years of electrical experience have shown that the Ward Leonard System is perfect.

We realized years ago that the value of an electric lighting and starting system to the automobile manufacturer lay in the perfection of its automatic control. Our perfection of this feature stamps the Ward Leonard System as the ultimate choice of engineers.

WARD LEONARD ELECTRIC CO.
BRONXVILLE N. Y.

· WARD LEONARD ·

106

Christmas

Clement C. Moore
James Whitcomb Riley
F. Hopkinson Smith

Henry Van Dyke
Eugene Field

Probably more grown men and women can repeat to-day: "'Twas the Night Before Christmas" than can remember any other poem of equal length in the language. They may have forgotten the name of the author, Clement C. Moore, but they can reel off the beginning glibly enough:

'Twas the night before Christmas and
all through the house
Not a creature was stirring, not even
a mouse;
The stockings were hung by the chimney
with care
In hopes that St. Nicholas soon would
be there;
The children were nestled all snug in
their beds,
While visions of sugar plums danced in
their heads.

And how these elocutionary lights, as well as the rest of us who are not vocally inclined, have revelled in Eugene Field's delicious "Jes' 'Fore Christmas."

"Father calls me William, sister calls
me Will,
Mother calls me Willi—the fellers call
me Bill!
• • • • • • • •
Most all the time the hull year round
there ain't no flies on me,
But jes' 'fore Christmas I'm as good as
I kin be!

And the pious smugness with which this interesting imp concludes is unctuous joy to the soul of the reader:

But Christmas, with its lots and lots uv
candies, cakes and toys,
Wuz made, they say, fur proper kids
and not fur naughty boys!
So wash yer face an' bresh yer hair an'
mind your p's and q's,
An' don't bust out yer pantaloons an'
don't wear out yer shoes.
Say "yessum" to the ladies an' "yessir"
to the men,
An' when they's company don't pass yer
plate fur pie again;
But, thinkin' uv the things you'd like to
see upon that tree,
Jes' 'fore Christmas be as good as you
kin be!"

"They's a kind o' feel in the air to me
When the Chris'mas time sets in
That's about as much of a mystery
As ever I've run ag'in.

Is it the bleat o' the whistle and beat
O' the little toy drums and blare
A' the horn? No! No! It is jest the
sweet—
The sad-sweet feel in the air!"
James Whitcomb Riley.

"Hang up the baby's stocking;
Be sure you don't forget;
The dear little dimpled darling,
She ne'er saw Christmas yet."

Henry Van Dyke preaches another pretty good sermon in "The Spirit of Christmas," which was published seven years ago. He says there is something better than keeping Christmas Day, "and that is keeping Christmas. Are you willing to forget what you have done for other people and to remember what other people have done for you; to ignore what the world owes you, and to think what you owe the world, to put your rights in the background, your duties in the middle distance and your chance to do a little more than your duty in the foreground; to see that your fellowmen are just as real as you are, and try to look behind their faces to their hearts, hungry for joy; to own that probably the only good reason for your existence is not what you are going to get out of life, but what you are going to give to life to close your book of complaints against the management of the universe, and look around you for a place where you can sow a few seeds of happiness—are you willing to do these things even for a day? Then you can keep Christmas.

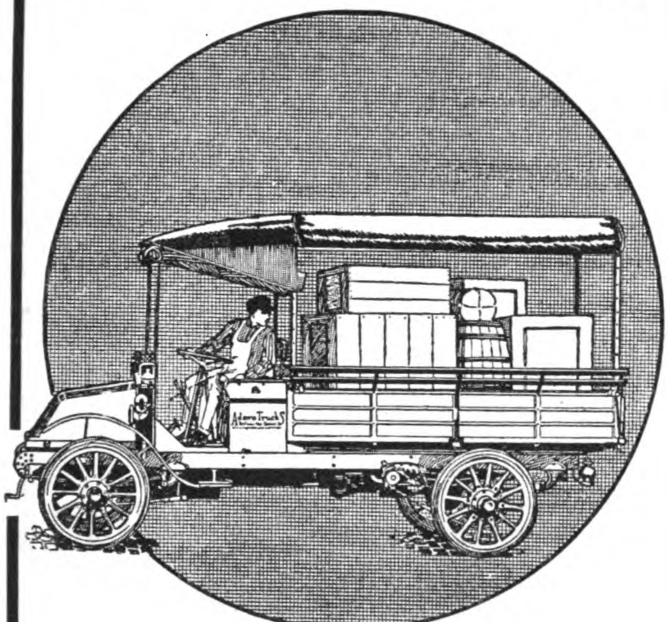
"Are you willing to stoop down and consider the needs and desires of little children; to remember the weakness and loneliness of people who are growing old; to stop asking who much your friends love you, and ask yourself whether you love them enough; to bear in mind the things that other people have to bear in their hearts; to try to understand what those who live in the same house with you really want, without waiting for them to tell you; to trim your lamp so that it will give more light and less smoke, and to carry it in front so that your shadow will fall behind you; to make a grave for your ugly thoughts and a garden for your kindly feelings, with the gate open—are you willing to do these things even for a day? Then you can keep Christmas.

"Are you willing to believe that love is the strongest thing in the world—stronger than hate, stronger than evil, stronger than death—and that the blessed life which began in Bethlehem nineteen hundred years ago is the image and brightness of the Eternal love? Then you can keep Christmas. And if you can keep it for a day, why not always?"

"And so, as Tiny Tim observed, God Bless Us, Every One!"

Says Longfellow:
"I heard the bells on Christmas Day
Their old familiar corals play.
And wild and sweet
The words repeat
Of peace on earth, good will to men!"

Adams Trucks
"Deliver the Goods"



Adams Trucks are Used in 85 Different Lines of Trade

Repeat orders from many large truck users, who have been operating from 2 to 25 trucks of different makes, demonstrate the superiority of the Adams

One owner of a number of trucks writes: "In answer to your inquiry of the 11th inst. regarding Adams Trucks, I am pleased to say it has proven the best of the bunch—I have eight. I don't know of any truck at any price that can beat it."

A New Orleans manufacturer using several other makes of trucks but who, several months ago, installed an Adams, writes: "We have finally found a truck to answer all our requirements."

Another writes: "We have had quite some experience with motor delivery cars, the Adams being our third, and we very gladly say that the Adams is the best, most reliable and cheapest to operate of any we have ever owned."

If you are not posted, why not write us direct and get acquainted with the Adams. "It Delivers the Goods."

We will exhibit at the National Commercial Car Show, Chicago, February 10th to 15th, and we invite all Merchants, Manufacturers and Dealers to inspect this line of trucks.

THE ADAMS BROS. CO.
FINLAY, OHIO

First American Truck Manufacturers to Use the French Type Hood. (Radiator rear of the Motor)

TRADE K-W MARK

Electric Head Light Outfit
$35.00

Complete Outfit; Generator, headlamps, switch, wire and bulbs.

Easy to install on any car with exposed fly wheel.

No storage battery required.

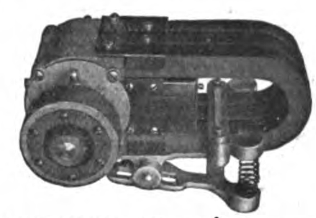
No complicated cut-out nor charging device.

CURRENT DIRECT FROM SELF-REGULATING ALTERNATING CURRENT GENERATOR.

Weight only 18 pounds. Compare this with the heavy, complicated and costly charging outfits.

MORE LIGHT AND BETTER LIGHT.

Let us describe it fully.



Model LS, $20.00. Complete Lamps, $15.00

The Lighting Special Generator

The new Model LS has one magnet less than our regular Model UL $35.00 Magneto, and is just like it in every way except that the Model LS is slightly smaller. Mode! LS will light two 2½-Ampere bulbs (two sixteen candle power bulbs). It embodies the well-known K-W construction, having no commutator, no brushes, and no sliding contacts, the only moving part being the rotor, which swings perfectly free, supported on high duty ball bearings.

FOR IGNITION. This Generator can be used in place of batteries for ignition if you have timer and spark coil.

We make a complete line of ignition apparatus including The K-W Master Vibrator and the famous K-W High Tension Magnetos—the strongest on earth. Don't simply ask for Catalogue—Tell us your troubles and we will help you.

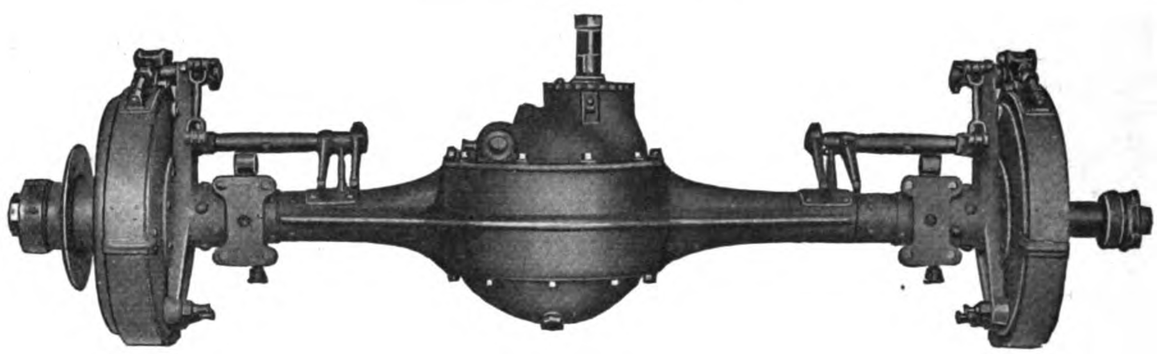
WE PAY THE EXPRESS East of the Mississippi River or to the Mississippi on points beyond, on any of our goods, when cash accompanies the order.

THE K-W IGNITION Co.
2833 Chester Ave.
CLEVELAND, OHIO. U.S.A.

American American

American Axles

Won't Rob Your Electric's Battery



The less current demanded to turn over your axles, the more power you have for mileage.

No electric car buyer can ignore that great truth, simply stated.

American Axles have proved that they conserve and transmit the maximum of power that any battery can give.

Ample evidence for you lies in the fact that American Axles are actually in use on 80 per cent. of the electrics in this country.

The option of Bevel Drive or Lanchester-Daimler Worm Gear can be had with American Axles only.

THE AMERICAN BALL BEARING CO.

Edgewater Park and L. S. & M. S. Ry.

American

CLEVELAND, OHIO

The Atwater Kent Ignition System

is not only distinctive from other ignition equipment in name, but it is **advantageously different** from all others in many respects.

Other ignition equipment have the distinction **without** the **difference.**

The Atwater Kent System is **different** in embodying the best features of both magneto and battery. In fact, it gives magneto results with a battery system, without the weaknesses of either, at less than one-half the cost of a good magneto.

It is ideal for use in connection with lighting and starting equipment as it produces a hot dynamic spark, perfectly timed, regardless of the engine speed.

Just a few of the many good features of the Atwater Kent System are—

Its simplicity of mechanism—no vibrators, relays or commutator—just one contact point regardless of the number of cylinders and only three moving parts, none of which are subject to excessive wear.

Its single adjustment easily and quickly made and seldom requiring attention.

Its adaptability and easy installation on any standard make of motor, new or old.

There are now two types of Atwater Kent Ignition equipment—standard Type F and the new Type K, the latter having the automatic spark control, and insulated primary circuit features.

PRICES OF THE TYPE F SYSTEM

	Standard Coil	Kick Switch Coil
1-cylinder	$17.00	.....
2-cylinder opposed	18.00	.....
2- " distributor type,	22.00	$24.00
3- " " "	25.00	27.00
4- " " "	25.00	27.00
6- " " "	27.00	29.00

PRICES OF THE TYPE K SYSTEM

	Standard Coil	Kick Switch Coil
2-cylinder	$32.00	$35.00
3- "	35.00	38.00
4- "	35.00	38.00
6- "	37.00	40.00

In substituting the Atwater Kent System for the magneto, or for driving it from any horizontal shaft or gear, we furnish a special magneto gear mounting, the additional price of which is $5.00.

Perhaps your present car needs only an Atwater Kent—"the different" system of ignition to enable it to give you perfect service. Anyhow you should have a copy of our Booklet B—it's interesting and it's free.

ATWATER KENT MFG. WORKS

4938 Stenton Ave. Philadelphia, Pa.


NATIONAL
AUTOMOBILE
SHOW
In Two Buildings
For Two Weeks
Grand
Central
Palace
Lexington
Avenue
46th-47th St
Madison Square Garden
Madison Ave, 26th-27th St
January 11 to 18
Pleasure Cars
(Gasoline and Electric)
Motorcycles
Parts and Accessories
January 20 to 25
Commercial Cars
(Gasoline and Electric)
Parts and Accessories
One Admission To Both Buildings

Enjoy the Day

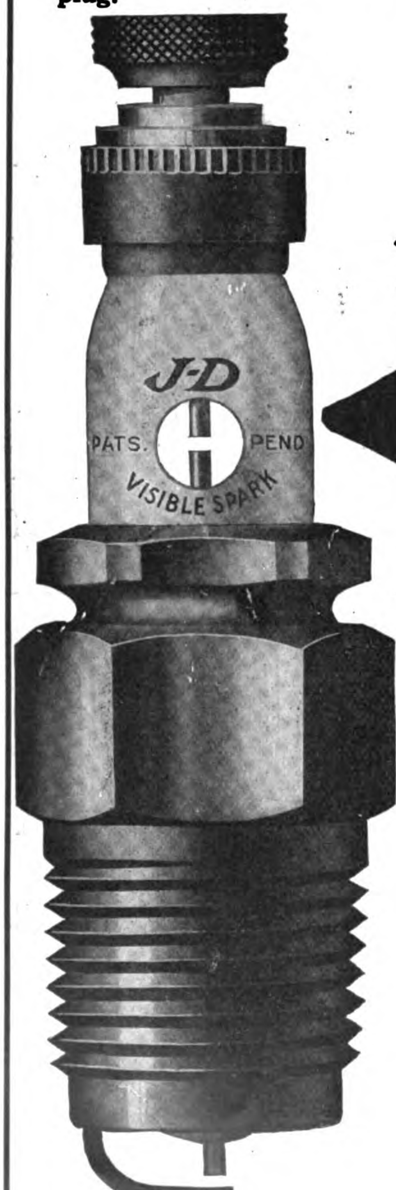
in a car
mounted on
HESS-BRIGHT BALL BEARINGS

The Hess-Bright Manufacturing Company, Philadelphia, Pa.

One Look Tells Everything

The J-D (JEFFERY-DEWITT CO. DETROIT, MICH.) Visible Spark Plug lays bare all ignition troubles

The "visible gap" is an open "window" giving you a full view of the internal workings of your spark plug.



If the spark is seen jumping the gap, look for your trouble between the gap and sparking point.

If there is no spark in the gap, your trouble is behind the plug—in magneto, or batteries, or coil, or wiring.

But for the "visible gap" it would take you many precious minutes—often hours—to locate the seat of trouble.

$1.00 Buys this great new Spark Plug

- Indicates in which direction trouble lies.
- Facilitates timing of engine.
- Intensifies spark in cylinders.
- Consumes only minimum current.
- Gap adjustable—can be closed entirely.
- By widening gap plug cleans itself.
- Permits regulating spark for any cylinder.
- Costs same as any good plug—$1.00.

Dealers will find J. D. Visible in greatest demand

Visible Idea Worked Out Perfectly for the First Time

The "visible gap" feature, so far as being incorporated in a plug, has always seemed as far away as perpetual motion. The visible feature has been marketed in a separate device for years, but this is the only plug embodying the visible feature in a practical manner.

It is simple. Merely a hole in the porcelain and a spiral action to regulate length of the gap in the central electrode which carries the current.

The hole in no way lessens the strength of the plug, and the current in jumping the "visible gap" loses none of its efficiency. On the other hand it intensifies the spark at the gap in the cylinder.

Additional prestige is lent the J. D. Visible Spark Plug by the fact that it is being introduced by the largest manufacturers of spark plugs in the world. We are exclusively manufacturers of spark plugs; we make millions of them each year.

The J. D. Spark Plug was a famous plug before it was improved by the visible feature. It combines finest workmanship, best materials and simplest designs.

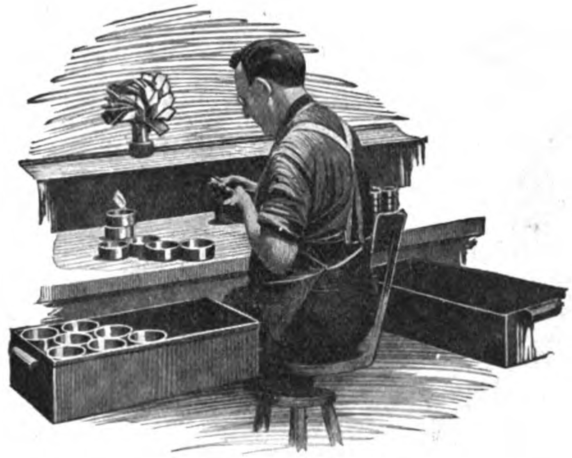
Every part of this plug is made in our factory—even the porcelain being produced in our own potteries from clays and other ingredients imported from Europe.

This unequivocal guarantee goes with all our spark plugs:

"Your money back or a new plug if you are not satisfied"

If your dealer hasn't the J. D. Visible yet, send your money direct to us for a set SPECIFYING SIZE WANTED OR MAKE OF MOTOR, and we will ship them postpaid. Remember, the J. D. Visible Plug is only $1.00. Write today for our literature on ignition. It is free.

Jeffery-Dewitt Company, 552 Butler Ave., Detroit, Mich.

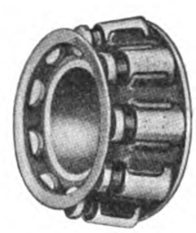


Sign of the bright red tag

¶ On the bench of each inspector is a rack full of crimson tags.

¶ Danger signals to be tied on every piece not made *exactly* to specifications; warning tags to insure that no imperfect parts shall enter the finished bearing.

Timken Tapered



Roller Bearing

¶ Here's a red-tagged 'cup' marked 'small O. D.'—date—name (Griffin) of the man who ground it. An inspector (Will Keyser) has found it to be half the thousandth part of an inch too small in outside diameter.

¶ So he tagged it red and sent it along, with other tagged parts, to the 'morgue.'

¶ 'Morgue' is the name Timken shop men give to the place where rejected parts go. It's the morgue man's task to break up those parts so they never can come, by possible chance, into use in the Timken Bearing.

¶ Twelve operations make the part called the 'cone.' Twelve inspections are given to *know* each dimension, each angle, is right. Let the slightest error occur at any step of the way—an inspector will spot it and—tie on the red tag quick!

¶ Long before such care was used, the Timken principle of tapered rollers revolving between a tapered cup and a tapered, two-ribbed cone gave a unique type of bearing that won marked success over all other kinds.

¶ In the years that have followed, Timken care *in every detail* of the making has added a hidden value that's only revealed in a life-time of good service.

The Timken Roller Bearing Company

Canton, Ohis, U. S. A.

The only axle manufacturer licensed to make automobile axles equipped with Timken Roller Bearings is the Timken-Detroit Axle Company

117


"THE • STEADY HAND"
HOFFECKER
SPEEDOMETER
The manufacturer whose reputation as the maker of a high class car depends on a wise choice of parts and equipment, selects the HOFFECKER SPEEDOMETER as the speed instrument for his latest models.
The HOFFECKER principle, and the HOFFECKER methods of construction have earned for the "Steady Hand" product, the highest place in the Speedometer World.
HOFFECKER SPEEDOMETERS are consistent performers and their quality never varies.
Catalog on request.
THE HOFFECKER CO.
Main Offices: BOSTON, MASS.
Branches—New York, Philadelphia, Pittsburg, Cleveland, San Francisco and Los Angeles

"THE JEWELED"

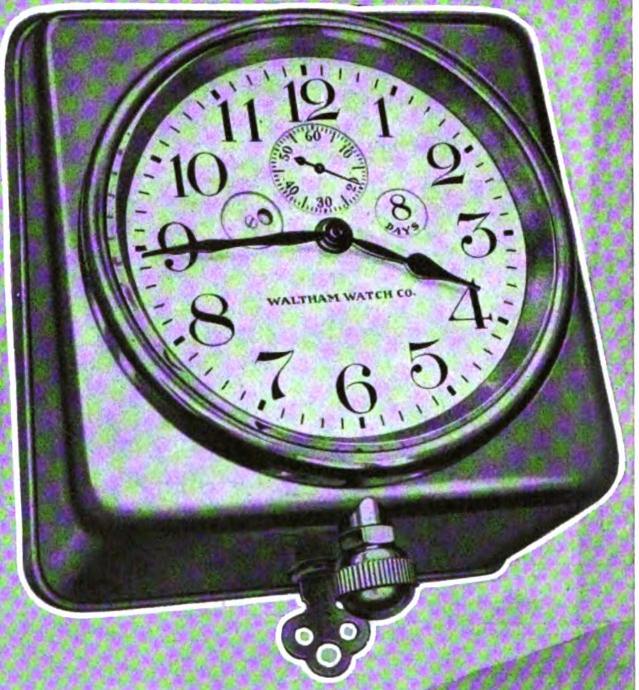
WALTHAM

TIMEPIECE

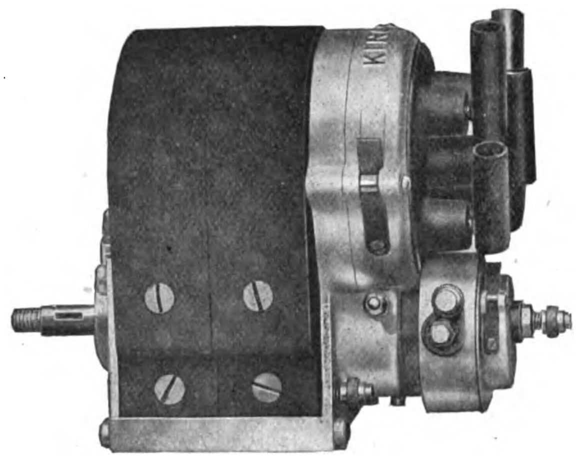
WALTHAM eight day timepieces for automobile use, are made according to WALTHAM standards, which means that they represent the highest development of watch manufacture.

It is the only timepiece made for automobiles having 15 jewels, and adjusted to temperature. The movement runs 10 days with one winding, the warning indicator signal giving notice that the movement should be wound three days in advance of its running down. It is an accurate and reliable timepiece, fully warranted. The case affords absolute protection from moisture, dust and theft.

WALTHAM WATCH CO.
WALTHAM MASS.



Batteries for Starting Are Out of Date



Model "B" Magneto

THE KINGSTON Magneto is all that is needed to start any car. It is rapidly displacing batteries which at best are only a needless complication. Discard your batteries, intsall a KINGSTON and enjoy peak-load motor satisfaction.

The Magneto That Put the Fat, Hot Spark on the Map

An important feature of the KINGSTON Magneto is the variable spark advance. Despite many attempts to eliminate this feature from the magneto, it has been found that without such advance the highest engine efficiency cannot be secured. The ignition time of the KINGSTON Magneto is not only variable to suit the speed of the engine, but is perfectly exact.

Another advantage is the armature construction which results in an effective spark being produced when turning as slowly as 50 R. P. M. This makes it easy to start on the first turn of the crank, and reduces the effort of cranking to a minimum. It also permits the engine to run unusually slow, and obviates the necessity of gearing down in city driving in order to keep the magneto up to firing speed.

Let us explain other details.

Write us your ignition troubles. We'll be glad to diagnose and prescribe for them. Our entire Engineering Department is at your service.

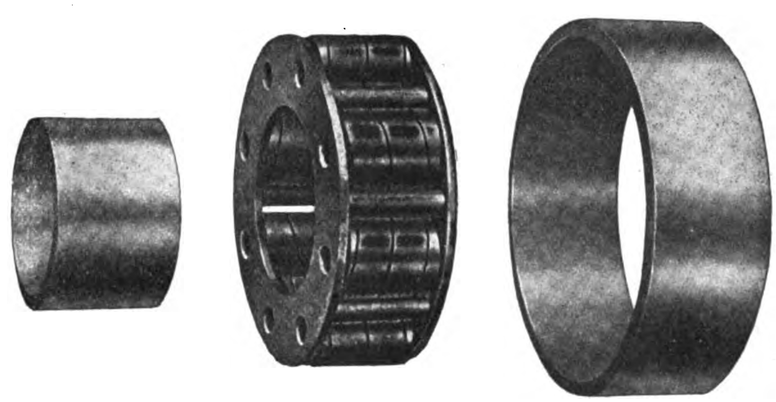
KOKOMO ELECTRIC COMPANY KOKOMO INDIANA

BRANCHES:

NEW YORK 1733 Broadway
CHICAGO, 1430 Michigan Ave.
DETROIT, 650 Woodward Ave.
LOS ANGELES, 804 S. Olive St.


KLINE KAR
THE value of an automobile both to owners and dealers lies not in the reputation of its makers, but in the real merit of the car itself. This is just the reason why the KLINE KAR means satisfaction to the user and tremendous financial return for the dealer. No greater combination of beauty, efficiency and durability has ever been turned out of any factory.
We have thousands of testimonials from satisfied users proving conclusively that KLINE KARS are built to satisfy and to stand up.
KLINE KARS have features of construction which positively stamp them as being ahead of their time. The economical transmission installed in all our models is one of the wonders of automobile engineering. It gives direct drive on third speed and means a tremendous saving of power. In addition to this, everyone of the models is equipped with enclosed valves, a complete electric lighting outfit, auxiliary rear springs, and an automatic mechanical starter.
These are some of the strong points of KLINE KAR design and equipment. Back of them stands the KLINE quality and the KLINE guarantee, which means satisfaction to users and a surplus of profit to dealers.
Our models include two, four, five, six and seven passenger bodies with four or six cylinders.
Prices $1850 to $3500.
Write for our agency proposition.
KLINE MOTOR CAR CORPORATION
YORK, PA.
RICHMOND, VA.
Model 6-50—$2850.

Hyatt Quiet Bearings

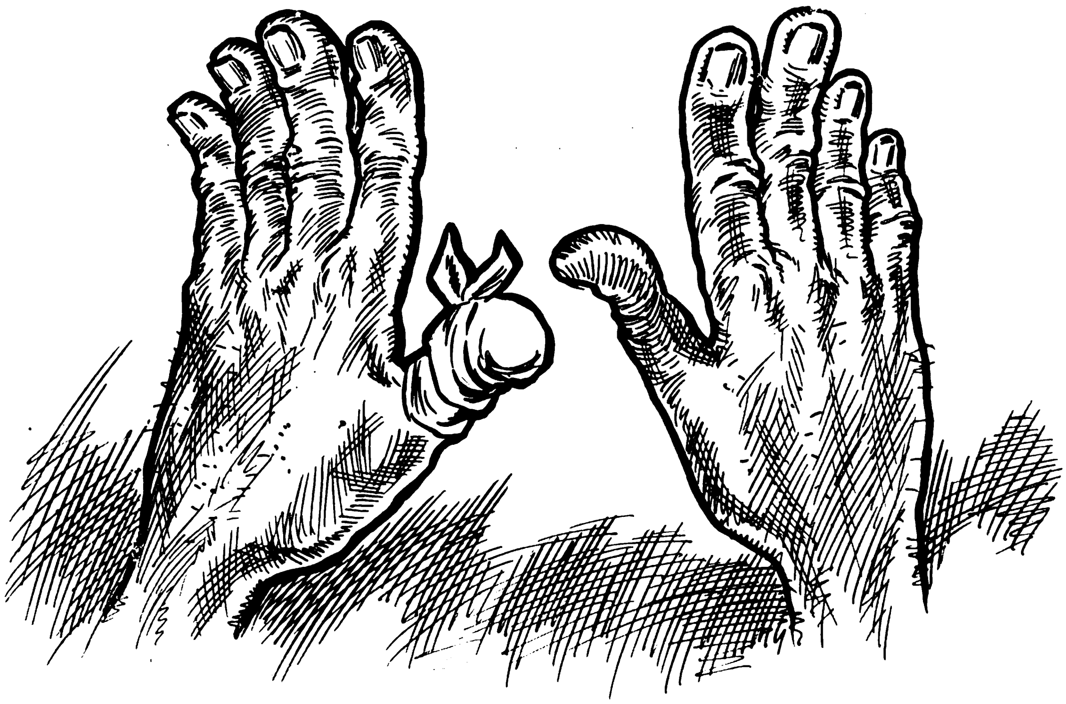


HYATT High Duty Type Bearings are best for transmissions because:—They have never failed in transmission service—Once adopted for use in transmissions, they have never been replaced by any other make; they have, in many instances, replaced other bearings—They reduce noise—They possess superior lubricating qualities found in no other bearings—Their cushioning effect relieves gears and shafts of undue strains, reducing excessive and unnecessary wear.

High efficiency, first cost, dependability,—each and all of which make bearing value, are not claimed as exclusive Hyatt features—but in practical value—the proper proportioning of all these factors and in ability to enable the Motor Car Builder to meet present conditions—the Hyatt Roller Bearing is claimed superior.

Hyatt Roller Bearing Co.

Detroit, Michigan.



JUST PAWS

Hands weren't intended for pawing around in dirt and mud. Yet that's what they must do when cranking a car in the old way. Do you like it?

LBA

STORAGE BATTERIES

with Electric Starting Outfits afford relief from cranking troubles and will also light your car. Just a push of the button to do either. But, *examine the Battery* and

BE SURE IT'S AN

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Use the Class A LBA Battery with an Electric Lighting Generator

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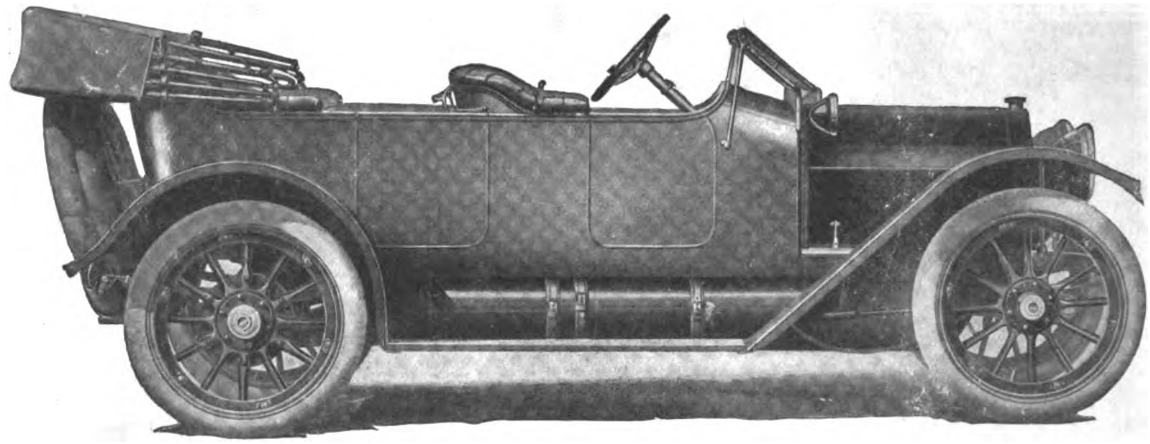

48-A — **Marion** — **$1850**

Electric Starter — Complete Equipment — Electric Lights

Electric Horn
Warner Speedometer
Plate Glass Wind Shield
Nickel Plated Trimmings
Concealed Tool Boxes
Foot Rest, Robe Rail

Dynamo Electric Lighting System
120-Hour Storage Battery
Q. D. Demountable Rims, One Extra
Mohair Top, Boot, Storm Curtains
Brewster Green or Deep Wine Color
Tire Irons, Kit, Tools, Pump, Jack

48-Horsepower
120-Inch Wheel Base
36x4-Inch Tires
Center Control
Deep Upholstering
English Steel Springs

Larger—Roomier—More Powerful

This is the Marion de luxe—a car every motorist must consider and compare. It is one of the most interesting automobiles in the 1913 series. It offers at a moderate price a big successful touring car with every item of equipment.

It has electric self starter, electric dynamo lighting system, electric horn and many features for which an additional charge is usually made. Moreover it is roomy, stylish and comfortable. It is quiet and economical.

Look at it! Where else can you get at this price its graceful lines, rich color, spacious body and dependable chassis. To obtain another car as well known and well built with its advantages would cost you much more money. The expenditure of the same amount would give a machine not the equal of the Marion 48-A.

Marion cars were good *ten years* ago; they have been better each succeeding year; they are better now than ever. The Marion Company is a firmly established and highly regarded concern. Its dealers are reputable business men.

Do not miss an opportunity to see this handsome, reliable, luxurious Marion 48-A. You'll enthuse over it, too. Ask us about its details. Get or send for a Marion book.

We offer to established automobile dealers or to business men desiring to enter the trade upon a substantial basis, the fairest sales agreement ever written. Ask about our territory.

THE MARION MOTOR CAR CO., 902 Oliver Ave., Indianapolis

J. I. HANDLEY, President